

NYMNP

22/08/2019

**From:** Victoria Hill  
**Sent:** 22 August 2019 13:56  
**To:** Rob Smith  
**Cc:**  
**Subject:** Sirius Response to Letter NYM/2019/0524/CVC dated 12 August 2019

Dear Rob,

Please find attached correspondence from Rob Staniland in response to your letter dated 21 August 2019 (reference NYM/2019/0524/CVC).

If you have any questions, please feel free to contact Rob direct.

Kind regards,

**Victoria Hill**  
**Environmental Management Officer**

**Sirius Minerals Plc**

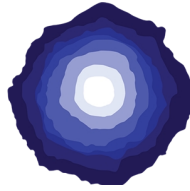
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Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**REMEDIAL ACTION PLAN (RAP) PHASE 11 - NYMNP 46- PHASE 11)**

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22/08/2019

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NYMNPA  
22/08/2019

**SIRIUS MINERALS PLC - DISCHARGE OF PLANNING CONDITIONS FOR  
PLANNING APPLICATION NYM/2017/0505/MEIA,  
NORTH YORKSHIRE POLYHALITE PROJECT**

<b>CONDITION</b>	<b>NYMNPA 46</b>
<b>REPORT</b>	<b>REMEDIAL ACTION PLAN</b>
<b>SITE</b>	<b>PHASE 11 WORKS AT WOODSMITH MINE, NORTH YORKSHIRE</b>
<b>DOCUMENT NUMBER</b>	<b>40-FWS-WS-70-WM-PL-0024</b>

1433DevOR445 Rev03/August 2019

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<b>PROJECT NUMBER</b>	1433			
<b>PROJECT TITLE</b>	North Yorkshire Polyhalite Project			
<b>CLIENT</b>	Sirius Minerals plc 7-10 Manor Court Manor Garth SCARBOROUGH YO11 3TU			
<b>REPORT TITLE</b>	Remedial Action Plan for the Phase 11 Works At Woodsmith Mine, North Yorkshire			
<b>REPORT REFERENCE</b>	1433DevOR445 Rev 3			
<b>DOCUMENT NUMBER</b>	40-FWS-WS-70-WM-PL-0024			
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NYMNPA

22/08/2019

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	1433DevOD410 SURFACE AND GROUNDWATER MONITORING LOCATIONS

## REMEDIAL ACTION PLAN FOR THE PHASE 11 WORKS AT WOODSMITH MINE, NORTH YORKSHIRE

### 1 INTRODUCTION

#### 1.1 General Background

This document has been prepared on behalf of Sirius Minerals plc and provides the Remedial Action Plan for the Phase 11 Works at the Doves Nest Farm Minesite (Phase 11 Works) that will run concurrently with the Phase 7 to 10 works. This is required to satisfy Condition 46 of the North York Moors National Park Authority (NYMNP) planning permission NYM/2014/0676/MEIA (as varied by NYM/2017/0505/MEIA).

This document details the remedial actions required should monitoring, undertaken in accordance the Ground and Surface Water Monitoring Scheme for the Phase 11 Works (Ref. 1), identify exceedances to the defined Trigger Values.

#### 1.2 Objectives

The purpose of this document is to:-



- Provide a list of individuals (and their contact details) who are responsible for identifying and investigating a Trigger Value exceedance;
- Provide a procedure for investigating and escalating a Trigger Value exceedance, and for informing the appropriate regulator (the Environment Agency);
- Provide a list of individuals and organisations to be informed in the event of an exceedance or a confirmed departure from the established baseline;
- Detail actions to protect the environment in the event of a suspected or confirmed environmental incident or departure from the established baseline.

#### 1.3 Phase 11 Works

Provided below are details of the proposed Phase 11 Works, which will be undertaken concurrently with the ongoing Phase 7 to 10 works.

##### Phase 11 Works

- Development of landscape mitigation screening;
- Tree clearance within Haxby Plantation;
- Sinking the MTS shaft via drill and blast method;
- Operation of the Galloway;
- Creation of a materials handling area;
- Installation of external silencer to the dust collector of the Service Shaft building;
- Installation of batteries.

**Ongoing Construction Works at the Woodsmith Mine Site**

- Phase 7 Completion of Service Shaft excavation to 83.17 m AOD;
- Phase 7 Excavation of Production Shaft Headgear Chamber to 158.16 m AOD;
- Phase 7 Excavation of Production Shaft to 83.66 m AOD;
- Phase 8 Construction of permanent Service Shaft building, including installation of the winder equipment;
- Phase 8 Construction of permanent Production Shaft building, including installation of the winder equipment;
- Phase 9 installation of secure storage unit;
- Phase 9 assembly and installation of Galloway into MTS Shaft;
- Phase 9 installation and operation of first stage of non-domestic wastewater treatment plant (NDWWTP);
- Phase 10 Mechanical excavation and grouting of Service Shaft to 83.17 m AOD to install a temporary precast concrete segmental liner with back grouting followed by installation of the permanent secondary cast insitu concrete; and
- Phase 10 Piling to the floor slab in the head frame chamber will be undertaken after completion of installing the hydrostatic liner.

**1.4 Compliance with Conditions**

Table 1 sets out the wording of Planning Condition 46 to Planning Consent Ref No. NYM/2017/0505/MEIA and details where the relevant material, to comply with this condition, has been provided within this report: -

**Table 1 - Summary of Planning Condition 46 and Where Relevant Details Are Provided In This Report**

<b>NYMNP Condition 46</b>	<b>Compliance with Condition 46</b>
The Remedial Action Plan shall include: -	
The remedial actions to be taken in the event that any monitoring triggers of the approved Construction and Operational Phase Ground and Surface Water Monitoring Scheme are exceeded.	Sections 3 to 5

**2 RESPONSIBILITIES AND CONTACTS**

**2.1 Parties Responsible for Identifying and Investigating a Trigger Value Exceedance**

Table 2 presents the details of the individuals and their contact information for the parties responsible for identifying and investigating a Trigger Value exceedance.

**Table 2 - Parties Responsible for Identifying and Investigating a Trigger Value Exceedance**

<b>Contact Name</b>	<b>Position</b>	<b>Company</b>	<b>Contact Details</b>	<b>Responsibility</b>
Robert Staniland	Environment Manager	Sirius Minerals	Resolution House Lake View Scarborough YO11 3ZB	Coordination of Environmental Activities within the Development
Charlotte Bell Zoe Cooper John Surphliss	Environmental officers			Monitoring of ground and surface water in accordance with the Ground Water Management Scheme.
Graham Clarke	Project Manager			Operation of the NDWWTP

## 2.2 Parties to be informed in the Event of an Exceedance/Departure from Baseline Conditions

In accordance with Condition 46 of planning permission NYM/2017/0505/MEIA, Table 3 presents those individuals and organisations who are to be informed in the event of an exceedance or a confirmed departure from the established baseline conditions: -

**Table 3 Parties to be informed in the Event of an Exceedance/Departure from Baseline Conditions**

Contact Name	Position	Company/ Regulatory Body	Contact Details
Robert Staniland	Environment Manager	Sirius Minerals	Resolution House, Lake View, Scarborough, YO11 3ZB
Graham Clarke	Project Manager	Sirius Minerals	
Fraser Thomlinson / Ruth Buckley	Planning Liaison Officer / Yorkshire Area Groundwater and Contaminated Land Team	Environment Agency	Lateral, 8 City Walk, Leeds, LS11 9AT
Rob Smith,	Senior Minerals Planner	North York Moors National Park Authority	The Old Vicarage, Bondgate, Helmsley, York, North Yorkshire YO62 5BP
Merlin Ash	Yorkshire and Northern Lincolnshire Team	Natural England	Hornbeam House, Crewe Business Park, Electra Way, Crewe, Cheshire CW1 6GJ

## 3 PROCEDURE FOR EVALUATING EXCEEDANCES IN TRIGGER VALUES

### 3.1 General

A Ground and Surface Water Monitoring Scheme (Ref. 1) has been prepared detailing the monitoring requirement for the Phase 11 Works. That document details the groundwater, spring water, surface water and ecological monitoring to be undertaken to identify what physical or chemical impacts are occurring from the Phase 11 Works undertaken concurrently with the ongoing Phase 7 to 10 works.

The Ground and Surface Water Monitoring Scheme (Ref. 1) details the Control and Compliance Trigger Values that the monitoring data will be assessed against.

Where exceedances of the Control Trigger Values occur, the procedure to evaluate and record the remedial actions required, will be as set out in Section 3 of the Remedial Action Plan.

### 3.2 Environmental Groundwater Level Evaluation

#### 3.2.1 Groundwater Levels Assessment Procedure

Details of the groundwater level monitoring locations are presented in Section 2.3 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

The results will be compared with baseline data and the Control and Compliance Trigger Values to identify any exceedances.



Appendix 1.1 presents the procedure for assessing exceedances of groundwater level (GWL) Control and Compliance Trigger Values at the environmental groundwater level monitoring points during the Phase 11 Works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

### 3.2.2 Consultation with Project Manager and Planning Remedial Actions

The recorded exceedance of either GWL Control or Compliance Trigger Values will be evaluated by the Environmental Engineer in consultation with the Project Manager to determine the cause of the exceedance and the appropriate course of remedial action that will be taken.

An exceedance of the GWL Control or Compliance Trigger Values for individual boreholes will be assessed in conjunction with the rainfall data for the preceding period, to ascertain whether the exceedance is due to natural climatic conditions or as a result of the Phase 7 to 11 Works.

The recorded exceedance will be classed as either: -

- A natural (non-site related) exceedance of the GWL Control or Compliance Trigger Value, caused by natural variations in rainfall (i.e. low rainfall).
- An exceedance of the GWL Control or Compliance Trigger Value, caused by the Phase 7 to 11 Works.
- An exceedance of the GWL Control or Compliance Trigger Value, caused by non-Phase 7 to 11 related offsite works.

Where the exceedance is found to be caused by natural climatic conditions or non-Phase 7 to 11 related works, they will be recorded as such and no further remedial actions will be required.

The remedial actions will be designed specific to the degree of exceedance (i.e. physical change in groundwater levels), the location where the exceedance was recorded, and the likely cause of this exceedance.

### 3.2.3 Implementing Remedial Actions

Where remedial actions are specified by the Environmental Officer, related to an exceedance in either GWL Control or Compliance Trigger Values, they will be advised to the Project Manager, the Environment Manager and the Regulators (as detailed in Section 2.2), and implemented by the Project Manager.

Remedial actions for an exceedance of the GWL Compliance Trigger Value will be considered in association with exceedances of any spring flow (SpWF) Control or Compliance Trigger Values (Section 3.7) or Ecology Control or Compliance Trigger Values (Section 3.9). They may include implementing additional monitoring and the provision of an alternative water supply to Moorside Farm or Soulsgrave Farm.

### 3.3 Groundwater Quality General Construction Activities

#### 3.3.1 Groundwater Quality Assessment Procedure

Details of the groundwater quality monitoring locations and testing suites are presented in Section 2.4 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

Groundwater samples will be taken on a monthly basis and the results of laboratory testing will be available one week after sampling. The laboratory results will be compared with baseline data and the GWQ Control and Compliance Trigger Values to identify any exceedances.

Appendix 1.2 presents the procedure for assessing exceedances of groundwater quality (GWQ) Control and Compliance Trigger Values at the groundwater quality monitoring points, during the general construction activities undertaken as part of the Phase 11 Works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

#### 3.3.2 Consultation with Project Manager and Planning Remedial Actions

The recorded exceedance of any GWQ Control and Compliance Trigger Values and the findings of the construction works inspection will be evaluated by the Environmental Officer in consultation with the Project Manager to determine the cause of the exceedance and the appropriate course of remedial action to be taken.

A natural (non-site related) exceedance of the GWQ Control Trigger Values in the up hydraulic gradient boreholes may require an adjustment of the Control Trigger value, in line with the revised baseline conditions, as described in the Ground and Surface Water Management Scheme (Ref. 1), and records of any changes and reasons for those changes will be kept for any subsequent required review.

The remedial actions will be designed specific to the determinand that has been exceeded, the location where the exceedance was recorded, and the likely cause of this exceedance in either the GWQ Control or Compliance Trigger Values.

#### 3.3.3 Implementing Remedial Actions

Where remedial actions are specified by the Environmental Officer, related to an exceedance in either the GWQ Control or Compliance Trigger Values, they will be advised to the Director of Operations, the Environment Manager and the Regulators (as detailed in Section 2.2), and implemented by the Project Manager.

Remedial actions for an exceedance of GWQ Control Trigger Values may include, but not be limited to; temporarily increasing monitoring frequency to weekly, remediation of spillage site and a change in site construction practices, as detailed in the Construction Environmental Management Plan (CEMP) to prevent future re-occurrence of construction related pollution.

Where the exceedance of the GWQ Compliance Trigger Value occurs down hydraulic gradient of the site, remedial actions may include modelling and installation of additional groundwater monitoring wells to evaluate the magnitude of impact at the site boundary and at the nearest

down hydraulic gradient receptor. If the results of that modelling and additional monitoring show that an adverse impact is occurring in exceedance of the Compliance Trigger Value at the groundwater receptor, then groundwater remediation of the pollution source will be considered and appropriate measures will be implemented, as agreed with the Regulators (see Section 2.2.2).

### **3.4 Groundwater Quality Associated with Bund F**

#### **3.4.1 Groundwater Quality Assessment Procedure**

Details of the groundwater quality monitoring locations and testing suites are presented in Section 2.4 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

Groundwater samples will be taken on a monthly basis and the results of laboratory testing will be available one week after sampling. The laboratory results will be compared with baseline data and the GWQ Control and Compliance Trigger Values to identify any exceedances.

Appendix 1.2 presents the procedure for assessing exceedances of groundwater quality (GWQ) Control and Compliance Trigger Values at the groundwater quality monitoring points, during the earthworks to construct Bund F utilising the MTS shaft construction arisings. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

#### **3.4.2 Consultation with Project Manager and Planning Remedial Actions**

Consultation with the Project Manager and Planning of remedial actions will be undertaken as detailed in Section 3.3.3.

#### **3.4.3 Implementing Remedial Actions**

Remedial actions for an exceedance of GWQ Control Trigger Values may include, but not be limited to; temporarily increasing monitoring frequency to weekly, change in blast design and management practices, and temporarily recirculating water from the basal drainage system (Manholes BF-BD-100 and BF-BD-200) back onto the earthworks during Bund F construction.

Where exceedances of the GWQ Compliance Trigger Value occurs down hydraulic gradient of the site associated with the leachable content of the extractive materials placed in Bund F, remedial actions may include installing temporary seals to the basal drainage system at manholes BF-BD-100 and BF-BD-200 and commencing recirculation of the basal drainage water onto the exposed rockfill on Bund F, increasing the size of the attenuation facilities downstream on the perimeter swale, modelling and installation of additional groundwater monitoring wells to evaluate the magnitude of impact at the site boundary and at the nearest down hydraulic gradient receptor. If the results of that modelling and additional monitoring show that an adverse impact is occurring in exceedance of the Compliance Trigger Value at the groundwater receptor, then measures to mitigate pollution will be considered and appropriate measures will be implemented, as agreed with the Regulators (see Section 2.2.2).

## 3.5 Spring Water Flow Rates

### 3.5.1 Spring Water Flow Rate Assessment Procedures

Details of the spring water flow rate monitoring is presented in Section 2.5 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

The spring flowrate monitoring will be undertaken at Soulsgrave Farm Spring and Moorside Farm Spring at a weekly frequency and the results compared with baseline data, and the SpWF Control and Compliance Trigger Values.

Appendix 1.3 presents the procedure for assessing exceedances of spring flow (SpWF) Control and Compliance Trigger Values, during the Phase 11 Works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

### 3.5.2 Consultation with Project Manager and Planning Remedial Actions

The recorded exceedance of either SpWF Control or Compliance Trigger Values will be evaluated by the Environmental Officer in consultation with the Project Manager to determine the cause of the exceedance and the appropriate course of remedial action that will be taken.

An exceedance of the SpWF Control or Compliance Trigger Values for Moorside Farm Spring and Soulsgrave Farm Spring will be assessed in conjunction with the rainfall data and groundwater level data for the preceding period, to ascertain whether the exceedance is due to natural conditions or as a result of the minesite development works.

An exceedance will be classed as either: -

- A natural (non-site related) exceedance of the SpWF Control / Compliance Trigger Value, caused by natural variations in rainfall (i.e. low rainfall).
- An exceedance of the SpWF Control / Compliance Trigger Value caused by the Phase 11 Works.

Where the exceedance is found to be natural, it will be recorded as such and no further remedial actions will be required.

The remedial actions will be designed specific to the degree of exceedance (i.e. physical change in flow rate), the location where the exceedance was recorded, and the likely cause of this exceedance.

### 3.5.3 Implementing Remedial Actions

Where remedial actions are specified by the Environmental Engineer, related to an exceedance in Trigger Values, they will be advised to the Director of Operations, the Environment Manager and the Regulators (as detailed in Section 2.2), and implemented by the Project Manager.

Remedial actions for a prolonged exceedance of the SpWF Compliance Trigger Values will be considered in association with exceedances of Environmental GWL Control or Compliance

Trigger Values or Ecological Control or Compliance Trigger Values (Section 3.8). Such remedial actions may include provision of an alternative water supply to Moorside Farm or Soulsgrave Farm.

## 3.6 Spring Water Quality

### 3.6.1 Spring Water Quality Assessment Procedure

Details of the spring water quality monitoring locations and testing suites are presented in Section 2.5 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

The spring water quality monitoring of Moorside Farm Spring and Soulsgrave Farm Spring will be undertaken monthly during the works. The laboratory results will be compared with the baseline and SpWQ Control and Compliance Trigger Values.

Appendix 1.4 presents the procedure for assessing exceedances of spring water quality (SpWQ) Control and Compliance Trigger Values during the minesite development works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

### 3.6.2 Consultation with Project Manager and Planning Remedial Actions

The recorded exceedance of any SpWQ Control and Compliance Trigger Values will be evaluated by the Environmental Officer in consultation with the Project Manager to determine the cause of the exceedance and the appropriate course of remedial action that will be taken.

An exceedance of the SpWQ Control and Compliance Trigger Value for Moorside Farm Spring and Soulsgrave Farm Spring will be assessed in conjunction with the rainfall data and groundwater quality data for the preceding period, to ascertain whether the exceedance is due to natural conditions or is as a result of the minesite development.

A natural (non-site related) exceedance of the Control Trigger Values in the spring water quality may require an adjustment of the SpWQ Control Trigger Value, in line with the revised baseline conditions.

The remedial actions will be designed specific to the exceedance was recorded and the likely cause.

### 3.6.3 Implementing Remedial Actions

Where remedial actions are specified by the Environmental Officer, they will be advised to the Director of Operations, the Environment Manager and the Regulators (as detailed in Section 2.2) and implemented by the Project Manager.

Remedial actions for an exceedance may include, but not be limited to, remediation of spillage site / pollution source and a change in site practices, detailed in the Construction Environmental Management Plan (CEMP), to prevent re-occurrence, future spillages / pollution.

Remedial actions for a prolonged exceedance of the SpWQ Compliance Trigger Value may include provision of an alternative water supply to Moorside Farm and remediation to the groundwater source supplying the spring.

### 3.7 Surface Water Quality and Geomorphology

#### 3.7.1 Surface Water Quality and Geomorphology Assessment Procedures

##### **Surface Water Quality**

Details of the surface water quality monitoring locations, testing suites and SWQ Control and Compliance Trigger Values are presented in Section 2.6 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

The surface water drainage system will be inspected on a regular basis to ensure that it is in good working order. This will include, as appropriate, inspection of the swales, filter drains, the attenuation tank for the Materials Handling Area and its outfall to the perimeter swale, and associated catch pits, ponds, oil separators and silt fences. Any visible impact on the surface water courses will be identified and considered in conjunction with the field turbidity readings and their respective background concentrations, such as cloudy discharge due to suspended solids.

The monitoring will be assessed by consideration of the construction activities, as determined from a visual site inspection of the operations, and the meteorological conditions, to identify the cause of a specific exceedance.

Appendix 1.5 presents the procedure for assessing exceedances of surface water quality (SWQ) Control and Compliance Trigger Values during the Phase 11 Works. It presents a summary of the sequence of activities and respective timescales for each stage, for which details are provided below.

##### **Geomorphology**

Details of the geomorphological surveys to be undertaken are presented in Section 2.6 of the Construction and Operation Ground and Surface Water Monitoring Scheme (Ref 1) and the locations are shown in Drawing 1433DevOR410.

The construction phase monitoring will be assessed by comparison with the pre-commencement baseline geomorphological conditions to establish evidence of erosion, geotechnical failure, sediment accumulation, vegetation changes, and pollution/dischouration, for which remedial actions to mitigate these changes should be considered.

#### 3.7.2 Consultation with Project Manager and Planning Remedial Actions

The recorded exceedance of the any SWQ Control and Compliance Trigger Values, changes in geomorphological conditions and the findings of the inspection will be evaluated by the Environmental Officer in consultation with the Project Manager to determine the cause of the exceedance and the appropriate course of remedial action that will be taken.

The remedial actions will be designed specific to the cause and form of the exceedance in terms of pollution, erosion, siltation or adverse impact where the exceedance has been recorded.

### 3.7.3 Implementing Remedial Actions

Where remedial actions are specified by the Environmental Officer, related to either an exceedance in SWQ Control or Compliance Trigger Values or to an adverse change in the stream's geomorphological conditions, they will be advised to the Director of Operations, the Environment Manager and the Regulators (as detailed in Section 2.2), and implemented by the Project Manager.

A natural (non-site related) exceedance of the SWQ Control Trigger Value may require an adjustment of the SWQ Control Trigger value, in line with the revised baseline conditions, as described in the Ground and Surface Water Management Scheme (Ref. 1).

Remedial actions for a exceedance of SWQ Control Trigger Values or due to an adverse change in the geomorphology of the stream may include, but not be limited to; maintenance or extension to swales, addition of check dams and silt fencing, clearance of filter drains and associated catch pits, implementation of silt fences, maintenance of ponds oil separators, management of unspent explosives and hydraulic fluids during MTS shaft construction, management of earthworks and surface water drainage during Bund F construction, management and attenuation of basal drainage discharge from Bund F into the surface water drainage system and temporarily closing off the discharge from the Materials Handling Area attenuation tank and treating this water in the NDWWTP.

Remedial actions for a exceedance of the Compliance Trigger Value or due to an adverse change in the geomorphology of the stream may include, but not be limited to, the above remedial actions, but may also include implementation of additional emergency surface water management measures including the use of additional hay/heather bales, environmentally friendly coagulant, silt busters and silt fences to reduce silt migration, the use of absorbent spill pads and booms to contain and absorb hydrocarbon contamination, installing temporary seals to the basal drainage system at manholes BF-BD-100 and BF-BD-200 and commencing recirculation of the basal drainage water onto the exposed rockfill on Bund F, increasing the size of the attenuation facilities downstream of the perimeter swale, and temporarily closing off the discharge from the Materials Handling Area attenuation tank and treating this water in the NDWWTP.

## 3.8 Ecology

### 3.8.1 Ecological Assessment Procedure

The following sections present the procedure that will be adopted for assessing exceedances of the Ecological Control Trigger Values (Ref. 1) during the Phase 11 Works. It presents a summary of the sequence of activities and respective timescales to assess the Ecological Trigger Values and to implement the remedial actions required.

### 3.8.2 Monitoring Appraisal

The objective of the ecological monitoring is to determine whether the Phase 11 Works are impacting on the flora in the shallow valley feature, south of Lousy Hill Lane, Ugglebarnby

Moor. Any changes in the habitat or its diversity in this area will be compared to changes in the groundwater levels and spring flow rates monitored at Moorside Farm Spring to determine whether these changes in habitat conditions are related to hydrogeological changes.

A series of ten fixed monitoring locations for quadrat sampling will be monitored undertaken in August or September before and after this construction period for change in National Vegetation Classification (NVC), change in percentage cover of the key indicator species and colonisation by new species.

### 3.8.3 Consultation with Project Manager and Planning Remedial Actions

The recorded exceedance of any Ecological Control Trigger Values will be evaluated by the Environmental Officer in consultation with the Project Manager to determine the cause of the exceedance and the appropriate course of remedial action that will be taken.

An exceedance of the Ecology Control Trigger Values will be assessed in conjunction with the rainfall data, groundwater level and quality data and the spring flow rate and quality data for the preceding period, to ascertain whether the exceedance is due to natural conditions or as a result of the works at Woodsmith Mine.

The remedial actions will be designed to mitigate the specific Ecological Control Trigger Value that has been exceeded.

### 3.8.4 Implementing Remedial Actions

Where remedial actions are specified by the Environmental Engineer, related to an exceedance in Ecological Control Trigger Values, they will be advised to the Director of Operations, the Environment Manager and the Regulators (as detailed in Section 2.2), and implemented by the Project Manager.

Remedial actions may include replanting of specific vegetation.

## 4 REPORTING

All exceedances in Groundwater Level, Spring Flow and Surface Water Quality Control and Compliance Trigger Values or visually identified impacts observed and remedial actions implemented will be reported on a weekly basis during the Phase 11 Works and for one month thereafter by the Environmental Engineer. Exceedances in Ground Water and Spring Quality Control and Compliance Trigger Values and remedial actions implemented will be reported on a monthly basis during the Phase 11 Works and for one month thereafter by the Environmental Engineer.

That report will detail the exceedance that occurred, the weekly construction activities and meteorological conditions preceding the exceedance, the results of the site inspection/monitoring, the established cause of the exceedance in Trigger Values and the remedial action specified together with the timescale for it to be implemented.

Where Control or Compliance Trigger Value exceedances are identified associated with the Phase 11 Works, they will be advised to those identified in Section 2.2 within 48 hours of receipt of the laboratory results. Where visual evidence of adverse impacts associated with the



Phase 11 Works are identified, the inspection report and remedial action specified will be issued to those identified in Section 2.2 within 24 hours, in respect to spring flows providing domestic water supplies and 48 hours of that exceedance for all other receptors.

On completion of the Remedial Action, a record of the measures implemented, and their effectiveness will be recorded and issued to the relevant parties. The Project Manager will provide a copy of the report to those identified in Section 2.2 to the timescales presented in Section 5.

## 5 TIMESCALES

A cumulative report detailing the assessment of monitoring and inspection results for groundwater level, spring flow and water quality, and surface water quality and geomorphology, recording any exceedances in Control and Compliance Trigger Values or visually identified impacts observed and remedial actions to be implemented will be compiled on an annual basis. The reports will be issued to the relevant regulators listed in Section 2.2 where an exceedance in Trigger Value or an impact is visually observed.

Control Trigger Value exceedances will be investigated within one week and the remedial action required implemented within two weeks of receipt of the monitoring results reporting the exceedance. Where a cloudy discharge or elevated turbidity readings exceed the Control Trigger Value, remedial action will be implemented within 48 hours.

Compliance Trigger Value exceedances for spring fed domestic water supplies will first be re-investigated within 24 hours of the exceedance. Subject to the findings of that monitoring, remedial action, in the form of providing a temporary tankered water supply, will be initiated within 24 hours of the exceedance and the requirement to introduce a long-term design solution initiated within one month.

Compliance Trigger Value exceedances for surface water will be investigated within 48 hours and the remedial action initiated within one week. Compliance Trigger Value exceedances for groundwater will be investigated within one week, and remedial action initiated within 1 month. Changes to site practices will be implemented within one week.

C MILLER  
ASSOCIATE DIRECTOR

R IZATT-LOWRY  
DIRECTOR

## 6 REFERENCES

- 1 FWS Consultants Ltd. 2019. Construction and Operation Ground and Surface Water Monitoring Scheme, Phase 11 Works at Woodsmith Mine, North Yorkshire (1433DevOR444).
- 2 FWS Consultants Ltd. 2019. Hydrogeological Risk Assessment (NYMNPA 45 & 46 – Phase 11) Phase 11 Works At Woodsmith Mine, North Yorkshire (1433DevOR433).

## APPENDIX 1

APPENDIX 1.1 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR GROUNDWATER LEVELS

APPENDIX 1.2 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR GROUNDWATER QUALITY

APPENDIX 1.3 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR SPRING FLOW RATE

APPENDIX 1.4 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR SPRING WATER QUALITY

APPENDIX 1.5 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR SURFACE WATER QUALITY AND GEOMORPHOLOGY

**APPENDIX 1.1 – PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE OF GROUNDWATER LEVELS**

<b>ENVIRONMENTAL</b>			
<b>Procedure</b>	<b>Responsibility</b>	<b>Control Trigger Value Exceedance</b>	
		<b>Groundwater Levels at BHs</b>	<b>Groundwater Level at GW 133A (HG111A)</b>
Monitoring	Environmental Officer	A review of the construction activities, excavation, grouting and temporary dewatering on the minesite and the meteorological conditions, up to and during the period of exceedance. An assessment will be made to determine if the exceedance of ground water level Control Trigger Value is a caused by natural climatic variation due to seasonal low rainfall, the Phase 7 to 11 Works, or a non-site related cause.	
Consultation with Project Manager and Planning Remedial Actions	Environmental Engineer/ Project Manager	Evaluate findings of monitoring in conjunction with meteorological data, spring flow rates, groundwater levels in the superficial deposits and ecological monitoring, to determine the cause and effects of the change in baseline conditions. Where the cause is due to natural climatic conditions, record that this change in baseline conditions and accommodate for this change in the Control Trigger Value. Where the cause of the exceedance in Control Trigger Values is due to impacts of the Phase 7 to 11 works, design an appropriate course of remedial action, if required.	
Implementing Remedial Actions	Project Manager/ Environmental Manager/ Environmental Engineer	If the change in the groundwater level below the Control Trigger value has arisen from an adverse impact by the Phase 7 to 11 works, details of the Remedial Actions necessary to prevent continued adverse impact will be specified. Such measures may include installation of recharge trenches.	If the change in the groundwater level below the Compliance Trigger value has arisen from an adverse impact by the Phase 7 to 11 works, details of the Remedial Actions necessary to prevent continued impact will be specified. Such measures may include installation of recharge trenches, the provision of an alternative water supply to Moorside Farm and / or Soulsgrave Farm.
Reporting	Environmental Engineer	Report to include details of exceedance, monitoring, and remedial actions.	Report to include details of exceedance, monitoring, and remedial actions.
Timescale		3 months to identify the cause and design and implement any remedial actions required.	6 months to identify the cause and design and implement any remedial actions required.

**APPENDIX 1.2 – PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE OF GROUNDWATER QUALITY**

<b>GENERAL CONSTRUCTION INCLUDING SHAFT EXCAVATION AND LINING</b>					
Procedure	Responsibility	Control Trigger Value Exceedance		Compliance Trigger Value Exceedance	
		Groundwater Quality at Up Hydraulic Gradient BHs	Groundwater Quality at Down Hydraulic Gradient BHs	Groundwater Quality at Up Hydraulic Gradient BHs	Groundwater Quality at Down Hydraulic Gradient BHs
Monitoring	Environmental Engineer	A review of the construction or potentially polluting activities up hydraulic gradient of the minesite will be undertaken to identify potential sources of contamination impacting on baseline groundwater quality.	<p>A review of the construction, blasting and earthworks activities within the minesite catchment area will be undertaken considering the data up to and during the period of exceedance and of the meteorological conditions during the period of the exceedance.</p> <p>A visual inspection of the ongoing construction works will be carried out. Inspection of oil separators, drill and blast activities, placement of arisings in Bund F, inspection of manholes BF-BD-100 and BF-BD-200, inspection of shaft excavation works and associated plant will be undertaken. The visual inspection will include observations on evidence of salt, grout, hydraulic oils, greases, hydrocarbon spillages and residual unspent explosives within the blast arisings.</p>	A review of activities up hydraulic gradient of the minesite will be undertaken to identify potential sources of contamination impacting on baseline groundwater quality.	<p>A review of the construction, blasting and earthworks activities within the minesite catchment area will be undertaken considering the data up to and during the period of exceedance and of the meteorological conditions during the period of the exceedance.</p> <p>A visual inspection of the ongoing construction works will be carried out. Inspection of oil separators, drill and blast activities, placement of arisings in Bund F, inspection of manholes BF-BD-100 and BF-BD-200, inspection of shaft excavation works, and associated plant will be undertaken. The visual inspection will include observations on evidence of salt, grout, hydraulic oils, greases, hydrocarbon spillages and residual unspent explosives within the blast arisings. Assessment will be undertaken to identify whether exceedances are associated with leaching of compounds from the extractive materials placed in Bund F.</p>
Consultation with Project Manager and Planning Remedial Actions	Environmental Engineer/ Project Manager	Evaluate findings of monitoring to determine the cause of the change in baseline groundwater quality and design the appropriate course of remedial action, if required.	Evaluate findings of monitoring to determine the cause of the change in groundwater quality and design the appropriate course of remedial action, if required.	Evaluate findings of monitoring to determine the cause of the change in baseline groundwater quality and design the appropriate course of remedial action if required.	Evaluate findings of monitoring to determine the cause of the change in groundwater quality and design the appropriate course of remedial action if required.
Implementing Remedial Actions	Project Manager/ Environmental Manager/ Environmental Engineer	<p>Continued monitoring of BHs to monitor plume movement through site.</p> <p>Consideration of up hydraulic gradient contamination in assessing down hydraulic gradient groundwater.</p> <p>Increase in monitoring frequency until levels return to baseline.</p>	<p>Remediation of site spillages.</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, maintenance of construction vehicles.</p> <p>Changes to the blast design and management to minimise unspent explosives within arisings placed in Bund F.</p> <p>Implement recirculation of groundwater drainage from manholes BF-BD-100 and BF-BD-200 back onto exposed fill on Bund F.</p> <p>Changes to working practices (CEMP).</p>	<p>Continued monitoring of BHs to monitor plume movement through site and installation of additional groundwater monitoring wells, where appropriate.</p> <p>Consideration of up hydraulic gradient contamination source in assessing down hydraulic gradient groundwater quality.</p> <p>Increase in monitoring</p>	<p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, maintenance of construction vehicles. Remediation of site spillages.</p> <p>Changes to working practices (CEMP).</p> <p>Changes to the blast design to minimise unspent explosives within arisings placed in Bund F.</p> <p>Installing temporary seals to the basal drainage system at manholes BF-BD-100 and BF-BD-200 and commencing recirculation of the basal drainage water onto the exposed rockfill on Bund F.</p>

			Increase in monitoring frequency until levels return to baseline.	frequency until levels return to baseline.	<p>Increasing the size of the attenuation facilities downstream on the perimeter swale.</p> <p>Modelling and installation of additional groundwater monitoring wells to demonstrate that there is no adverse impact occurring at the site boundary. If the results of that modelling or monitoring of additional boundary monitoring wells show that an impact on the groundwater is occurring, then remediation of the groundwater pollution will be considered.</p> <p>Increase in monitoring frequency until levels return to baseline.</p>
Reporting	Environmental Engineer	Report to include details of exceedance, monitoring, and remedial actions.		Report to include details of exceedance, monitoring, and remedial actions.	
Timescale		1 week to identify the cause and design and implement any remedial actions required.		1 week to identify the cause, 1 week to implement changes determined necessary to site practices and 1 month to design and initiate implementation of any pollution clean-up remedial actions required.	

**APPENDIX 1.3 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR SPRING FLOW RATE**

Procedure	Responsibility	Control Trigger Value Exceedance	Compliance Trigger Value Exceedance
		Spring flow rates	Spring flow rates
Inspection	Environmental Engineer	A review will be carried out of the construction activities that have been undertaken within the area of the shaft platform and the meteorological conditions, up to and during the period of exceedance. An assessment will be made to determine if the physical change that has been recorded in the spring flow rate at either Moorside Farm Spring or Soulsgrave Farm Spring is a natural variation due to seasonal low rainfall, or an impact caused by the Phase 11 Works.	
Consultation with Project Manager and Planning Remedial Actions	Environmental Engineer/ Project Manager	Evaluate findings of monitoring to determine the cause of the change in baseline conditions, in association with the groundwater level and ecological monitoring, and design the appropriate course of remedial action, if required.	
Implementing Remedial Actions	Project Manager/ Environmental Manager/ Environmental Engineer	If the change in the baseline data below the Control Trigger value has arisen from an adverse impact by the Phase 2 to 11 works the Remedial Actions to prevent continued impact will be specified. Such measures may include provision of an alternative water supply to replace spring water abstractions.	If the change in the baseline data below the Compliance Trigger value has arisen from an adverse impact by the Phase 2 - 11 works, the Remedial Actions to prevent continued impact will be specified. Such measures may repeat monitoring within 24 hours to confirm if the exceedance conditions are sustained. Subject to which, provision will be made for a temporary tankered water supply to Moorside Farm and Soulsgrave Farms supplemented, where necessary, with the long term solution designed and implemented that may comprise provision of an alternative water supply to replace spring water abstraction.
Reporting	Environmental Engineer	Report to include details of exceedance, monitoring, and remedial actions.	Report to include details of exceedance, monitoring, and remedial actions.
Timescale		1 week to identify the cause and 1 month to undertake the design and implement remedial actions required.	Within 24 hours of repeat follow up monitoring confirming that a Compliance Trigger Value exceedance is being caused by the Phase 2 - 11 works to identify the cause and to provide a tankered interim water supply, if necessary, and within 1 month to design and initiate implementation of any re-infiltration remedial actions required.

**APPENDIX 1.4 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR SPRING WATER QUALITY**

Procedure	Responsibility	Control Trigger Value Exceedance	Compliance Trigger Value Exceedance
		Spring water quality	Spring water quality
Inspection	Environmental Engineer	<p>A review will be undertaken of the construction activities on the minesite up to and during the period of exceedance, and of the meteorological conditions during the period of the exceedance.</p> <p>A visual inspection of the ongoing construction works will be carried out including inspection of oil separators for hydrocarbon exceedances, and of fuel, lubricant, hydraulics and salt storage facilities. The visual inspection will include observations on evidence of cloudy discharges and a record of the turbidity value recorded in the surface water and spring discharges.</p>	
Consultation with Project Manager and Planning Remedial Actions	Environmental Engineer/ Project Manager	<p>Evaluate findings of monitoring to determine the cause of the change in conditions and design the appropriate course of remedial action, if required.</p>	
Implementing Remedial Actions	Project Manager/ Environmental Manager/ Environmental Engineer	<p>Changes to working practices including management of fuel, lubricant, hydraulics and salt storage facilities.</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, and maintenance of construction vehicles.</p> <p>Changes to working practices (CEMP) such as implementation of additional surface water management measures, such as additional filter drains, or oil separators.</p>	<p>Changes to working practices including management of fuel, lubricant, hydraulics and salt storage facilities.</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, and maintenance of construction vehicles.</p> <p>Changes to working practices (CEMP) such as implementation of additional surface water management measures, such as additional filter drains, or oil separators.</p> <p>Temporary provision of alternative water supply to Moorside Farm and to Soulsgrave Farm, as necessary.</p> <p>Where groundwater pollution associated with the Phase 11 Works is determined to be the cause of a long-term change to spring quality, remediation of the groundwater pollution will be considered. Such measures may include; repeat monitoring within 24 hours and laboratory analysis on an accelerated turn around, to confirm if the exceedance in water quality conditions is sustained. Subject to the receipt of which, provision will be made within 24 hours for an alternative water supply to Moorside Farm and Soulsgrave Farms supplemented, where necessary, with pollution clean-up proposals.</p>
Reporting	Environmental Engineer	<p>Report to include details of exceedance, inspection, and remedial actions.</p>	
Timescale		<p>1 week to identify the cause and design and implement any remedial actions required.</p> <p>Remedial action of cloudy discharge or turbidity readings exceeding background quality within 48 hrs.</p>	<p>If the repeat follow up monitoring confirms that a Compliance Trigger Value exceedance is being caused by the Phase 2 - 11 works, a tankered interim water supply is to be provided within 24 hours, if necessary. Within a period of 1 month, implementation of any pollution clean-up remedial actions required shall be initiated.</p>



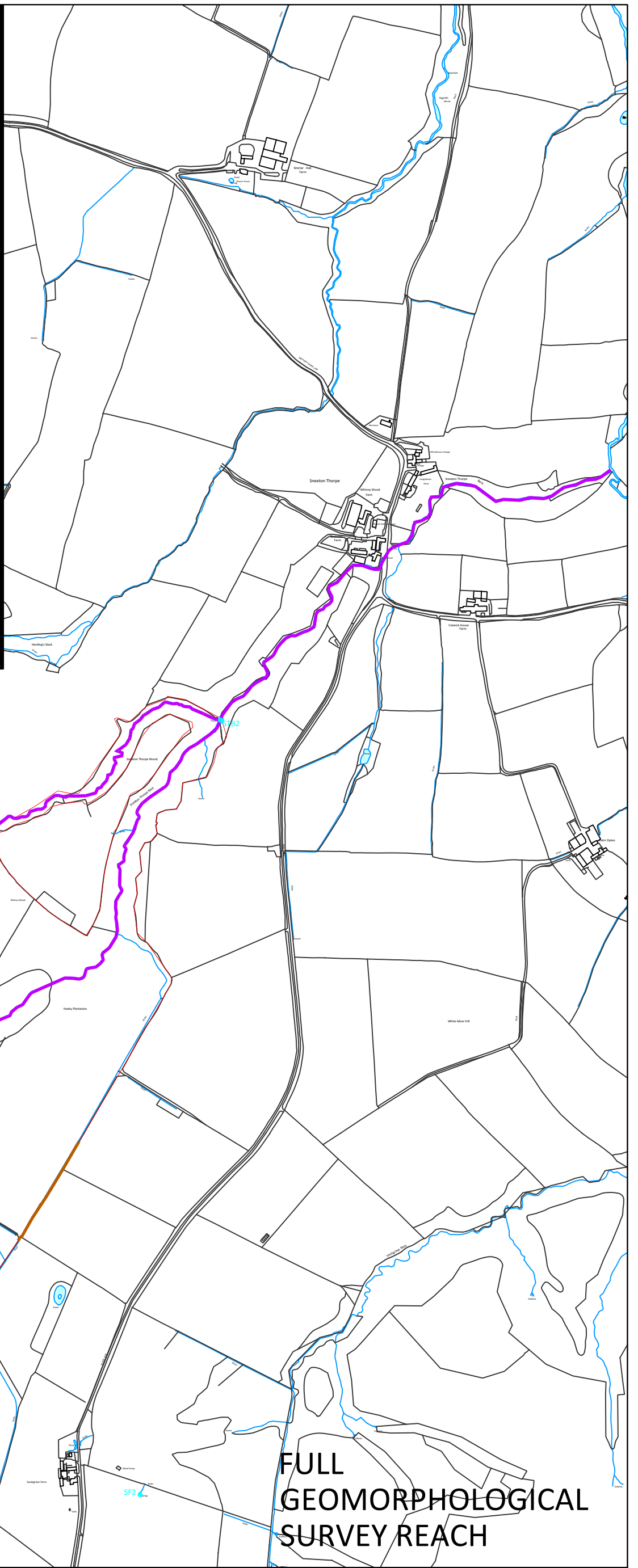
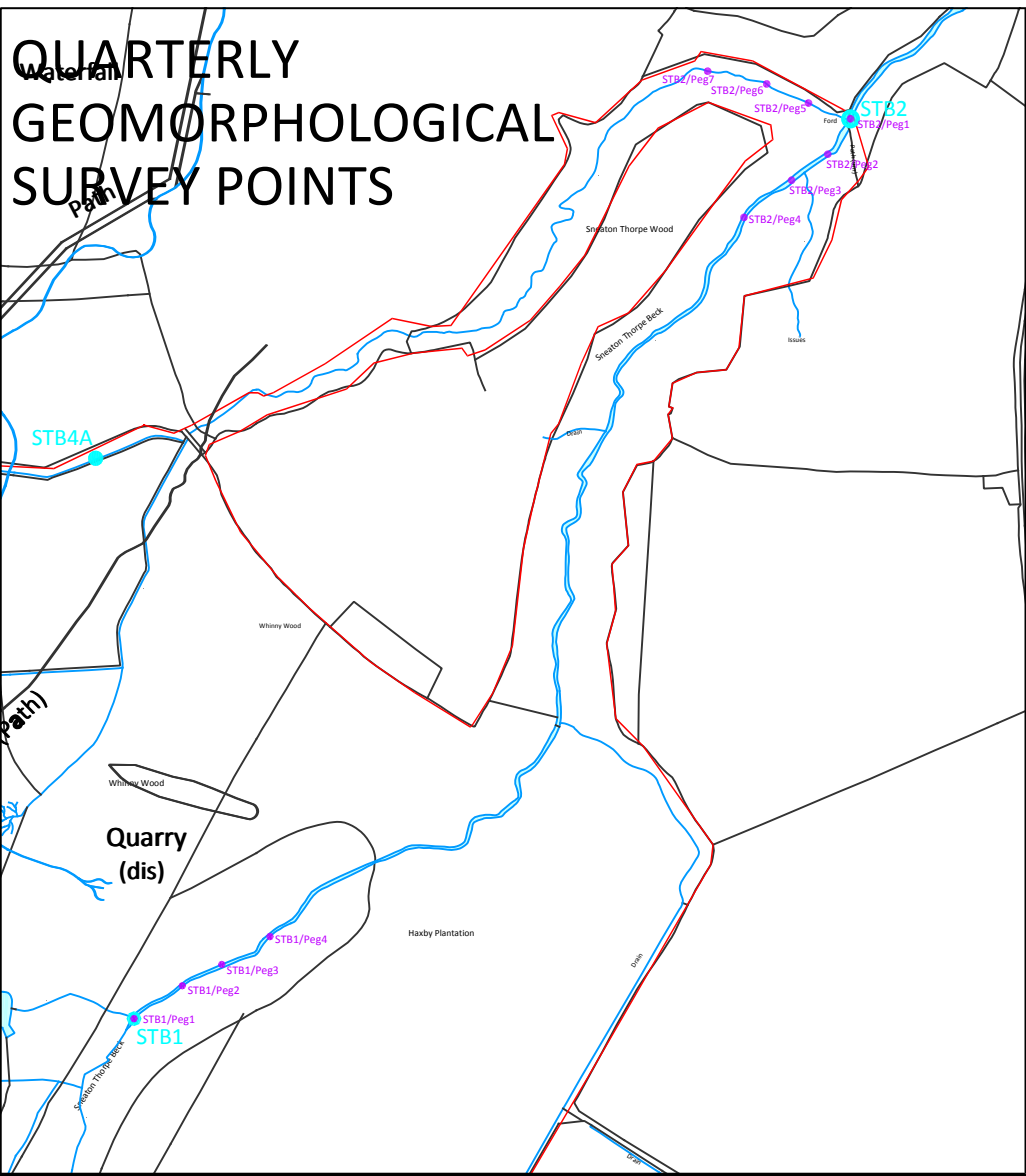
**APPENDIX 1.5 - PROCEDURE FOR ADDRESSING TRIGGER VALUE EXCEEDANCE FOR SURFACE WATER QUALITY AND GEOMORPHOLOGY**

Procedure	Responsibility	Control Trigger Value Exceedance	Compliance Trigger Value Exceedance
		Surface Water Quality and Stream Geomorphology	Surface Water Quality and Stream Geomorphology
Inspection	Environmental Engineer	<p>A review will be undertaken of the construction activities up to and during the period of exceedance and of the meteorological conditions during the period of the exceedance.</p> <p>The visual inspection of the ongoing construction works will include inspection of oil separators for hydrocarbon exceedances, inspection of surface drainage, the Materials Handling attenuation tank and of pond outfalls for evidence of cloudy discharges and to provide a record of the turbidity value recorded, geomorphological inspection for evidence of erosion, geotechnical failure, sediment accumulation, vegetation change, pollution and discolouration and construction litter.</p>	
Consultation with Project Manager and Planning Remedial Actions	Environmental Engineer/ Project Manager	<p>Evaluate findings of monitoring to determine the cause of the physical or chemical change in surface water conditions and design the appropriate course of remedial action, if required.</p>	
Implementing Remedial Actions	Project Manager/ Environmental Manager/ Environmental Engineer	<p>Changes to working practices including implementation of silt fences and hay/heather bales.</p> <p>Maintenance clearance of filter drains to the shaft platform areas, maintenance of oil separator, and maintenance of construction vehicles.</p> <p>Changes to working practices (CEMP).</p> <p>Implementation of additional surface water management measures, such as additional filter drains, or oil separators.</p> <p>Where inspection and monitoring of the outflow to the perimeter swale from the Materials Handling Area attenuation tank OF11 indicates significant pollution associated with unspent explosives or hydraulic oils, close off the penstock valve and pump the water to the NDWWTP for treatment prior to discharge.</p>	<p>Implementation of additional emergency surface water management measures including hay/heather bales, silt busters and silt fences, absorbent spill pads and boons, environmentally friendly coagulant, or additional oil separators, temporarily closing the penstock in the attenuation pond and recirculation of basal drainage from Bund F onto the exposed rock fill.</p> <p>Maintenance clearance of filter drains to site road, ponds including dredging or reprofiling, oil separators and of construction vehicles.</p> <p>Changes to working practices (CEMP).</p> <p>Where inspection and monitoring of the outflow to the perimeter swale from the Materials Handling Area attenuation tank OF11 indicates significant pollution associated with unspent explosives or hydraulic oils, close off the penstock valve and pump the water to the NDWWTP for treatment prior to discharge.</p> <p>Implementation of additional surface water management measures, such as additional filter drains, clay stanks, use of hydrobrakes to slow water flow and discharge rates down and to allow more settlement of suspended solids prior to discharge to Sneaton Thorpe Beck, and potentially increasing the size of the receiving attenuation basin from Bund F to increase dilution of basal drainage and surface runoff prior to discharge to Sneaton Thorpe Beck.</p>
Reporting	Environmental Engineer	<p>Report to include details of exceedance, inspection, and remedial actions.</p>	
Timescale		<p>1 week to identify the cause, design and implement remedial actions required.</p> <p>Remedial action of cloudy discharge or elevated turbidity readings exceeding background quality are to be implemented within 48 hrs.</p>	<p>48 hours to identify the cause and 1 week to design and implement the remedial actions required.</p>

## APPENDIX 2

### DRAWINGS

# QUARTERLY GEOMORPHOLOGICAL SURVEY POINTS



# FULL GEOMORPHOLOGICAL SURVEY REACH

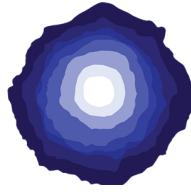
NOTES / KEY	
SITE OWNERSHIP BOUNDARY	
NYM SAC	
SURFACE WATER	
BOREHOLES	
SURFACE WATER MONITORING LOCATIONS	
GROUNDWATER MONITORING LOCATIONS	
LOCATION TO BE DECOMMISSIONED	
GEOMORPHOLOGY SURVEY	

DRAWING TITLE	
PHASE 11 SURFACE AND GROUNDWATER QUALITY MONITORING POINTS	
INSET - QUARTERLY GEOMORPHOLOGICAL SURVEY REACH	
PROJECT TITLE	
NORTH YORKSHIRE POLYHALITE PROJECT	

CLIENT SIRIUS MINERALS PLC	
STATUS FINAL	PROJECT NUMBER 1433Dev
DRAWN BY CM	DATE JULY 2019
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Project Title / Facility Name:  
**North Yorkshire Polyhalite Project**

Document Title:  
**PHASE 11 NOISE AND VIBRATION MANAGEMENT PLAN**

**Document Review Status**

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**40-RHD-WS-70-EN-PL-0040**

# REPORT

## **Phase 11 - Woodsmith Mine Noise and Vibration Management Plan**

### **Woodsmith Mine Phase 11 - NVMP**

Client: Sirius Minerals plc

Reference: 40-RHD-WS-70-EN-PL-0040 Rev 2

Status: 03/Final

Date: 22 August 2019

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Date / initials: 22/08/2019

Approved by: Matthew Hunt

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Classification

Project related



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## 1 INTRODUCTION

### 1.1 Purpose of this Report

- 1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning permission was subsequently granted in 2015 subject to conditions, as varied in February 2018 by NYM/2017/0505/MEIA.
- 1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details the requirements with respect to noise and vibration management for the Phase 11 Works (see Paragraph 1.1.4 below) at Woodsmith Mine. This document is required to partially satisfy the requirements of Conditions 18 and 29 of the NYMNPA planning permission. These planning conditions are detailed in **Table 1-1** and **Table 1-3**.

Table 1-1: Condition NYMNPA 18 Noise and Vibration Management Plan

NYMNPA 18	Compliance with Condition NYMNPA-18
Prior to the commencement of each Phase of Construction at Dove's Nest Farm or Lady Cross Plantation, a Noise and Vibration Management Plan (NVMP) for the control, mitigation and monitoring of noise and vibration for both construction and operational phases at the two sites shall be submitted to and approved in writing by the MPA in consultation with the SBC EHO. The scheme shall set out the following:	This document addresses Phase 11 Works at Woodsmith Mine. Works at Lady Cross Plantation are deferred and are therefore not addressed in this Plan.
Noise-sensitive receptors for which predictions shall be made and at which the noise and vibration limits shall apply and which shall include recreational receptors.	Section 3.1
Predicted noise levels at the noise-sensitive receptors from noise and vibration generated at the DNF and LCP sites for the key construction phases during the forthcoming year including any periods in which the higher daytime limit of 70 dB LAeq shall apply (permitted 56 days for temporary works to create noise-reducing bunds and/or barriers as per Conditions 20 and 22).	Section 3, and Appendix C
The best practicable means which will be used to control noise and vibration levels on site including such measures proposed in the Environmental Statement (September 2014 as updated by the Supplementary Environmental Statement dated February 2015) and the Supplementary Environmental Statement dated July 2017 (updated by further information dated October and November 2017) as relevant. Such measures shall include, but are not limited to: the use of the quietest available plant, equipment and techniques; the regular maintenance and inspection of such plant and equipment; the use of cladding, attenuators and barriers to reduce noise levels from noisy plant and operations; the specification of appropriate reversing alarms to minimise annoyance; and, measures to reduce vibration and air overpressure during blasting.	Section 5
Details of the noise and vibration monitoring system to be installed around the DNF and LCP sites to continuously log noise levels during construction and operation. The system shall include at least six noise monitors installed around the boundary of the Dove's Nest site and at least four monitors at key residential receptors near the Dove's Nest site and at least four noise monitors around the Lady Cross Plantation Site and at least three monitors at key residential receptors near the Lady Cross Plantation site.	Section 4



NYMNPA 18	Compliance with Condition NYMNPA-18
<p>The precise number and location of noise monitors shall be set out in the NVMP. The developer shall use reasonable endeavours to obtain access to the residential receptor properties for the installation of noise monitors and only if access cannot be obtained the number or location of noise monitors may be reduced. The MPA and the SBC EHO and/or their advisers shall be granted access to inspect the noise and vibration data whenever required, records of the data should be kept for a reasonable period and these records should be accessible by the public.</p>	<p>Section 3, Section 4 and Figure B.1</p>
<p>Details of the procedure to be followed in the event that the noise predictions detailed in the NVMP or the noise limits detailed in conditions 20 to 23 are exceeded. Such procedures shall require the investigation of the reasons for the breach of the limits and the cessation of the activity causing the breach until such a time as additional mitigation can be provided.</p>	<p>Section 5.4</p>
<p>Details of how the residents will be informed and consulted about the site operations and progress, particularly in regard to blasting and especially noisy operations including details of complaints logging and management procedures and a 24-hour telephone incident hotline. Details of the procedure for investigating complaints and informing complainants of the results of such investigations and of any actions resulting from them.</p>	<p>Section 5.4 and Scheme for the Prior Notification of Blasting (40-SMP-WS-1000-PA-PL-00001)</p>
<p>The NVMP shall be adhered to at all times unless agreed previously in writing by the MPA.</p>	
<p>The NVMP shall be updated and agreed whenever appropriate to reflect changes in the programme during construction and operation and at intervals not less than 6 months after the initial start on site and thereafter annually.</p>	<p>Section 1</p>

Table 1-2: Condition NYMNPA 19 Use of Earth Moving Plant

NYMNPA 19	Compliance with Condition NYMNPA-19
<p>Mobile earth-moving plant shall not be used between the hours of 19:00 to 07:00 unless otherwise agreed in advance with the MPA in consultation with the SBC EHO and any such operations shall accord with the Noise and Vibration Management Plan and other planning conditions relating to noise.</p>	<p>The information to assist the NYMNPA in confirming compliance with this Condition is provided in Section 6.3.8</p>

Table 1-3: Condition NYMNPA 29 Scheme for the Monitoring of Blasting Vibration

NYMNPA 29	Compliance with Condition NYMNPA-29
<p>Prior to the commencement of any blasting operations associated with shaft sinking or chamber construction, a scheme for the monitoring of blasting vibration within 1 kilometre of the site shall be submitted to the MPA for approval. Blast monitoring shall take place in accordance with the approved scheme and the results forwarded to the MPA on a quarterly basis until the completion of those blasting operations.</p>	<p>Section 1 and Section 5</p>

- 1.1.3 This NVMP relates to the Phase 11 Works at Woodsmith Mine and does not include any activities at Lady Cross Plantation, as these works have been deferred. The NYMNPA has confirmed that it supports this approach.



- 1.1.4 Phase 4, 4a, 5, 6, 7 and 9 activities will continue past the start date of Phase 11. Phase 8 activities are subject to a separate NVMP (40-RHD-WS-70-EN-PL-0034) and are not considered in this document. Phase 8 included the construction of permanent buildings, which is subject to separate noise limits as specified in condition NYMNPA-20.

1.1.5 This NVMP therefore supersedes all previous NVMPs (with the exception of that for Phase 8) upon the commencement of Phase 11 and considers processes and controls with respect to all activities on site throughout Phase 11. Specific activities required for Phase 11 comprise the following:

- Development of landscape mitigation screening;
- Tree clearance within the Haxby Plantation;
- Sinking of the MTS shaft via drill and blast method;
- Operation of the Galloway;
- Creation of a materials handling area;
- Installation of external silencer to the dust collector of the Service Shaft building; and
- Installation of batteries.

### **Planning Conditions**

1.1.6 In addition to Condition NYMNPA 18, two further conditions NYMNPA 20 and NYMNPA 21 establish noise limits relating to the Woodsmith Mine site (see **Section 2.2**). Planning condition detail is provided in **Table 1-4** and **Table 1-5**.

Table 1-4: Condition NYMNPA 20 Noise Limits during Construction - Daytime

NYMNPA 20	Compliance with Condition NYMNPA-20
<p>Day-time (07.00 hrs to 19.00 hrs) noise levels <math>L_{Aeq,1hr}</math> from mine construction at the Dove's Nest site, excluding blasting operations, shall not exceed 55 dB <math>L_{Aeq,1hr}</math> and for short-term, construction activities solely relating to the demolition of existing buildings and erection of new structures excluding earth mound and bunds shall not exceed 65dB <math>L_{Aeq,1hr}</math>.</p> <p>An upper limit of 70 dB <math>L_{Aeq,1hr}</math> for the purposes of temporary noisy operations to provide noise-reducing earth bunds and / or barriers may be permitted for up to 56 days in any calendar year provided such temporary operations are specified and agreed in the NVMP described in Condition 18. Each calendar day when the higher temporary noise level is exceeded shall be counted as one day.</p> <p>Noise levels shall be measured in accordance with BS 4142:2014 and the limits apply at the curtilage boundary of residential properties and at the following recreational receptors: Falling Foss tea room, Lound House Camp/Caravan site, Sneaton Foss Lane Caravan site and at any location on the Wainwright Coast to Coast walk footpath as illustrated in drawing number PB1110-P2-7-002 which is Figure 7.2 of Part 2 of the York Potash Project Mine, MTS and MHF Environmental Statement dated September 2014.</p>	<p>Section 3, and Appendix C</p>

Table 1-5: Condition NYMNPA 21 Noise Limits during Construction - Nighttime

NYMNPA 21	Compliance with Condition NYMNPA-21
<p>Evening (19.00 hrs to 22.00 hrs) and night-time (22.00 to 07.00 hrs) noise levels <math>L_{Aeq,1hr}</math> from mine construction at the Dove's Nest site, excluding blasting operations, shall not exceed 42 dB <math>L_{Aeq,1hr}</math> Noise levels shall be measured in accordance with BS 4142: 2014 and the limits apply at the curtilage boundary of residential properties and at the following recreational receptors: Lound House Camp/Caravan site and Sneaton Caravan site.</p>	<p>Section 3, and Appendix C</p>

- 1.1.7 Conditions NYMNPA 24, 27, 28 and 29 relate to vibration arising from blasting activities during underground chamber construction or shaft sinking activities. Planning condition detail is provided in **Table 1-6 to Table 1-8**.

Table 1-6: Condition NYMNPA 24 Noise from Blasting

NYMNPA 24	Compliance with Condition NYMNPA-24
Noise levels (air overpressure) from blasting shall not exceed 115dB (linear peak) as measured at any residential properties. No blasting shall take place outside the period 0700 until 2200 unless agreed in advance in writing by the MPA and it can be demonstrated that there will be no significant adverse noise effect on residents.	Section 2 and Section 5

Table 1-7: Condition NYMNPA 27 Blasting Vibration Limits - Daytime

NYMNPA 27	Compliance with Condition NYMNPA-27
Day time (07.00 hrs to 19.00 hrs) ground vibration as a result of underground chamber construction or blasting operations involved in shaft sinking shall not exceed a peak particle velocity of 6 mm/sec in 95% of all blasts measured over any period of 6 months and no individual blast shall exceed a peak particle velocity of 10 mm/s as measured at vibration sensitive buildings. Evening (19.00 to 22.00 hrs) ground vibration as a result of underground chamber construction or blasting operations involved in shaft sinking shall not exceed a peak particle velocity of 4.5 mm/sec in 95% of all blasts measured over any period of 6 months and no individual blast shall exceed a peak particle velocity of 6 mm/s as measured at Vibration Sensitive Buildings and Infrastructure.	Section 2 and Section 5

Table 1-8: Condition NYMNPA 28 Blasting Vibration Limits - Nighttime

NYMNPA 28	Compliance with Condition NYMNPA-28
Night time (22:00 hrs to 07.00 hrs) ground vibration from construction/blasting shall not exceed a peak particle velocity of 2 mm/s in 95% of blasts at residential properties and no individual blast shall exceed a peak particle velocity of 3 mm/s as measured at Vibration Sensitive Buildings and Infrastructure.	Section 2 and Section 5

- 1.1.8 In this document, the term “*construction*” includes all physical and related engineering and construction activities associated with the Phase 11 Works, as described above. Updates to this plan will be prepared and submitted to the NYMNPA for approval in advance of subsequent construction phases and following any material design or method change.

## 2 GUIDANCE

### 2.1 Legislation and British Standards

2.1.1 Wherever practicable, construction will be carried out in accordance with:

- BS 5228:2009+A1:2014 *Code of Practice for noise and vibration control on construction and open sites*.

### 2.2 Construction Limits

2.2.1 Established construction noise limits (as measured at the identified receptors) remain as:

- 55 dB  $L_{Aeq,1hr}$  for daytime (07:00 – 19:00);
- 65 dB  $L_{Aeq,1hr}$  for the demolition of buildings and erection of new structures;
- Up to 70 dB  $L_{Aeq,1hr}$  for temporary noisy operations to provide noise-reducing earth bunds and / or barriers; and
- 42 dB  $L_{Aeq,1hr}$  for evening and night-time (19:00 – 07:00).

2.2.2 Established blasting vibration limits (peak particle velocity, PPV, as measured at the identified receptors) are:

- 6 mm/sec in 95% of all blasts, 10 mm/s in individual blasts for blasting during daytime (07:00 to 19:00);
- 4.5 mm/sec in 95% of all blasts, 6 mm/s in individual blasts for blasting during the evening (19:00 to 22:00); and
- 2 mm/sec in 95% of all blasts, 3 mm/s in individual blasts for blasting during the night (22:00 to 07:00).

2.2.3 Established limits for air overpressure noise levels (from blasting), as measured at any residential properties are:

- shall not exceed 115dB (linear peak).

2.2.4 No blasting shall take place outside the period 0700 until 2200 unless agreed in advance in writing by the MPA.

### 2.3 Construction Method

2.3.1 Contractors responsible for implementing these Phase 11 Works (see Construction Environmental Management Plan (CEMP; reference 40-RHD-WS-70-EN-PL-0041)) have provided details of the construction plan, number and type of plant items to be used and location/duration of construction activities within the site. Further detail is provided in the Phase 11 Construction Method Statement (CMS) (reference 40-SMP-WS-7100-PA-MS-00009).

2.3.2 **Appendix C** details the plant items used within the model, their sound power level and location on site. Predictions of noise levels based upon these details are assessed within this NVMP.

### 3 PREDICTED CONSTRUCTION NOISE AND VIBRATION LEVELS

#### 3.1 Baseline Receptor Locations

3.1.1 Residential and recreational receptors for this NVMP remain as identified in the Environmental Statement (ES) which accompanied the planning application, in previous iterations of the NVMP (e.g. Phase 4 NVMP; document reference 40-RHD-WS-70-EN-PL-0017), and as shown in **Appendix B, Figure B1**. Whilst monitoring is not ongoing at Soulsgrave Farm it is still considered a receptor for the purposes of this NVMP.

#### 3.2 Predicted Noise Levels

3.2.1 Noise modelling was undertaken to provide predictions of noise levels throughout the Phase. **Tables C.1 and C.2 in Appendix C** outline the construction noise assessment predictions for the Phase 11 Works.

3.2.2 Noise levels due to construction activities in the Phase 11 Works were not predicted to exceed the agreed construction noise limits at any of the identified noise-sensitive receptors during the daytime, evening or night-time following the application of suitable measures, including activity timing and physical mitigation.

3.2.3 Whilst noise levels during the daytime are not predicted to exceed the 55dB  $L_{Aeq,1hr}$  daytime limit, the higher 70dB  $L_{Aeq,1hr}$  limit can be considered applicable during development of the landscape mitigation screening (see **Section 6.3**).

#### 3.3 Vibration

3.3.1 In relation to all construction works, excluding blasting, ground borne vibration was considered according to the conservative approach outlined in previous NVMPs (e.g. Phase 4 document reference 40-RHD-WS-70-EN-PL-0017; see Table C.7, Appendix C for minimum set-back distances for vibration levels of reportable significance).

3.3.2 All identified sensitive receptors are at least 180m from the nearest site boundary, and the minimum distance between the primary haul route and any of the surrounding receptors is over 400m. Therefore ground-borne vibration levels due to construction works, excluding blasting, will be below levels considered to be *“just about perceptible in residential environments”*<sup>1</sup>.

3.3.3 Details of vibration associated with blasting activities are provided in **Section 5**.

### 4 NOISE MONITORING PROGRAMME

#### 4.1 Noise Monitoring

4.1.1 Continuous noise monitoring, as required by condition NYMNPA 18, is being undertaken during construction at three key residential receptor locations and seven boundary locations as described in previous NVMP (e.g. Phase 4 document reference 40-RHD-WS-70-EN-PL-0017) and shown in

<sup>1</sup> Planning Policy Guidance Note 24 (PPG24, 1994), Department for Communities and Local Government. This guidance has been withdrawn but remains applicable in the absence of any replacement guidance.

**Appendix B, Figure B1.** Sound Level Meters (SLMs) record  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A90}$ , and  $L_{A10}$  data with a “fast” time constant and A-weighting (see **Appendix A** for descriptions of these terms). Weather condition monitoring is carried out simultaneously.

- 4.1.2 A system of real time alerts enables remote monitoring of noise levels and appropriate action by Contractors. Reports are produced monthly for submission to SBC and NYMNPA, and the full dataset is presented in graphical format.

## 5 BLASTING VIBRATION MONITORING PROGRAMME

- 5.1.1 Condition NYMNPA 29 requires a scheme for monitoring of blasting vibration within 1 kilometre of the site to be submitted to the MPA for approval.
- 5.1.2 Subject to approval from the MPA, continuous vibration monitoring is being undertaken during blasting operations at one key residential receptor location (Parkdown Bungalow, NM1) and one on site location (boundary location BML1).
- 5.1.3 Monitoring is undertaken using V9000 Seismographs recording Peak Particle Velocity (PPV) and air over-pressure. The Seismographs are self-calibrating.
- 5.1.4 PPV at the receptors is difficult to predict as the propagation of vibration through the ground depends upon a large number of factors including geological conditions between the blast location and receptor and maximum instantaneous charge weight per delay.
- 5.1.5 The assessment presented in the Environmental Statement (Document Title: York Potash Project Mine, MTS and MHF Environmental Statement, dated 28 September 2014) concluded that blast-induced vibration at the residential receptors with the designation “NM2” and “NM3” would be significantly below the levels referred to in Condition 23. This assessment was based on an assumption that the Service Shaft, Production Shaft and MTS Shaft were to be constructed concurrently via the drill and blast methodology.
- 5.1.6 The drill and blast methodology is now only being applied at the MTS Shaft, which is located close to 700m from NM3 and in excess of 980m from NM2. On this basis, it is not expected that vibration-related impacts would arise at receptor locations or that vibration levels in these locations would be worse than those that could be detected at either BML1 (~200m from the MTS Shaft) or NM1 (~470m from the MTS Shaft).
- 5.1.7 A series of test blasts will be carried out to ascertain the blast design (including number of delays, powder velocity, charge weight etc.) that will ensure blasting vibration limits at the receptors are not exceeded.
- 5.1.8 Monitoring during test blasting will be undertaken for a period of one month, concurrently at four locations, including:
- Locations representative of the site boundary - BML1, BML2 and BML3; and
  - Locations representative of the nearest residential receptors – NM1.
- 5.1.9 Locations NM2 and NM3 will also be included, subject to access agreement with the property owners.
- 5.1.10 The results from these monitoring locations will be used to optimise the blast design using

regression line analysis.

- 5.1.11 The continuous monitoring and monitoring during test blasting will be undertaken in accordance with BS 7385:1990 Evaluation and measurement for vibration in buildings, Part 1 Guide for measurement of vibrations and evaluation of their effects on buildings.
- 5.1.12 During the test blasting monitoring, the Local Planning Authority will be provided with a weekly update on recorded levels. Air overpressure monitoring and reporting will take place in parallel with vibration monitoring.
- 5.1.13 During the test blasting monitoring, in the very unlikely event of a recorded exceedance of the levels specified in the Planning Permission, the Authority will be informed within 24 hours, including details of any measures being taken to avoid a reoccurrence.
- 5.1.14 Following the 1 month period of test blasting and monitoring, the ongoing blasting and air over pressure monitoring results will be forwarded to the Local Planning Authority on a quarterly basis until the end of such blasting activities.

## **6 MITIGATION AND PROCEDURES**

### **6.1 Purpose of the Section**

- 6.1.1 This section outlines measures to be taken by the Contractors to limit, and manage the impact of, noise. This section also outlines the Best Practicable Means and specific mitigation actions to be adopted.

### **6.2 Best Practicable Means**

- 6.2.1 The Control of Pollution Act (1974) and BS 5228:2009+A1:2014 define working methods and mitigation measures referred to as Best Practicable Means (BPM). Appropriate BPM set out in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017), will continue to be applied to the Phase 11 Works.

#### **Management Structure and Responsibilities**

- 6.2.2 While overall responsibility for compliance with environmental and approvals requirements will remain with Sirius Minerals, all Contractors working on site are accountable for undertaking the construction activities in accordance with the requirements of this NVMP.
- 6.2.3 The CEMP (reference 40-RHD-WS-70-EN-PL-0041) provides details of the lines of responsibility for environmental management (including relating to robust implementation of noise management and mitigation measures) during the Phase 11 Works.

#### **Maintenance**

- 6.2.4 Maintenance of plant will be carried out routinely and in accordance with the manufacturers' guidance. Daily inspections will be undertaken as described in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017).



## Training

- 6.2.5 The site induction programme and site rules will include good working practice instructions for site staff, managers, visitors and contractors to help minimise noise, as set out in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017).

## 6.3 Specific Mitigation

### Activity timing and barriers

- 6.3.1 Crushing of extracted material within the materials handling area will not be undertaken between 19:00 and 07:00, unless and until it can be demonstrated that no exceedance of the noise limits would occur.
- 6.3.2 Condition NYMNPA 20 establishes a daytime (07:00 to 19:00) noise limit relating to the Woodsmith Mine site, specifically for temporary noisy operations which allow for the construction/reduction of earth bunds and or barriers as detailed in Table 1-2. The condition stipulates an upper limit of 70dB  $L_{Aeq,1hr}$  which is applicable for up to 56 days in any calendar year and would apply to these Works.
- 6.3.3 Phase 11 noise modelling showed that the daytime limits would not be exceeded during the Phase 11 Works. Sirius Minerals remains committed to implementing the working practices and noise controls that are already being carried out across the site.
- 6.3.4 The application of the 70dB  $L_{Aeq,1hr}$  level relates to Works being carried out in the north-eastern corner of the site, when the development of Bund F will be at its closest point to the residential receptor NM1. Although not expected, there remains the potential for exceedances when working this close to the site boundary and it would be prudent to apply the upper limit accordingly, on a precautionary basis, for a short duration not exceeding that established in Condition 20.
- 6.3.5 This principle is considered relevant to short-term, periodic noise during the initial development of Bund F only, and not to the general creation of landscape screening across the site over a longer time period.
- 6.3.6 Placement of extracted material onto the Bund F tipping area will not be undertaken between 19:00 and 07:00 until the berm profile is established to a sufficient height and width to ensure adequate screening at the closest receptor (Parkdown Bungalow). The berm will be graded during the daytime (07:00 to 19:00) only before night-time tipping or Bund F grading activity commences. Material tipping can occur on the materials handling area at night.
- 6.3.7 Where extracted material is not suitable for immediate placement into screening berms, shipping containers may be placed on the materials handling area to provide temporary screening.
- 6.3.8 As for all Phases since early site preparation, works to handle and temporarily store extractive material during Phase 11 will be carried out on a 24-hour basis. This is in accordance with approved drawing YP-P2-CX-080: *“During the period 19:00 – 07:00 hours excavated spoil from shaft and tunnel works would be tipped at designated locations on the screening mounds...”*. As stated above, material will only be crushed, compacted and profiled in these areas during normal working hours (07:00 – 19:00).

## 6.4 Communications

### Procedure for complaints or exceedance of limits

- 6.4.1 The procedures to be followed in the event of a complaint or an exceedance of permitted noise limits will remain as set out in previous NVMPs (e.g. Phase 4, reference 40-RHD-WS-70-EN-PL-0017).

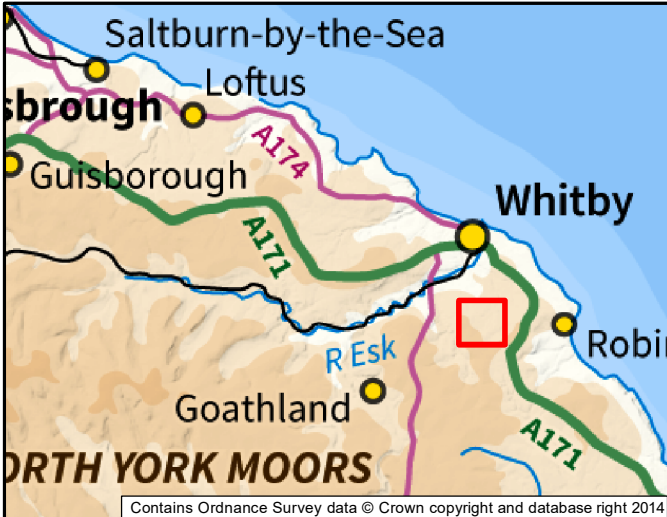
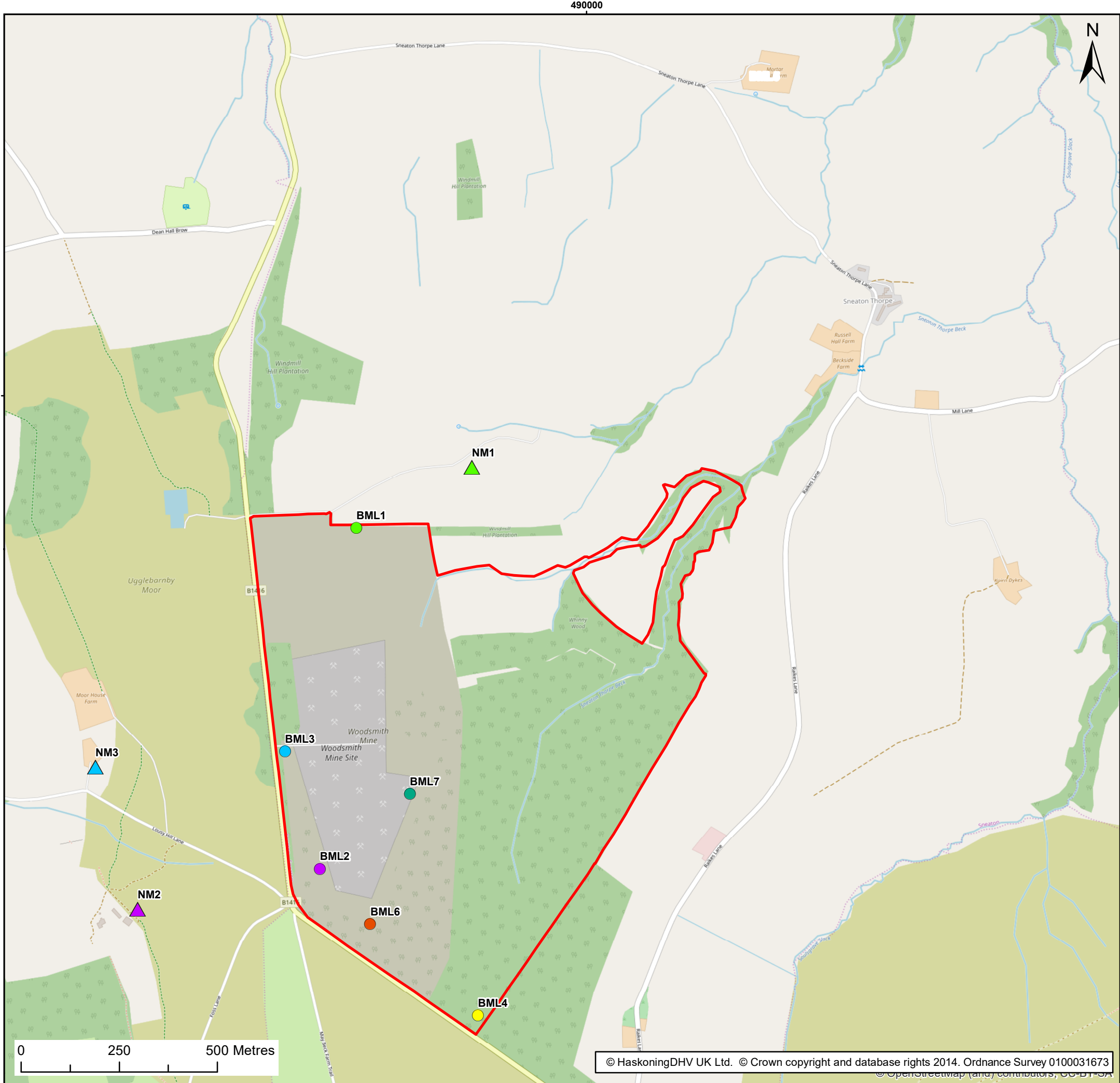
### Public relations

- 6.4.2 Good public relations with local residents in nearby noise-sensitive receptors will be maintained.
- 6.4.3 A Community and Stakeholder Engagement Plan is provided in Appendix A to the Phase 11 CEMP (40-RHD-WS-70-EN-PL-0041). It remains valid for Phase 11 Works, and details actions to be taken by Sirius Minerals plc and the Contractors.
- 6.4.4 A Scheme for the Prior Notification of Blasting (40-SMP-WS-1000-PA-PL-00001) was approved as part of the Phase 7 Works at Woodsmith and contains details of the procedures adopted for informing local residents of blasting operations.
- 6.4.5 The Local Planning Authority and local communities will be informed of the timing of Works in the Bund F area that have the potential to generate higher levels of noise. These Works would be completed as quickly as possible.

## Appendix A Acoustic Terminology

Term	Definition
Noise sensitive receptors	People, property or designated sites for nature conservation that may be at risk from exposure to noise and vibration that could potentially arise as a result of the proposed development/project
Noise and Vibration study area	The area assessed for noise and vibration impacts during this assessment
Baseline scenario	Scenarios with the proposed development/project not in operation
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 $\mu$ Pa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
$L_{Aeq,T}$	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.
$L_{A10,T}$	The A weighted noise level exceeded for 10% of the specified measurement period (T). $L_{A10}$ is the index generally adopted to assess traffic noise
$L_{A90,T}$	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142:2014 it is used to define the 'background' noise level.
$L_{Amax}$	The maximum A-weighted sound pressure level recorded during a measurement.
PPV	Instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position.
'A' weighting	A frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Fast time constant	Sound level meters have two conventional time weightings, F = Fast and S = Slow with time constants of 125 ms and 1000 ms respectively. Fast time constant relates to the response time of the meter which allows rapid variations in noise level to be registered.

## Appendix B Figures



- Legend:
- Land Ownership Boundary
- Site Boundary Monitoring Locations**
- BML1 - Parkdown Bungalow
  - BML2 - Thornhill
  - BML3 - Moorside Farm
  - BML4 - Soulsgrave Farm/Wainwright Coast to Coast Walk
  - BML6 - Sneaton Foss/Falling Foss
  - BML7 - Between shaft sinking area and BML4
- Receptor Monitoring Locations**
- ▲ NM1 - Parkdown Bungalow
  - ▲ NM2 - Thornhill
  - ▲ NM3 - Moorside Farm

Client:	Project:
Sirius Minerals plc	Sirius North Yorkshire Polyhalite Project

Title:  
Proposed Residential Receptor and Boundary Noise Monitoring Locations

Appendix: B	Figure: B.1	Drawing No: 40-RHD-WS-70-EN-PL-0016-D001			
Rev:	Date:	Drawn:	Checked:	Size:	Scale:
B	16/10/2018	JT	AB	A3	1:10,000
A	23/05/2017	GC	AB	A3	1:10,000

Co-ordinate system: British National Grid

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## Appendix C Predicted Construction Noise Levels

The predicted noise levels detailed within the tables below are considered to represent the most conservative scenario.

**Table C.1 Calculated highest noise levels during Phase 11 – Daytime**

Receptor Location	Daytime (07:00–19:00)	
	Limit $L_{Aeq,1hr}$ dB	Maximum Predicted $L_{Aeq,1hr}$ dB
Parkdown Bungalow	55	51.0
Moor House Farm	55	38.5
Moorside Farm	55	36.6
Thornhill	55	37.0
Soulsgrave	55	41.5
Wainwright Coast to Coast Path	55	40.0
Sneaton Foss Caravan Park	55	39.0
Falling Foss Tearooms	55	21.6
Lound House Caravan Park	55	40.4

**Table C.2 Calculated highest noise levels during Phase 11 – Evening and night time**

Receptor Location	Evening and Night-time (19:00–07:00)	
	Limit $L_{Aeq,1hr}$ dB	Maximum Predicted $L_{Aeq,1hr}$ dB
Parkdown Bungalow	42	41.9
Moor House Farm	42	35.7

Receptor Location	Evening and Night-time (19:00–07:00)	
	Limit $L_{Aeq,1hr}$ dB	Maximum Predicted $L_{Aeq,1hr}$ dB
Moorside Farm	42	33.8
Thornhill	42	33.3
Soulsgrave	42	37.6
Wainwright Coast to Coast Path	42	36.0
Sneaton Foss Caravan Park	42	35.1
Falling Foss Tearooms	42	16.5
Lound House Caravan Park	42	33.7

During the past year, visits have been made to the various receptors for equipment maintenance and monitoring purposes. At those receptors to the south and west of the site (particularly Moorside, Thornhill and the Wainwright Coast to Coast Path) it was observed, over a number of visits, that site noise is generally inaudible. Predicted noise levels in the tables above can, therefore, be considered to be a very conservative case.

### Modelling Assumptions

Concurrent Phase 4, 4a, 5, 6, 7 and 9 activities were logarithmically added to the modelled results for Phase 11, where appropriate, to produce the noise levels in Tables C.1 and C.2.

The predicted night-time levels in Table C.2 include a screen between the closest boundary of the works to the nearest receptor (Parkdown Bungalow). The screen will be graded during the daytime (07:00 to 19:00) only until it is of sufficient dimensions. The profiled screen will ensure adequate attenuation from on-site works, before night-time tipping or grading activity commences on Bund F. Nighttime operations on the materials handling area do not require any specific screening.

The following Phase 11 equipment and associated sound power levels were used within the SoundPLAN noise models:

#### Tree Clearance

1no. Harvester (Backhoe mounted chainsaw), 115 dB(A), 20% daytime ontime

#### Batteries

4x AVK container units, 68 dB(A) @1m continuous operation

#### **Development of mitigation screening**

- 5x Dozer, 109 dB(A), 75% ontime daytime only
- 1x Front end loader, 107dB(A), 75% ontime
- 1x Dump truck, LwA 110 dB(A), 60min/hr daytime, 30min/hr night to Material Handling Platform
- 1x Dump Truck LwA 110 dB(A), 60min/hr daytime, 30min/hr night to Bund F tipping area
- 1x Dump truck tipping, 107dB(A) (measured on site), 15min/hr
- 1x Mobile Crusher, 109dB(A), daytime only 20% on-time daytime only

#### **Grout shed and winches**

- 1x Grout Shed operations, 80dB(A), continuous operation
- 1x Winch, 100dB(A), continuous operation

#### **Service Shaft Ventilation and Dust Silencer**

- 1x Silencer, 88dB(A), continuous operation
- 1x Ventilation unit, 88dB(A) continuous operation
- 1x Service Shaft Winch House, LwA 100dB, continuous operation
- 1x Winch House PS, LwA 100dB, continuous operation
- 1 x PS ventilation, 88dB(A), continuous operation

#### **Air Compressing Facility**

- 5x Compressors LR290, 90 dB(A), 100%
- 2x Condensates pumps, 80.5 dB(A), 100%
- 1x Adsorption Dryer, 106 dB(A), 100%

#### **NDWWTP**

- 1x Dissolved Air Flotation Unit, 93.1 dB(A), 80% on time, daytime only
- 3x Shaft Head Shaker Unit, 97.7 dB(A), 80% on time daytime only at MTS shaft, North and South shafts

Mobile equipment was modelled as a moving point line source with speeds of between 5 and 20 kph.  
Stationary plant was modelled as a point source.

Noise propagation was calculated using the BS 5228:2009+A1:2014 methodology.



Our Ref: 40-SMP-NPA-LE-0002

Mr. Rob Smith  
North York Moors National Park Authority  
The Old Vicarage  
Bondgate  
Helmsley  
North Yorkshire  
YO62 5BP

22 August 2019

Dear Rob

**NORTH YORKSHIRE MOORS NATIONAL PARK AUTHORITY LETTER NYM/2019/0524/CVC DATED 12 AUGUST 2019 VERIFICATION CHECK OF CONDITIONS 4, 18, 29, 34, 45, 46, 47, 52, 57, 60, 64, 68, 70, 71, 73, 76, 79, 81, 87, 91, 92, 93, 94, 95 AND 97 OF PLANNING APPROVAL NYM/2017/0505/MEIA AT LAND AT WOODSMITH MINE (FORMERLY DOVES NEST FARM & HAXBY PLANTATION), SNEATONTORPE (MINEHEAD); UNDERNEATH 252KM2 OF THE NYMNP (WINNING & WORKING OF MINERALS); A CORRIDOR EXTENDING UNDERGROUND FROM THE EDGE OF THE NP BOUNDARY TO WILTON COMPLEX (MINERAL TRANSPORT SYSTEM); LADYCROSS PLANTATION NEAR EGTON, LOCKWOOD BECK FARM NEAR MOORSHOLM, TOCKETTS LYTHE, NEAR GUISBOROUGH (INTERMEDIATE SHAFT SITES); SITE WITHIN THE EASTERN LIMITS OF THE WILTON COMPLEX, TEESIDE (TUNNEL PORTAL)**

This letter sets out the response of Sirius Minerals to a request for clarification from North Yorkshire Moors National Park Authority, as referenced above. For each issue, the North Yorkshire Moors National Park Authority's request is presented in blue text with the Sirius Minerals response following in black text.

Noise and Vibration Management Plan – para. 3.2.3 of the NVMP states that, whilst noise levels arising from phase 11 works are not expected to exceed the 55 dB  $L_{aeg,1hr}$  day time limit, the higher 70 dB  $L_{aeg,1hr}$  limit applying on a limited basis for provision of noise-reducing earth bunds and/or barriers (i.e. as referred to in condition 20) can be considered applicable during development of the landscape mitigation screening. The NPA does not agree that the 70 dB  $L_{aeg,1hr}$  limit can be considered as being generally applicable to construction of the main perimeter screen mounds. Whilst it is acknowledged that such mounds will play a role in mitigation of noise impacts during the later stages of construction, and from the operational site, this is incidental to their main role in mitigating the visual and wider landscape impact of the development. The Authority also notes that construction of such screen mounds will be taking place progressively and continuously over a period of years during main shaft sinking activity, rather than being a periodic short-term activity. In this context it is also noted that para. 6.3.3 of the NVMP states that placement of extracted material onto the Bund F area will not take place outside the hours of 0700-1900 until the berm profile is established to a sufficient height and width to ensure adequate screening of the closest receptor.

It would be helpful if you could clarify whether it is predicted that noise levels at the nearest (or any other) receptor would exceed the 55 dB  $L_{aeg\ 1hr}$  limit during any activity associated with bund formation. If this is the case, it is suggested that the reference to the flexibility afforded by condition 20 for a 70 dB  $L_{aeg\ 1hr}$  limit in certain circumstances is deleted from the Phase 11 NVMP.

This query was discussed with the Authority on 15/08/2019.

Our modelling shows that the daytime limits would not be exceeded during the Phase 11 Works. We remain committed to implementing the working practices and noise controls that are already being carried out across the site.

As discussed, the request for use of the 70dB  $LA_{eq\ 1hr}$  relates to Works being carried out in the north eastern corner of the site, when the development of Bund F will be at its closest point to the residential receptor that is given the designation "NM1" in the Noise and Vibration Management Plan. Although not expected, there remains the potential for exceedances when working this close to the site boundary and we believe it would be prudent to apply the upper limit accordingly, on a precautionary basis, for a short duration not exceeding that established in Condition 20. We will inform the Authority and local communities of the timing of Works in this area that have the potential to generate higher levels of noise and will seek to complete them as quickly as possible.

To be clear, we are concerned about short-term, periodic noise during the initial development of Bund F only. We are not seeking to apply this precautionary approach to the creation of landscape screening in general and certainly not "over a period of years".

It is further noted that the approved plans for the mine development indicate an area, which falls within part of the area covered by Bund F, where there is a prohibition on any night time construction activity, including tipping of material. This area is shown on approved drawing YP-P2-CX-080 Woodsmith Mine Construction Hours of Working. This drawing also confirms, in the notes to the key, that within the remainder of the Bund F area, crushing, compacting and final profiling of deposited material will only take place between the hours of 0700-1900. It would be helpful if it could be confirmed within the Phase 11 conditions discharge documentation that this restriction will be complied with.

The restriction will be complied with.

It should be noted that, as for all Phases since early site preparation, works to handle and temporarily store extractive material during Phase 11 will be carried out on a 24-hour basis. This is in accordance with approved drawing YP-P2-CX-080: "During the period 19:00 – 07:00 hours excavated spoil from shaft and tunnel works would be tipped at designated locations on the screening mounds...". Material will only be crushed, compacted and profiled in these areas during normal working hours (07:00 – 19:00). The Authority's approval to continue with this approach for Phase 11 is required, in accordance with the requirements of Condition 19. On this basis, please can the Authority confirm that it is content with the continuation of current earthworks practice?

Monitoring of blasting – the NVMP (para. 5.1.2) states that vibration monitoring during blasting is to be carried out at one off-site location only (Parkdown Bungalow), with monitoring also taking place at the corresponding site boundary monitoring station. Whilst it is appreciated that Parkdown Bungalow is the closest residential receptor to the

location where the blasting will take place, it is also noted (as referenced at para. 5.1.4 of the NVMP), that propagation of vibration is difficult to predict due to the variability of local factors. On this basis it is considered that it would be prudent to allow for continued monitoring of blasting at a further off-site location on the opposite side of the shaft platform area and it is suggested that location NM3 and the corresponding boundary location BML3 may be suitable from this perspective. It would be appropriate to keep under review the need for this additional monitoring location when considering discharge of conditions at future stages of construction.

The assessment presented in the Project's Environmental Statement concluded that blast induced vibration at the residential receptors with the designation "NM2" and "NM3" would be significantly below the levels referred to in Condition 23. This assessment was based on an assumption that the Service Shaft, Production Shaft and MTS Shaft were to be constructed concurrently via the drill and blast methodology. This methodology is now only being applied at the MTS Shaft, which is located close to 700m from NM3 and in excess of 980m from NM2. On this basis, there is no reason to suspect that vibration related impacts would arise at receptor locations or that vibration levels in these locations would be worse than those that could be detected at either BML1 (~200m from the MTS Shaft) or NM1 (~470m from the MTS Shaft). We will be undertaking monitoring at multiple locations (as below) during test blasting, which will allow for validation of the levels. We suggest that the results are used as the basis of agreement of ongoing monitoring requirements with the Authority, accepting that we carry the burden of proof.

It is noted (para. 5.1.6) that additional test blast monitoring will take place at 6 locations including NM2 and NM3. The remaining proposed locations for monitoring of test blasts should be clarified. It would also be helpful if the likely duration of test blasting could be indicated. It will be important that the results of test blasting are provided to the Authority as soon as possible and it would be appreciated if you could clarify the intended process for this. It would also be helpful if the scheme indicated that the arrangements for monitoring of blasting will be refined, if necessary, in discussion with the Authority, in the light of results from test blasting. With regards to para. 5.1.8, it would be helpful if the NVMP indicated that, where a breach of condition limits on blasting is detected, the result are provided to the NPA as soon as possible and in any event within one week.

Monitoring will take place at:

- BML1
- BML2
- BML3
- NM1

Subject to access agreement with the property owners, the other two locations will be:

- NM2 and
- NM3.

Monitoring will take place for a period of one month.

During the monitoring, we will provide the Authority with a weekly update on recorded levels. In the very unlikely event of a recorded exceedance of the levels specified in the Planning Permission, the Authority will be informed within 24 hours, including details of any measures being taken to avoid a reoccurrence.

The above will be included in the updated NVMP, which will be sent to the Authority by email.

Finally in relation to the NVMP, please could you clarify whether air overpressure monitoring and reporting will take place in parallel with vibration monitoring and reporting for all proposed monitoring locations.

Yes it will. The equipment measures both, simultaneously.

Construction Environment Management Plan – Whilst the CEMP makes general reference to requirements for temporary task lighting in support of Phase 11 works, it is understood that there will be a requirement for lighting of the new materials handling area, to be developed to support bund construction. This will introduce lighting into a part of the site not currently lit and with potential for high visibility from off-site locations to the east (e.g. along the A171). It would therefore be helpful if more specific information could be provided about the intended approach to lighting in this area, for example in terms of the expected number and type of lighting units required, and the approach to locating and managing these to help ensure that significant adverse impact from lighting in this area does not arise. It would also be helpful if it could be confirmed that lighting in this area and any lighting used on the bund itself would be consistent with the good practice identified in the updated Protected Species Management Plan for bats, which also forms part of the Phase 11 submission.

All lighting used in Phase 11, whether existing or new, will follow the principles established in both the CEMP and the Protected Species Management Plan for Bats. It will also be subject to the ongoing Proactive Monitoring and regular lighting reviews carried out on site. These practices are already established within the CEMP and no update is necessary.

Activities within the materials handling area and during bund formation are likely to have high potential for the generation of dust. Whilst a range of dust management measures were identified in the documentation submitted and approved at Phase 5 stage, it would be helpful if more detail could be specified (e.g. in the Construction Environment Management Plan for Phase 11) on how this matter will be addressed and monitored in the particular context of the significant scale of materials handling activity to be carried out in this element of the Phase 11 works.

Bulk earthworks, including the creation of perimeter bunds have been carried out since the beginning of the Project. Dust generation has not been an issue during this time and is not expected to be an issue going forward. The same controls and monitoring currently in use will continue throughout the Phase. This will be kept under review, informed by visual observation and via the monitoring results and any necessary additional mitigation will be carried out, if required.

The materials handling area is intended for use when extractive material is too damp to place into the bunds; as such, the potential for dust generation at this location is minimal. The dust management measures already carried out on site will be applied in this area, as required.

The remedial action plan (relating to ground and surface water monitoring) indicates at a number of locations (Paras. 3.3.3 and 3.4.3) that, if modelling and additional monitoring results show that an adverse impact is occurring in exceedance of the Compliance Trigger Value, then measure to mitigate pollution will be considered. It is requested that this requirement be strengthened to indicate that appropriate measures will also be implemented where necessary.

The Remedial Action Plan has been updated to ensure this requirement is clear. The updated document will be provided to the Authority via email.

The updated Protected Species Management Plan for bats makes reference to the related report by INCA dated June 2019 concerning Bats and Lighting, including the identification of dark buffer zones. However, the report by INCA also indicates that it is intended to extend bat activity surveys to take in the wider operational site and its surroundings, based on the route of original bat activity transects where they correspond with the perimeter of the works, as well as within Haxby Plantation. For clarity it would be helpful if this stated intention could also be included within the Phase 11 PSMP for bats.

These surveys are being carried out to inform a wider understanding of bat activity within our land ownership. The surveys are not a requirement of our European Protected Species Licence and do not fall within the remit of the PSMP.

We trust that this response addresses the points of clarification raised by the North Yorkshire Moors National Park Authority and that conditions relating to Phase 11 can now be partially discharged. If you have any further questions, please contact the undersigned.

Yours sincerely,



Robert Staniland  
Planning & Environment Manager