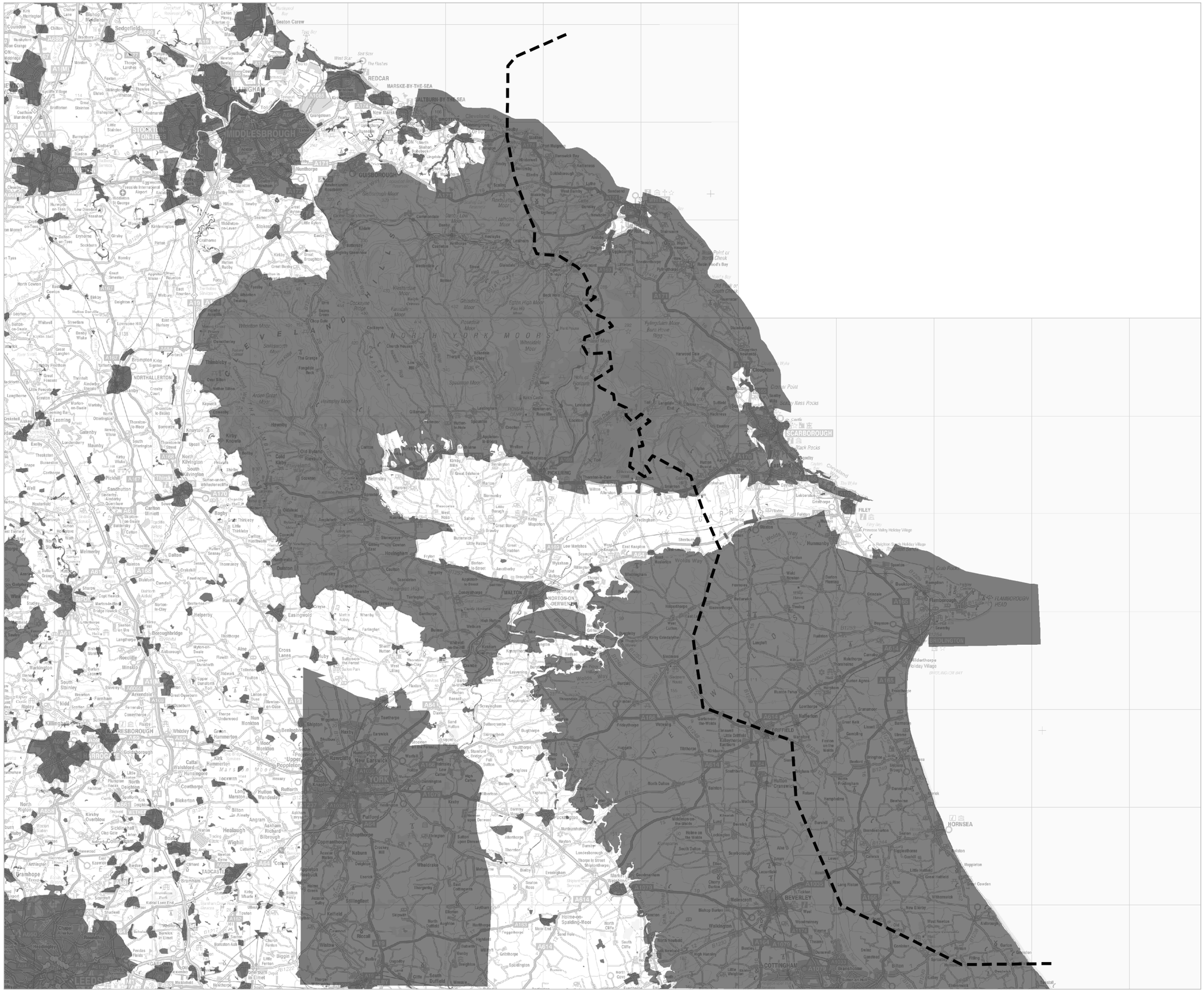


Key

Environmental Constraints

Estimated Extent of Onshore Polyhalite

Environmental Constraints

Nathaniel Lichfield & Partners
Planning. Design. Economics.

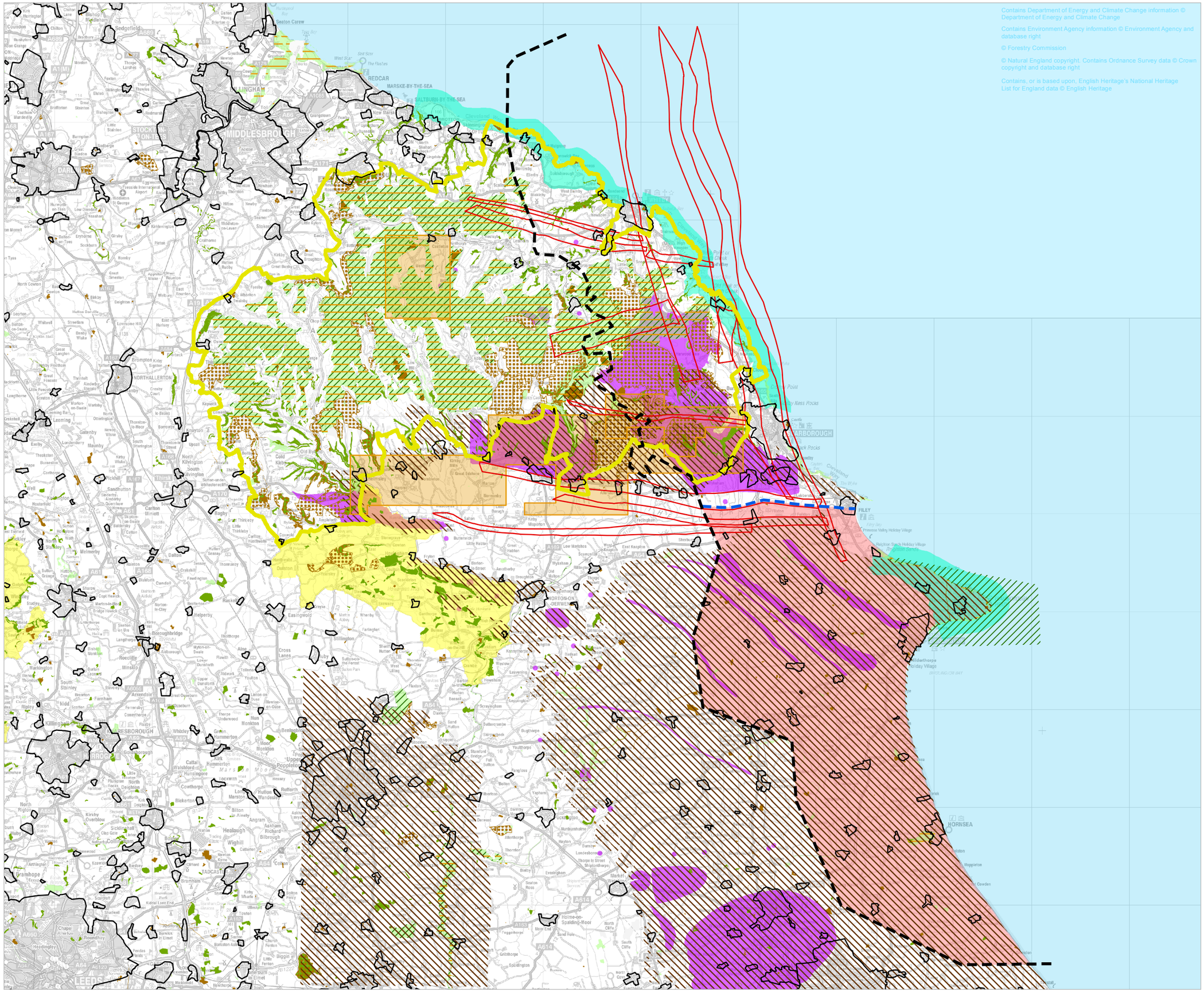
Project	Minehead Alternative Sites Assessment
Title	Stage 2: Environmental Constraints Mapping
Client	York Potash Limited
Date	10.04.2014
Scale	-
Drawn by	MAR
Drg. No	GIS50303/04-12

N

GIS Reference: S:\LE50274 - York Potash Minehead\LE50303-04 - York Potash Minehead - Environmental Constraints - Map 12 - 28.02.2014.mxd

Appendix 14

ASA Combined Mining and Environmental Constraints Mapping



Key

Constraints

North York Moors National Park

Estimated Extent of Onshore Polyhalite

Special Protection Area

Special Area of Conservation

Ancient Woodland

AONB

SSSI

Scheduled Monument

Heritage Coasts

Forestry Commission Land

Settlement Boundaries

Fault Exclusion Zone

Principal Aquifer (Bedrock)

Source Protection Zone

The North Sea

Gas Licences

Polyhalite 1800m Contour

Onshore Polyhalite at depths greater than 1800m

nlp Nathaniel Lichfield & Partners
Planning. Design. Economics.

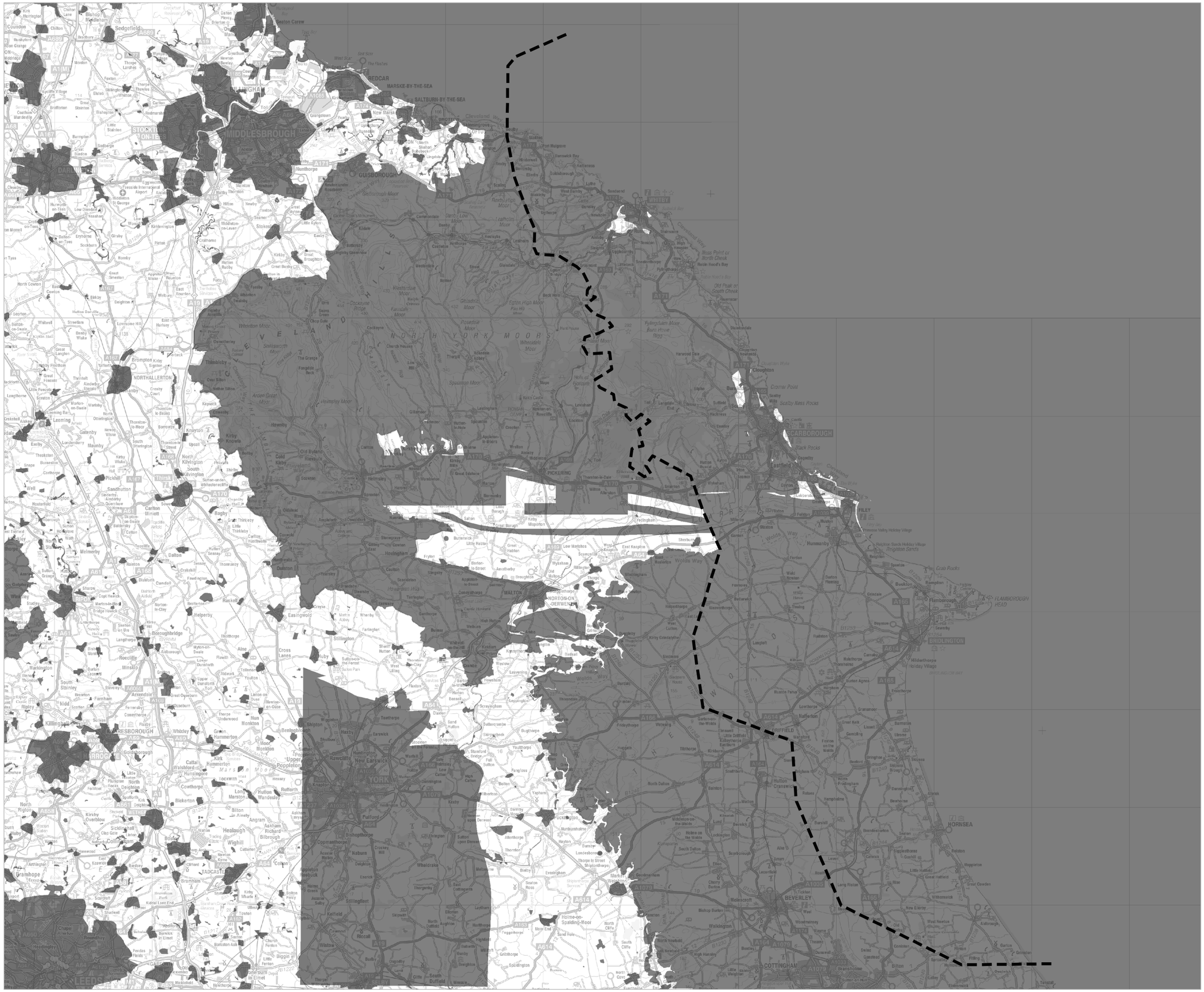
Project	Minehead Alternative Sites Assessment
Title	Stage 2: Combined Mining and Environmental Constraints Mapping
Client	York Potash Limited
Date	15.04.2014
Scale	-
Drawn by	MAR
Drg. No	GIS50303/04-17

N

GIS Reference: S:\LE50274 - York Potash Minehead\LE50303-04 - York Potash Minehead - Environmental & Mining Constraints - Map 2 - 10.04.2014.mxd

Appendix 15

ASA Combined Mining and Environmental Constraints Shadow Mapping



Key

Constraints

Estimated Extent of Onshore Polyhalite

Mining and Environmental Constraints

Nathaniel Lichfield & Partners
Planning. Design. Economics.

Project	Minehead Alternative Sites Assessment
Title	Stage 2: Combined Mining and Environmental Constraints Mapping
Client	York Potash Limited
Date	15.04.2014
Scale	-
Drawn by	MAR
Drg. No	GIS50303/04-15

N

GIS Reference: S:\LE50274 - York Potash Minehead\LE50303-04 - York Potash Minehead - Environmental & Mining Constraints - Map 1 - 08.04.2014.mxd

Appendix 16

ASA Environmental Constraints Mapping – Topography

Key

Environmental Constraints

North York Moors National Park

Estimated Extent of Onshore Polyhalite

Settlement Boundaries

Contour

Mining and Environmental Constraints

Nathaniel Lichfield & Partners
Planning. Design. Economics.

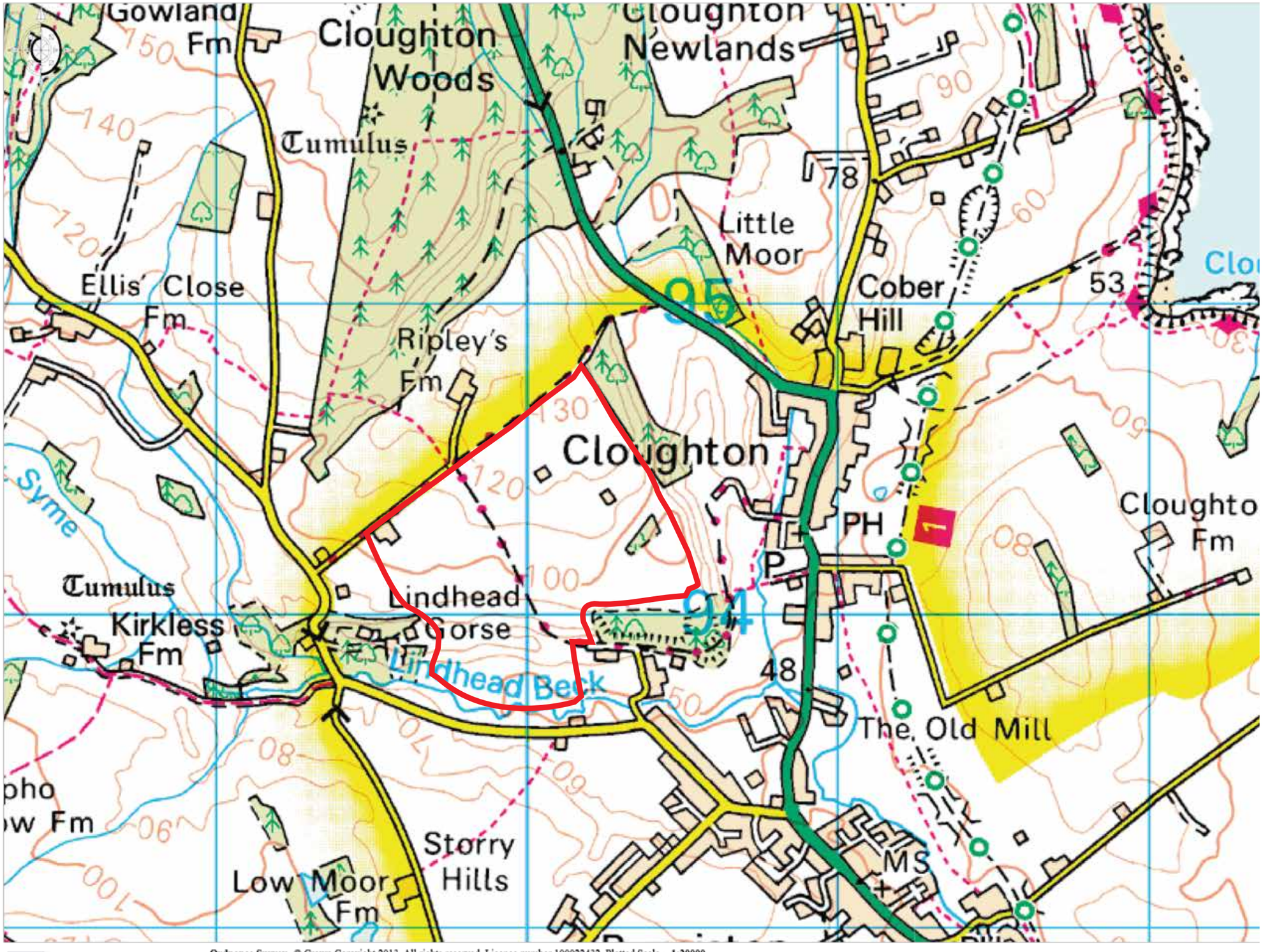
Project	Minehead Alternative Sites Assessment
Title	Stage 2: Combined Mining and Environmental Constraints Mapping & Topography
Client	York Potash Limited
Date	30.04.2014
Scale	-
Drawn by	MAR
Drg. No	GIS50303/04-19

N

GIS Reference: S:\LE50274 - York Potash Minehead\LE50303-04 - York Potash Minehead - Environmental & Mining Constraints - Map 4 - 30.04.2014.mxd

Appendix 17

ASA Short-Listed Site Boundary Plans



Promap®

KEY

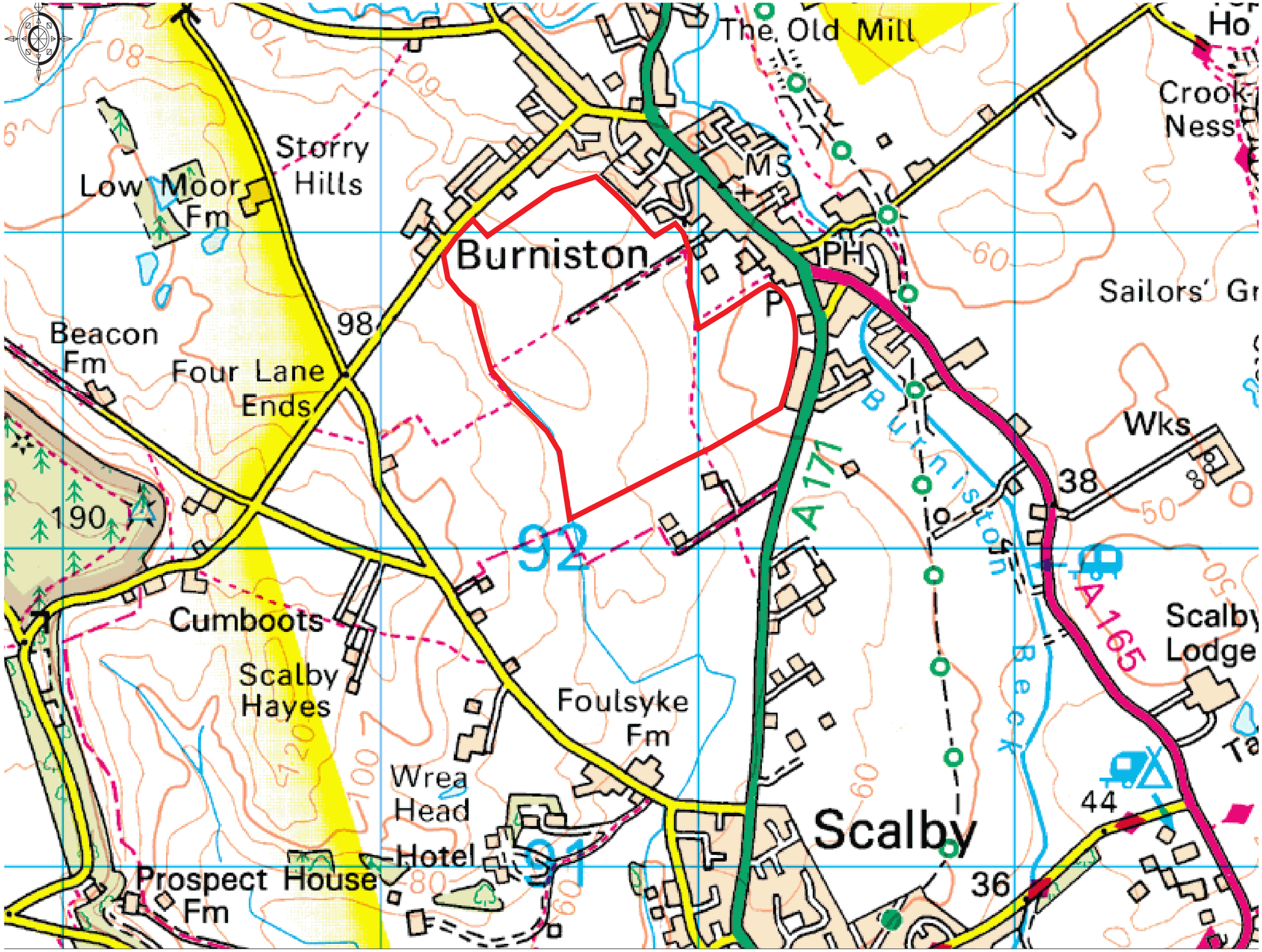
Site boundary

nlp Nathaniel Lichfield & Partners
Planning. Design. Economics.

Project	Minehead Alternative Sites Assessment
Title	**Potential Alternative Minehead Site 1 - Land at Lindhead Gorse**
Client	York Potash
Date	September 2014
Scale	
Drawn by	VM
Drg. No	IL50274-003

N

LE50274



KEY

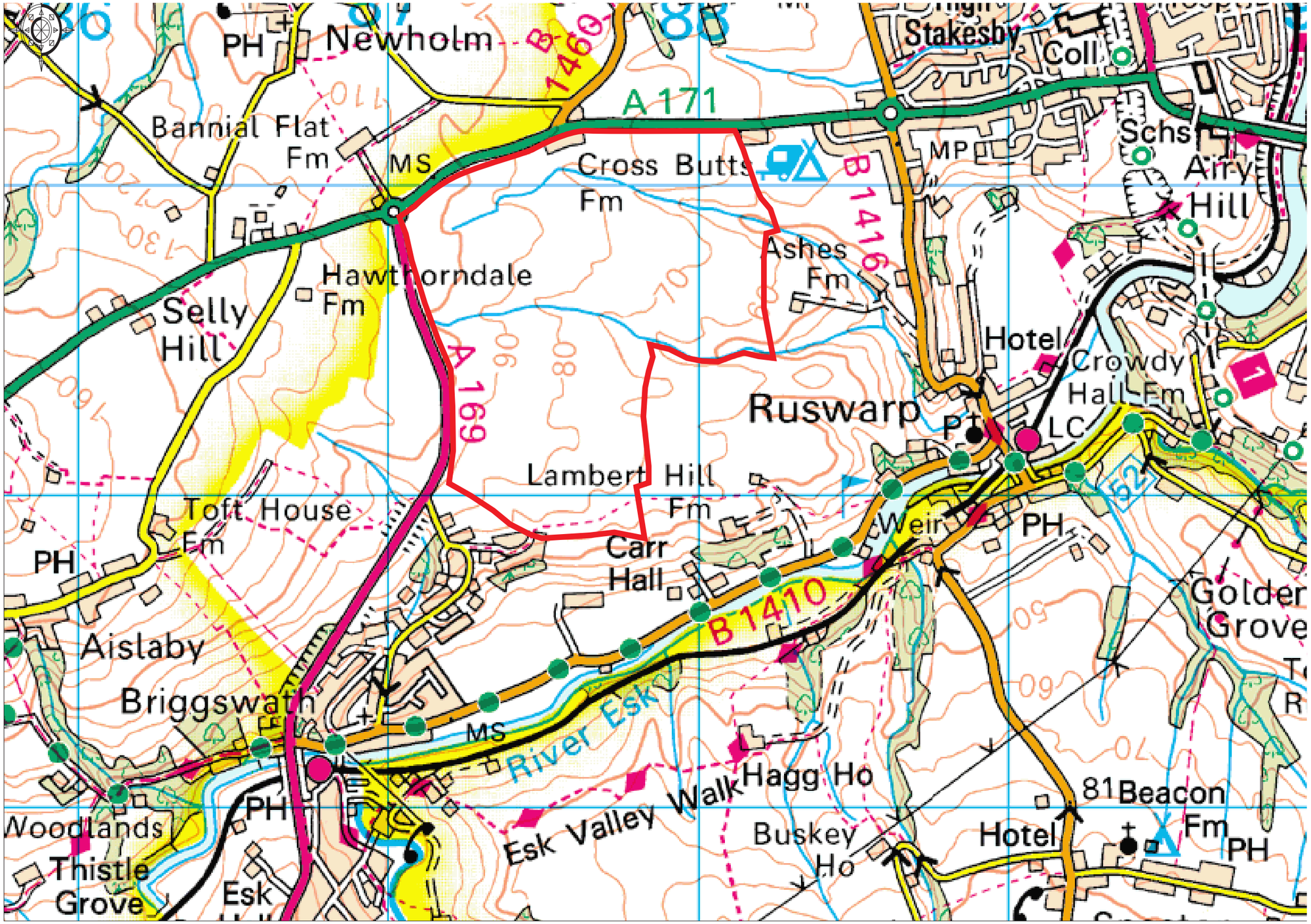
Site boundary

nlp Nathaniel Lichfield & Partners
Planning. Design. Economics.

Project	Minehead Alternative Sites Assessment
Title	**Potential Alternative Minehead Site 2 - Land at Burniston**
Client	York Potash
Date	September 2014
Scale	
Drawn by	VM
Drg. No	IL50274-004

N

LE50274



KEY

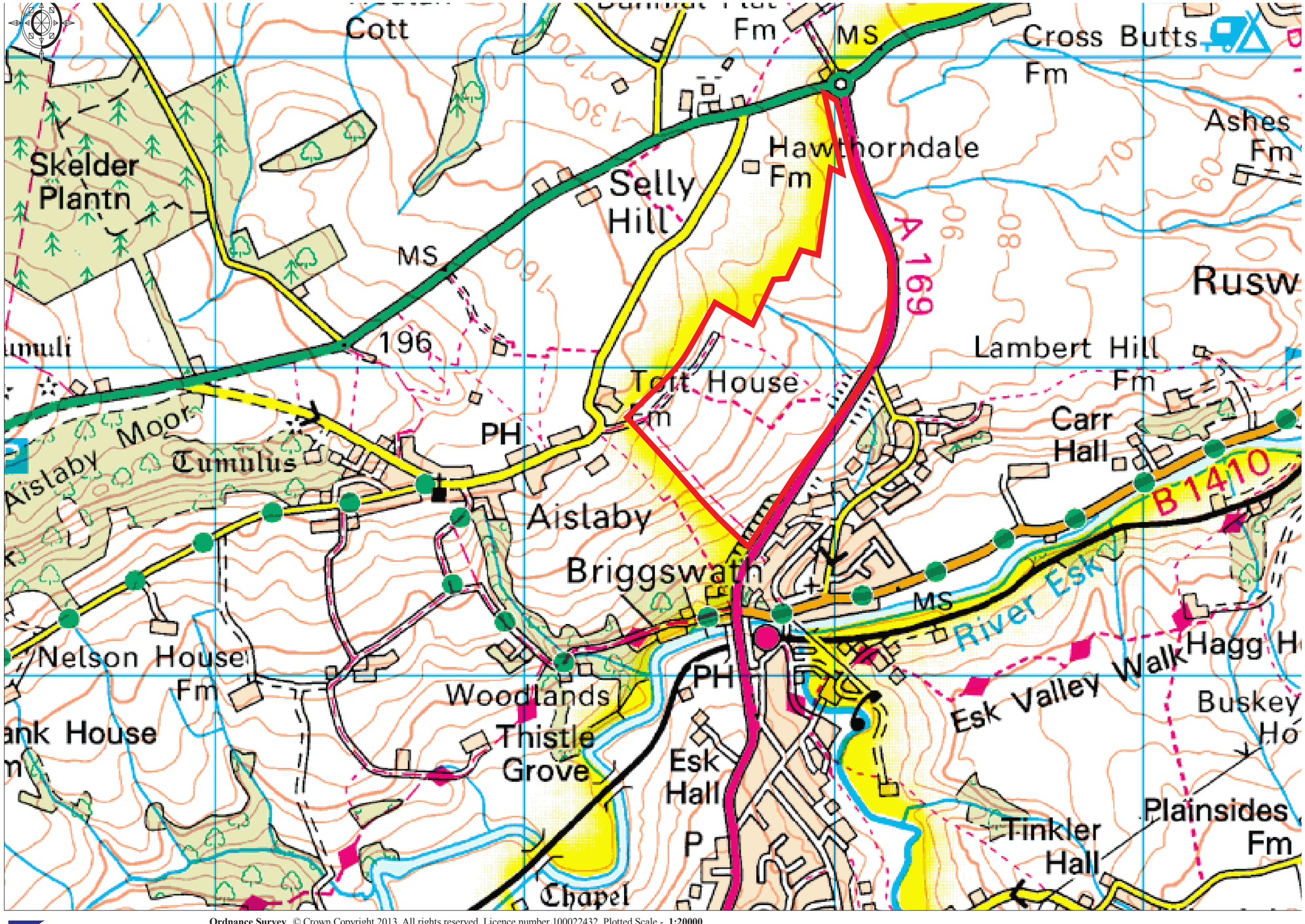
Site boundary

nlp Nathaniel Lichfield & Partners
Planning. Design. Economics.

Project	Minehead Alternative Sites Assessment
Title	**Potential Alternative Minehead Site 3 - Land at Runswarp**
Client	York Potash
Date	September 2014
Scale	
Drawn by	VM
Drg. No	IL50274-001

N

LE50274



Promap®

KEY

Site boundary

nlp Nathaniel Lichfield & Partners
Planning. Design. Economics.

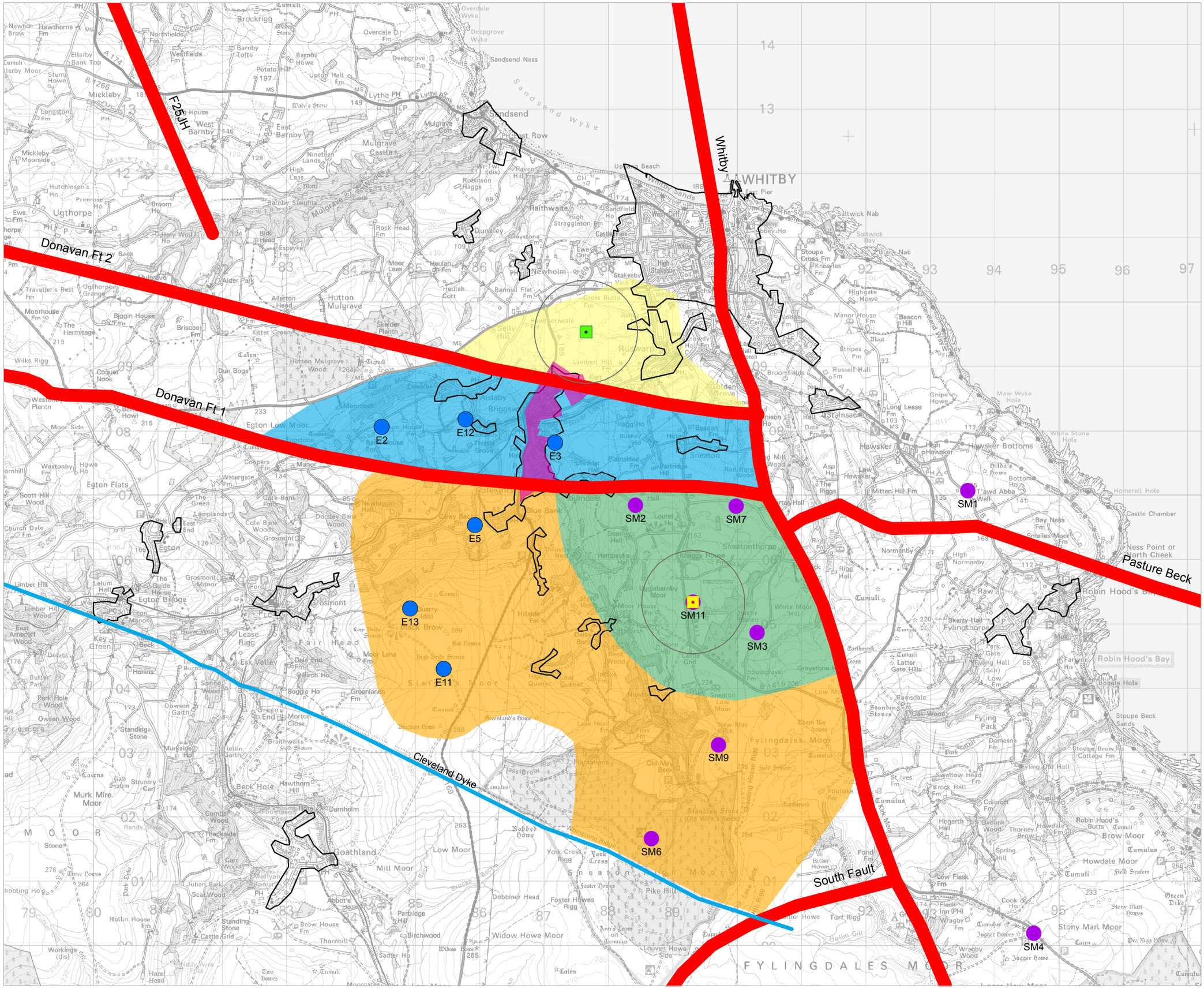
Project	Minehead Alternative Sites Assessment
Title	**Potential Alternative Minehead Site 4 - Land at Briggswath**
Client	York Potash
Date	September 2014
Scale	
Drawn by	VM
Drg. No	IL50274-002

N

LE50274

Appendix 18

Exploration Potential at Whitby Enclave



Key

- Legacy Boreholes
- YPL Boreholes
- Proposed Minehead at Dove's Nest Farm
- Proposed Minehead at Site 3 – Land at Ruswarp
- Indicative Dove's Nest Farm/Site 3 - Land at Ruswarp Shaft Pillar of Support – 800m
- Fault Exclusion Zones – 200m
- Cleveland Dyke

- Village Exclusion Zone utilised by SRK
- Dove's Nest Indicated Resource Area
- Inferred Mineral Resource Area
- Exploration Potential - Disturbed
- Exploration Potential - Undisturbed
- Settlement Boundaries

Nathaniel Lichfield & Partners
Planning. Design. Economics.

Project	Minehead Alternative Site Assessment
Title	Exploration Potential
Client	York Potash Limited
Date	15.09.2014
Scale	-
Drawn by	CS
Drg. No	GIS50303/04-20

N

GIS Reference: S:\LE50274 - York Potash Minehead\LE50303-04 - York Potash Minehead - Whitby - Exploration - 21.08.2014.mxd

Appendix 19

RHDHV Environmental Appraisal of ASA Shortlisted Sites

York Potash Project - Environmental Assessment of Shortlisted Minehead Sites

York Potash Limited

22 September 2014
Final Report rev6
PB1110

YORKPOTASH
A Sirius Minerals Project

Royal HaskoningDHV
Enhancing Society Together

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INDUSTRY, ENERGY & MINING

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Document title	York Potash Project - Environmental Assessment of Shortlisted Minehead Sites High-level Environmental Assessment
Document short title	YPL Minehead ASA (Environmental)
Status	Final Report rev6
Date	22 September 2014
Project name	York Potash Project - Minehead
Project number	PB1110
Client	York Potash Limited
Reference	PB1110/R005_rev6/303688/Lond

Drafted by	Phil Williamson	
Checked by	Dr Matthew Hunt	
Date/initials check	15.11.13……	……
Draft approved by	Dr Matthew Hunt	
Date/initials approval	15.11.13……	……
Rev6 approved by	Dr Matthew Hunt	22 September 2014

CONTENTS

1 INTRODUCTION

This technical report describes the approach taken to identify high-level environmental constraints and significant environmental risks associated with five selected areas shortlisted for the location of the minehead component of the York Potash Project (YPP). The process considers the minehead element and associated onsite infrastructure.

An important part of the Environmental Impact Assessment (EIA) process is to review the alternatives considered during the evolution of the project, and to set out why one site has been selected over other alternatives. Royal HaskoningDHV has been instructed to provide input in respect of the assessment of a short-list of potential alternative sites for minehead development identified in the Alternative Sites Assessment (ASA) being progressed by Nathaniel Lichfield and Partners (NLP). In this stage sites are appraised against a suite of environmental, economic, social and operating topics to determine their overall suitability. This technical report provides the environmental assessment.

At a high level, this report does include some consideration of potential locations for intermediate shaft sites associated with the underground Mineral Transport System (MTS) required to transport mineral away from the minehead for processing and export. However this is limited to an indication of whether construction or operational constraints would likely determine that the sites should be within the North York Moors National Park Authority (NYMNPA) boundary, or within larger areas designated at a national or international level for nature conservation. Since the site locations are not specifically identified detailed consideration of potential sites under this scenario has not been undertaken. As such consideration of air, noise, traffic and other impacts associated with the intermediate sites has not been undertaken.

In terms of shortlisted sites for the minehead development, this report considers:

- Three broad locations (Whitby Enclave, Cloughton Surrounds and Dove's Nest Farm Area); which contain
- Five alternative areas.

2 AIMS AND OBJECTIVES

The assessment of each area takes the form of a high-level, topic-based environmental constraints analysis. The minehead assessed here comprises two vertical mine shafts that will be sunk to approximately 1,520 metres below ground and two accompanying ventilation shafts that will be sunk to approximately 1,520 metres below ground. Extensive underground chambers are also proposed to accommodate various plant and machinery whilst above ground, a number of associated buildings, access, car parking and landscaping will be created.

Intermediate shaft sites associated with the MTS vary in number depending on the location of the alternative minehead site. The assessment is based on developing outline minehead designs / assumptions from April 2014.

The approach taken in this report effectively transposes the site plan devised for one site (Dove's Nest Farm) onto all shortlisted sites and considers likely environmental impacts associated with each.

The topic-based environmental reviews focus on available (online) data sources, and professional judgement. They concentrate on key receptors and likely effects, considering construction and operational phases. A brief summary assessment is provided for the following topics:

- Transport and Access;
- Noise;
- Air;
- Ecology;
- Recreation and amenity;
- Cultural heritage;
- Soils and land quality;
- Flood risk; and
- Landscape

This technical report does not consider issues related to hydrogeology (covered separately by SRK's *"An Independent Report on the Potential for Polyhalite Exploration in North Yorkshire, England With Particular Reference to the York Potash Project"* (SRK, April 2014)).

3 SITE DESCRIPTIONS AND LOCATIONS

This section provides a brief overview of the three broad locations in which the five shortlisted areas are located – two in Cloughton Surrounds, two in Whitby Enclave and one at Dove's Nest Farm. Geographical data outlining these areas were provided by YPL.

3.1 Cloughton Surrounds

The Cloughton location is approximately 6.8km to the north of Scarborough Town Centre on the A171, as shown in **Figure 3.1**.

The Cloughton location is on the boundary with the North York Moors National Park and is made up of either generally flat pasture or arable land with pockets of woodland.

The Cloughton Surrounds location contains two shortlisted areas (Areas 1 and 2), which are shown in **Plates 3.1** to **3.2** below.

Plate 3.1 Area 1 viewed from the south (image courtesy of Estell Warren Ltd)

Plate 3.2 Within Area 2 looking south to Scarborough (image courtesy of Estell Warren Ltd)

3.2 Whitby Enclave

The location known as the Whitby Enclave is located approximately 2.1km to the south-west of Whitby Town Centre and 0.8km to the north-west of Ruswarp Village centre (see **Figure 3.2**).

The Whitby Enclave falls outside the National Park boundary. However it is bordered to the north, east and south by the National Park. The area is a series of pasture fields which are bounded by the A171 to the north, the A169 to the west, the B1410 to the south and the B1416 to the west.

The area is open and elevated, lying at between 130mAOD in the western side and approximately 50mAOD towards the east and is relatively uniform in character. It contains three steeply incised minor valleys or 'cloughs', which drain to the east and south. The field boundaries are made up of hedges that are closely maintained and the field pattern is of a relatively large scale and generally regular. The cloughs are vegetated with some smaller trees. Fields towards the west are larger and arable, those to the east being predominantly grazing and smaller in size.

The Whitby Enclave location contains two shortlisted areas (Areas 4 and 5). These are shown in **Plates 3.3** and **3.4** below.

Plate 3.3 Area 3 looking east towards Whitby (image courtesy of Estell Warren Ltd)

Plate 3.4 Area 4 viewed from the southern flank of the Esk Valley (image courtesy of Estell Warren Ltd)

3.3 Dove's Nest Farm

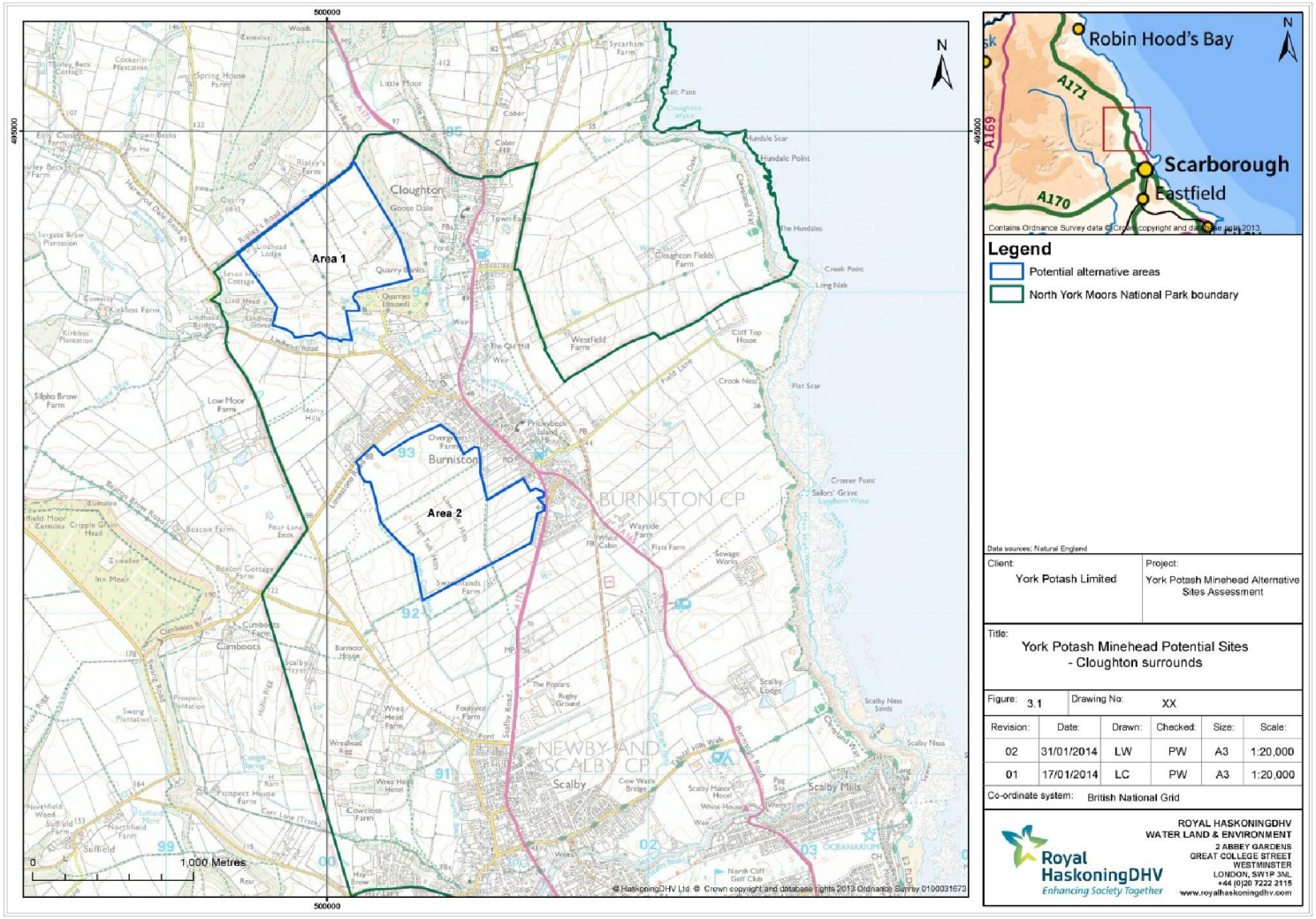
Dove's Nest Farm is located approximately 5.5km to the south of Whitby Town Centre.

Dove's Nest Farm lies within North York Moors National Park, approximately 2km south of the Whitby Enclave location. The area is a mixture of arable and pastoral fields and plantations and semi-natural woodland. It is bounded by the B1416 at its southern and western boundaries, with Haxby plantation and Whinny Wood forming the eastern boundary. The northern boundary is open with views down to Whitby in the north.

The Dove's Nest Farm contains one shortlisted area (Area 5), which is shown in **Plate 3.5** below.

Plate 3.5 Area 5 viewed from east (image courtesy of Estell Warren Ltd)

Figure 3.1 **Map of alternative areas at Cloughton Surrounds**



Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	31/01/2014	LW	PW	A3	1:20,000
01	17/01/2014	LC	PW	A3	1:20,000

Figure 3.2 **Map of alternative areas at Whitby Enclave**

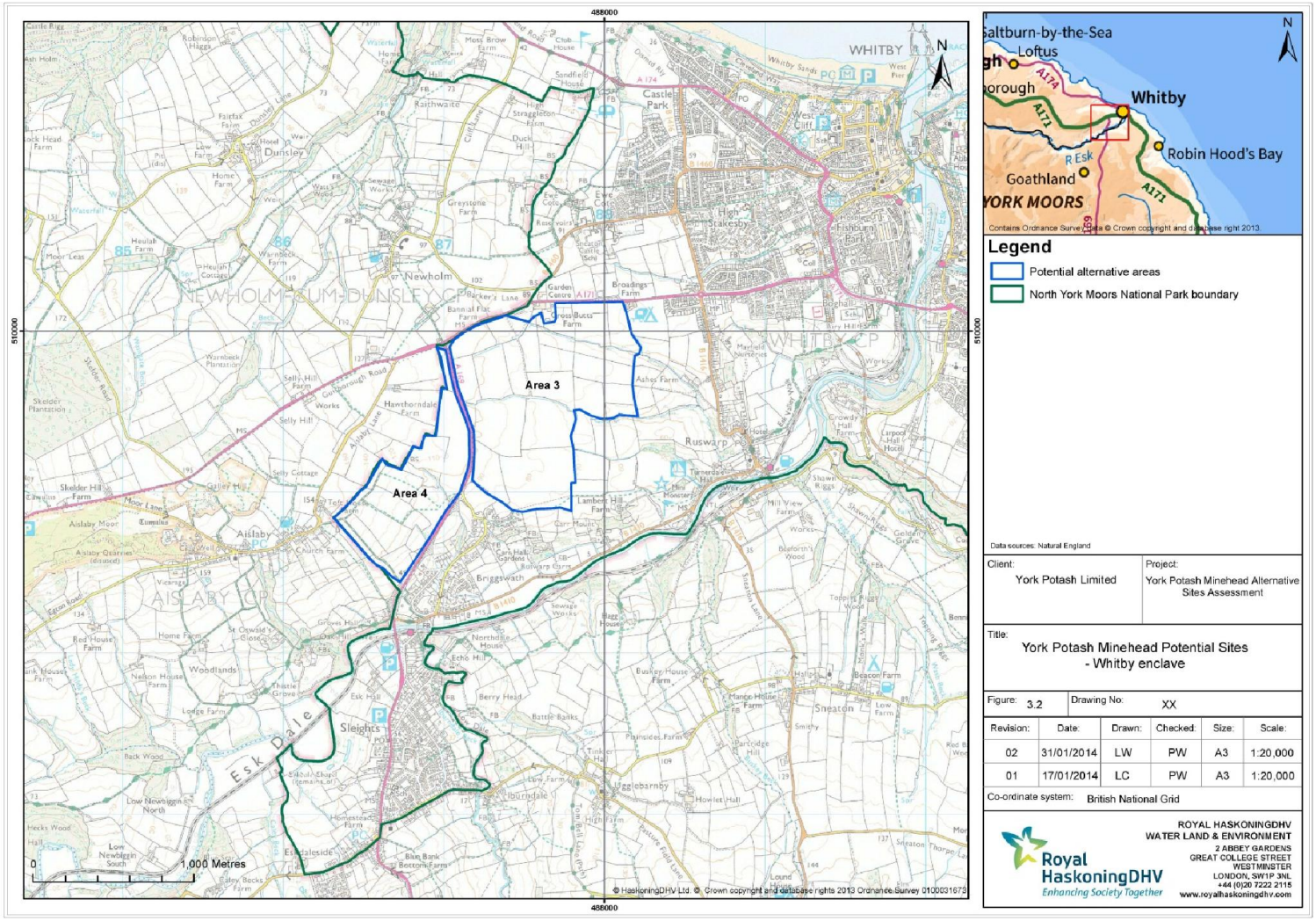
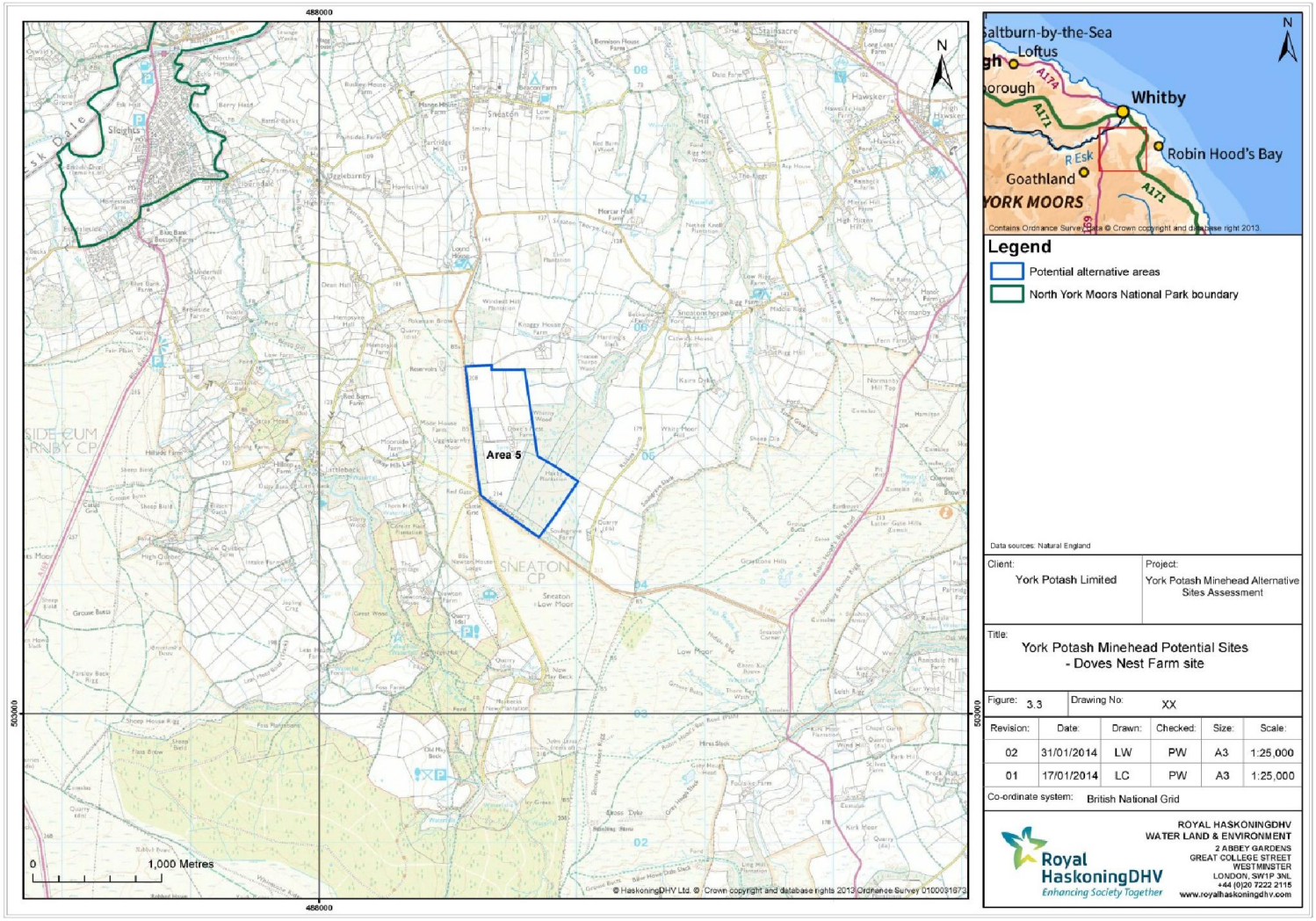


Figure 3.3 **Map of alternative area at Dove's Nest Farm**



4 METHODOLOGY

Methodologies used in this high-level environmental assessment differ between disciplines. Whilst they have generally utilised freely available information, where additional information is available it has been used and the source referenced. The level of detail in each assessment has been guided by a judgement on the potential for a topic to have a more significant impact on site selection. Consequently transport and access, noise and landscape were identified as topics requiring more detailed assessment. Methodologies are described below.

4.1 Transport and access

To assess the areas a high level review has been undertaken of the potential traffic and transport impacts at each area. The following Institute of Environmental Assessment (IEA) and Department for Transport (DfT) headings have been used to 'frame' the review:

- Severance and pedestrian amenity;
- Transport network capacity;
- Accessibility (potential for the sustainable transport of people/freight); and
- Road safety.

Traffic borne impacts upon air quality, noise and vibration are considered separately.

The assessment of traffic impacts is typically informed by an understanding of the likely increases in traffic resulting from the proposed development and the likely increases in Heavy Duty Vehicles (HDV)[1]. For the purpose of this assessment preliminary traffic calculations and comprehensive baseline data have been utilised to inform the potential traffic impact.

The construction phase traffic demand has been used as the 'worst case' since it is expected to result in a greater impact than the operational phase due to the higher vehicle demand associated with construction. Notwithstanding this, it is recognised that operational traffic will be significant for some of the headings identified and, unless explicitly stated, the potential impacts outlined will apply to both the construction and operational phases of the development.

The traffic demand for the construction phase that will inform this assessment and the minehead Transport Assessment has been derived by way of a 'first principles' approach. The 'first principles' approach generates traffic volumes from an understanding of material quantities and personnel numbers. A daily peak HDV demand of approximately 158 two-way movements and up to 645 employees has been utilised when appraising impacts.

[1] The EU established HDV as collective term for Heavy Goods Vehicles and Public Service Vehicles (Buses and Coaches) for the purpose of monitoring air quality environmental impact. This term is used in this report when traffic data is quoted.

4.2 Noise

The noise assessment to consider the potential constraints and risks associated with the shortlisted minehead locations has focussed on the impact of construction and operational phase activities on identified human (residential) receptor locations. This includes a consideration of traffic movements on the local road network (i.e. those roads which lead directly and only to the area) and on-site activities for both construction and operation.

In order to establish a high-level impact assessment of construction and operational noise at each alternative minehead location, the assumed maximum construction and operational noise emissions were entered into the SoundPLAN noise prediction modelling software and noise propagation contours generated. The SoundPLAN noise modelling software package directly implements the calculation algorithm described in International Standard (ISO) 9613. The calculation method takes account of air absorption, distance attenuation, barriers and topography, and light downwind conditions from source to receptor. A three-dimensional model was created, using topographical data of the local area, to ensure likely propagation was correct. The noise propagation contours provide a visual description of the predicted noise levels in relation to receptors in the vicinity of the noise source. The contour plans produced are provided in **Section 5**. For consistency, the geographic centre of each site – modified by topographic anomalies or access point restrictions which may preclude some locations – was used as the noise point source for the purpose of these models.

The worst-case construction and operational noise level has been established by using information provided in the assessment relating to a previous planning application for the Dove's Nest Farm site. Phase 1 construction activities were assessed as representing the worst-case noise impact.

When assessing impact, the World Health Organisation (WHO) recommends suitable standards of noise of 55dB L_{Aeq} during the daytime for outdoor living areas and 45dB L_{Aeq} outside bedroom windows at night.

At this stage the wider network routes that will be utilised by construction and operational phase vehicles (i.e. those roads that traffic may use to get to the area) are not known. Constraints associated with traffic noise impacts have therefore not been considered.

4.3 Air

The following main elements have been used to determine the receptors screened for in this high-level assessment.

- Construction and operational phase traffic movements on the local road network at identified human receptor locations and identified ecological sites;
- Construction phase dust at identified human receptor locations and identified dust sensitive ecological sites;
- Operational phase fugitive dust releases at identified human receptor locations and identified dust sensitive ecological sites;
- Non-road mobile machinery within the site on identified human receptor locations and identified ecological sites; and

- Pollutant deposition on identified ecological sites.

As noted above, since routes that will be utilised by construction phase and operational phase vehicles are not known it is not possible to identify constraints associated with traffic impacts on local air quality. Some initial observations have been provided regarding the presence of receptor locations along roads in the immediate vicinity of the site and whether these roads are located within an existing Air Quality Management Area (AQMA). AQMA data was obtained from the Department for Environment, Food and Rural Affairs (Defra) website (http://aqma.defra.gov.uk/aqma/maps.php).

4.4 Ecology

The Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk) and the Natural England website (www.naturalengland.org.uk) were reviewed for information on statutory sites and notable habitats of nature conservation value (e.g. ancient woodlands) within 2km of each of the five potential alternative minehead areas.

A search for water bodies within 250m of each area was made using Ordnance Survey (OS) maps to inform consideration of potential impacts on great crested newts. A search area of 250m was chosen having taken into account the habitats around each area and although this species can use suitable terrestrial habitat up to 500m from a breeding pond (*Great crested newt mitigation guidelines*, English Nature, 2001), more recent research suggests that newts are likely to travel no more than 250m from ponds where suitable habitats for foraging and hibernation exist (Cresswell & Whitworth, 2004).

An ecological data search was requested from North and East Yorkshire Ecological Data Centre (NEYEDC) on 15th January 2014. This provided records of protected and notable species, notable habitats and non-statutory designated sites within 2km of each of the five potential alternative areas.

In addition to considering potential effects associated with the minehead development the study also acknowledges the potential for effects to arise from development associated with the MTS. As introduced above and described below, (**Section 4.9**) broad co-ordinates were used to estimate whether intermediate access shafts would be required within statutory sites.

4.5 Recreation and amenity

The North Yorkshire County Council online mapping service (http://maps.northyorks.gov.uk/connect/?mapcfg=Out_and_About), the Sustrans National Cycle Network mapping tool (http://www.sustrans.org.uk/ncn/map) and Ordnance Survey 1:25,000 mapping were reviewed for the presence of Public Rights of Way (PRoW) within 500m of the five potential areas.

A high level search for major recreational groups active within each area was undertaken using available web resources. No consultation was undertaken to identify all relevant plans or groups that may be impacted by the siting of the shortlisted sites. Additionally, no identification of formal or informal amenity and recreation, seasonal recreational activities, events (such as festivals or one-off activities), and overall provision was undertaken for the high level assessment.

4.6 Cultural heritage

A review of the freely available online designated heritage asset datasets from the English Heritage National Record of the Historic Environment (NRHE) / National Heritage List online (http://list.english-heritage.org.uk/) was conducted in October 2013. The data was predominantly used to check for the position of known designated assets (Scheduled Monuments, Listed Buildings, Historic Parks and Gardens) against the positions of the shortlisted sites. The relevant datasets were downloaded and overlain on 1:25k OS mapping within ArcGIS, cross referenced against the area(s) under consideration.

To enable comparisons to be drawn between the five shortlisted area options, 500m and 2km buffer zones (study areas) were established from the edge of each of the area boundaries in order to highlight the locations of known designated heritage assets in relation to the shortlisted sites.

This appraisal focussed on providing a high-level overview, based on freely and readily accessible data relevant to designated heritage assets. No searches were conducted at this stage for records of non-designated assets/sites (archaeological sites), previous fieldwork within the areas of interest, aerial photographs, historic mapping or historic landscape characterisation, for example through the North Yorkshire County Council (NYCC) Historic Environment Record (HER).

The possibility of impacts, through changes to the setting[2] of certain designated heritage assets for example, would require additional, more detailed consideration as part of further historic environment assessment works alongside project design. This will particularly be the case for any above ground infrastructure associated with the minehead site. An important aspect of this would be to ascertain what contribution the setting of those identified heritage assets taken forward for further assessment, has in terms of the assets' significance.

4.7 Soils and land quality

The soil and land quality assessment focussed on a desk-based review with the objective of identifying the likely presence/extent of constraints to development. The following sources were examined:

- Environment Agency website – for information concerning recorded landfills, pollution incidents, groundwater source protection zones and aquifer designations (www.environment-agency.gov.uk);
- Historical maps (http://www.old-maps.co.uk © Crown Copyright and Landmark Information Group Limited 2013);
- University of Cranfield National Soil Resources Institute Soilscapes Viewer for soil type (https://www.landis.org.uk/soilscapes); and

[2] The setting of a heritage asset is defined in the National Planning Policy Framework (NPPF) (Communities and Local Government, 2012) as '*The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.*'

- www.magic.gov.uk for Agricultural Land Classification (ALC) and Environmental Stewardship schemes.

In the case of the ALC, soil and historical maps, the scale of information available online means that only an initial indication of site characteristics can be given and further, more detailed information would need to be obtained to confirm specific site conditions.

4.8 Flood risk

Appraisal of flood risk is based on the Environment Agency's 'What's In Your Backyard' mapping outputs. These enable the identification of sites located in areas that are at risk from 1 in 100 and 1 in 1000 year flood events (0.1% and 0.01% likelihood per year of a flood as significant as that modelled). No site specific flood modelling has been undertaken as this is not considered appropriate for this screening exercise.

4.9 Landscape

Due to the high number of sensitive landscape features present in and around the five areas, a thorough assessment has been conducted to provide a more detailed assessment of the impact upon landscape and visual impact. The methodology adopted is set out below:

- Completion of a desk top study to identify prevailing landscape character within and around each site alternative (using existing published landscape character assessment (LUC, 2013; WYG, 2003));

- Identification of key landscape and visual receptors on general constraints mapping including North York Moors National Park boundary, Heritage Coast, Scheduled Monuments, Listed Buildings, Conservation Areas and public rights of way. General visual receptors including residential property and roads were identified from Ordnance Survey maps and have not been included on the constraints mapping;

- Location of shortlisted sites on 1:25,000 scale Ordnance Survey base maps and plotting of 1km standoffs to a distance of 6km from site boundaries;

- Preparation of digital terrain models using Ordnance Survey Terrain 50 data (ASCII 50m grid files) and plotting of zones of theoretical visibility (ZTV) for each shortlisted site, based on a single, centrally located, 45m and 10m high point respectively for construction and operational stages;

- Completion of a site visit to briefly assess each shortlisted site in the field (based on prevailing landscape character and scale, openness and enclosure, topography, pattern and complexity, vegetation structure and woodland cover, experiential character and availability of open views);

- Identification of broad potential for effects on landscape receptors including key characteristics and designated landscapes;

- Identification of broad potential for effects on visual receptors including views from designated features, residential properties, public rights of way and roads;

- Identification of the potential for effective mitigation including fit with existing landscape character and relationship with key landscape and visual receptors.

A more detailed alternative assessment was undertaken for two sites from a landscape impact perspective. An indicative minehead site design was drawn up, including a proposed landform that could accommodate spoil generated by the minehead development and MTS, as well as outline restoration proposals to test how the site could be restored to mitigate any identified landscape and visual effects. ZTVs were re-run for these sites on this basis.

In addition to considering potential effects associated with minehead development the study also takes account of potential in-combination effects that could arise from development associated with the MTS. For the purposes of this exercise broad co-ordinates were provided by the tunnel design engineer and used to estimate how many intermediate access shafts would be needed within the National Park for the Cloughton Surrounds alternatives. The intermediate shaft locations for Doves Nest Farm and the Whitby Enclave alternatives would be at the same locations.

Effects associated with potential MTS intermediate shaft sites have not been assessed in detail. It may be assumed, however, that each MTS intermediate shaft site would require a 45m high temporary winding tower during the construction period, would need to accommodate approximately 250,000m^3 of spoil and would require a permanent 20 x 20 x 8m high shaft top building during the operational stage.

The following table summarises the potential MTS implications of the minehead site alternatives:

Table 4.1 Summary of Potential MTS Implications of the minehead site alternatives

Minehead alternative/ group of alternatives	Number of MTS shafts within National Park	Number of MTS shafts on edge of National Park
Cloughton Surrounds	6	1 close to edge 1 intervisible with edge
Whitby Enclave	1	1 close to edge 1 intervisible with edge
Doves Nest Farm	1	1 close to edge 1 intervisible with edge

The Whitby Enclave and Dove's Nest Farm alternatives would require an additional MTS shaft within the minehead site. The Cloughton Surrounds alternatives would require an MTS portal within the minehead site.

The digital terrain model used for the preparation of ZTV includes major blocks of woodland and forest cover, plotted from freely available aerial photography. For the purposes of this assessment, woodland height was set to 10m above ground levels.

5 HIGH LEVEL ASSESSMENT

Assessment of each shortlisted area has been conducted at a high level and provides a brief description of the location of the area, followed by the potential constraints and risks to each environmental receptor for each of the topics listed in **Section 2**.

5.1 Area 1 (Lindhead Gorse)

Located approximately 300m west of the centre of Cloughton village, Area 1 is situated on Ripley's Farm. The land is defined by field boundaries, woodland (to the north-east and south-east) and a watercourse (Lindhead Beck) to the south. Area 1 is located outside, but adjacent to, the National Park boundary.

The parcel of land is approximately 65 hectares.

The site slopes upwards in a northerly direction towards the National Park boundary, with a variance in height across the site of approximately 80m. The steepest change in height is on the southern part which experiences an increase from 50m AOD to 100m AOD.

Various designated areas and constraints are shown in **Figure 5.1**.

5.1.1 Transport and access

Access appraisal
The boundary for Area 1 does not adjoin the A171 and, as such, construction and operational traffic would have to route via unclassified roads (Lindhead Road and Harwood Dale Road). Harwood Dale Road is not considered appropriate due to presence of steep section of road with hairpin bends. Furthermore, access to the area via Lindhead Road an unclassified residential road with a primary school fronting on it, is also not considered appropriate due to the highway geometry, potential for parked vehicles and adverse impacts upon sensitive user groups.

To develop Area 1 a new access with the A171 (north of Cloughton) would have to be created. Providing an acceptable access solution in this area is likely to be challenging for the following reasons.

There is a significant change in gradient between the A171 and Area 1 and an acceptable access solution is likely to require significant earthworks/cuttings. Furthermore, the vertical and horizontal alignment of the A171 in this area restricts forward visibility of vehicles from Area 1 of traffic on the A171. The combination of restricted visibility and additional slow moving HGV traffic could result in a road safety issue.

Network capacity appraisal
During preliminary scoping discussions with NYCC for the minehead Transport Assessment between January – March 2014, NYCC advised that they would not wish to see HGV development traffic proceeding south along the A171 from its junction with the B1416 due to environmental constraints (narrow roads, adverse gradients and seasonal traffic leading to congestion).

Area 1 is located south of this junction and therefore generates significant additional traffic loading on routes identified as a constraint by NYCC.

Severance and pedestrian amenity appraisal

For Area 1 the location of the minehead would be likely to result in significant volumes of traffic being routed along the A171 through Cloughton and Burniston.

The A171 is a primary route carrying in the region of 450 HDVs a day[3] through Cloughton The addition of approximately 158 additional HDVs a day from the minehead together with workforce generated traffic is likely to lead to an adverse impact upon the local communities that are considered to be of high sensitivity due to presence of schools, shops and residential properties with narrow footways fronting directly onto the A171.

Accessibility appraisal

Being located within less than five miles of the centre of Scarborough and served by an off road cycle route (the old Whitby to Scarborough railway line) it is considered Area 1 has the potential to encourage employees (construction and operation) to walk and cycle to work, thereby reducing the potential employee traffic generation at the minehead and Park and Ride sites.

Bus service 93 routes along the A171 between Middlesbrough, Whitby and Scarborough at half hour frequencies and could provide an alternative to minibuses, further increasing opportunities for public transport use.

Road safety appraisal

There are no identified collision clusters (NYCC Road Casualties Report 2012 (NYCC, 2014)) in the vicinity of the proposed area. Collision clusters represent concentrations of accidents that are considered to be sensitive to changes in traffic flows and could therefore potentially be impacted by the project.

5.1.2 Air and noise

The closest human receptor is within the area boundary (Lindhead Lodge, a residential property located to the north-west of the area) with the closest human receptors outside the area boundary being:

- Quarry House – approximately 7m from southern area boundary;
- Sykes Farm – approximately 37m from southern area boundary; and
- Lindhead Barn – approximately 32m from western area boundary.
- Lindhead Lodge – adjacent to the northern area boundary
- Ripley Farm - approximately 100m from the northern area boundary
- Seven Hills Cottage - approximately 250m from the western area boundary

These are all residential properties.

In total there are also six discrete residential receptors within 500m of the area boundary, which include:

- Four groups of <10 properties (individual / small groups of properties);

[3] NYCC Permanent Traffic Counter (000016180099), located on the A171 North of Cloughton

- One group of approximately 30 properties (Burniston); and
- One group of approximately 50 properties (Cloughton).

There are no statutory ecological receptors nearby; the closest statutory ecological receptor is Iron Scar and Hundale Point to Scalby Ness SSSI at approximately 1.63km from the area boundary. The Non-statutory Goose Dale & Quarry Banks Site of Importance for Nature Conservation (SINC) lies within the area boundary.

The area and surroundings are not located within an Air Quality Management Area.

Of the receptors identified above, construction and operational phase dust emissions have the potential to impact on all receptor locations within 350m of the area boundary. This is approximately 20 properties for Area 1. Air quality risk is assessed in terms of the risk to the nearest receptor, which in this case is a residential receptor located within the site boundary.

Additional development-generated traffic movements should be considered within 200m of each affected road. If the area is accessed via the A171 human receptor locations adjacent to that road, including those in the villages of Cloughton and Burniston will be affected by increased noise and air quality issues associated with construction and/or operational phase traffic movements. Further afield, the A171 also runs through the village of Scalby and the town of Scarborough to the south. The diffusion tube monitoring of nitrogen dioxide (NO_2) on the A171 in Scarborough in 2012 showed concentrations approaching or exceeding the annual mean air quality objective which could be exacerbated by additional traffic loads (SBC, 2013).

This is a high level assessment and no baseline noise monitoring was undertaken. It is acknowledged that background noise levels in Area 1 may be higher (or lower) than levels monitored at the Doves Nest Farm site.

Construction Noise
Lindhead Lodge is potentially the receptor worst affected by construction HGV traffic noise and site excavation operations. The dwelling lies within the development area boundary and there is potential that the construction haul road will run directly adjacent to this dwelling. The Lindhead Gorse residential property (300m) and properties in Cloughton (290m) may also be disturbed by initial construction works. Residential dwellings located to the south and east are located at lower elevations than the potential minehead site, providing an opportunity for effective mitigation during the construction phase. The effectiveness of such mitigation would only be quantifiable following the production of detailed phasing and earthwork bunding schemes.

Operational noise
Lindhead Lodge, Lindhead Gorse and properties in Cloughton are the primary receptors for disturbance during operation of the minehead.

In addition, a small number of individual properties on the outskirts of Burniston are close to the south-east (approximately 100m).

The following noise levels were predicted at the nearby residential receptors and represent the worst-case construction and operational noise impacts.

Receiver	Predicted Construction Noise Impact L_{Aeq} dB	Predicted Operational Noise Impact L_{Aeq} dB
Lindhead	60	25
Lindhead Lodge	65	30
Ripley Farm	64	29
Severn Hills Cottage	53	18

Noise contour plots are provided as **Figure 5.2**, illustrating the levels and propagation of noise from the site during construction and operational phases.

There is a potential for noise disturbance to surrounding sensitive receptors from the minehead construction. Operational aspects are not predicted to cause a noise disturbance.

There are six discrete residential receptors within 500m of the area boundary (identified above). Construction noise impact is likely to extend to all receptors within 500m of the site boundary and beyond to a significant number of dwellings in Burniston and Cloughton. Operational noise will not be audible.

The area is currently used for farming but is open and would not benefit from natural screening. Suitable noise mitigation (earth bunds and screens) around the minehead site would significantly reduce noise disturbance.

At this stage it is not possible to specify exact mitigation measures for vibration likely to arise from construction operations. However preference would be given to using methods which would be expected to generate lower levels of vibration. Best management practice for vibration would be implemented to minimise vibration impacts including:

- Choosing alternative, lower impact equipment or methods where possible;
- Scheduling the use of vibration-causing equipment at the least sensitive times of day;
- Routing, operating or locating high vibration sources as far away from sensitive areas as possible;
- Sequencing operations so that vibration-causing activities do not occur simultaneously;
- Isolating the equipment causing vibration on resilient mounts;
- Keeping equipment well maintained.

5.1.3 Ecology

There are no statutory sites within the area boundary. The Non-statutory Goose Dale & Quarry Banks Site of Importance for Nature Conservation (SINC) lies within the area boundary.

Areas of deciduous woodland Biodiversity Action Plan (BAP) habitat and land identified in the National Inventory of Woodland and Trees are adjacent to the area boundary.

Key habitats within the area boundary include arable fields, agricultural buildings, and areas of vegetation (trees and associated scrub).

There are no direct impacts to statutory designated features in this area; however there is the potential to impact upon sensitive features (key habitats and fauna).

The following protected species have been recorded within 2km of Areas 1 – 3, as provided by NEYEDC:

Table 5.1 Protected species recorded within 2km of Areas 1 - 3 (courtesy of NEYEDC)

Species	Protection	Recorded near
Common toad	Wildlife and Countryside Act 1981 (Schedule 5)	No location of record provided
Common frog	Wildlife and Countryside Act 1981	Cloughton Beck Marsh
51 bird species	Wildlife and Countryside Act 1981	Wykeham Forest; Claughton; Scarborough; Scalby lodge
Freshwater crayfish	Habitats Directive Annex 5	Scalby
Bluebell	Wildlife and Countryside Act 1981 (Schedule 8)	North York Moors; Wykeham Forest
Atlantic white-sided dolphin	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	Long Nab (NB: sea-dwelling species – unlikely to be impacted)
Common porpoise	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	Scarborough Bay (NB: sea-dwelling species – unlikely to be impacted)
Grass snake	Wildlife and Countryside Act 1981 (Schedule 5)	Longhorn Wyke
Adder	Wildlife and Countryside Act 1981 (Schedule 5)	Wykeham Forest; Hackness
Common lizard	Wildlife and Countryside Act 1981 (Schedule 5)	Wykeham Forest
European water vole	Wildlife and Countryside Act 1981 (Schedule 5)	Cloughton; Burniston Beck; Scalby; Newby; Cow Wath beck; Mowthorpe; Upper Derwent; Thorn Park; Carrs
European otter	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	Scalby Beck; Cloughton; Burniston Beck; Cow Wath Beck; Langdale.
Eurasian badger	Protection of Badgers Act (1992)	Cloughton; Burniston; Harwood Dale; Wykeham Forest
Common pipistrelle	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	No location of record provided

Based on the available habitats and species records obtained from NEYEDC, the key ecological considerations are likely to be nesting birds, badgers, common reptile species, foraging bats and bats roosting within buildings and mature trees.

Based on indicative locations for intermediate shafts, three sites would be likely to be required within the North York Moors SSSI, SAC and SPA.

5.1.4 Recreation and amenity (PRoW)

Two PRoW of approximately 2km bisect Area 1 from Ripley's Road to the disused quarry and abut the area boundary along Ripley's Road.

Three public footpaths totalling approximately 1.5km lie within 500m of Area 1 north of Ripley's Road, south of Linehead Road, and east of Cloughton.

One public bridleway of approximately 100m lies within 500m of Area 1, running south from Linehead Road.

A summary of the recreation groups and organisations that operate within 2km of the Area boundary are detailed in **Table 5.2** below.

Table 5.2 Recreation groups active within 2km of the area boundary at Area 1 (Lindhead Gorse)

Recreation group	Summary of activity	Territory
Scarborough and District Riding Club	On and off-road rides	Bridleways and minor roads surrounding Scarborough
Whitby Wheelers Cycling Club	On-road cycling	Roads surrounding Whitby Enclave
Teesside Clarion C & AC	On-road cycling	Roads surrounding Robin Hood's Bay
Richardson's Cycle Club	On-road cycling	Roads surrounding Scarborough
Scarborough and District Ramblers Club	Rambling and walking on PRoW in North Yorkshire	PRoW / minor roads in North Yorkshire
Burniston local residents	Dog walking, short walks	PRoW and minor roads in Burniston
Cloughton local residents	Dog walking, short walks	PRoW and minor roads in Burniston

5.1.5 Cultural heritage

There are no designated heritage assets (Listed Buildings, Scheduled Monuments, Historic Parks and Gardens) located within the area boundary.

The nearest designated asset is located immediately to the south on Lindhead Road - the Grade II Listed Sykes Farmhouse (*1316422*). There is a cluster of Grade II Listed Buildings within Cloughton, around 500m to the east of the area boundary. Further Grade II Listed Buildings are located within the 2km study area to the south-east of the area. These are situated predominantly to the east side of Scalby Road / Main Street (the A171) through Burniston. Further Grade II Listed Buildings are also located towards the periphery of the 2km study area.

One Scheduled Monument is indicated to feature within the 500m study area - a dovecote at Cloughton Hall, which is also a Grade II Listed Building (*1016424* /

1148206). There is a further Scheduled Monument between the 500m and 2km study areas - a round barrow (*1019775*) located 120m west of Kirkless Farm. There are also a number of other Scheduled Monuments within the wider 2km study area. These include cairns and round barrows (*1019621 – 1019625*) on Suffield and Inn Moors, c. 2km to the south-west - a round barrow and cross dyke in Cloughton Plantations to the north (*1019771* / *1019772*) - a stone hut circle and iron working site on Holm Slack (*1019773*) again to the north, and a further round barrow (*1019774*) to the west at Thirley Beck Farm (*1167847*), which is a Grade II Listed Building.

There are no registered historic parks or gardens within either of the study areas (500m and 2km).

In summary, there are no known designated heritage assets within the area boundary. However, the area has a number of designated heritage assets in both the immediate and wider vicinity of the area boundary that would require further assessment, specific to possible setting effects to these assets, cross referenced with the minehead design and particularly any above ground infrastructure.

5.1.6 Soils and land quality

The historic land use for the area is shown as a series of fields with quarries (later disused) in the Quarry Bank at the south-eastern corner. A spring is shown on site from historic mapping and an old limekiln is also shown at the south-western corner.

Agricultural Land Classification (ALC) for the area is Grade 3 or 4, and the area is within an Entry Level Stewardship scheme and a Higher Level target area. Target areas are areas where Natural England is seeking the most environmental benefits from Higher Level Stewardship agreements.

The soil type is a slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey type. The aquifer classification is a Secondary A Bedrock Aquifer. There is no superficial deposit aquifer classification. There is no Source Protection Zone (SPZ) within the area boundary.

No registered landfills are present within Area 1 and there are no reported pollution incidents for the area.

5.1.7 Flood risk

Burniston Beck is designated as a Main River (presenting a potential flood risk) and extends to Quarry Road (in the south-east of the area). Flooding from Lindhead Beck does not reach above 60mAOD and as such does not encroach significantly onto the area – see **Figure 5.1** for visualisation of the flood extents. This flood risk area within Area 1 is in Flood Risk Zone 2 (<1% chance of flooding each year).

5.1.8 Landscape

The site is located on an open, elevated, south facing hillside flank, with distant views to the south and partial containment of views to the north and east. Land use comprises arable farmland with fields bounded by dry stone walls. The wider area of open, lower lying, farmed landscape between Cloughton in the north and Scarborough in the south

east forms a strong contrast with the elevated, afforested edges of the National Park to the south, west and north.

The site does not lie within an area of designated landscape but is located immediately adjacent to the boundary of the North York Moors National Park, along Ripley Road on the northern site boundary, and is intervisible with parts of the National Park in coastal areas to the east and along the edge of the Tabular Hills (Pickering to Lockton) in the west. The site is also intervisible with higher ground within the North Yorkshire and Cleveland Heritage Coast, extending between Tindall Point in the north and Scalby Mills in the south. The Cloughton Conservation Area lies approximately 100m to the east of the site.

Construction / operation stage landscape / visual effects would include (see **Appendix A**):

- Loss of existing landscape features (dry stone walls, farmland, limited areas of scrub and hedgerows across the southern part of the site);
- Adverse effects on views from higher ground within the North Yorkshire and Cleveland Heritage Coast between Tindall Point and Scalby Mills;
- Adverse influence in close to mid-range views from surrounding PRoW, roads and residential properties including effects on local settlements at Burniston in the south and parts of Cloughton in the east;
- Adverse effects would occur in distant views from the Cleveland Way National Trail, which follows the coastline in the east, the northern fringes of the Scarborough urban area and from the Scarborough Castle Scheduled Monument and tourist feature.

Area 1 would require approximately six MTS intermediate shaft sites within the National Park, with consequent construction stage visual effects associated with 45m high temporary winding towers and permanent operational stage effects associated with accommodation of spoil and provision of shaft head buildings at each site.

This alternative would require further MTS shafts close to the edge of the National Park, with one shaft expected to be clearly intervisible from the edge of the National Park and a further site expected to be more distant but intervisible.

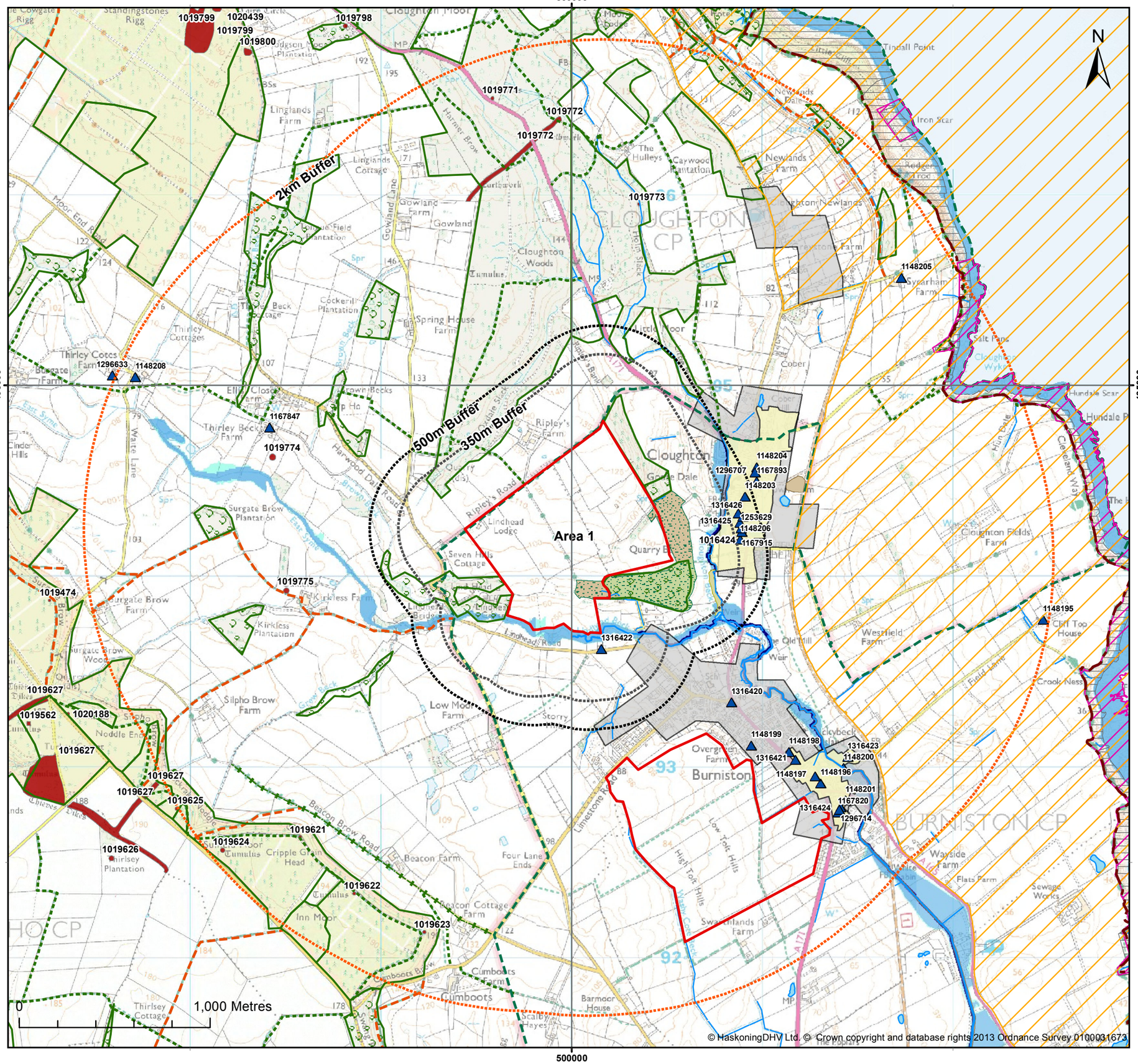
Mitigation opportunities during the construction stage would be very limited, due to the open, elevated position of the site, a lack of inherent enclosure and intervisibility with surrounding higher or lower ground.

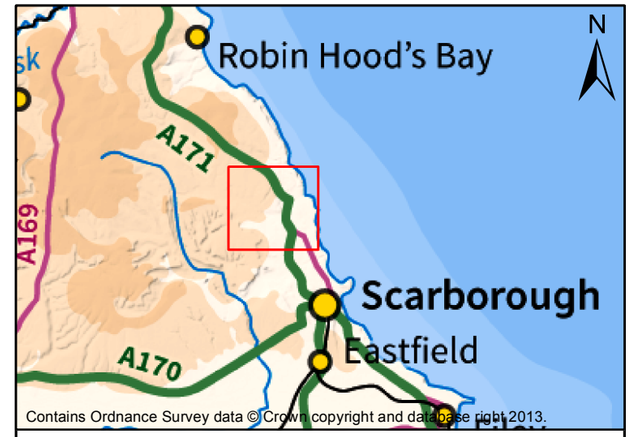
The potential construction stage and permanent stage effects of MTS related development for the Cloughton Surrounds minehead alternative on the National Park is considered sufficient to outweigh any other benefits provided by these alternatives.

Figure 5.1 **Constraints map of Area 1 (Lindhead Gorse)**

500000

495000





Legend

- Potential alternative area
- 2km Buffer
- 500m Buffer
- 350m Buffer
- North York Moors National Park
- National Inventory of Woodland and Trees
- River
- Pond
- Urban Area
- Conservation Area

Archaeological Constraints
- Scheduled Monument
- Listed Building

Public Right of Way
- Byways Open to All Traffic
- Public Bridleways
- Public Footpaths

- Cleveland Way National Trail
- Heritage Coast
- Iron Scar & Hundale Point to Scalby Ness SSSI

BAP Priority Habitat
- Coastal Floodplain Grazing Marsh
- Deciduous Woodland
- Lowland Dry Acid
- Maritime Cliff and Slope
- Purple Moor Grass and Rush Pasture
- Saline Lagoon
- Fen

Flood Risk
- Flooding from rivers or sea without defences
- Extent of extreme flood
- Main rivers

Data sources: Natural England, English Heritage
images derived from Environment Agency "What's in Your Back Yard"

Client: York Potash Limited

Project: York Potash Minehead Alternative Sites Assessment

Title: York Potash Minehead Potential Sites - Potential Area 1

Figure: 5.1 | Drawing No: XX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
05	30/01/2014	LW	PW	A3	1:20,000
04	13/12/2013	LW	PW	A3	1:20,000

Co-ordinate system: British National Grid

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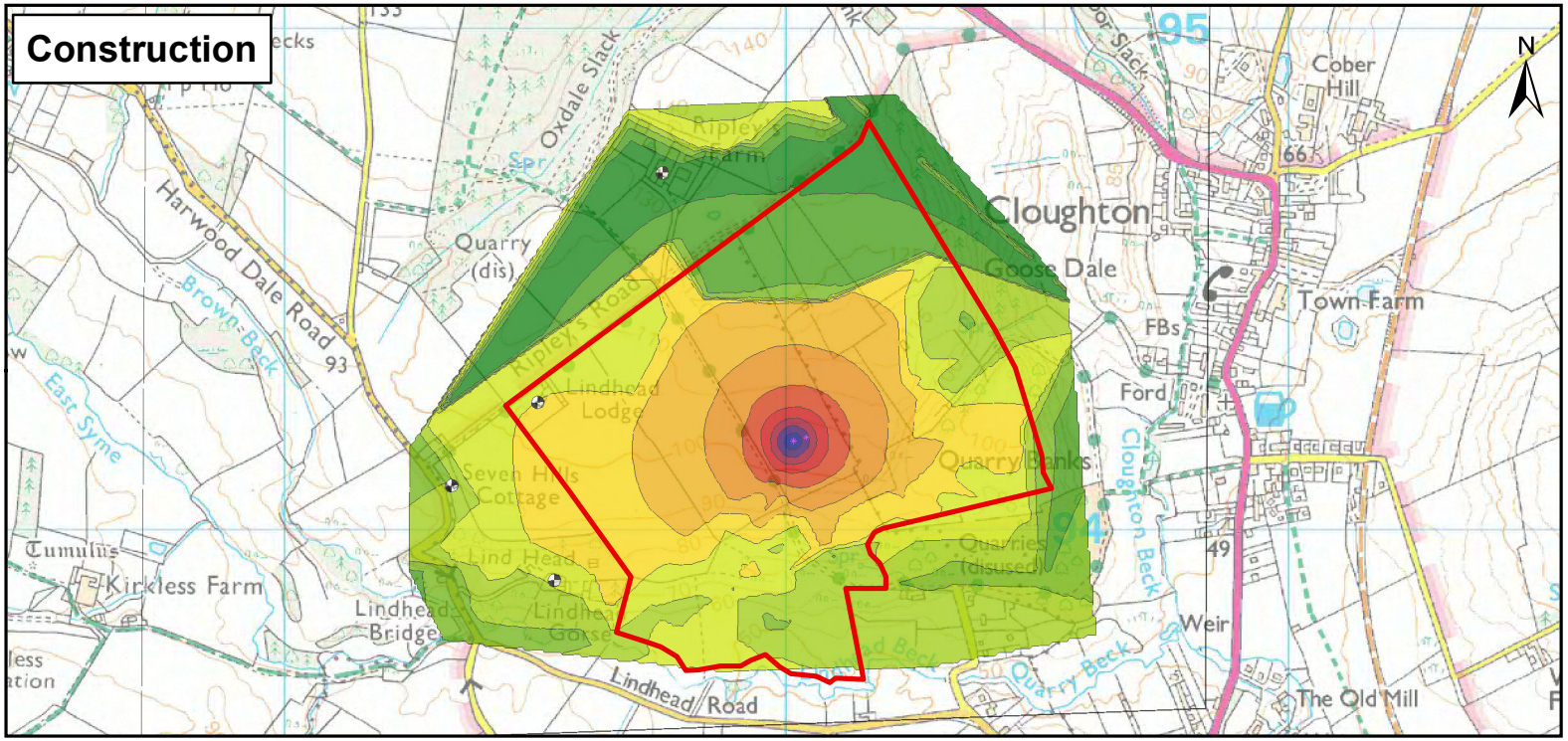
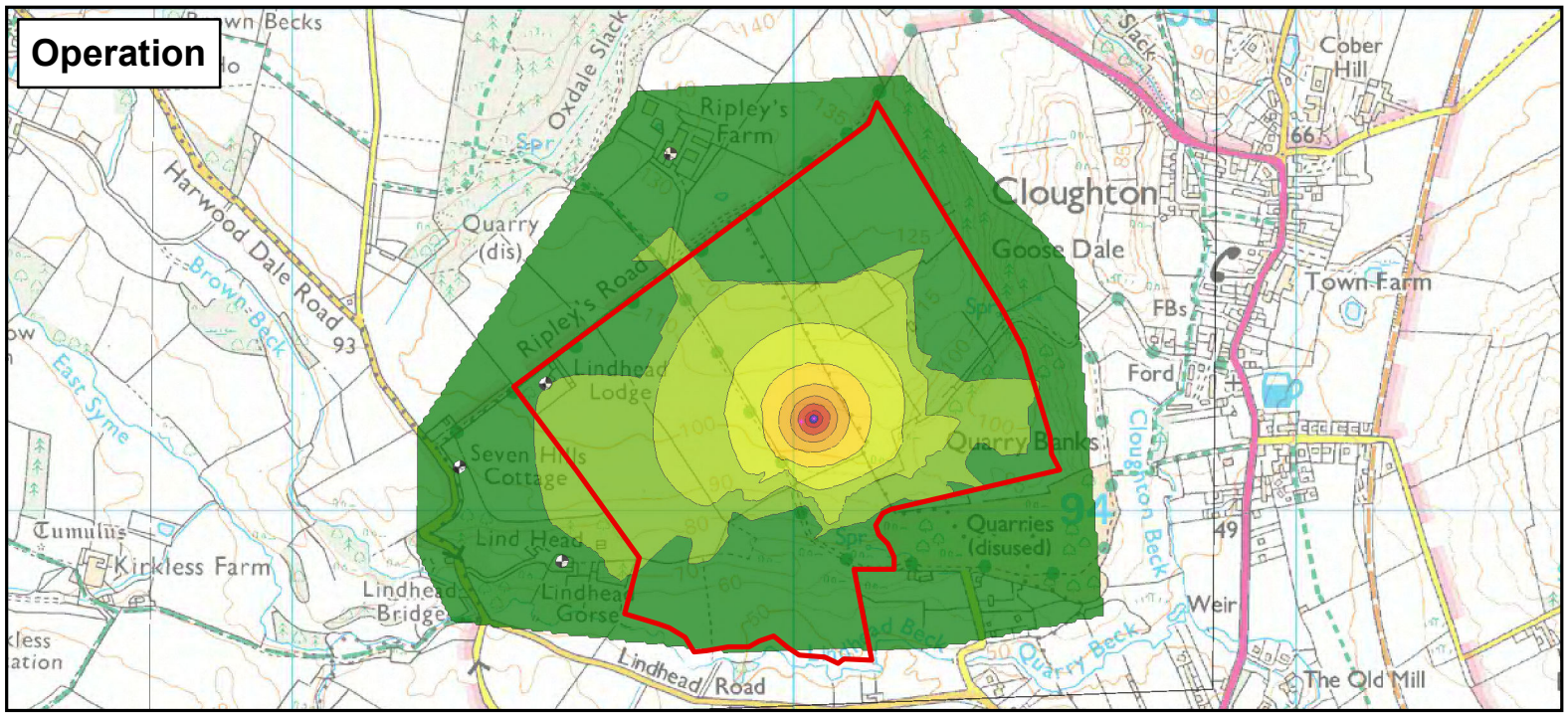
Figure 5.2 **Construction and Operation Noise Contours for Area 1 (Lindhead Gorse)**

Construction



Operation



Legend

Potential alternative area

Point receiver

Noise level (Construction)
Lr24hr
in dB(A)

	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	<= 85
85 <	<= 90
90 <	<= 95
95 <	<= 100
100 <	

Noise level (Operation)
Lr24hr
in dB(A)

	<= 30
30 <	<= 35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	

Client: York Potash Company

Project: York Potash Minehead ES and HRA Refurbishment

Title: York Potash Minehead Noise Modelling Results Site 1: Construction and Operation

Figure: 5.2

Drawing No:

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	21/07/2014	LC	AH	A4	1:15,000
02	28/07/2014	SW	AH	A4	1:15,000

Co-ordinate system: British National Grid

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5.2 Area 2 (Burniston)

Located adjacent to the village of Burniston, Area 2 is situated on Foulsyke Farm land defined by field boundaries, residential properties (to the north and east) and a watercourse (Washy Cote Beck) to the west. Area 2 is located approximately 200m outside the National Park boundary.

The parcel of land is approximately 68 hectares.

The site slopes west to east towards the coast, with an approximate 40m drop from 85mAOD to 45mAOD across the site.

Designated areas and other constraints are shown in **Figure 5.3**.

5.2.1 Transport and access

Access appraisal
Area 2 adjoins Limestone Road to the north and the A171 to the east. Limestone Road is an unclassified residential road with a primary school fronting on it and therefore access to the area via this route is not considered appropriate due to the highway geometry, potential for parked vehicles and adverse impacts upon sensitive user groups.

Furthermore, the eastern boundary of Area 2 adjoins the A171 within the village envelope of Burniston. It is considered that an additional 158 HDVs a day manoeuvring within the village of Burniston is likely to introduce adverse environmental and road safety impacts.

Should Area 2 be developed then it would be prudent to investigate options to provide an access to the area via the A171 that is located outside of the village envelope.

Network capacity appraisal
During preliminary application discussions with NYCC for the minehead planning application between January – March 2014, NYCC advised that they would wish to see HGV development traffic proceeding south along the A171 from its junction with the B1416 due to environmental constraints (narrow roads, adverse gradients and seasonal traffic leading to congestion).

Area 2 will be located south of this junction and therefore generate significant additional traffic loading on routes identified as a constraint by NYCC.

Severance and pedestrian amenity appraisal
For Area 2 the location of the minehead would be likely to result in significant volumes of traffic being routed along the A171 through Cloughton and Burniston.

The A171 is a primary route carrying in the region of 450 HDVs a day[4], the addition of approximately 158 additional HDVs a day from the minehead together with workforce generated traffic is likely to lead to an adverse impact upon the local communities that

[4] NYCC Permanent Traffic Counter (000016180099), located on the A171 North of Cloughton

are considered to be of high sensitivity due to the presence of schools, shops and residential properties with narrow footways fronting directly onto the A171).

Accessibility appraisal
Being located less than five miles from the centre of Scarborough and served by an off road cycle route (the old Whitby to Scarborough railway line) it is considered Area 2 has the potential to encourage employees (construction and operation) to walk and cycle to work, thereby reducing the potential employee traffic generation at the minehead and Park and Ride sites.

Bus service 93 that routes along the A171 between Middlesbrough, Whitby and Scarborough at half hour frequencies could provide an alternative to minibuses and increase opportunities for public transport use.

Road safety appraisal
There are no identified collision clusters (NYCC Road Casualties Report 2012 (NYCC, 2014)) in the vicinity of the proposed area. Collision clusters represent concentrations of accidents that are considered to be sensitive to changes in traffic flows and could therefore potentially be impacted by the project.

5.2.2 Air and noise

The closest human receptor locations on A171 Scalby Road/High Street are located immediately adjacent to the proposed area boundary. These are residential properties in the village of Burniston.

In total there are six discrete residential receptors within 500m of the area boundary, which include:

- Five groups of <10 properties (individual / small groups of properties); and
- One group of approximately 300 properties (Burniston).

No statutory ecological receptors are nearby; the closest ecological receptor is Iron Scar and Hundale Point to Scalby Ness SSSI, approximately 1.4km from the area boundary.

Neither the area nor its surroundings are located within an Air Quality Management Area.

Of the receptors identified above, construction and operational phase dust emissions have the potential to impact on all receptor locations within 350m of the area boundary. This is approximately 300 properties for Area 2. Air quality risk is assessed in terms of the risk to the nearest receptor, which in this case is a residential receptor located less than 20m from the site boundary.

Additional development-generated traffic movements should be considered within 200m of each affected road. If the area is accessed via the A171 human receptor locations adjacent to that road, including those in the villages of Cloughton and Burniston, will be affected by construction and/or operational phase traffic movements. Further afield the A171 also runs through the village of Scalby and the town of Scarborough to the south. The A171 in Scarborough is a road where diffusion tube monitoring of NO_2 in 2012

showed concentrations approaching or exceeding the annual mean air quality objective which could be exacerbated by additional traffic loads (SBC, 2013).

This is a high level assessment and no baseline noise monitoring was undertaken. It is acknowledged that background noise levels in Area 2 may be higher (or lower) than the Doves Nest Farm site.

Construction noise
Swarthlands Farm (91m to area boundary) would potentially be the worst affected by construction HGV traffic noise and site excavation operations. Distant properties to the north in Burniston would likely also be disturbed by construction activities.

Operational noise
Swarthlands Farm and properties towards the south of Burniston are the primary receptors for disturbance during operation of the minehead. Effective use of noise mitigation (earth bunds and screens) around the minehead site will aid a reduction in noise impact.

The following noise levels were predicted at the nearby residential receptors and represent the worst-case construction and operational noise impacts:

Receiver	Predicted Construction Noise Impact L_{Aeq} dB	Predicted Operational Noise Impact L_{Aeq} dB
Burniston Properties	65	31
Limestone Rd	68	32
Overgreen Farm	70	36
Swarthlands Farm	68	33

Noise contour plots are provided as **Figure 5.4**.

There is a potential for noise disturbance to surrounding sensitive receptors from the minehead construction. Operational aspects are not predicted to cause a noise disturbance.

There are six discrete residential receptors within 500m of the area boundary (identified above). Construction noise impact is likely to extend to all receptors within 500m of the site boundary and beyond to a significant number of dwellings in Burniston. Operational noise will not be audible.

The site is currently used for farming but is open and would not benefit from natural screening.

At this stage it is not possible to specify exact mitigation measures for vibration likely to arise from construction operations. However preference would be given to using methods which would be expected to generate lower levels of vibration. Best management practice for vibration would be implemented to minimise vibration impacts including:

- Choosing alternative, lower impact equipment or methods where possible;
- Scheduling the use of vibration-causing equipment at the least sensitive time of day;
- Routing, operating or locating high vibration sources as far away from sensitive areas as possible;
- Sequencing operations so that vibration-causing activities do not occur simultaneously;
- Isolating the equipment causing vibration on resilient mounts;
- Keeping equipment well maintained.

5.2.3 Ecology

There are no statutory or non-statutory designated conservation sites within the area boundary.

There are areas of deciduous woodland BAP Priority Habitat adjacent to the area boundary.

Key habitats within the area boundary include arable fields, a water body (a pond) and areas of vegetation (trees and associated scrub).

There are no direct impacts to designated features in this area; however there is the potential to impact upon undesignated features (key habitats and fauna).

See **Section 5.1.3** for details of protected species that have been recorded within 2km of Areas 1 - 3, as provided by NEYEDC.

Based on the available habitats and species records obtained from NEYEDC, the key ecological considerations are likely to be nesting birds, badgers, common reptile species, foraging bats, great crested newts and water voles.

Based on indicative locations for intermediate shafts, three sites would be likely to be required within the North York Moors SSSI, SAC and SPA.

5.2.4 Recreation and amenity (PRoW)

Two public footpaths of approximately 2km in length bisect Area 2 from Burniston towards Harewood Dale Road and from Burniston to Swarthwards Farm. One public bridleway of approximately 1km in length lies within 500m of the area between the A171 and Harewood Dale Road. One permissive bridleway of approximately 1.5km lies within 500m of the area running north-south east of Burniston. This bridleway forms part of National Cycle Network 1. One public footpath of approximately 1km lies within 500m of the area running north-south east of Burniston. Three public footpaths totalling approximately 500m lie within 500m of the potential area running from the area to Harewood Dale Road, the potential area south to the A171 and from Harewood Dale Road to Linehead Road.

A summary of the recreation groups and organisations that operate within 2km of the area boundary are detailed in **Table 5.3** below.

Table 5.3 Recreation groups active within 2km of the area boundary at Area 2 (Burniston)

Recreation group	Summary of activity	Territory
River Scalby Beck – Scalby Mills	River game fishery	From Scalby Mills to 1.5km above Scalby Village
Scarborough and District Canoe Club	River canoeing / kayaking	Scalby Beck
Scarborough and District Riding Club	On and off-road rides	Bridleways and minor roads surrounding Scarborough
Whitby Wheelers Cycling Club	On-road cycling	Roads surrounding Whitby Enclave
Teesside Clarion C & AC	On-road cycling	Roads surrounding Robin Hood's Bay
Richardson's Cycle Club	On-road cycling	Roads surrounding Scarborough
Scarborough and District Ramblers Club	Rambling and walking on PRoW in North Yorkshire	PRoW / minor roads in North Yorkshire
Burniston local residents	Dog walking, short walks	PRoW and minor roads in Burniston

5.2.5 Cultural heritage

There are no designated heritage assets (Listed Buildings, Scheduled Monuments, Historic Parks and Gardens) located within the area boundary.

The cluster of Grade II Listed Buildings within Burniston is located within the 500m study area to the north-east and east of the area. The Grade II Listed Sykes Farmhouse (*1316422*) is located just to the north of the 500m study area. Further to the north is the cluster of Grade II Listed Buildings within Cloughton, these are located within the 2km study area from the area boundary. To the south, towards the edge of the 2km study area, is a further cluster of Grade II Listed Buildings within Scalby, as well as the Church of St. Laurence (*1148211*) a Grade II* Listed Building[5]. Further isolated Listed Buildings also feature towards the periphery of the 2km study area.

With respect to Scheduled Monuments, the dovecote at Cloughton Hall (*1016424*) is located to the north, and cairns and round barrows on Suffield and Inn Moors (*1019621 – 1019624*) are located beyond the 500m study area to the west. The round barrow (*1019775*) west of Kirkless Farmhouse is located right on the edge of the 2km study area.

There are no registered historic parks or gardens within the study areas.

In summary, there are no known designated heritage assets within the area boundary. However, the area has a number of designated heritage assets in both the immediate and wider vicinity of the area boundary that would require further assessment, specific to

[5] English Heritage describes Grade II* buildings as '*particularly important buildings of more than special interest*'.

possible setting effects to these assets, cross referenced with the minehead design and particularly any above ground infrastructure.

5.2.6 Soils and land quality

The historic land use for the area is shown as a series of fields on historic mapping. Springs are visible in the centre and to the south of the area. An old kiln is shown to the south-west of the area.

Agricultural Land Classification (ALC) is Grade 3 for the area. It is partly within an Entry Level Stewardship scheme and lies within a Higher Level target area.

The soil type is a slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey type. The aquifer classification is a Secondary A Bedrock Aquifer. There is no superficial deposit aquifer classification. There is no Source Protection Zone (SPZ) within the area boundary.

No registered landfills are present on site but two are located nearby land to the south east of the area. There are no reported pollution incidents for the area.

5.2.7 Flood risk

Burniston Beck is designated as a Main River but is located on the opposite side of the A171 and Burniston village. The Environment Agency maps indicate that the area lies within Flood Zone 1 (<0.1% chance of flooding each year), and is not at significant risk of flooding.

5.2.8 Landscape

The site forms part of a series of smoothly rolling ridges and valleys, falling from higher ground along the edge of the National Park in the west and south west towards the coast in the east. Land use comprises arable farmland with hedgerow boundaries. Field pattern comprises large to medium scale linear fields running perpendicular to landform ridges and decreasing to a small scale field size at the eastern edge of the site adjacent to Burniston. The wider area of open, lower lying, farmed landscape between Cloughton in the north and Scarborough in the south east forms a strong contrast with the elevated, afforested edges of the National park to the south, west and north.

The site does not lie within an area of designated landscape and is located, at its closest point, approximately 400 metres from the North York Moors National Park boundary in the west. The site is intervisible with parts of the National Park on higher ground to the west and north, along the edge of the Tabular Hills (Pickering to Lockton), and on higher ground across the open coastal landscape north east of Burniston. The site is also intervisible with higher ground within the North Yorkshire and Cleveland Heritage Coast, extending between Tindall Point in the north and Scalby Mills in the south. The site is adjacent to the Burniston Conservation Area to the east.

Construction stage landscape / visual effects would include (see **Appendix A**):

- Loss of existing landscape features (linear field pattern, hedgerows, arable farmland, and undulating topography).

- Adverse effects in views from higher ground within the North Yorkshire and Cleveland Heritage Coast between Tindall Point and Scalby Mills.

- Adverse influence in close to mid-range range views from surrounding public rights of way, roads and residential properties including close range effects in views from the settlement of Burniston, which lies to the immediate east and north of the site.

- Adverse effects would occur in distant views from parts of the Cleveland Way National Trail, which follows the coastline in the east, the northern fringes of the Scarborough urban area and from the Scarborough Castle Scheduled Monument and tourist feature.

Operation stage landscape / visual effects would include (see **Appendix A**):

- As above but with a reduced extent across the open coastal landscape and within the National Park.

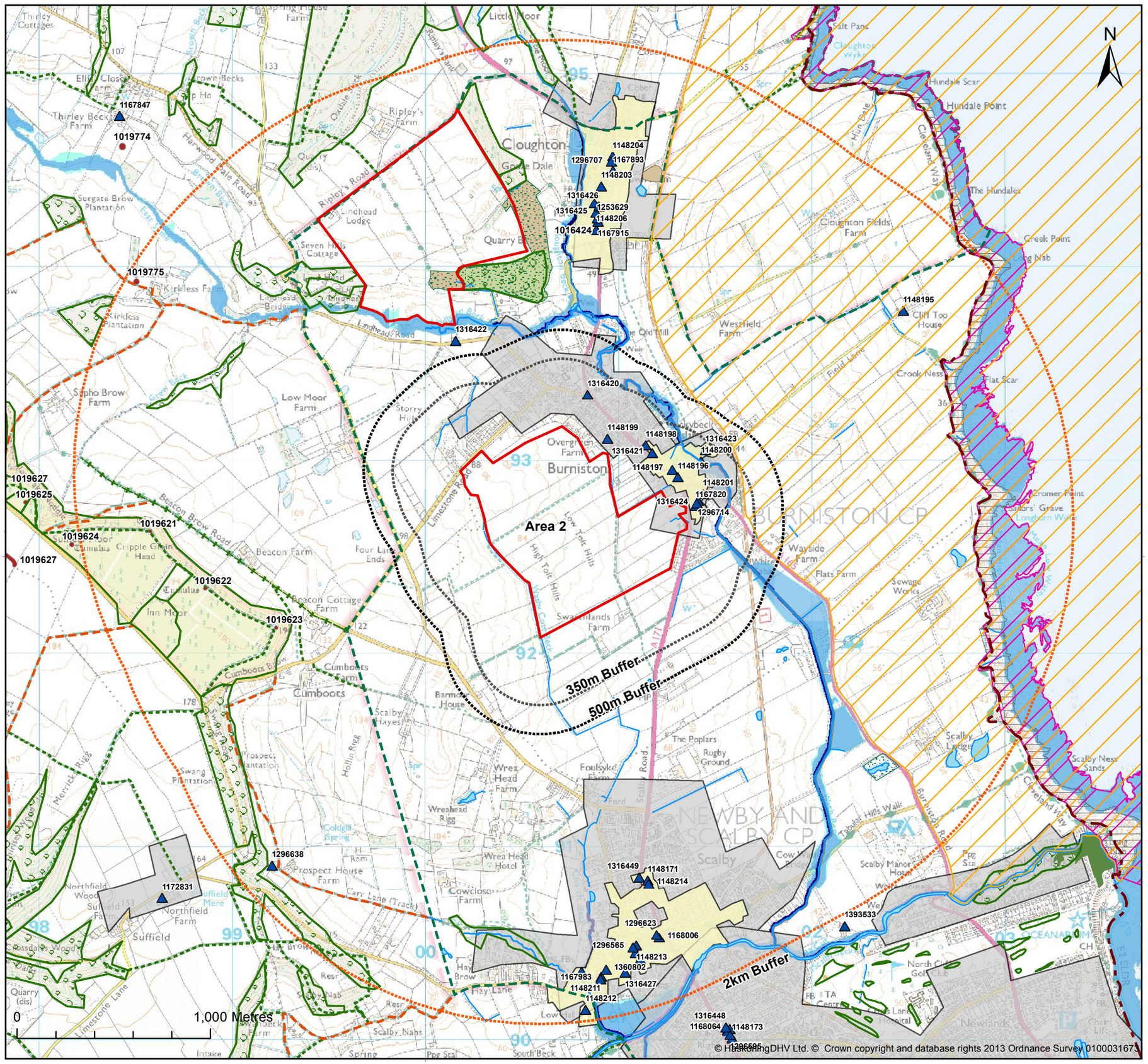
Area 2 would require approximately six MTS intermediate shaft sites within the National Park. Consequently, there will be construction stage visual effects associated with the 6 MTS structures. This will include 45m high temporary winding towers and permanent operational stage effects associated with accommodation of spoil and provision of shaft head buildings at each site.

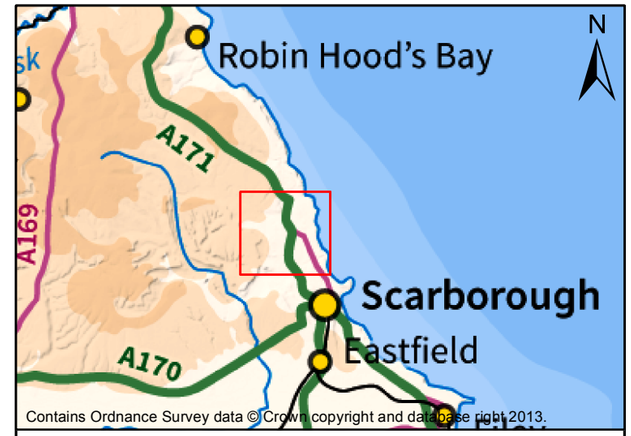
Area 2 as an alternative would require further MTS shafts close to the edge of the National Park, with one shaft expected to be clearly intervisible from the edge of the National Park and a further site expected to be more distant but intervisible.

Mitigation opportunities during the construction stage would be limited, due to the open character of the site and lack of significant containing features within the surrounding landscape.

The potential construction stage and permanent stage effects of MTS related development for the Cloughton Surrounds minehead alternative on the National Park is considered sufficient to outweigh any other benefits provided by these alternatives.

Figure 5.3 **Constraints map of Area 2 (Burniston)**





Legend

- Potential alternative area
- 2km Buffer
- 500m Buffer
- 350m Buffer
- North York Moors National Park
- National Inventory of Woodland and Trees
- River
- Pond
- Urban Area
- Conservation Area

Archaeological Constraints
- Scheduled Monument
- Listed Building

Public Right of Way
- Byways Open to All Traffic
- Public Bridleways
- Public Footpaths

- Cleveland Way National Trail
- Heritage Coast
- Iron Scar & Hundale Point to Scalby Ness SSSI

BAP Priority Habitat
- Coastal Floodplain Grazing Marsh
- Deciduous Woodland
- Lowland Calcareous Grassland
- Lowland Dry Acid Grassland
- Maritime Cliff and Slope
- Purple Moor Grass and Rush Pasture
- Fen

Flood Risk
- Flooding from rivers or sea without defences
- Extent of extreme flood
- Main rivers
- Flood defences

Data sources: Natural England, English Heritage
images derived from Environment Agency "What's in Your Back Yard"

Client: York Potash Limited

Project: York Potash Minehead Alternative Sites Assessment

Title: York Potash Minehead Potential Sites - Potential Area 2

Figure: 5.3 | Drawing No: XX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
05	31/01/2014	LW	PW	A3	1:20,000
04	13/12/2013	LW	PW	A3	1:20,000

Co-ordinate system: British National Grid

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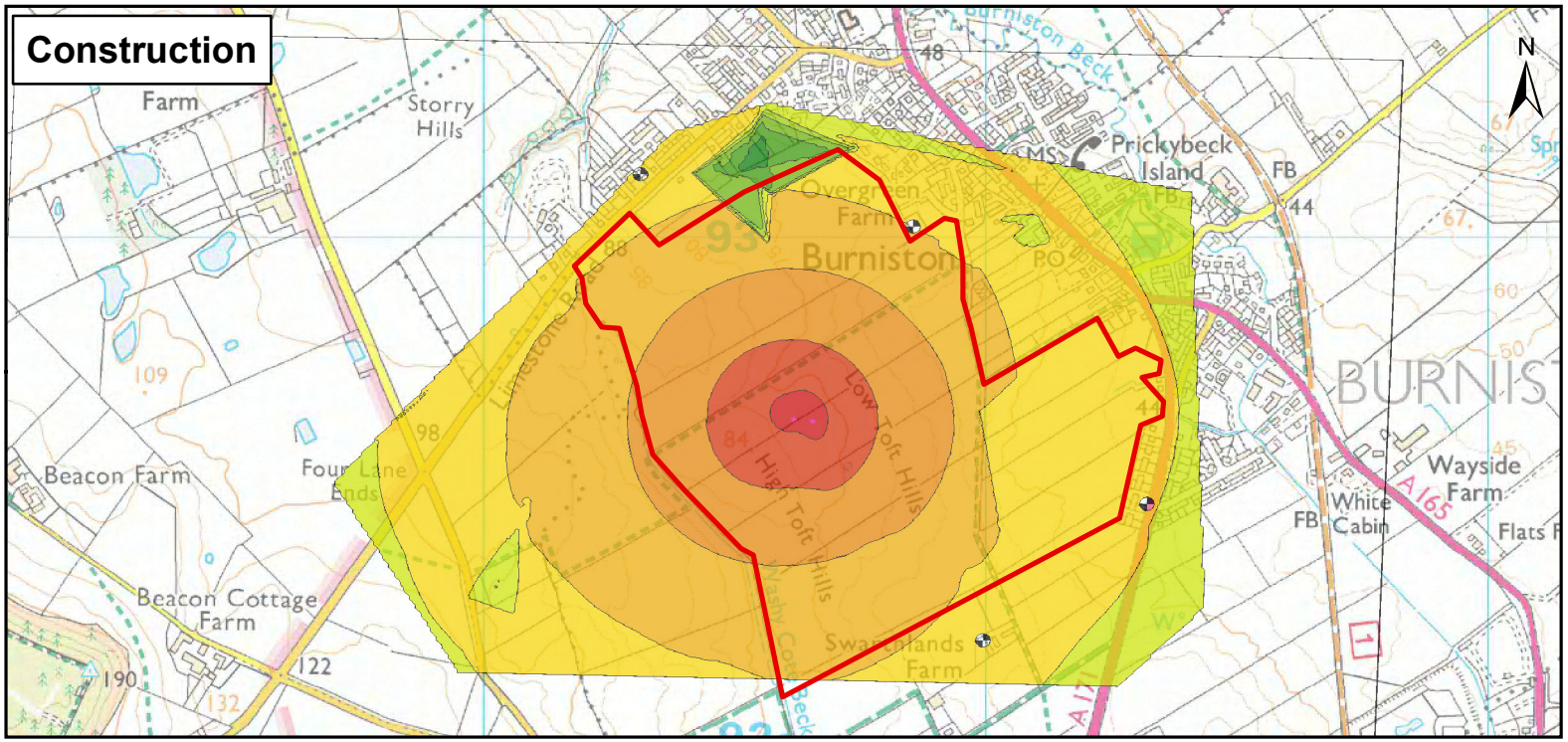
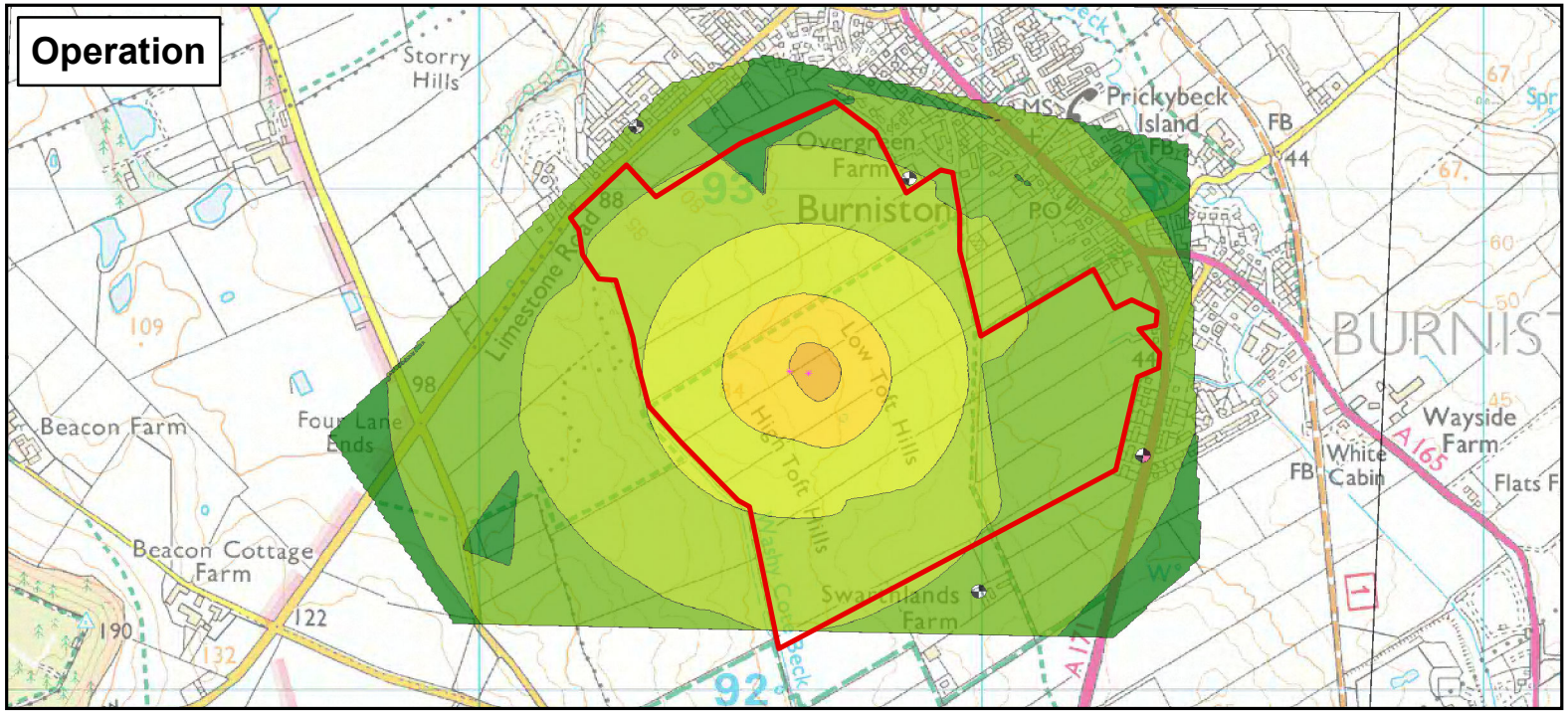
Figure 5.4 **Construction and Operation Noise Contours for Area 2 (Burniston)**

Construction



Operation



Legend

- Potential alternative area
- Point receiver

Noise level (Construction)
Lr24hr
in dB(A)

	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	<= 85
85 <	<= 90
90 <	<= 95
95 <	<= 100
100 <	

Noise level (Operation)
Lr24hr
in dB(A)

	<= 30
30 <	<= 35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	

Client: York Potash Company

Project: York Potash Minehead ES and HRA Refurbishment

Title: York Potash Minehead Noise Modelling Results Site 2: Construction and Operation

Figure: 5.4

Drawing No:

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	21/07/2014	LC	AH	A4	1:15,000
02	28/07/2014	SW	AH	A4	1:15,000

Co-ordinate system: British National Grid

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5.3 Area 3 (Ruswarp)

Area 3 is located to the north of the River Esk between Briggswarth and Ruswarp. The area is situated on farmland defined by field boundaries to the east and south, and the A171 road to the north and the A169 road to the west. Area 3 is located adjacent to the National Park, with the Park boundary, running along the opposite side of the A171.

The parcel of land is approximately 104 hectares.

There is an approximate 45m downward slope across the site from the western area to the east boundary, including two incised river valleys running west to east.

There are two drainage channels located within the area boundary that run from the west of the area to the east. These are both tributaries of the River Esk.

Constraints are shown in **Figure 5.6**.

5.3.1 Transport and access

Access appraisal
The boundary for Area 3 adjoins the A169 and A171. The A171 at this point on the network is of a modern standard and design. Therefore, direct access via the A171 or the A169 is considered to be appropriate for YPP traffic.

Network capacity appraisal
The roundabout of the A171 and A169 has been identified by NYCC (during preliminary scoping discussions for the minehead Transport Assessment) as a sensitive junction that would require detailed capacity assessment; however it is considered that should the assessment demonstrate capacity improvements are required there is potential to provide additional capacity within the existing junction footprint.

The location of Area 3 (on the stretch of the A171 to the north of Whitby) will also reduce the potential traffic impacts upon the highly sensitive Mayfield Road junction (signalised junction of the A171/A174 in Whitby).

Severance and pedestrian amenity appraisal
The location of Area 3 at the intersection of the A171 and A169 minimises the potential for significant adverse impacts upon pedestrian sensitive routes. HGV traffic is expected to route via the A171 towards Teesside, with the potential for local quarry suppliers to route via the A169 therefore avoiding Whitby and Scarborough. In addition, the impact due to construction and operational workforce traffic on Whitby or Scarborough would be limited with origins to the east (Teesside corridor) and the south-west (Pickering and outwards) avoiding those respective areas.

Accessibility appraisal
Area 3 is within two miles of the centre of Whitby and as such there is the potential to encourage a shift (for construction and operational workers) to walk and cycle to work. However, for this to be truly effective it is considered that there may be a requirement to upgrade/provide new routes.

Area 3 would be located adjacent to the Whitby Park and Ride site; this could reduce the potential impact of operational bus transfer trips as some workers may be able to walk from the Park and Ride site to the minehead, if a safe route could be provided.

Bus service 93 that routes along the A171 between Middlesbrough, Whitby and Scarborough at half hour frequencies could provide an alternative to minibuses and increase opportunities for public transport use.

Road safety appraisal
There are three identified collisions clusters (NYCC Road Casualties Report 2012 (NYCC, 2014)) within the vicinity of the area. However these have been treated by NYCC and one will be fully mitigated as part of the proposed Park and Ride scheme.

5.3.2 Air and noise

The closest human receptors are located adjacent to the southern area boundary (Lamberts Hill Farm) and northern area boundary (Cross Butts Farm), Ashes Farm lying to the east and properties in Ruswarp.

In total there are 10 discrete residential receptors within 500m of the area boundary, which include:

- Eight groups of <10 properties (individual / small groups of properties);
- One group of approximately 40 properties (Briggswath); and
- One group of approximately 70 properties (Whitby).

No designated ecological receptors are nearby; the area boundary is approximately 2.5km from the closest point of the Whitby – Saltwick SSSI. No impact is likely.

Of the receptors identified above, construction and operational phase dust emissions have the potential to impact on all receptor locations within 350m of the area boundary. This is approximately 50 properties for Area 3. Air quality risk is assessed in terms of the risk to the nearest receptor, which in this case is a residential receptor located less than 20m from the site boundary.

Additional development-generated traffic movements should be considered within 200m of each affected road. If the area is accessed via the A171 from the east, human receptors located adjacent to that road, including those in the town of Whitby, will be affected. The A171 connects with the A174 in Whitby. The A174 is one of the roads listed where diffusion tube monitoring in 2012 showed NO_2 concentrations approaching or exceeding the annual mean air quality objective which could be exacerbated by additional traffic loads (SBC, 2013).

If the area is accessed via the A169, human receptors located adjacent to that road, including those in Briggswath, will be affected.

This is a high level assessment and no baseline noise monitoring was undertaken. It is acknowledged that background noise levels in Area 3 may be higher (or lower) than the Doves Nest Farm site.

Construction noise
Lambert Hill Farm (320m) and properties to the north east of Briggswath (70m) including Cross Butts Farm will potentially be the receptors worst affected by construction HGV traffic noise and site excavation operations. Distant properties to the east in Ruswarp would likely also be disturbed by construction.

Operational noise
Lambert Hill Farm, Carr Hall and properties to the north-east of Briggswath are the primary receptors for disturbance during operation of the minehead. The effective use of noise mitigation (earth bunds and screens) around the minehead site will aid a reduction in noise impact.

There are a large number of individual properties in close proximity to the south west and east. The area is close to the south westerly edge of Whitby.

The following noise levels were predicted at the nearby residential receptors and represent the worst-case construction and operational noise impacts:

Receiver	Predicted Construction Noise Impact L_{Aeq} dB	Predicted Operational Noise Impact L_{Aeq} dB
Ashes Farm	61	26
Cross Butts Farm	61	27
Lambert Hill Farm	63	28
Ruswarp Properties	60	25

Noise contour plots are provided as **Figure 5.7**.

There are ten discrete residential receptors within 500m of the area boundary (identified above). Construction noise impact is likely to extend to all receptors within 500m of the site boundary and beyond to a number of dwellings in Ruswarp and Briggswath. Operational noise will not be audible.

Area 3 is currently used for farming but is open and would not benefit from natural screening.

At this stage it is not possible to specify exact mitigation measures for vibration likely to arise from construction operations. However preference would be given to using methods which would be expected to generate lower levels of vibration. Best management practice for vibration would be implemented to minimise vibration impacts including:

- Choosing alternative, lower impact equipment or methods where possible;
- Scheduling the use of vibration-causing equipment at the least sensitive time of day;
- Routing, operating or locating high vibration sources as far away from sensitive areas as possible;
- Sequencing operations so that vibration-causing activities do not occur simultaneously;
- Isolating the equipment causing vibration on resilient mounts;

- Keeping equipment well maintained.

5.3.3 Ecology

There are no statutory or non-statutory sites within the area boundary. There are areas of deciduous woodland BAP Priority Habitat adjacent to and within the area boundary. Key habitats within the area boundary include arable fields, water bodies (ditches) and areas of vegetation (trees and associated scrub).There are no direct impacts to designated features in this area; however there is the potential to impact upon undesignated features (key habitats and fauna).

The following protected species have been recorded within 2km of Areas 4 and 5, as provided by NEYEDC:

Table 5.4 Protected species recorded within 2km of Areas 4 and 5 (courtesy of NEYEDC)

Species	Protection	Recorded near
Common toad	Wildlife and Countryside Act 1981 (Schedule 5)	Sleights
Palmate newt	Wildlife and Countryside Act 1981 (Schedule 5)	Whitby; Stainmoor
Common frog	Wildlife and Countryside Act 1981 (Schedule 5)	Whitby
Common moorhen and green woodpecker	Birds Directive Annex 2.2	Sleights
Snowdrop	Habitats Directive Annex 5	North York Moors
Bluebell	Wildlife and Countryside Act 1981 (Schedule 8)	North York Moors; Esk Valley; The Bats; Dunsley Beck; Stainsacre Beck
Minke whale	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	Whitby Harbour (NB: sea-dwelling species – unlikely to be impacted)
White whale	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	Whitby (NB: sea-dwelling species – unlikely to be impacted)
White-beaked dolphin	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	Flamborough Head (NB: sea-dwelling species – unlikely to be impacted)
Slow-worm	Wildlife and Countryside Act 1981 (Schedule 5)	Whitby
Adder	Wildlife and Countryside Act 1981 (Schedule 5)	Aislaby
European water vole	Wildlife and Countryside Act 1981 (Schedule 5)	Eller Beck; River Esk
European otter	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	River Esk
Eurasian badger	Protection of Badgers Act (1992)	Sleights; Ruswarp

Based on the available habitats and species records obtained from NEYEDC, the key ecological considerations are likely to be nesting birds, badgers, common reptile species, foraging bats and water voles.

Based on indicative locations for intermediate shafts, one site would be likely to be required within the North York Moors SSSI, SAC and SPA.

5.3.4 Recreation and amenity (PRoW)

One public footpath of <100m lies within the potential area, running east-west, north of Lambert Hill Farm. Four public footpaths totalling approximately 2.5km lie within 500m of the potential area, at Newholm, Briggswath and Lambert Hill Farm. One public bridleway of approximately 400m lies within 500m of the potential area north of Bannial Flat Farm.

The B1410, lying within 500m of the potential area, is also an on-road part of National Cycle Network Route 165.

A summary of major recreation groups and organisations that operate within 2km of the area boundary are detailed in **Table 5.5** below.

Table 5.5 Recreation groups active within 2km of the area boundary at Area 3 (Ruswarp)

Recreation group	Summary of activity	Territory
River Esk – Ruswarp Fishery	River game fishery	2km downstream from weir at Ruswarp
Scarborough and District Canoe Club	River canoeing / kayaking	River Esk Egton Bridge to Ruswarp
Whitby and District Riding Club	On and off-road rides	Bridleways and minor roads surrounding Whitby Enclave
Whitby Wheelers Cycling Club	On-road cycling	Roads surrounding Whitby Enclave
Teesside Clarion C & AC	On-road cycling	Roads surrounding Robin Hood's Bay
Richardson's Cycle Club	On-road cycling	Roads surrounding Scarborough
Scarborough and District Ramblers Club	Rambling and walking on PRoW in North Yorkshire	PRoW / minor roads in North Yorkshire
The Wainwright Society	Rambling on PRoW, specifically from along Wainwright's Coast to Coast Walk	PRoW between Little Beck and High Hawkser
Briggswath local residents	Dog walking, short walks	Minor roads in Briggswath

5.3.5 Cultural heritage

There are no designated heritage assets (Listed Buildings, Scheduled Monuments, Historic Parks and Gardens) located within the area boundary.

The nearest designated assets are two Grade II Listed Buildings located immediately to the north of the area boundary, Farm Buildings to Cross Butts (*1148251*) and Cross Butts (*1204616*). There are also two Grade II Listed Buildings in close proximity to the south-west of the area boundary, Carr Hill Farmhouse (*296081*) and Carr Hall Farmhouse (*1316363*). Also within the 500m study area are the Grade II Listed Carr Hall (*1148325*) and Carr Mount (*1148326*), both situated to the south, and the Grade II Listed

Smeaton Castle (*1148250*) to the north. There are numerous Listed Buildings within the wider 2km study area including clusters around Ewe Cote Hall Farmhouse to the immediate north of the 500m study area, within Stakesby to the north-east of the area, Newholm to the north-west, Aislaby and Briggswath to the south-west, Ruswarp to the south-east, Sneaton further to the south-east and abundant numbers of Listed Buildings within Whitby to the north-east, which falls only partly within the 2km study area.

There are no registered historic parks or gardens within either of the study areas. The nearest is Mulgrave Castle (*1001065*) a Grade II* Historic Park and Garden over 1km to the north-west.

At least one Scheduled Monument is located within the 2km study area, the Wishing Chair Cross (*1009851*), a cross base at the junction of Stakesby Road and Westbourne Road to the north-east of the 500m study area. No impact is predicated for these receptors. Whitby Abbey Ruins (*1316347* / *1017941*) a Grade I Listed Building and Scheduled Monument, as well as Grade II Park and Garden (Whitby Abbey House) is located beyond the north-east boundary of the 2km study area on the east bank of the River Esk. Various other Grade I Listed Buildings also sit within the wider Whitby Abbey Complex.

In summary, there are no known designated heritage assets within the area boundary. However, the area has a number of designated heritage assets in both the immediate and wider vicinity of the area boundary that would require further assessment, specific to possible setting effects to these assets, cross referenced with the minehead design and particularly any above ground infrastructure.

5.3.6 Soils and land quality

The historic land use for the area is shown on historic maps[6] as a series of fields. Hydraulic rams are shown in the centre of the area with springs to the west of the area.

Agricultural Land Classification (ALC) is Grade 3 or 4 for the area and a small part of the area lies within an Entry Level Stewardship scheme and the area lies within a High Level Target Area.

The soil type is a slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey type. The aquifer classification is a Secondary A Bedrock Aquifer. There is no superficial deposit aquifer classification. There is no Source Protection Zone (SPZ) within the area boundary.

No landfills are present within Area 3 and there are no reported pollution incidents for the area.

5.3.7 Flood risk

The River Esk is designated as a Main River but is located on the opposite side of the B1410. The Environment Agency maps indicate that the area lies within Flood Zone 1 (<0.1% chance of flooding each year), and is not at significant risk of flooding; however,

[6] There is no map coverage for the area after 1974 / 1979.

the drainage channels that feed into the River Esk have the potential to be a significant technical constraint to the location of the site.

5.3.8 Landscape

The site is located within elevated, open farmland on the northern flank of the River Esk valley to the south west of Whitby. The landform falls gently south and eastwards and is bisected by three small incised valleys, associated with minor watercourses. Land use comprises arable fields bounded by hedgerows. Tree cover follows the incised valleys.

The site does not lie within any area of designated landscape but adjoins the North York Moors National Park in the north. The site is intervisible with parts of the National Park on higher ground to the north and west and an arc of higher ground extending from Saltwick in the east to Sleights Moor in the south west, across the southern flank of the Esk valley. Intervisibility with the North Yorkshire and Cleveland Heritage Coast also occurs to the east and south east of Whitby.

Construction stage landscape / visual effects would include (see **Appendix A**):

- Loss of existing landscape features (field pattern, hedgerows and arable farmland), changes to topography and partial interruption of incised valley features;

- Adverse visual influence across the northern flank of the lower Esk valley and areas of coastal hinterland and moorland landscape south of the Esk valley, within the National Park boundary. Adverse influence would also occur across parts of the Heritage Coast designated area east and south east of Whitby (including across Whitby Abbey);

- Adverse influence in close to mid-range range views from surrounding public rights of way, roads and residential properties, including effects in views from properties extending across the western edge of Whitby, including Ruswarp Lane to the east of the site;

- Adverse effects would occur in distant views from public rights of way, roads and residential properties across the southern flank of the Esk valley, including settlements at Sleights, Sneaton and Ugglebarnby, and from Whitby Abbey Scheduled Monument in the north east.

Operation stage landscape / visual effects would include (see **Appendix A**):

- As above but with a reduced extent of influence on the coastal hinterland landscape to the north. Adverse effects on views from within the National Park and Whitby Abbey would remain.

Area 3 would require one MTS intermediate shaft site within the National Park with associated construction and permanent stage effects. These effects would be associated with 45m high temporary winding towers and permanent operational stage effects associated with accommodation of spoil and provision of shaft head buildings at each site.

It would also require further MTS shafts close to the edge of the National Park, with one shaft expected to be clearly intervisible from the edge of the National Park and a further site expected to be more distant but intervisible.

Mitigation opportunities during the construction stage would be limited, due to the open and outward facing nature of the site and lack of significant containing features within the surrounding landscape. The large footprint of the site would allow spoil and mine buildings/ platforms to be accommodated whilst retaining topographical features. Landform changes would partially screen operational buildings and activities, requiring woodland planting to provide additional screening. Woodland planting would alter the presently open character of the site but would reflect heavier woodland cover across upper valley flanks to the west of the site (around Aislaby). Lighting effects have the potential to increase the perceived extent of the Whitby urban area westwards along the crest of the northern flank of the Esk valley.

Figure 5.5 **Constraints map of Area 3 (Ruswarp)**

488000

510000

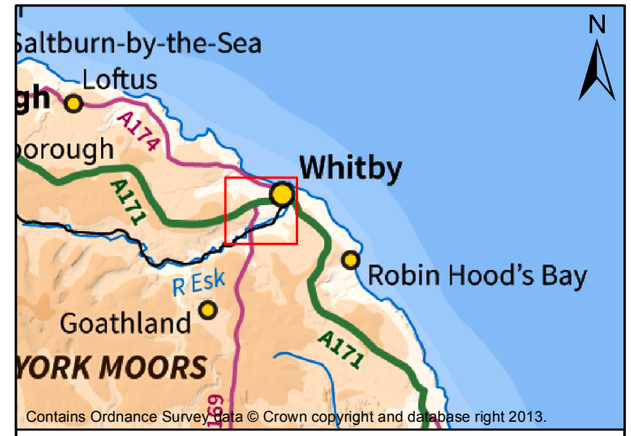
Area 3

350m Buffer

500m Buffer

2km Buffer

0 1,000 Metres



Legend

- Potential alternative area
- 2km Buffer
- 500m Buffer
- 350m Buffer
- North York Moors National Park
- National Inventory of Woodland and Trees
- River
- Pond
- Urban Area
- Conservation Area

Archaeological Constraints
- Scheduled Monument
- Listed Building

Public Right of Way
- Public Bridleways
- Public Footpaths
- Cleveland Way National Trail

- Heritage Coast
- Whitby-Saltwick SSSI

BAP Priority Habitat
- Coastal Floodplain Grazing Marsh
- Deciduous Woodland
- Lowland Calcareous Grassland
- Lowland Dry Acid Grassland
- Lowland Meadows
- Maritime Cliff and Slope
- Mudflats
- Reedbeds
- Fen
- Upland Heathland

Flood Risk
- Flooding from rivers or sea without defences
- Extent of extreme flood
- Main rivers

Data sources: Natural England, English Heritage
images derived from Environment Agency "What's in Your Back Yard"

Client: York Potash Limited

Project: York Potash Minehead Alternative Sites Assessment

Title: York Potash Minehead Potential Sites - Potential Area 3

Figure: 5.5 | Drawing No: XX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
05	31/01/2014	LW	PW	A3	1:20,000
04	13/12/2013	LW	PW	A3	1:20,000

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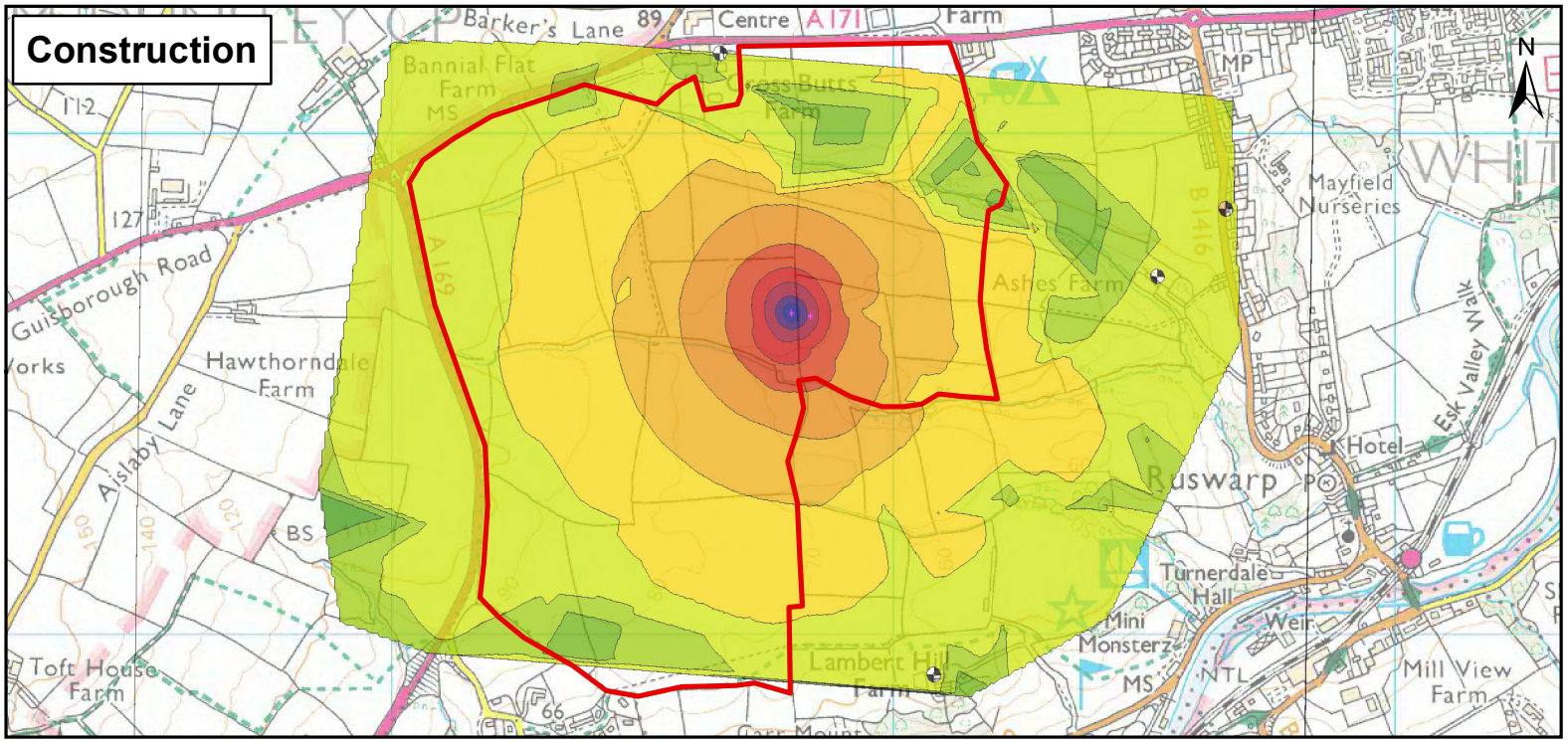
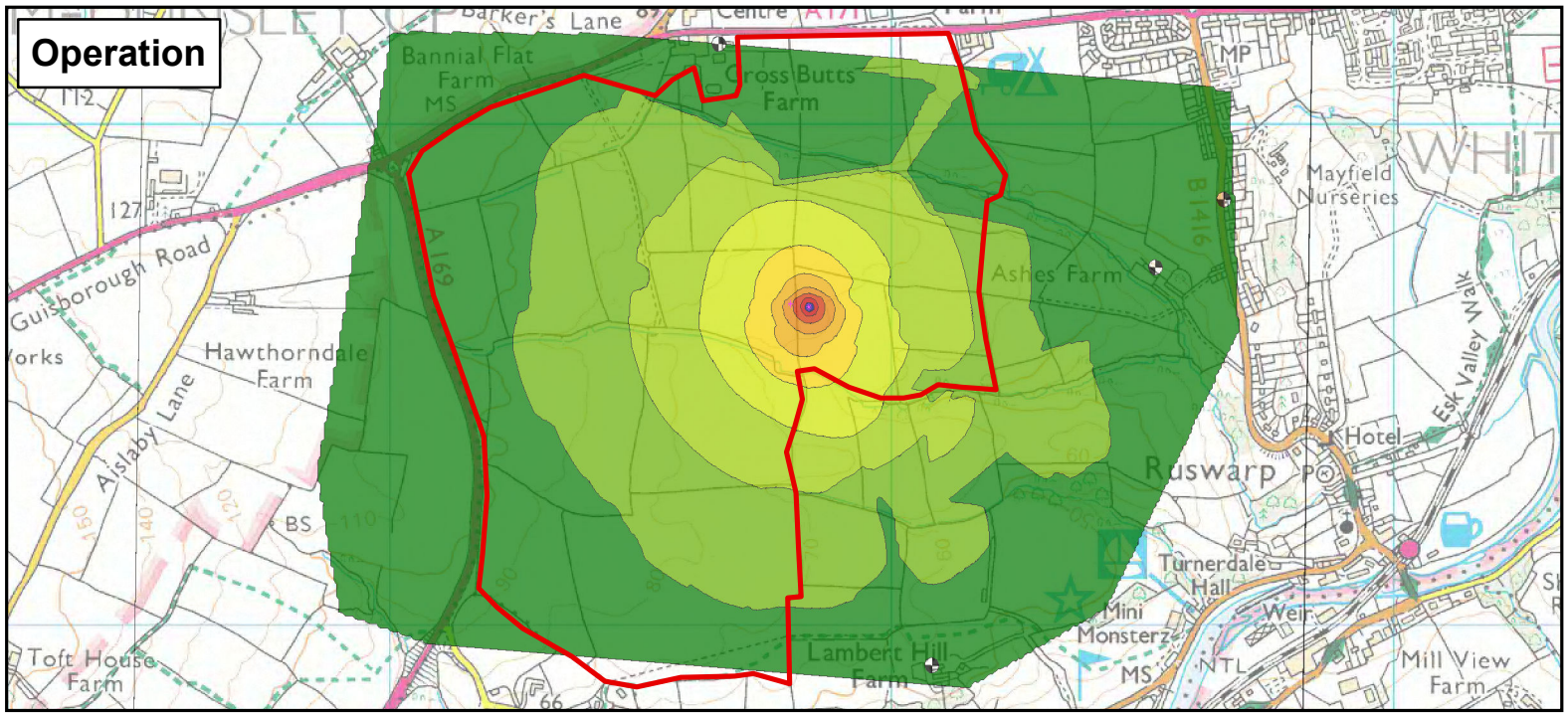
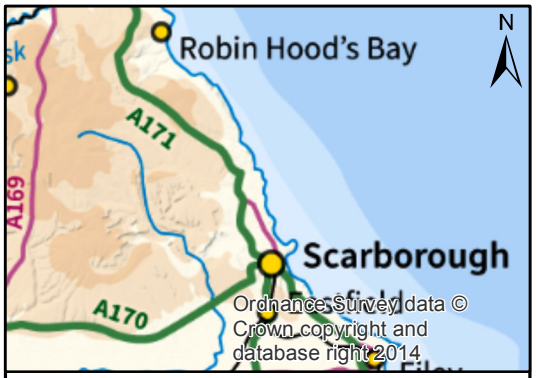
Figure 5.6 **Construction and Operation Noise Contours for Area 3 (Ruswarp)**

Construction



Operation





Legend

Potential alternative area

Point receiver

Noise level (Construction)
Lr24hr
in dB(A)

	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	<= 85
85 <	<= 90
90 <	<= 95
95 <	<= 100
100 <	

Noise level (Operation)
Lr24hr
in dB(A)

	<= 30
30 <	<= 35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	

Client: York Potash Company

Project: York Potash Minehead ES and HRA Refurbishment

Title: York Potash Minehead Noise Modelling Results Site 3: Construction and Operation

Figure: 5.6

Drawing No:

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	21/07/2014	LC	AH	A4	1:15,000
02	28/07/2014	SW	AH	A4	1:15,000

Co-ordinate system: British National Grid

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5.4 Area 4 (Briggswath)

Area 4 is located immediately north of Briggswath and south-west of Whitby, on the opposite side of the A169 road to Area 3. The area is situated on farmland defined by the A169 to the east and the National Park boundary to the west and south. The area is located outside the National Park but runs adjacent to it along its entire west and southern edges.

The southern area of the site is steeply sloping, rising from 70m AOD in the southern corner to 130m AOD on the northern boundary of the central part of the site. The northern area of the site is more gradually sloping, with approximately a 20m drop in the land.

A range of designations and constraints are shown in **Figure 5.8**.

5.4.1 Transport and access

Access appraisal
The boundary for Area 4 adjoins the A169 and A171. The A171 at this point on the network is of a modern standard and design. Therefore, direct access from the A171 or the A169 is considered to be appropriate for YPP traffic.

Network capacity appraisal
The roundabout of the A171 and A169 has been identified by NYCC (during preliminary scoping discussions for the minehead previous Transport Assessment) as a junction that would require detailed capacity assessment; however it is considered that should the assessment demonstrate capacity improvements are required there is potential to accommodate improvements within the footprint envelope.

The location of Area 4 (on the stretch of the A171 to the north of Whitby) will also reduce the potential for traffic impacts upon the highly sensitive Mayfield Road junction (signalised junction of the A171/A174 in Whitby).

Severance and pedestrian amenity appraisal
The location of Area 4 at the intersection of the A171 and A169 minimises the potential for significant adverse impacts upon pedestrian sensitive routes. HGV traffic is expected to route via the A171 towards Teesside, with the potential for local quarry suppliers to route via the A169 therefore avoiding Whitby and Scarborough. In addition, the impact due to construction and operational workforce traffic on Whitby or Scarborough would be limited with origins to the east (Teesside corridor) and the south-west (Pickering and outwards) avoiding those respective areas.

Accessibility appraisal
Area 4 is within two miles of the centre of Whitby and as such there is the potential to encourage the construction and operational workforce to walk and cycle to work, however for this to be truly effective it is considered that there may be a requirement to upgrade/provide some of the existing new routes.

Area 4 would be located adjacent to the Whitby Park and Ride site; this could reduce the potential impact of bus transfer trips as some workers may be able to walk from the Park and Ride site to the minehead if a safe route could be provided.

Bus service 93 that routes along the A171 between Middlesbrough, Whitby and Scarborough at half hour frequencies could provide an alternative to minibuses and increase opportunities for public transport use.

Road safety appraisal
There are three identified collisions clusters (NYCC Road Casualties Report 2012 (NYCC, 2014)) nearby. These have been treated by NYCC and one will be fully mitigated as part of the proposed Park and Ride scheme associated with the proposed minehead development.

5.4.2 Air and noise

The closest human receptors are located close to the area boundary:

- Toft House Farm and The Granary (residential property), Guisborough Road – approximately 37m from the northern area boundary
- Robins Hill (residential property), A169 Brook Park – approximately 20m from the eastern area boundary
- Selly Hill Farm – approximately 700m to the north west
- Hawthorndale Farm – approximately 200m to the west.

In total there are nine discrete residential receptors within 500m of the area boundary, which include:

- Six groups of <10 properties (individual / small groups of properties);
- One group of approximately 20 properties (Aislaby)
- One group of approximately 20 properties (Sleights); and
- One group of approximately 100 properties (Briggswath).

No ecological receptors are nearby; the nearest designated ecological receptor is Whitby - Saltwick SSSI which is approximately 3.53km from the closest point of the area. No impact is predicted at this location.

Neither the area nor its surroundings are located within an Air Quality Management Area.

Of the receptors identified above, construction and operational phase dust emissions have the potential to impact on all receptor locations within 350m of the area boundary. This is approximately 100 properties for Area 4. Air quality risk is assessed in terms of the risk to the nearest receptor, which in this case is a residential receptor located less than 20m from the site boundary.

Additional development-generated traffic movements should be considered within 200m of each affected road. If the site is accessed via the A169, human receptors located adjacent to that road, including those in the village of Briggswath, will be affected.

This is a high level assessment and no baseline noise monitoring was undertaken. It is acknowledged that background noise levels in Area 4 may be higher (or lower) than the Doves Nest Farm site.

Construction noise
Tott House Farm (100m) and properties to the north-west of Briggswath will potentially be the worst affected by construction HGV traffic noise and site excavation operations. Distant properties to the south and east in Briggswath would likely also be disturbed by construction noise.

Operational noise
Tott House Farm and Hawthorndale Farm are the primary receptors for disturbance during operation of the minehead. The effective use of noise mitigation (earth bunds and screens) around the minehead site will aid a reduction in noise impact.

A large number of individual properties are close to the west and east.

The following noise levels were predicted at the nearby residential receptors and represent the worst-case construction and operational noise impacts:

Receiver	Predicted Construction Noise Impact L_{Aeq} dB	Predicted Operational Noise Impact L_{Aeq} dB
Briggswath Properties	63	25
Hawthorndale Farm	70	33
Selly Hill Farm	52	14
Toft House Farm	54	17

The noise contour plots are provided as **Figure 5.9**.

There are nine discrete residential receptors within 500m of the area boundary (identified above). Construction noise impact is likely to extend to all receptors within 500m of the site boundary and beyond to a significant number of dwellings in Briggswath, Aislaby and Sleights. Operational noise will not be audible.

The site is currently used for farming but is open but may benefit from minimal natural screening through the undulating nature of the land.

At this stage it is not possible to specify exact mitigation measures for vibration likely to arise from construction operations. However preference would be given to using methods which would be expected to generate lower levels of vibration. Best management practice for vibration would be implemented to minimise vibration impacts including:

- Choosing alternative, lower impact equipment or methods where possible;
- Scheduling the use of vibration-causing equipment at the least sensitive time of day;
- Routing, operating or locating high vibration sources as far away from sensitive areas as possible;
- Sequencing operations so that vibration-causing activities do not occur simultaneously;
- Isolating the equipment causing vibration on resilient mounts;
- Keeping equipment well maintained.

5.4.3 Ecology

There are no statutory or non-statutory sites within the area boundary. There are areas of deciduous woodland BAP Priority Habitat adjacent to and within the area boundary. The construction phase and operation phases should seek to mitigate any potential impact to this habitat.

Based on indicative locations for intermediate shafts, one site would be likely to be required within the North York Moors SSSI, SAC and SPA.

There are no direct impacts to designated features in this area; however there is the potential to impact upon undesignated features (key habitats and fauna). Key habitats within the area boundary include arable fields, a water body (a ditch) and areas of vegetation (trees and associated scrub).

See **Section 5.4.3** for details of protected species that have been recorded within 2km of Areas 1 - 3, as provided by NEYEDC.

Based on the available habitats and species records obtained from NEYEDC, the key ecological considerations are likely to be nesting birds, badgers, common reptile species, foraging bats and water voles.

5.4.4 Recreation and amenity (PRoW)

Two public footpaths totalling approximately 1.5km lie within the potential area connecting Aislaby and Briggswath. One public bridleway of approximately 300m lies within the potential area connecting Aislaby and Briggswath. Five public footpaths totalling approximately 1.5km lie within 500m of the potential area at Newholm, Aislaby and Guisborough Road. Three public bridleways of approximately 400m lie within 500m at Aislaby, Newholm and Groves Hall. The B1410, lying within 500m of the potential area, is also an on-road section of National Cycle Network Route 165.

A summary of major recreation groups and organisations that operate within 2km of the area boundary are detailed in **Table 5.6** below.

Table 5.6 Recreation groups active within 2km of the area boundary at Area 4 (Briggswath)

Recreation group	Summary of activity	Territory
River Esk – Ruswarp Fishery	River game fishery	2km downstream from weir at Ruswarp
Scarborough and District Canoe Club	River canoeing / kayaking	River Esk Egton Bridge to Ruswarp
Whitby and District Riding Club	On and off-road rides	Bridleways and minor roads surrounding Whitby Enclave
Whitby Wheelers Cycling Club	On-road cycling	Roads surrounding Whitby Enclave
Teesside Clarion C & AC	On-road cycling	Roads surrounding Robin Hood's Bay
Richardson's Cycle Club	On-road cycling	Roads surrounding Scarborough
Scarborough and	Rambling and walking on PRoW in North	PRoW / minor roads in North

District Ramblers Club	Yorkshire	Yorkshire
Briggswath local residents	Dog walking, short walks	PRoW and minor roads in Briggswath and Aislaby
Sleights local residents	Dog walking, short walks	PRoW and minor roads in Briggswath and Aislaby

5.4.5 Cultural heritage

There are no designated heritage assets located within the area boundary.

The nearest designated assets are located to the east of the area boundary, the Grade II Listed Carr Hill Farmhouse (*296081*) and Carr Hall Farmhouse (*1316363*). Other designated assets within the 500m study area include the cluster of Listed Buildings within Aislaby to the south-west, including the Grade II* Listed Pond House (*1316048*) and numerous Grade II Listed Buildings, as well as other predominantly Grade II Listed Buildings within Briggswath to the south of the area boundary. There are further clusters of Listed Buildings within the wider 2km study area, including at Ruswarp to the east, Ewe Cote Hall Farmhouse and associated Listed Buildings to the north-east, as well as around Stakesby also to the north-east, and in and around Sleights to the south. Various other isolated Listed Buildings are also present with the 2km study area.

The Wishing Chair Cross (*1009851*) Scheduled Monument, a cross base at the junction of Stakesby Road and Westbourne Road, is located towards the north-west limit of the 2km study area, and a further Scheduled Monument, a round barrow (*1016534*), on Dunsley Moor is also located just within the 2km study area to the west of the area (other Scheduled barrows just outside the study area form part of the same scheduled barrow group).

There are no registered historic parks or gardens within the study areas. The nearest is Mulgrave Castle (*1001065*) Grade II* Historic Park and Garden to the north-west.

There are no known designated heritage assets (Listed Buildings, Scheduled Monuments, Historic Parks and Gardens) within the area boundary.

However, the area has a number of designated heritage assets in both the immediate and wider vicinity of the area boundary that would require further assessment, specific to possible setting effects to these assets, cross referenced with the minehead design and particularly any above ground infrastructure.

5.4.6 Soils and land quality

The historic land use for the area is shown on historic maps as a series of fields. There is a spring on the west side and an old sand pit at the eastern boundary. The road along the eastern boundary was constructed circa 1930s.

Agricultural Land Classification (ALC) is Grade 3 or 4 for the area and the northern half of the area lies within an Entry Level Stewardship scheme and the area lies within a High Level Target Area.

The soil type is a slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey type. The aquifer classification is a Secondary A Bedrock Aquifer. There is no superficial deposit aquifer classification. There is no Source Protection Zone (SPZ) within the area boundary.

No landfills are present within Area 4 and there are no reported pollution incidents for the area.

5.4.7 Flood risk

The River Esk is designated as a Main River but is located on the opposite side of the B1410. The Environment Agency maps indicate that the area lies within Flood Zone 1 (<0.1% chance of flooding each year), and is not at significant risk of flooding.

5.4.8 Landscape

The site is located within elevated, open farmland on the northern flank of the River Esk valley to the south west of Whitby. The landform falls gently eastwards across the northern part of the site and steeply south eastwards across the southern part of the site. Small incised valleys, associated with minor watercourses and tree cover, cut into the lower eastern edge of the site. Land use is primarily arable farmland with pasture to the south eastern edge, with hedgerow field boundaries.

The site does not lie within any area of designated landscape but adjoins the North York Moors National Park along its northern and western edges. The site is intervisible with parts of the National Park on higher ground to the north and west and an arc of higher ground extending from Saltwick in the east to Sleights Moor in the south west, across the southern flank of the Esk valley. Intervisibility with the North Yorkshire and Cleveland Heritage Coast also occurs to the east and south east of Whitby. The site is adjacent to the Aislaby Conservation Area to the west.

Construction stage landscape / visual effects would include (see **Appendix A**):

- Loss of existing landscape features (field pattern, hedgerows, farmland, undulating topography, incised valley features and woodland);
- Adverse visual influence across the northern flank of the lower Esk valley and areas of coastal hinterland and moorland landscape south of the Esk valley.
- Adverse influence in close to mid-range range views from residential property within nearby settlements at Aislaby and Briggswath, from outlying residential properties and from surrounding public rights of way and roads.
- Adverse effects would occur in distant views from the western edge of Whitby, from Whitby Abbey Scheduled Monument in the north east and from rights of way, roads and residential properties across the southern flank of the Esk valley, including settlements at Sleights and Sneaton.

Construction stage landscape / visual effects would include (see **Appendix A**):

- As above but with a reduced extent of influence on the coastal hinterland landscape to the north and reduced effects on Aislaby and Briggswath.

Area 4 would require one MTS intermediate shaft site within the National Park with associated construction and permanent stage effects. The effects would be associated with 45m high temporary winding towers and permanent operational stage effects associated with accommodation of spoil and provision of shaft head buildings at each site.

It would also require further MTS shafts close to the edge of the National Park, with one shaft expected to be clearly intervisible from the edge of the National Park and a further site expected to be more distant but intervisible.

Mitigation opportunities during the construction stage would be very limited, due to the steep, open and outward facing nature of the site. Existing nearby woodland cover to the west and south of the site would provide some containment within local views. Suitable mitigation is expected to take longer to establish at this site.

Figure 5.7 **Constraints map of Area 4 (Briggswath)**

488000

510000

2km Buffer

500m Buffer

350m Buffer

Area 4

WHITBY

NEWHOLM-CUM-DUNSLEY

AISLABY CP

WHITBY CP

Sleights

Ruswarp

Dunsley

Goathland

Robin Hood's Bay

Loftus

Whitby

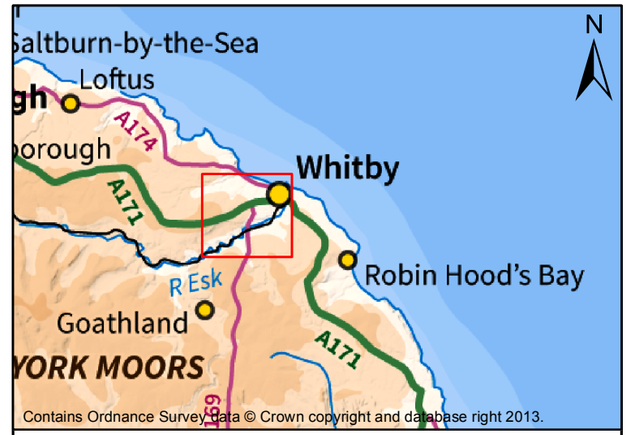
R Esk

A174

A171

YORK MOORS

0 1,000 Metres



Legend

- Potential alternative area
- 2km Buffer
- 500m Buffer
- 350m Buffer
- North York Moors National Park
- National Inventory of Woodland and Trees
- River
- Pond
- Urban Area
- Conservation Area

Archaeological Constraints
- Scheduled Monument
- Listed Building

Public Right of Way
- Public Bridleways
- Public Footpaths
- Cleveland Way National Trail

- Heritage Coast
- North York Moors SSSI, SAC & SPA
- Whitby-Saltwick SSSI

BAP Priority Habitat
- Coastal Floodplain Grazing Marsh
- Deciduous Woodland
- Lowland Calcareous Grassland
- Lowland Dry Acid Grassland
- Lowland Meadows
- Maritime Cliff and Slope
- Mudflats
- Reedbeds
- Fen
- Upland Heathland

Flood Risk
- Flooding from rivers or sea without defences
- Extent of extreme flood
- Main rivers

Data sources: Natural England, English Heritage
images derived from Environment Agency "What's in Your Back Yard"

Client: York Potash Limited

Project: York Potash Minehead Alternative Sites Assessment

Title: York Potash Minehead Potential Sites - Potential Area 4

Figure: 5.7 | Drawing No: XX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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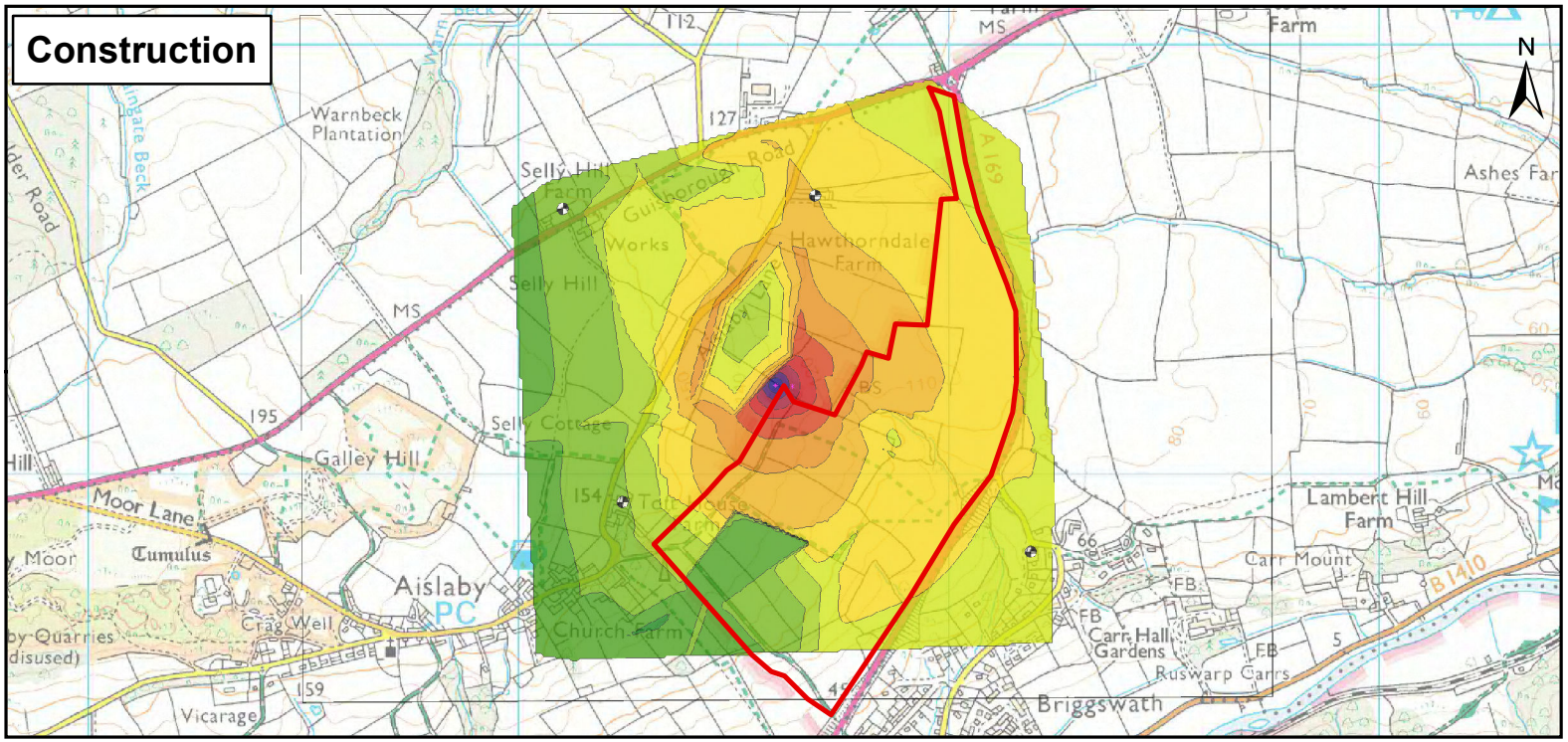
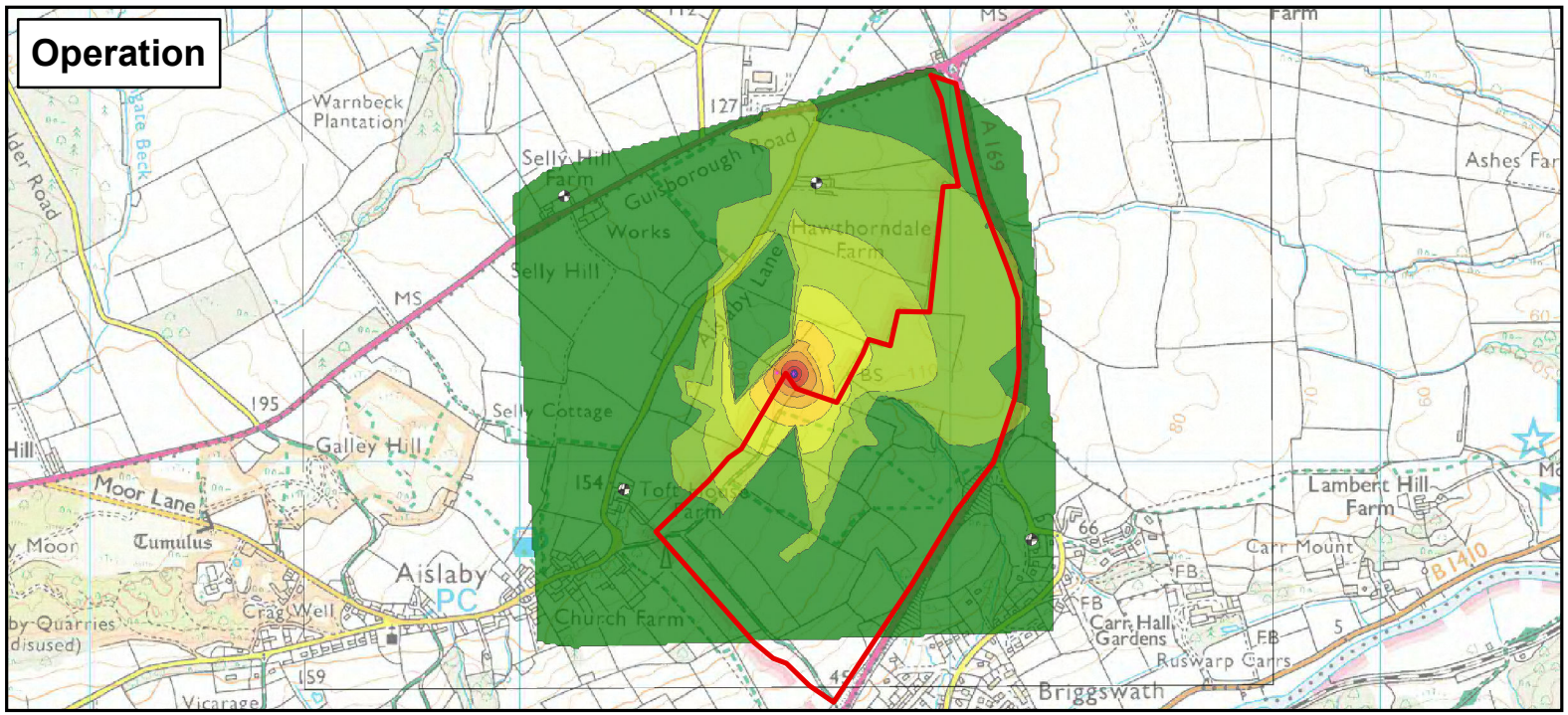
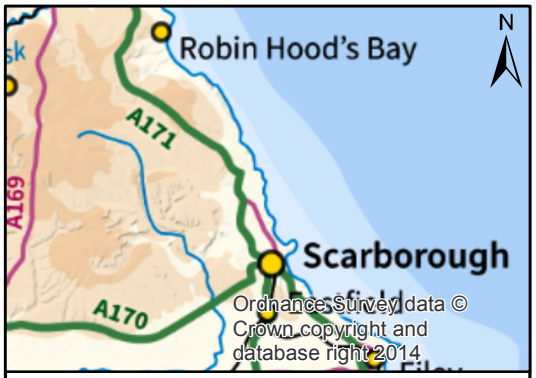
Figure 5.8 **Construction and Operation Noise Contours for Area 4 (Briggswath)**

Construction



Operation





Legend

- Potential alternative area
- Point receiver

Noise level (Construction) Lr24hr in dB(A)

	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	<= 85
85 <	<= 90
90 <	<= 95
95 <	<= 100
100 <	

Noise level (Operation) Lr24hr in dB(A)

	<= 30
30 <	<= 35
35 <	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	

Client: York Potash Company

Project: York Potash Minehead ES and HRA Refurbishment

Title: York Potash Minehead Noise Modelling Results Site 4: Construction and Operation

Figure: 5.8

Drawing No:

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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5.5 Area 5 (Dove's Nest Farm)

Area 5 is located approximately 3km south of Sneaton and 1km east of Little Beck, along the B1416 road. It is bounded by the B1416 at its southern and western boundaries, with Haxby plantation and Whinny Wood forming the eastern boundary. The area is located within the North York Moors National Park.

The area is an active farm accessed directly off the B1416.

The parcel of land is approximately 95 hectares.

Constraints are shown in **Figure 5.10**.

5.5.1 Transport and access

Access appraisal
The boundary for Area 5 would be served by the B1416 which connects with the A171 3km east of the area boundary. All HGV site traffic would travel east long towards the A171 and would not route north through Sneaton.

In consultation with NYCC it has been established that a new priority junction complete with right turn lane from the B1416 would be required to mitigate potential road safety concerns. With this mitigation it is considered that the access is adequate to accommodate the YPP traffic.

Severance and pedestrian amenity appraisal
The location of the Area 5 alongside a remote section of the B1416 minimises the potential for significant adverse impacts upon sensitive receptors. Notwithstanding, the B1416 in the location of Area 5 forms part of a designated Cycle Route and an increase in construction traffic is likely to lead to an adverse impact upon the users of this route.

It is anticipated the majority of construction traffic will have an origin in the Teesside area which will lead to construction peak forecast 158 HDV movements per day generated and through Whitby (against a baseline of ~400 to 700 HDV on Whitby highway links), together with workforce generated traffic during shift change. In addition, there is a forecast traffic demand from local employee catchment and aggregate suppliers to the south of the site with potential for significant impacts in Scarborough.

It is considered that operational traffic generation will not be as intense and therefore will not give rise to significant impacts.

Network capacity appraisal
The roundabout of the A171 and A169 and the Mayfield Road Junction were identified by NYCC within the previous Transport Assessment as sensitive junctions that would require detailed capacity assessment however it is considered that there is potential to provide additional capacity within the existing junction footprint should the need be identified.

Accessibility appraisal
Area 5 is over five miles from the centre of Whitby and as such the opportunities for walking are limited and cycling is only likely to be attractive to the keenest cyclists.

Furthermore, Area 5 is not served by an existing bus route. This could be mitigated by the proposed Park and Ride scheme associated with the minehead.

Therefore, the opportunities for a shift to walking, cycling and public transport for construction and operational workers is limited and would heavily rely upon Park and Ride and minibus transfer.

Road safety appraisal
There are no identified collision clusters NYCC Road Casualties Report 2012 (NYCC, 2014)) in the vicinity of the proposed area. Collision clusters represent concentrations of accidents that are considered to be sensitive to changes in traffic flows and could therefore potentially be impacted by the project.

5.5.2 Air and noise

The closest human receptors are located close to the area boundary:

- Soulsgrave Farm, on Raikes lane – approximately 200m from the eastern area boundary
- Parkdown Bungalow – adjacent to the northern area boundary
- Moorside Farm – 400m from the western area boundary
- Thorn Hill – approximately 400m from the south western site boundary

These are all residential properties.

In total there are seven discrete residential receptors within 500m of the area boundary, which include:

- Seven groups of <10 properties (individual / small groups of properties).

The nearest ecological receptor is the North York Moors SSSI, SPA and SAC which is adjacent to the western and southern area boundaries. There is a risk of pollutant deposition on this site.

Neither the area nor its surroundings are located within an Air Quality Management Area.

Of the receptors identified above, construction and operational phase dust emissions have the potential to impact on all receptor locations within 350m of the area boundary. This is approximately 5 properties for Area 1. Air quality risk is assessed in terms of the risk to the nearest receptor, which in this case is a residential receptor located less than 20m from the site boundary.

Additional development-generated traffic movements should be considered within 200m of each affected road. Human receptors located in the villages of Normanby and Hawkser, the town of Whitby and along the A171 will be affected by construction traffic.

This is a high level assessment and no baseline noise monitoring was undertaken specifically for this alternative sites study.

Construction noise
Manor Farm adjacent to the A171 and properties in the south-west of High Hawkser also adjacent will potentially be the receptors worst affected by construction HGV traffic noise. Parkdown Farm, Soulsgrave Farm, Moor House Farm and Thorn Hill will potentially be the worst affected by site excavation operations due to their proximity to the site.

Operational noise
Parkdown Farm, Soulsgrave Farm, Moor House Farm and Thorn Hill are the primary receptors for disturbance during operation of the minehead. The effective use of noise mitigation (earth bunds and screens) around the minehead site will aid a reduction in noise impact.

The following noise levels were predicted for the nearby residential receptors and represent the worst-case construction and operational noise impacts from the works at the Dove's Nest Farm site boundary:

Receiver	Predicted Construction Noise Impact L_{Aeq} dB	Predicted Operational Noise Impact L_{Aeq} dB
Moor House Farm	64	29
Parkdown Farm	56	25
Soulsgrave Farm	59	24
Thorn Hill	64	28

The noise contour plots are provided as **Figure 5.11.**

There is a potential for noise disturbance to surrounding sensitive receptors from the minehead construction. Operational aspects are not predicted to cause a noise disturbance.

There are seven discrete residential receptors within 500m of the area boundary (identified above). Construction noise impact is likely to extend to all receptors within 500m of the site boundary and beyond to less than ten other residential dwellings in the surrounding area. Operational noise will not be audible.

In terms of predicted construction noise impact upon human receptors, Dove's Nest Farm represents the most favourable location for minehead infrastructure due to the existing woodland noise mitigation and the remoteness of nearby receptors.

The site is currently used for farming but is open and could benefit from natural screening to the north-west.

At this stage it is not possible to specify exact mitigation measures for vibration likely to arise from construction operations. However preference would be given to using methods which would be expected to generate lower levels of vibration. Best management practice for vibration would be implemented to minimise vibration impacts including:

- Choosing alternative, lower impact equipment or methods where possible;

- Scheduling the use of vibration-causing equipment at the least sensitive time of day;
- Routing, operating or locating high vibration sources as far away from sensitive areas as possible;
- Sequencing operations so that vibration-causing activities do not occur simultaneously;
- Isolating the equipment causing vibration on resilient mounts;
- Keeping equipment well maintained.

5.5.3 Ecology

There are no statutory or non-statutory sites within the area boundary. The North York Moors SSSI, SPA and SAC lie adjacent to the southern and western area boundaries. There are areas of deciduous woodland BAP Priority Habitat within the area boundary and area of Upland heathland BAP Priority Habitat adjacent to the area boundary. The development design should seek to mitigate any potential impact to this habitat. This is most relevant for the construction phase.

Key habitats within the area boundary include arable and pastoral fields, two tributaries to Sneaton Thorpe Beck (which supports an area of ancient woodland 500m downstream of the area boundary), coniferous plantation woodland and other scrub vegetation.

The following protected species have been recorded within 2km of Areas 6, as provided by NEYEDC:

Table 5.7 Protected species recorded within 2km of Area 5 (courtesy of NEYEDC)

Species	Protection	Recorded near
Common toad	Wildlife and Countryside Act 1981 (Schedule 5)	Wykeham Forest; Midge Hall; Robin Hood's Bay
Palmate newt	Wildlife and Countryside Act 1981 (Schedule 5)	Sneaton; Midge Hall; Haxby
Common frog	Wildlife and Countryside Act 1981 (Schedule 5)	Sneaton; Wykeham Forest
63 bird species	Wildlife and Countryside Act 1981	Little Beck Wood; Wykeham Forest
European eel	The Eels (England and Wales) Regulations 2009	No location of record provided
Snowdrop	Habitats Directive Annex 5	Wykeham Forest
Bluebell	Wildlife and Countryside Act 1981 (Schedule 8)	North York Moors; Little Beck Wood
White-letter hairstreak	Wildlife and Countryside Act 1981 (Schedule 5)	Little Beck Wood
Slow-worm	Wildlife and Countryside Act 1981 (Schedule 5)	Robin Hood's Bay
Adder	Wildlife and Countryside Act 1981 (Schedule 5)	May Beck; Wykeham Forest; Sneaton Moor; Haxby plantation
Common lizard	Wildlife and Countryside Act 1981 (Schedule 5)	Wykeham Forest; Sneaton Low Moor
European water vole	Wildlife and Countryside Act 1981 (Schedule 5)	Eller beck; Damholme; River Esk

Species	Protection	Recorded near
European otter	Wildlife and Countryside Act 1981 (Schedule 5) The Conservation of Habitats and Species Regulations 2010 (as amended)	River Esk; Barndale
Eurasian badger	Protection of Badgers Act (1992)	Little beck Wood; Maybeck; Haxby Plantation; Great Wood; Icy Green; Crook's Plantation; Foss Plantation; Wykeham Forest

Based on the available habitats and species records obtained from NEYEDC, the key ecological considerations are likely to be nesting birds, badgers, common reptile species, foraging and roosting bats and water voles and designated features of the North York Moors SSSI, SPA and SAC.

The Dove's Nest site does not require that any intermediate shafts are located within the North York Moors SSSI, SAC and SPA.

5.5.4 Recreation and amenity (PRoW)

There are no PRoW within the site boundary. Three public bridleways of approximately 1.5km lie within 500m of the area boundary running from Hempsyke Hall to Lousy Hall Lane, Lousy Hall Lane to Newton Farm and Pasture field lane to the B1416. Raike's Lane and the B1416 between Raike's Lane and May Beck Farm Trail is an on-road section of Moors to Sea Route 7 cycle route. This runs adjacent to the area boundary and along an access route to the area for approximately 1km.

A summary of major recreation groups and organisations that operate within 2km of the area boundary are detailed in **Table 5.8** below.

Table 5.8 Recreation groups active within 2km of the area boundary at Area 5 (Dove's Nest Farm)

Recreation group	Summary of activity	Territory
Whitby and District Riding Club	On and off-road rides	Bridleways and minor roads surrounding Whitby Enclave
Whitby Wheelers Cycling Club	On-road cycling	Roads surrounding Whitby Enclave
Teesside Clarion C & AC	On-road cycling	Roads surrounding Robin Hood's Bay
Richardson's Cycle Club	On-road cycling	Roads surrounding Scarborough
Scarborough and District Ramblers Club	Rambling and walking on PRoW in North Yorkshire	PRoW / minor roads in North Yorkshire
The Wainwright Society	Rambling on PRoW, specifically from along Wainwright's Coast to Coast Walk	PRoW between Little Beck and High Hawkser
Little Beck local residents	Dog walking, short walks	Minor roads connecting to the B1416

5.5.5 Cultural heritage

There are no designated heritage assets located within the area boundary.

The nearest designated asset is a Grade II Listed boundary stone at red gate between parishes of Eskdaleside cum Ugglebarnby and Sneaton (*1148791*) located across the B1416 (approximately 10m south-west) from the area boundary. There are no other designated assets within 500m of the study area. There are further clusters of listed buildings within the wider 2km study area, including at Ugglebarnby to the North, around Newton Farm to the south-west. Two other isolated designated assets are also present with the 2km study area.

A World War II bombing decoy 500m north West of John Cross (*1019757*) Scheduled Monument is located within 2km of the area boundary to the south-east. Two round barrows known as Thorn Key Howes, on Low Moor (*1019794*) and the John Cross boundary cross (*1011744*), all designated as Scheduled Monuments, are also located within 2km of the area boundary. Other Scheduled barrows just outside the study area form part of the same scheduled barrow group.

There are no registered historic parks or gardens within the study areas.

There are no known designated heritage assets (Listed Buildings, Scheduled Monuments, Historic Parks and Gardens) within the area boundary.

However, the area has a number of designated heritage assets in both the immediate and wider vicinity of the area boundary that would require further assessment, specific to possible setting effects to these assets, cross referenced with the minehead design and particularly any above ground infrastructure.

5.5.6 Soils and land quality

The historic land use for the area is shown on historic maps (1853 onwards) as a series of fields and wooded areas that correspond to the current layout, except for a new plantation area in the northwest of the area.

Agricultural Land Classification (ALC) is Grade 4 for the area and the western half of the area lies within an Entry Level Stewardship scheme and the area lies within a High Level Target Area.

The soil type is predominantly a slow permeable, seasonally wet acid loamy and clayey type however there are areas of slow permeable, seasonally wet very acid upland soils with a peaty surface around the south-east of the area boundary, and very acid loamy upland soils with a peaty surface along the western boundary of the area. The aquifer classification is a Secondary A Bedrock Aquifer. There is no superficial deposit aquifer classification. There is no Source Protection Zone (SPZ) within the area boundary.

No landfills are present within Area 5 and there are no reported pollution incidents for the area.

5.5.7 Flood risk

The River Esk is designated as a Main River (i.e. presenting a potential flood risk) but is located on the opposite side of the B1416 approximately 200m below the area boundary. The Environment Agency maps indicate that the area lies within Flood Zone 1 (<0.1% chance of flooding each year), and is not at significant risk of flooding.

5.5.8 Landscape

The site is located within an elevated area of farmland and plantation south of Sneaton and to the south west of Whitby. Mixed plantation woodland provides partial visual enclosure along western, southern and eastern boundaries. Topography within the site slopes gently from west to east, with surface water draining to Sneaton Thorpe Beck on the eastern boundary. The site lies on a broad north-south trending ridge associated with Ugglebarnby Moor, beyond which landform drops away sharply to Little Beck valley in the west and more gradually to the Esk valley in the north and the coast in the east. Land use comprises arable fields and plantation woodland.

The site lies entirely within the North York Moors National Park. The site is intervisible with open, elevated moorland ridges at Sleights Moor in the west and Graystone Hills/ Latter Gate Hills in the east, both of which are Open Access land. More distant intervisibility is also possible from the North Yorkshire and Cleveland Heritage Coast to the east and south of Whitby and from the northern flank of the Esk valley between Aislaby and Whitby. Mid-range views to the site are possible from local roads and public rights of way including the Coast to Coast Walk to the east of site. Distant views of the site are possible from Whitby Abbey Scheduled Monument and tourist feature in the north.

The project area for which the ZTV have been calculated differs slightly from the project area described in previous sections of this report. This is due to a subsequent update to the project area to incorporate more of the Haxby Plantation. The change to the project area small and is unlikely to greater alter the outcome of the ZTVs.

Construction stage landscape effects would include (see **Appendix A**):

- Some loss of existing features (hedgerows, hedgerow trees, arable/ pastoral farmland and coniferous plantation);
- Adverse visual influence in views from areas of open and elevated landscape to the west and across areas to the east and north east of the site generally, including within distant views from the western edge of the North Yorkshire and Cleveland Heritage Coast.
- In views from the west existing woodland cover would be expected to screen most ground level activity with temporary winding towers remaining visible.
- In views from the east and north east ground level activities, including earthworks and construction of buildings would be visible to some degree, above and between existing woodland cover depending on viewpoint.
- Potential exists for increased adverse effects on perceptual landscape character at Ugglebarnby Moor and within the environs of Raikes Lane.

Construction stage visual effects would include:

- Adverse influence in close to mid-range views from outlying residential properties, the adjoining B1416 road, surrounding public rights of way, including

the Coast to Coast Walk, and Open Access land at Ugglebarnby Moor in the west, Sneaton Low Moor in the south and Graystone Hills in the east.

- Mid-range to distant views would be possible in views from villages at Hawsker, Stainsacre, Sneaton and the southern edges of Whitby and from the wider public rights of way and road network, including the A171 in the east and A169 in the west.
- Ground level activity would be visible within the view corridor extending east and north east from the site with temporary winding towers being visible to a greater or lesser degree within views in general.

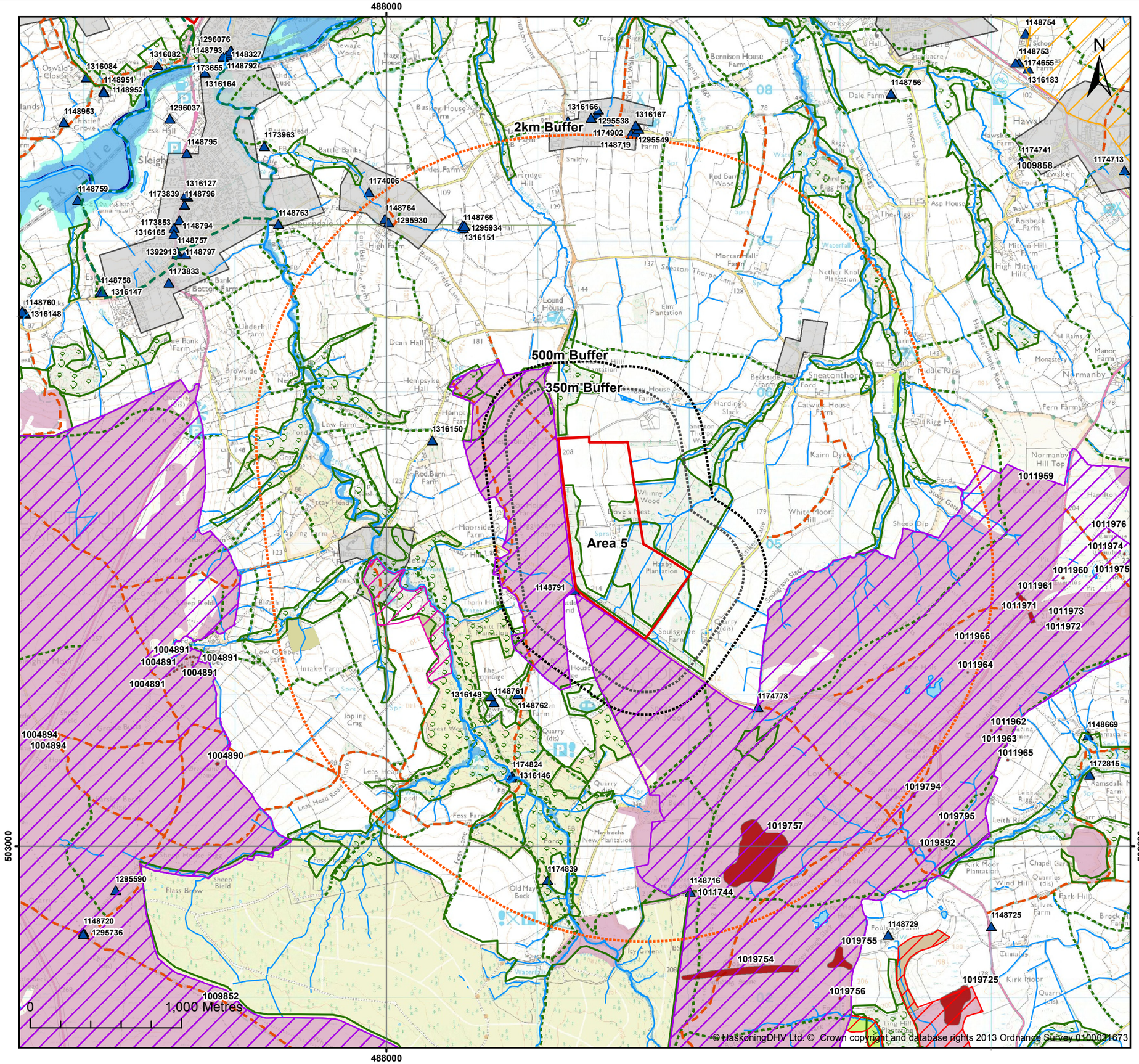
A range of similar effects would occur during the operational stage although the overall envelope and extent of visible development would be reduced due to containment by existing mature woodland cover around the site (see **Appendix A**).

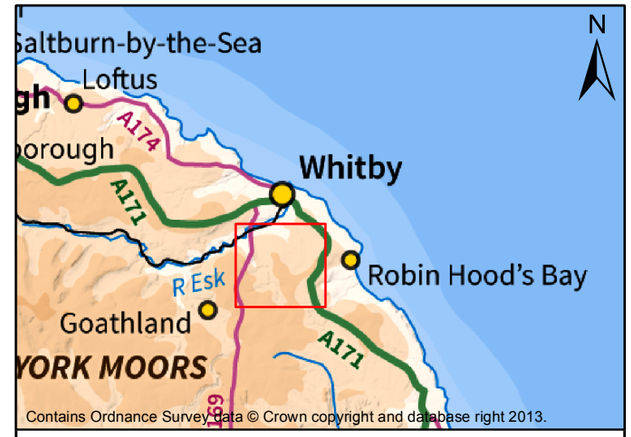
The Dove's Nest Farm site requires one MTS intermediate shaft site within the National Park, with associated construction and permanent stage effects. These effects would be associated with 45m high temporary winding towers and permanent operational stage effects associated with accommodation of spoil and provision of shaft head buildings at each site.

This site also requires further MTS shafts close to the edge of the National Park, with one shaft expected to be clearly intervisible from the edge of the National Park and a further site expected to be more distant but intervisible.

Existing mature woodland belts to the western, southern and eastern edges of the site would provide a degree of inherent mitigation during both construction and operational stages of the scheme, although location of the site on a ridge would reduce effectiveness in screening views of the temporary winding towers. Setting of minehead buildings east and downslope of the landform ridge would improve natural screening of operational stage activities in views from the west. Sensitive screen mounding and woodland planting could be used to contain operational stage views from the east. The existing heavily wooded character of the Ugglebarnby Ridge could provide an armature for large scale mitigation planting, enabling effective screening to be achieved whilst remaining in keeping with prevailing landscape character.

Figure 5.9 Constraints map of Area 5 (Dove's Nest Farm)





Legend

- Potential alternative area
- 2km Buffer
- 500m Buffer
- 350m Buffer
- North York Moors National Park
- National Inventory of Woodland and Trees
- River
- Pond
- Urban Area

Archaeological Constraints
- Scheduled Monument
- Listed Building

Public Right of Way
- Public Bridleways
- Public Footpaths

- Heritage Coast
- Biller Howe Dale
- Littlebeck Wood SSSI
- North York Moors SSSI, SAC & SPA

BAP Priority Habitat
- Deciduous Woodland
- Lowland Dry Acid Grassland
- Lowland Meadows
- Fen
- Undetermined Grassland
- Upland Heathland

Flood Risk
- Flooding from rivers or sea without defences
- Extent of extreme flood
- Main rivers

Data sources: Natural England, English Heritage
images derived from Environment Agency "What's in Your Back Yard"

Client: York Potash Limited

Project: York Potash Minehead Alternative Sites Assessment

Title: York Potash Minehead Potential Sites - Potential Area 5

Figure: 5.9 | Drawing No: XX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	31/01/2014	LW	PW	A3	1:25,000
03	13/12/2013	LW	PW	A3	1:25,000

Co-ordinate system: British National Grid

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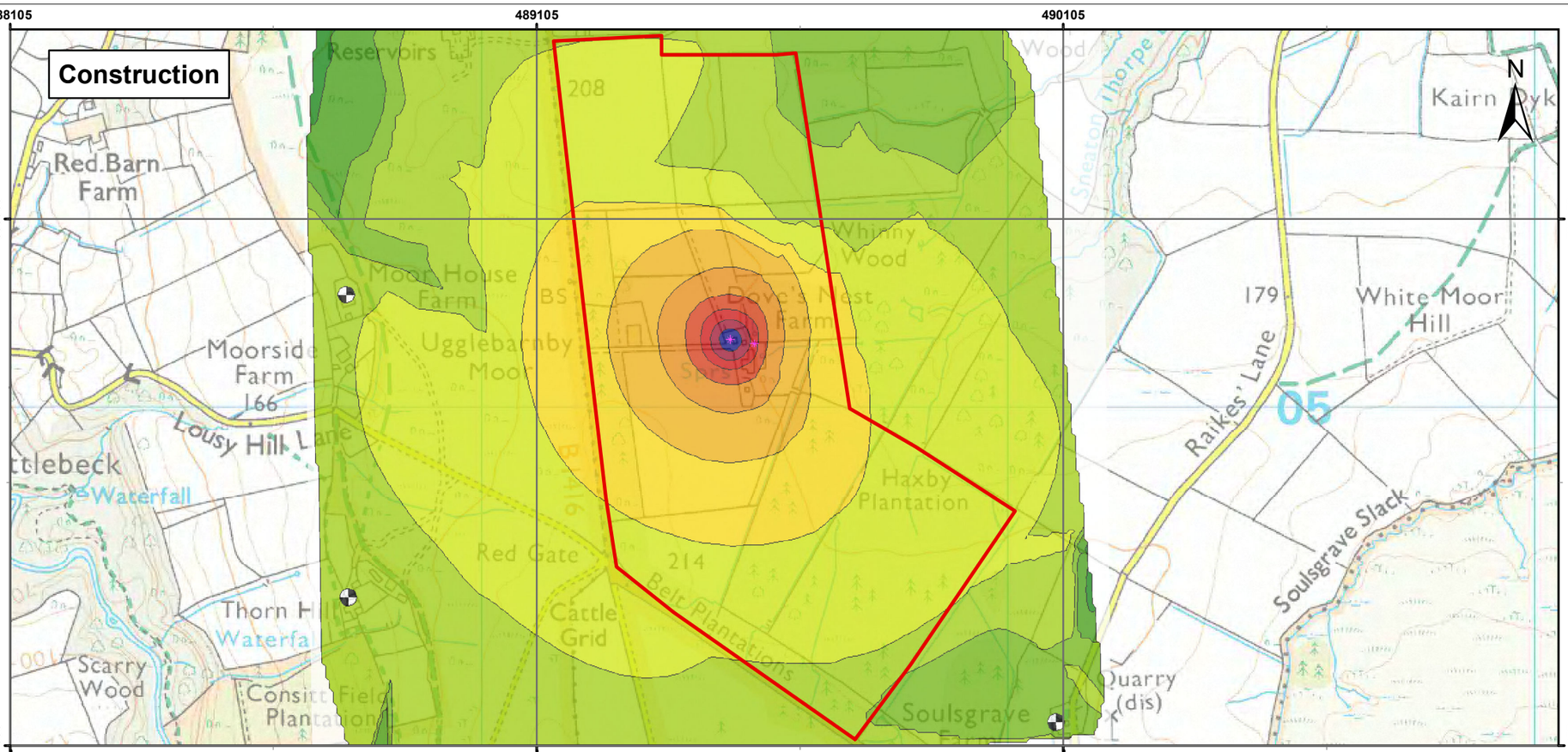
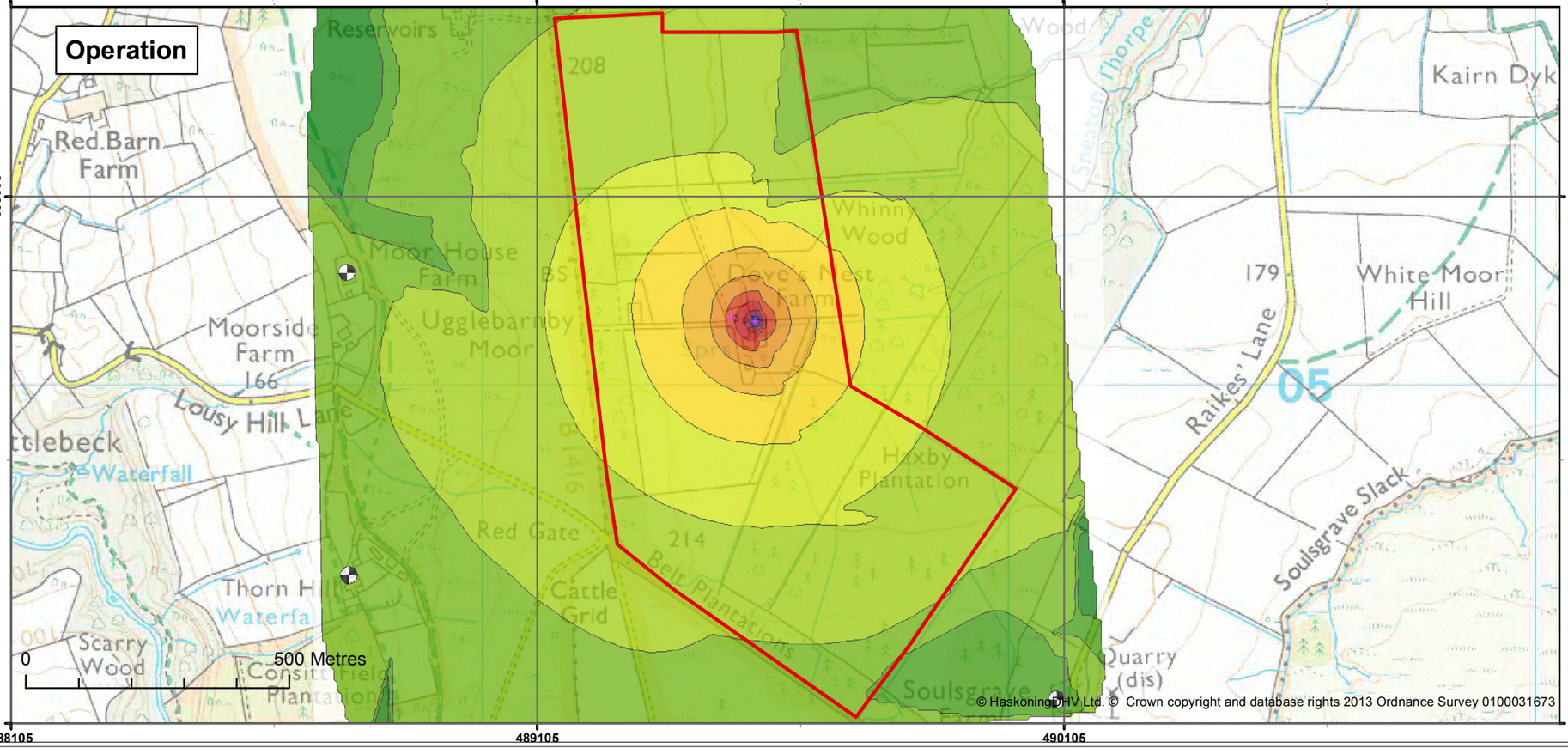
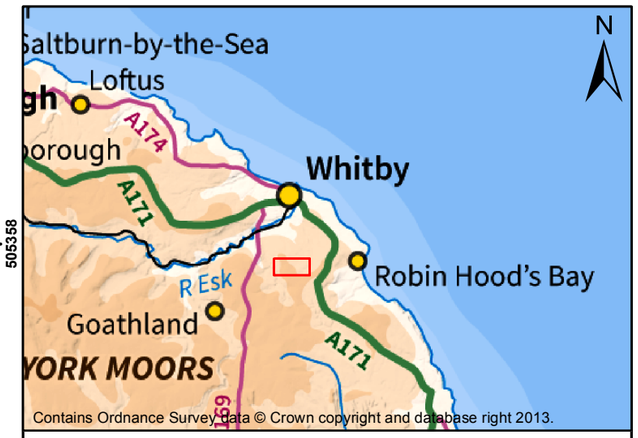
Figure 5.10 **Construction and Operation Noise Contours for Area 5 (Dove's Nest Farm)**







Legend

- Potential alternative area
- Noise calculation area

Noise level Lr24hr in aB(A)

	<= 50
50 <	<= 60
60 <	<= 70
70 <	<= 80
80 <	<= 90
90 <	<= 100
100 <	

- Elevation point
- Point source
- Point receiver

Client: York Potash Limited

Project: York Potash Minehead Alternative Sites Assessment

Title: York Potash Minehead Noise Modelling Results - Area 5: Construction and Operation

Figure: 5.10

Drawing No: XX

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	31/01/2014	LB	GC	A3	1:10,000
01	20/01/2014	LB	GC	A3	1:10,000

Co-ordinate system: British National Grid

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6 SUMMARY OF SITES AND CONSTRAINTS

Table 6.1 summarises a comparison of the environmental risks associated with the five areas considered in this environmental comparison of shortlisted sites. It includes summary details of the environmental risks associated with each topic and uses a traffic light system to indicate the level of risk posed by each area under each topic.

Table 6.1 Summary comparison of the potential environmental risks associated with the five shortlisted sites

Key	
Presents strong evidence of an environmental risk	
Presents a potential environmental risk and requires further investigation or specific mitigation	
Presents no notable environmental risks	

Potential risks	Area 1	Area 2	Area 3	Area 4	Area 5
Transport and access	Some potential for shift in transport mode in area. Constrained site access options and potential for significant adverse impacts upon local sensitive receptors and the wider highway network.	Some potential for shift in transport mode in area. Constrained site access options and potential for significant adverse impacts upon local sensitive receptors and the wider highway network.	Direct access to the primary highway network with limited impacts upon the most sensitive areas and some potential to encourage shift in transport mode in area.	Direct access to the primary highway network with limited impacts upon the most sensitive areas and some potential to encourage shift in transport mode in area.	Direct access to the highway network remote from local communities but potential for significant adverse impacts upon a cycle route sensitive junctions and sensitive routes through Whitby and Scarborough. Limited opportunities for shift in transport mode in area.
Noise	Settlements (residential receptors) within / adjacent to site	Settlements (residential receptors) adjacent to site	Isolated residential receptors adjacent to site Proximity to nearby settlements	Isolated residential receptors adjacent to site Proximity to nearby settlements	Isolated residential receptors / ecological receptors adjacent to site Noise mitigation already exists

Potential risks	Area 1	Area 2	Area 3	Area 4	Area 5
Air	Residential / ecological receptors within / adjacent to site. Access routes have air quality concern.	Residential receptors adjacent to site. Access routes have air quality concern.	Isolated residential receptors adjacent to site. Proximity to nearby settlements. Access routes have air quality concern.	Isolated residential receptors adjacent to site. Proximity to nearby settlements.	Isolated residential receptors / ecological receptors adjacent to site.
Ecology	No designated site within / adjacent to area boundary BAP habitat within area boundary. Intermediate sites likely to be required within statutory sites.	No designated site within / adjacent to area boundary BAP habitat adjacent to area boundary. Intermediate sites likely to be required within statutory sites.	No designated site within / adjacent to area boundary BAP habitat within area boundary. Intermediate site potentially required within statutory sites.	No designated site within / adjacent to area boundary BAP habitat within area boundary. Intermediate site potentially required within statutory sites.	SSSI / Natura 2000 site adjacent to area boundary BAP habitat within area boundary. No Intermediate site required within statutory sites.
Recreation and amenity (PRoW)	Footpaths lie within area boundary	Footpaths lie within area boundary	Footpaths lie within area boundary	Footpaths and bridleways lie within area boundary	No PRoW in area boundary Sustrans cycle route coincides with access route
Cultural heritage	No heritage assets within the area boundary Potential setting impact on nearby assets	No heritage assets within the area boundary Potential setting impact on nearby assets	No heritage assets within the area boundary Potential setting impact on nearby assets	No heritage assets within the area boundary Potential setting impact on nearby assets	No heritage assets within the area boundary Potential setting impact on nearby assets
Soils and land quality	No groundwater or ground contaminant risks Site covered by ELS	Pollution risk from landfills near area Site covered by ELS	No groundwater or ground contaminant risks Site covered by ELS	No groundwater or ground contaminant risks Site covered by ELS	No groundwater or ground contaminant risks Site covered by ELS
Flood risk	Minimal flood risk	No flood risk	No flood risk Onsite drains present technical constraint	No flood risk	No flood risk

Potential risks	Area 1	Area 2	Area 3	Area 4	Area 5
Landscape	Adverse visual impacts; mitigation options very limited. Intermediate sites likely to be required within National Park boundary.	Adverse visual impacts; mitigation options limited. Intermediate sites likely to be required within National Park boundary.	Adverse visual impacts; construction mitigation options limited (operational mitigation options available). Intermediate site required within National Park boundary. After Dove's Nest this site could be a second preference, on the basis that mitigation could take longer to become effective and would entail a change from existing open valley side landscape character to one of a wooded nature.	Adverse visual impacts; mitigation options very limited. Intermediate site likely to be required within National Park boundary. After Dove's Nest Farm this site could be a second preference, on the basis that mitigation could take considerably longer to become effective and would entail a significant change from existing open valley side landscape character to one of a wooded nature.	Adverse visual impacts; mitigation options available. Intermediate site required within National Park boundary.
Summary	Traffic / access, air quality and visual impacts are likely to present concerns to development in Area 1. Noise impacts, impacts to designated habitats, flood risk, heritage setting and PRoW diversion will also need to be considered.	Traffic / access, pollution risk from landfills and visual impacts are likely to present concerns to development in Area 2. Noise and air quality impacts, impacts to designated habitats, heritage setting and PRoW diversion will also need to be considered.	Noise and air quality impacts, impacts to designated habitats, heritage setting, flood risk, visual impacts and PRoW diversion will also need to be considered.	Noise and visual impacts are likely to present concerns to development in Area 4. Air quality impacts, impacts to designated habitats, heritage setting and PRoW diversion will also need to be considered.	Traffic (including cycle route impacts), noise and air quality impacts, impacts to designated sites and habitats, heritage setting and visual impacts will need to be considered for Area 5.

7 REFERENCES

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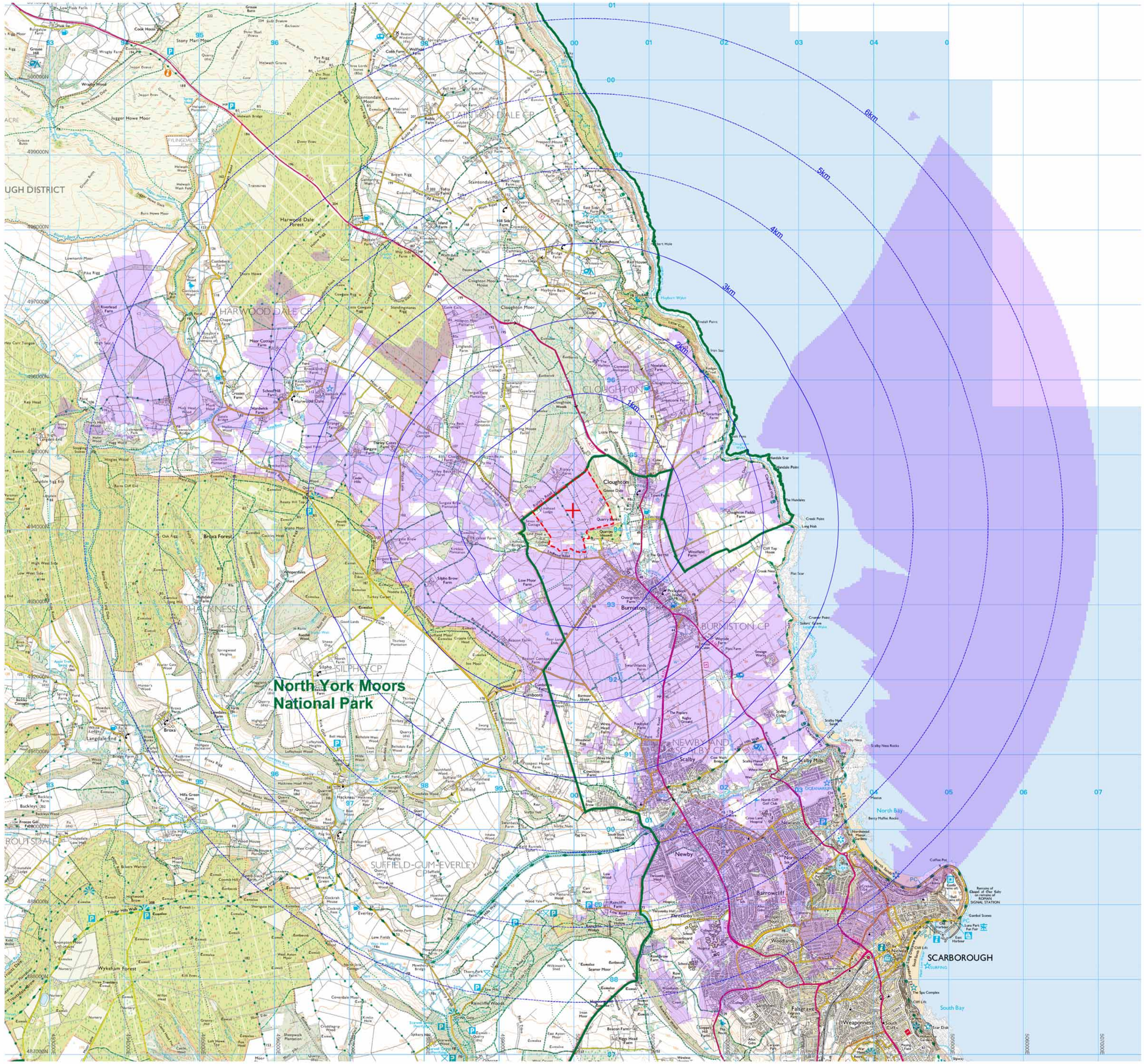
Appendix A: Zones of Theoretical Visibility

APPENDIX A: ZONES OF THEORETICAL VISIBILITY

This Appendix contains Figures of Zones of Theoretical Visibility for Construction and Operation of the minehead site for all five alternative areas. This includes:

- Operation Zone of Theoretical Visibility for Area 1 (Lindhead Gorse) Drawing No. 2312.01
- Construction Zone of Theoretical Visibility for Area 1 (Lindhead Gorse) Drawing No. 2312.02
- Operation Zone of Theoretical Visibility for Area 2 (Burniston) Drawing No. 2312.03
- Construction Zone of Theoretical Visibility for Area 2 (Burniston) Drawing No. 2312.04
- Operation Zone of Theoretical Visibility for Area 3 (Ruswarp) Drawing No. 2312.07
- Construction Zone of Theoretical Visibility for Area 3 (Ruswarp) Drawing No. 2312.08
- Operation Zone of Theoretical Visibility for Area 4 (Briggswath) Drawing No. 2312.09
- Construction Zone of Theoretical Visibility for Area 4 (Briggswath) Drawing No. 2312.10
- Operation Zone of Theoretical Visibility for Area 5 (Dove's Nest Farm) Drawing No. 2312.11
- Construction Zone of Theoretical Visibility for Area 5 (Dove's Nest Farm) Drawing No. 2312.12

Note that the alternative areas are numbered differently in the Zones of Theoretical Visibility figures. Use the drawing numbers (e.g. 2312.01) to identify the correct figures.



KEY

- SITE BOUNDARY
- POINT USED FOR ZTV ANALYSIS
- 1km OFFSETS FROM SITE BOUNDARY
- NORTH YORK MOORS NATIONAL PARK
- ZONE OF THEORETICAL VISIBILITY

Notes:

- ZTV envelope prepared using 45m high single point source located at centre of site. Digital terrain modelling is based on Ordnance Survey Terrain 50 data (ASCII 50m grid files). The ZTV takes no account of built forms. Larger woodland areas have been included in the ZTV model at an assumed height of 10m above ground level.
- Observers eye level assumed to be 1.7m

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YORKPOTASH
A Sirius Minerals Project

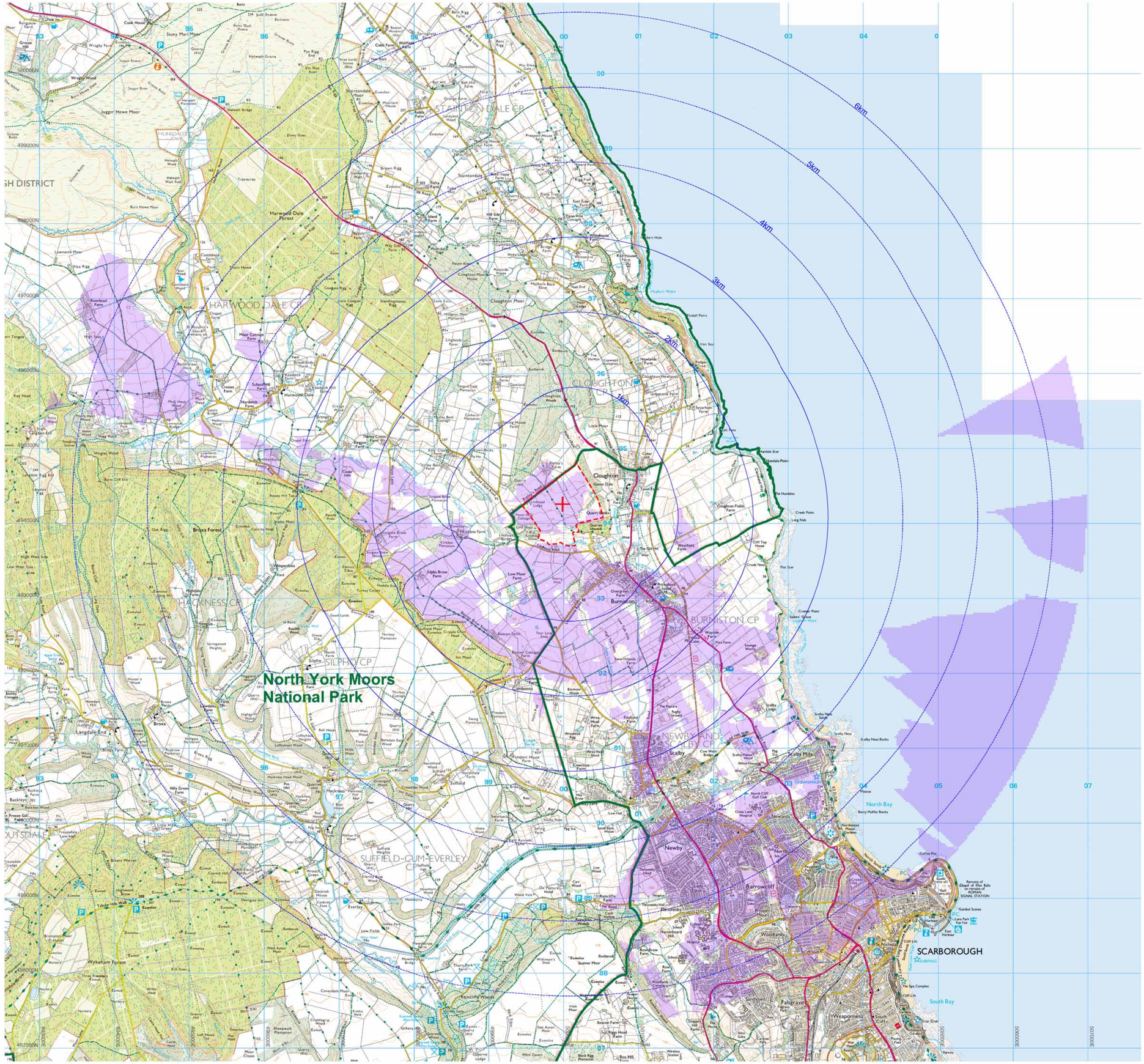
Project:

York Potash Project
Review of Alternative Minehead Sites

Drawing Title:

Site 1 (Cloughton Surrounds)
Zone of Theoretical Visibility -
Construction Stage

Drawing Number:	Revision:
2312.01	.
Scale:	Date:
1:25,000 @ A1	**December 2013**
Drawn:	Checked:
ME	SW



KEY

- SITE BOUNDARY
- POINT USED FOR ZTV ANALYSIS
- 1km OFFSETS FROM SITE BOUNDARY
- NORTH YORK MOORS NATIONAL PARK
- ZONE OF THEORETICAL VISIBILITY

Notes:

- ZTV envelope prepared using 10m high single point source located at centre of site. Digital terrain modelling is based on Ordnance Survey Terrain 50 data (ASCII 50m grid files). The ZTV takes no account of built forms. Larger woodland areas have been included in the ZTV model at an assumed height of 10m above ground level.
- Observers eye level assumed to be 1.7m

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Project:

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Review of Alternative Minehead Sites

Drawing Title:

Site 1 (Cloughton Surrounds)
Zone of Theoretical Visibility - Operational Stage

Drawing Number:	Revision:
2312.02	.
Scale:	Date:
1:25,000 @ A1	**December 2013**
Drawn:	Checked:
ME	SW

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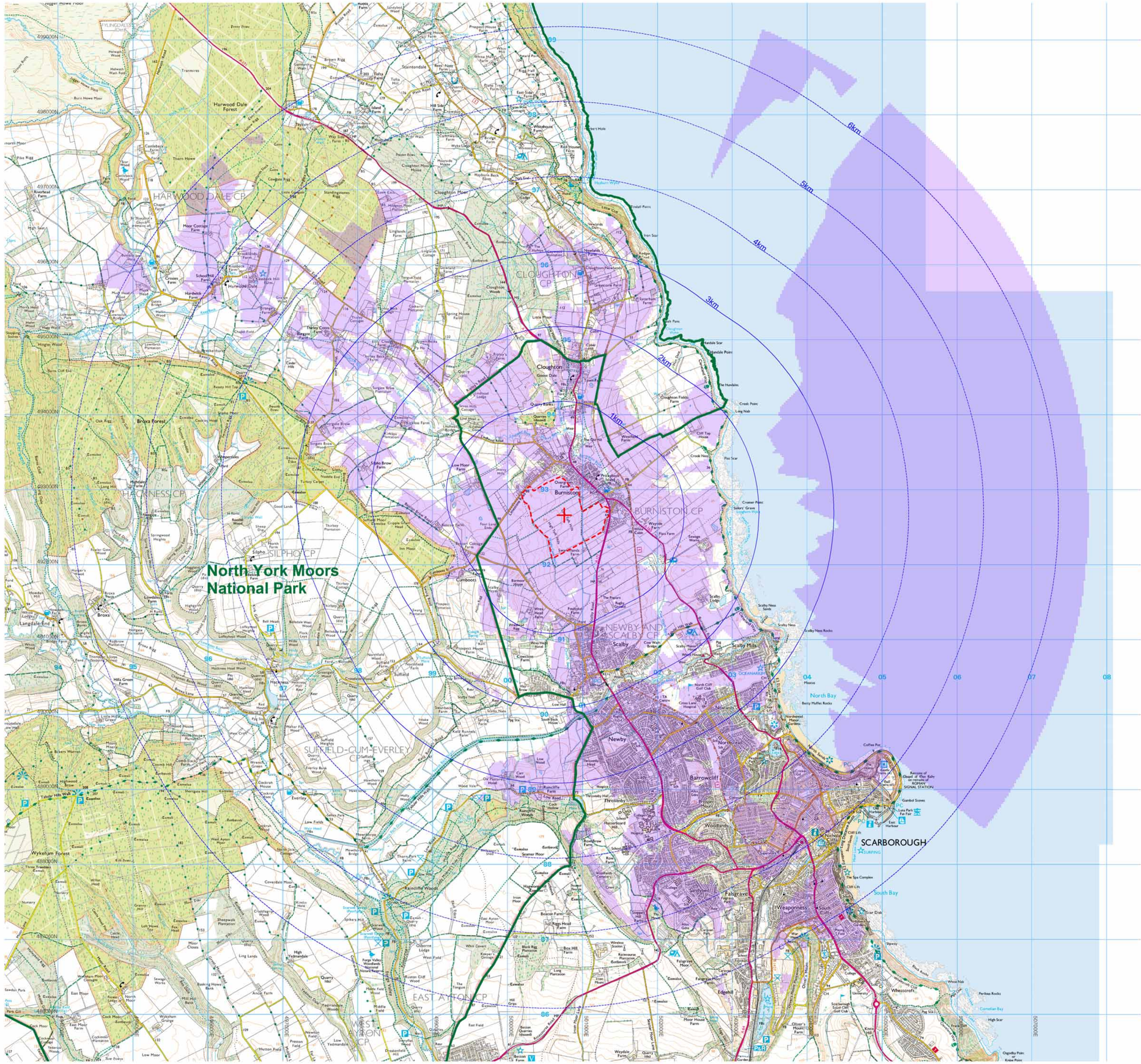

KEY

- SITE BOUNDARY
- POINT USED FOR ZTV ANALYSIS
- 1km OFFSETS FROM SITE BOUNDARY
- NORTH YORK MOORS NATIONAL PARK
- ZONE OF THEORETICAL VISIBILITY

Notes:

- ZTV envelope prepared using 45m high single point source located at centre of site. Digital terrain modelling is based on Ordnance Survey Terrain 50 data (ASCII 50m grid files). The ZTV takes no account of built forms. Larger woodland areas have been included in the ZTV model at an assumed height of 10m above ground level.
- Observers eye level assumed to be 1.7m

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YORKPOTASH
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Project:

York Potash Project
Review of Alternative Minehead Sites

Drawing Title:

Site 2 (Cloughton Surrounds)
Zone of Theoretical Visibility - Construction Stage

Drawing Number:	Revision:
2312.03	.
Scale:	**Date:**
1:25,000 @ A1	**December 2013**
Drawn:	**Checked:**
ME	SW

File: 2312_03_ZTV site 2_construction_13_12_02.dwg , Printed: 05/12/2013, Last saved by: John

NORTH

KEY

- SITE BOUNDARY
- POINT USED FOR ZTV ANALYSIS
- 1km OFFSETS FROM SITE BOUNDARY
- NORTH YORK MOORS NATIONAL PARK
- ZONE OF THEORETICAL VISIBILITY

Notes:

- ZTV envelope prepared using 10m high single point source located at centre of site. Digital terrain modelling is based on Ordnance Survey Terrain 50 data (ASCII 50m grid files). The ZTV takes no account of built forms. Larger woodland areas have been included in the ZTV model at an assumed height of 10m above ground level.
- Observers eye level assumed to be 1.7m

Revision .

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YORKPOTASH
A Sirius Minerals Project

Project:

York Potash Project
Review of Alternative Minehead Sites

Drawing Title:

Site 2 (Cloughton Surrounds)
Zone of Theoretical Visibility -
Operational Stage

Drawing Number:	Revision:
2312.04	.
Scale:	Date:
1:25,000 @ A1	**December 2013**
Drawn:	Checked:
ME	SW

File: 2312_04_ZTV site 2_operational_13_12_02.dwg , Plotted: 05/12/2013, Last saved by: John