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Date: 29 April 2022
Our ref: 50303/04/HS/JCx/20967493v2
Your ref: NYM/2017/0505/MEIA

Dear Rob

North York Moors: Ladycross Plantation - Application to Partially Discharge Conditions 4, 18, 34, 42, 52, 55, 57, 59, 60, 65, 68, 70, 71, 76, 80, 88, 89, 90, 91, 92, 93, 94 and 95 of Planning Permission NYM/2017/0505/MEIA

On behalf of our client, Anglo American Woodsmith Limited, we are pleased to submit this application for limited and partial approval of Planning Conditions 4, 18, 34, 42, 52, 55, 57, 59, 60, 65, 68, 70, 71, 76, 80, 88, 89, 90, 91, 92, 93, 94 and 95 of Planning Permission NYM/2017/0505/MEIA.

The Project will be delivered in a series of Phases within each discrete part of the overall consented area. This application relates solely to Phase 3a works at Ladycross Plantation.

Background

On 19 October 2015, the NYMNPA granted planning permission for the "Winning and working of polyhalite by underground methods including the construction of a minehead at Dove's Nest Farm involving access, maintenance and ventilation shafts, the landforming of associated spoil, the construction of buildings, access roads, car parking and helicopter landing site, attenuation ponds, landscaping, restoration and aftercare and associated works. In addition, the construction of an underground tunnel between Doves Nest Farm and land at Wilton that links to the mine below ground, comprising 1 no. shaft at Doves Nest Farm, 3 no. intermediate access shaft sites, each with associated landforming of associated spoil, the construction of buildings, access roads and car parking, landscaping, restoration and aftercare, and the construction of a tunnel portal at Wilton comprising buildings, landforming of spoil and associated works" (Council Reference NYM/2014/0676/MEIA).

NYM/2014/0676/MEIA was approved subject to 95 planning conditions and a Section 106 Agreement.

On 6 February 2017, the NYMNPA granted planning permission for the *"Variation of Condition 5 of planning permission NYM/2014/0676/MEIA to allow minor*

material amendments relating to that part of the development at the Woodsmith Mine site (formerly known as Doves Nest Farm and Haxby Plantation), including; re-design of foreshafts and shaft construction methodology, changes to building layout and shaft access arrangements, revisions to construction and operational shaft platform levels, revisions to location and layout of surface water attenuation ponds, revisions to groundwater management arrangements and amendments to internal access arrangements" (Council Reference NYM/2017/0505/MEIA).

The amended scheme (NYM/2017/0505/MEIA) was approved subject to 98 planning conditions and a deed of variation to the originally approved Section 106 Agreement.

Phase 3a Works

The Phase 3a works comprise a slight variation to the construction methodology for the cuttings lagoon as previously approved under Phase 3.

Partial Discharge

Anglo American acknowledges that limited and partial approval of Planning Conditions 4, 18, 34, 42, 52, 55, 57, 59, 60, 65, 68, 70, 71, 76, 80, 88, 89, 90, 91, 92, 93, 94 and 95 when given, does not constitute permission to undertake works other than those described, and that such works remain subject to the approval of other conditions.

This approach has been discussed and agreed with your Planning Team and is consistent with the approach taken at the Woodsmith Mine site.

Condition 86

As detailed in the Construction Method Statement, it is proposed to line the proposed lagoon with clay. In the context that the clay is to be used as an aggregate material that will be taken off-site after the construction phase, we seek – as part of this discharge of condition submission – the NYMPA's written agreement for this approach, as per the requirements of Condition 86.

Application Submission

The application was submitted via the planning portal on 29 April 2022 (reference PP-11224443) and comprises the following documentation:

- Completed application form;
- Application drawings – Please see Appendix 1;
- Supporting Documents – Please see Appendix 1.

The requisite planning application fee of £116 has been paid online by credit card.

Conclusion

We trust that this application provides you with the necessary information to be able to partially discharge the above conditions to cover Phase 3a site works at Ladycross Plantation. However, should you require any further information, please do not hesitate to contact me.

Yours sincerely

James Cox
Associate Director

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Appendix 1 : Supporting Documents

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Table 1: List of Supporting Documents

Condition No	Description	Document Name / Number	Further Details
N/A	N/A	Listed Plans	40-STS-LC-2100-PA-22-20113 – Ladycross Plantation Phase 3a General Arrangement 40-STS-LC-2100-PA-22-20111 – Ladycross Plantation Phase 3a Phasing Plan
4	Phasing Plan	40-STS-LC-2100-PA-22-20111 – Ladycross Plantation Phase 3a Phasing Plan	N/A
18	Noise & Vibration	Phase 3 Ladycross Plantation Noise and Vibration Management Plan - 40-STS-LC-2100-EN-PL-00009	The Phase 3 NVMP will remain applicable for the Phase 3a works.
34	Construction Traffic Management Plan	Phase 3 Ladycross Plantation Construction Traffic Management Plan - 40-STS-LC-2100-LG-PL-00001	The Phase 3 CTMP will remain applicable for the Phase 3a works.
42	Access	Refer to CEMP (Condition 93)	Access arrangements will remain as per earlier phases. Further details regarding the proposed parking, manoeuvring and turning areas that will be utilised in this phase are also set out in the Construction Method Statement and Listed Plans.
52	Protected Species	Ladycross Plantation Phase 3 Protected Species	Please also refer to the Phase 3a CEMP (Condition 93).

	Management Plan	Management Plan – Bats – 40-STS-LC-2100-EN-PL-00001 Ladycross Plantation Phase 3 Protected Species Management Plan – Breeding Birds – 40-STS-LC-2100-EN-PL-00002 Ladycross Plantation Phase 3 Protected Species Management Plan – Reptiles – 40-STS-LC-2100-EN-PL-00003 Ladycross Plantation Phase 3 Protected Species Management Plan – Badgers – 40-STS-LC-2100-EN-PL-00004 Ladycross Plantation Phase 3 Protected Species Management Plan – Water Voles – 40-STS-LC-2100-EN-PL-00005	
57	Landscape & Ecological Management Plan	Ladycross Plantation – Phase 3 Works – NYMNPA 57 Landscape & Ecological Management Plan– 40-STS-LC-2100-EN-PL-00014	N/A

59	External Lighting	Refer to CEMP (Condition 93)	N/A
60	Surface Water Drainage	Ladycross Plantation – Phase 3 Works – NYMNPA 60 and 80 Surface Water Drainage Scheme – 40-STS-LC-2100-PA-PL-20102	The Phase 3 Surface Water Drainage Scheme will remain applicable for the Phase 3a works.
65	Temporary Fencing	Refer to Construction Method Statement (Condition 94)	Listed plans.
68	Temporary Structures	Refer to Construction Method Statement (Condition 94)	Listed plans.
70	Arboricultural Method Statement	Ladycross Plantation Phase 3 Arboricultural Method Statement – 40-STS-LC-2100-CN-MS-00003	Please also refer to CEMP (Condition 93).
71	Hard & Soft Landscaping	40-STS-LC-2100-20112 – Ladycross Plantation Phase 3a Hard and Soft Landscaping Plan	N/A
76	Soil Management Plan	Ladycross Plantation – Phase 3 Works – NYMNPA 76 Soil Management Plan – 40-STS-LC-2100-EN-PL-00007	The Phase 3 Soil Management Plan will remain applicable for the Phase 3a works.
80	Surface Water Drainage	Ladycross Plantation – Phase 3 Works – NYMNPA 60 and 80 Surface Water Drainage Scheme – 40-STS-LC-2100-PA-PL-20102	See Condition 60 above

88	Hydrogeological Risk Assessment	Ladycross Plantation – Phase 3a Works – NYMNPA 88 Hydrogeological Risk Assessment – 40-STS-LC-2100-EN-RA-00003	N/A
88	Ground Water & Surface Water Monitoring Scheme	Phase 3 Construction & Operation Groundwater & Surface Water Monitoring Scheme - 40-STS-LC-2100-EN-PL-00012	The Phase 3 Construction & Operation Groundwater & Surface Water Monitoring Scheme will remain applicable to the Phase 3a works.
89	Remedial Action Plan	Ladycross Plantation – Phase 3 Works – NYMNPA 89 Remedial Action Plan – 40-STS-LC-2100-EN-PL-00011	The Phase 3 Remedial Action Plan will remain applicable to the Phase 3a works.
90	Groundwater Management Scheme	Ladycross Plantation – Phase 3a Works – NYMNPA 88 Hydrogeological Risk Assessment – 40-STS-LC-2100-EN-RA-00003	Please also refer to CEMP (Condition 93).
91	Emissions	Phase 3 Ladycross Plantation Emissions to Atmosphere - 40-STS-LC-2100-EN-PL-00013	The Phase 3 Emissions to Atmosphere Report will remain applicable to the Phase 3a works.
92	CVPMP	Phase 3 Ladycross Plantation Construction Vehicle & Plant Management Plan -	The Phase 3 CVPMP will remain applicable to the Phase 3a works.

		40-STS-LC-2100-LG-PL-00002	
93	CEMP	Phase 3a Ladycross Plantation Construction Environmental Management Plan – 40-STS-LC-2100-EN-PL-00024 Phase 3 Ladycross Plantation Dust Management Plan – 40-STS-LC-2100-EN-PL-00015	Phase 3a CMS (reference 40-STS-LC-2100-CN-MS-00005)
94	Construction Method Statement	Phase 3a Ladycoss Plantation Construction Method Statement – 40-STS-LC-2100-CN-MS-00005	Listed plans.
95	Written Scheme of Investigation	Refer to CEMP (Condition 93)	40-COT-LC-8324-EN-PL-00002 – Ladycross Plantation - Written Scheme of Investigation for an Archaeological Watching Brief – Phase 2

Project Title / Facility Name:

Woodsmith Project

Document Title:

CONSTRUCTION METHOD STATEMENT - PHASE 3A - LADYCROSS

NYMNPA

29/04/2022

Document Review Status

- [x] 1. Reviewed – Accepted – Work May Proceed — By: Angela Samuels
- [ ] 2. Reviewed – Accepted As Noted, Work May Proceed, Revise & Resubmit — On: 29 Apr 2022 11:22
- [ ] 3. Reviewed – Work May Not Proceed, Revise & Resubmit
- [ ] 4. For information only
- [ ] 5. On Hold – Pending Project Restart & Ramp Up

Rev.	Revision Date (dd mmm yyyy)	Reason For Issue		Prepared by	Verified by	Approved by
C	29-Apr-2022	Planning	PLA			
B	21-Apr-2022	Planning	PLA			
A	11-Apr-2022	Planning	PLA			

Document ID:

40-STS-LC-2100-CN-MS-00005

NORTH YORKSHIRE POLYHALITE PROJECT (788.5030)

CONSTRUCTION METHOD STATEMENT - PHASE 3A - LADYCROSS PLANTATION

40-STS-LC-2100-CN-MS-00005

Revision	Date of issue	Prepared by	Checked by	Approved by	Changes
A (PLA)	11/04/2022	Carl Thomas	William Hodgson	Callum Fryer	First Issue
B (PLA)	21/04/2022	Carl Thomas	William Hodgson	Callum Fryer	Review post Rev A comments
C (PLA)	29/04/2022	Carl Thomas	William Hodgson	Callum Fryer	Review post Rev B comments

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1. INTRODUCTION

1.1. OVERVIEW

This document has been prepared on behalf of Anglo American and details the Construction Method Statement for the Phase 3 and 3A construction activity at Ladycross Intermediate Shaft Site.

This document builds on the CMS produced for Phase 2, Construction Method Statement (40-STS-LC-2100-CN-MS-00001).

This report only details the construction works required for the Phase 3 and 3A works at the Ladycross Plantation Intermediate Shaft Site.

The CMS provides an overview of the resource requirements and the plant and materials that are anticipated to be used during the Phase 3 and 3A construction works at Ladycross Plantation. It includes the measures to be taken to ensure that the works are carried out in accordance with the requirements of both the planning permission and of Anglo American and, above all, are carried out safely and in compliance with all statutory obligations.

In addition, while not submitted to the Planning Authority, all site works are controlled by a Risk Assessment and Method Statement (RAMS) process, which identify the resources, plant, materials and specific controls required for all scopes of work.

This document provides details of the previously submitted and approved Phase 3 works as well as the Phase 3A submission which incorporates the alterations required for the cuttings lagoon construction methodology. The Phase 3A Construction Environmental Management Plan (CEMP) (40-STS-LC-2100-EN-PL-00024), Phase 3A Construction Method Statement (CMS) (40-STS-LC-2100-CN-MS-00005) Phase 3A Hydrogeological Risk Assessment (HRA) (40-STS-LC-2100-EN-RA-00003), Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113), Phase 3A Phasing Plan (40-STS-LC-2100-PA-22-20111) and Phase 3A Landscaping Plan (40-STS-LC-2100-PA-22-20112) makes up the Phase 3A submission. No other adjustments are required from Phase 3 supporting documentation previously submitted to and approved by North York Moors National Park Authority (NYMNPA).

Alterations from the Phase 3 to the Phase 3A CMS are detailed in sections **3.4**, **3.4.4 and 4** and the Phase 3A General Arrangement Plan. The Phase 3A works only concern a change to the cuttings lagoon construction methodology, as previously approved under Phase 3.

A site plan is provided separately.

Table 1 - 1 Condition NYMNPA-94: Construction Method Statement

NYMNPA 94 Compliance	Compliance
Prior to the commencement of each Phase of Construction at Dove's Nest Farm or Lady Cross Plantation, a Construction Method Statement shall be submitted for that phase, and approved in writing by the MPA, in consultation with the appropriate Highway Authority. Each approved Statement shall be adhered to throughout the construction period. The Statements shall provide for:	This CMS is for the Phase 3A works at Ladycross Plantation
(i) The parking of vehicles of site operatives and visitors clear of the highway;	**Section 5.2**
(ii) Loading and unloading of plant and materials;	**Section 5.5**
(iii) Storage of plant and materials used in constructing the development;	**Sections 5.6** and **7** Additional information is provided within the Phase 3A CEMP
(iv) Erection and maintenance of security fencing;	Information is provided within the Phase 2 CMS
(v) Wheel washing facilities;	**Section 3.9**
(vi) An outline construction method for sub-surface works including adherence to the 'rack and pillar' method of mining described in the SEI (14th February 2015) and the SRK Subsidence Memorandum (15th May 2013);	This type of work is not required in Phase 3A.
(vii) Buildings and structures associated with the mine and tunnel shafts;	**Section 3.4, 3.5, 3.6 and 3.7**
(viii) Welfare/office building and security gatehouse;	**Section 3.2** Additional information is provided within the Phase 3A CEMP
(ix) Screening bunds;	**Section 3.1** Phase 3A General Arrangement Plan

NYMNPA 94 Compliance	Compliance
(x) Hardstandings;	**Section 3.10** and **Attachment B** set out details of hardstanding and access roads to be constructed in Phase 3A and relevant control measures.
(xi) Shuttle Bus terminal;	**Section 3.11**
(xii) Park-and-Ride layby;	This type of work is not required in Phase 3A.
(xiii) Emergency helipad;	This type of work is not required in Phase 3A.
(xiv) Lighting columns;	**Section 6** sets out measures to control light pollution from any construction works lighting required during Phase 3A.
(xv) Internal access and haul roads;	**Section 5**
(xvi) Domestic wastewater (foul sewage) treatment plant;	No plant to be installed in Phase 3A. **Section 3.3.1** sets out measures for management of domestic wastewater.
(xvii) Non-domestic wastewater treatment plant and settlement tanks;	This type of work is not required in Phase 3A.
(xviii) Surface water attenuation ponds, settlement ponds, swales and wetland areas;	**Section 4** sets out the details of surface water management works to be undertaken as part of Phase 3A. Additional information is provided within the Phase 3 Surface Water Drainage (40-STS-LC-2100-PA-22-20107)
(xix) Temporary spoil and Polyhalite storage areas;	Polyhalite storage is not required as part of these Phases. Temporary soil mounds are covered in **Section 3.1**. All required mitigation is included within the Phase 3 Soil Management Plan (SMP) (40-STS-LC-2100-EN-PL-00007)
(xx) Removal of any temporary structures; and	No removal of temporary structures required in Phase 3A.

NYMNPA 94 Compliance	Compliance
(xxi) Formation of spoil mounds and the establishment of vegetation on them.	Temporary soil mounds are covered in **Section 3.1.** All required mitigation is included within the Phase 3 SMP.
The CMS shall contain a construction timetable and order of works noting any construction dependencies, refer to any inherent mitigation to address adverse impacts identified in the EIA, and cross refer to the CEMP in relation to any additional avoidance or mitigation measures.	The CMS relates to the Phase 3A Works at Ladycross only and all required mitigation has been included in the accompanying Phase 3A CEMP. References have been made to the CEMP within this CMS.

The Phase 3 and 3A works requires temporary use of clay material for construction activities and addresses condition 86, as stated in the below table and associated section.

Table 1 - 2 Condition NYMNPA-86: Temporary clay import

NYMNPA 86 Compliance	Compliance
There shall be no importation of clay to the LCP site or DNF unless otherwise agreed in writing by the Mineral Planning Authority.	**Section 3.4, 3.5 and 3.6**

The CMS is a live document and updates to this CMS plan will be prepared for subsequent construction phases and following any design or method change. The NYMNPA has confirmed that it supports this approach.

2. DESCRIPTION OF WORKS

2.1. PHASE 3 AND 3A WORKS

Phase 3 and 3A comprises construction works, and **Section 3** details the strategy that will be undertaken to ensure construction and ongoing earthworks are carried out in a phased approach. The works will be prioritised and carried out to ensure no area is stripped and left exposed due to restrictions of the topsoil stripping window.

2.1.1. PHASE 3 WORKS

Specific works include:

- Additional soil stripping and storage within temporary bunds,
- Installation and use of hardstanding for welfare, car parking, laydown areas, and haul road,
- Installation of foul drainage facilities,
- Installation of further site surface water drainage, including oil interceptor,
- Mobilisation of on-site facilities, including welfare, car park, wheel wash, refuelling, workshop, grout plant and associated services,
- Construction of cuttings lagoon and associated cuttings pit and muck-away area, and
- Installation of working pad for pre-grouting and shaft sinking works.

2.1.2. PHASE 3A WORKS

Changes to Phase 3 as part of Phase 3A works include:

- Revised cuttings lagoon construction methodology.

Specific works are shown on Strabag Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113).

3. WORK SEQUENCE DETAILS

3.1. PHASE 3 AND 3A TOPSOIL AND SUBSOIL STRIPPING OF WELFARE, CAR PARKING, REFUELLING AND FURTHER LAYDOWN AREAS

The Phase 3 and 3A CEMP and the Phase 3 Soil Management Plan (SMP) set out the detailed requirements in relation to soil handling and storage for the site in order to protect the soil quality and the surrounding environment.

The Phase 3 and 3A works includes the establishment of welfare, car parking, refuelling facilities, and additional SUDs drainage installation.

Due to the requirements of the soil stripping window and construction time frames, the site is likely to be stripped in most areas prior to Phase 3 and 3A construction and installations. Phases are dependent on weather and site conditions at the time of working. As such a phased approach will be carried out to ensure best practice and reduce exposure during the topsoil strip. Topsoils and subsoils will not be stripped unless conditions at that time comply with both the site SMP, and Construction Code of Practice for the Sustainable Use of Soils on Construction Sites 2009 published by the Department of Environment, Food and Rural Affairs (Department for Environment, Food and Rural Affairs, 2009) and the Good Practice Guide for Handling Soils (Ministry of Agriculture, Fisheries and Food, 2000).

All areas that do require stripping will undergo circa 200mm topsoil strip followed by a 250mm – 300mm subsoil strip and where ground conditions allow. All areas will be dressed with imported virgin material to protect the underlying subsoils.

Archaeological works are to be carried out in all areas where topsoil and subsoil stripping is required and in accordance with the Archaeological Scheme of Works (40-COT-LC-8324-EN-PL-00002).

Areas that require further soil stripping to accommodate the Phase 3A works are shown in the Phase 3A Hard and Soft Landscaping Plan (40-STS-LC-2100-PA-22-20112) and the Phase 3A Phasing Plan (40-STS-LC-2100-PA-22-20111).

3.1.1. PRECAUTIONARY METHOD OF WORKING (PMOW) FOR SITE CLEARANCE (ECOLOGY)

The Environmental Statement which supported the original planning application concluded that if appropriate mitigation and enhancement activities were undertaken, the impacts on protected species would not be considered significant.

This CMS should be read in conjunction with the Phase 3A Construction Environmental Management Plan, CEMP (40-STS-LC-2100-EN-PL-00024) and Protected Species Management Plans.

3.2. INSTALLATION OF WELFARE AND CAR PARKING

In Phase 3 and 3A, new temporary welfare facilities will be installed in the north western part of site, as detailed within the Phase 3A General Arrangement Drawing (40-STS-LC-2100-PA-22-20113) The welfare will be modular units, double stacked with a planned footprint area of approx. 150m^2. The modular units will incorporate site welfare, office and toilet spaces. A car parking area is to be established to include 20 spaces. All visitors to the site will park within the designated car park.

The units will not exceed 7m height and will be lifted into place by a site mobile crane or HIAB. The units will be painted RAL6008 (brown/green) or equivalent prior to arrival on site. Discreet, sensor-controlled perimeter downlighting will be fitted to provide safe access and egress. All windows will be fitted with shutters.

A stores cabin will be retrofitted to the below footprint and external stairs positioned to face into site.

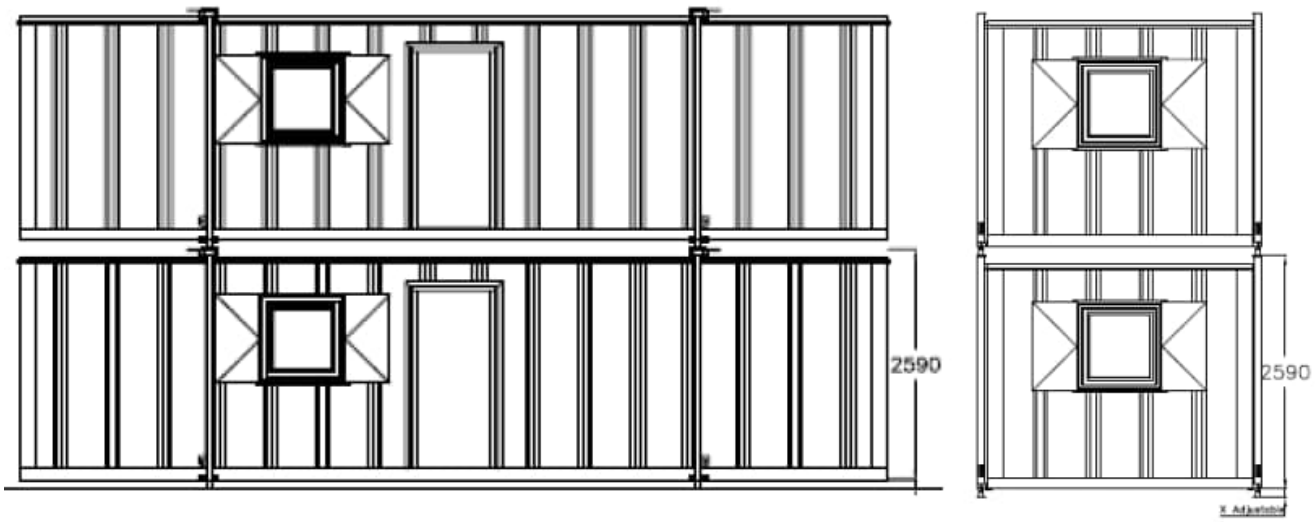


Image 1 – Proposed Ladycross welfare height sketch.

Image 2 – Proposed Ladycross welfare floor plan.

Temporary storage containers will be located within the footprint of the Phase 3 and 3A welfare compound. The containers will be used for storage of site materials during the Phase 3 and 3A works. The container dimensions will be approximately 6m by 2.5m. External material will be painted RAL6008 (brown/green) or equivalent prior to arrival on site.

Image 3 – Mobile storage container, a similar container (painted either Brown Green (RAL 6008) or Juniper Green (RAL 160 20 10)) will be used at Ladycross Plantation.

A temporary workshop is required for Phase 3 and 3A construction activities. The workshop will comprise single container units equipped with a Zapp shelter and roller shutter doors. Dimensions of the workshop will be approximately 15m x 10m. External material will be painted/manufactured RAL6008 (brown/green) or equivalent prior to arrival on site.

Image 4 –Workshop, a similar configuration (painted either Brown Green (RAL 6008) or Juniper Green (RAL 160 20 10)) will be used at Ladycross Plantation.

The workshop will be serviced by a small compressor unit see **Image 5**. The compressor will be located beside the workshop and will be located within an appropriate shelter shielded from external receptors. The compressor will be approx. 1.75m x 0.5m.

Image 5 – Compressor to service the workshop.

3.3. INSTALLATION OF UTILITIES INCLUDING WATER, POWER AND FOUL DRAINAGE FACILITIES

The Phase 3 and 3A works will rely on alternative utility supplies from generators and tankers.

3.3.1. WATER SUPPLY AND STORAGE

The site will be serviced with potable water by tankers for both welfare and construction activities. Welfare units are supplied with self-contained water storage systems, these will be topped up as required. Bottled water dispensers will be provided for site staff. Where required, dust suppression bowsers will also periodically be topped up via tanker. Baker tanks may also be used as temporary storage vessels.

3.3.2. ELECTRICAL SUPPLY

The site is to be powered by welfare integrated generator units and mobile generator sets. An SDMO super silent 60KVa generator set is to be installed to power the onsite Siltbuster unit see **Image 6**. The unit will be fuelled via a fuel cube system.

Image 6 – KOHLER SDMO 60KVa Generator set

The Grout plant will be powered by an internal diesel engine. Workshop facilities will be powered by a super silent 60kVa unit.

Periodically small tool generators may also be required to undertake remote site works. These units will comprise 110V petrol/diesel powered units, an example is provided in **Image 7**.

Image 7 – 110V Small Tools generator set

3.3.1. FOUL DRAINAGE

Septic waste will be temporarily stored in effluent tanks and will be removed regularly via tanker to a suitably permitted facility. A temporary twin walled 20m^3 cesspit will be installed at the welfare compound this will be set in a blinded excavation to mitigate against leakage.

3.4. CONSTRUCTION OF LAGOON, CUTTINGS PIT AND MUCK AWAY

The lagoon, cuttings pit and associated muck away area are shown in Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113). An example of the lagoon and cutting pit are shown below in **Image 11**.

The cuttings lagoon plays a primary role in controlling drill water quality and thus an important part of the overall drilling efficiency. The lagoon will be utilised for storage of drill waters and the recirculation of water during the reaming of the shaft. It will be positioned close to the new shaft whilst maintaining adequate space around the drilling operation.

When assessing lagoon capacity, a key consideration is the allowance of an adequate freeboard as to ensure no site flood risk. The lagoon provides capacity for approximately two times the capacity of the drilled hole, as well as a storm event. The storage volume of the Phase 3A Ladycross Plantation cuttings lagoon is calculated as 12,000m^3 including freeboard capacity. Muck away works will be limited to dayshift working hours (7:00 am to 7:00 pm) only.

To facilitate construction of the lagoon, the initial 500mm of stone placed for hardstanding and area protection in Phase 2 will be removed and used to build up the working platform area. In a variation from Phase 3, in Phase 3A, the ground level will be lowered to an average of 3.2m within the lagoon footprint. Excavation depths will vary based on competent clay at location.

Depths have been defined based upon recent geotechnical stability tests and explorations. During these works it was discovered that superficial deposits were homogeneous throughout trial holes and as such the depths of dig are designed within the superficial deposits situated above the grey clay aquiclude.

The lagoon will be lined by a composite of three materials, an initial basal geosynthetic clay liner, a middle impermeable clay liner and a final lagoon membrane liner.

This three-layer methodology is proposed as a means to control and mitigate against any losses of lagoon fluids. The methodologies will also be backed up by third party Construction Quality Assurance (CQA). The cuttings lagoon cross section is provided in **Attachment A**. Details of environmental controls are provided within the CEMP.

A total volume of approximately 15,000m^3 of highly impermeable clay will be imported to site for the construction of the lagoon bund walls, base layer and bunds for the construction of the Phase 3 attenuation pond (this pond will formalise the temporary pond constructed for Phase 2 works). The clay will only be utilised for these works and will be temporary. The on-site superficial material is not geotechnically suitable for construction use.

After completion of the construction phase works, the lagoon and pond will be decommissioned, the excavation infilled with the previously excavated superficial material, and the imported clay will be removed from site and ground levels will be restored.

There is a small potential for groundwaters to enter the excavation within the superficial deposits, charged by surface waters. This will be controlled via over pumping and in compliance with Regulation 5 of the Water Abstraction and Impounding (Exemptions) Regulations 2017.

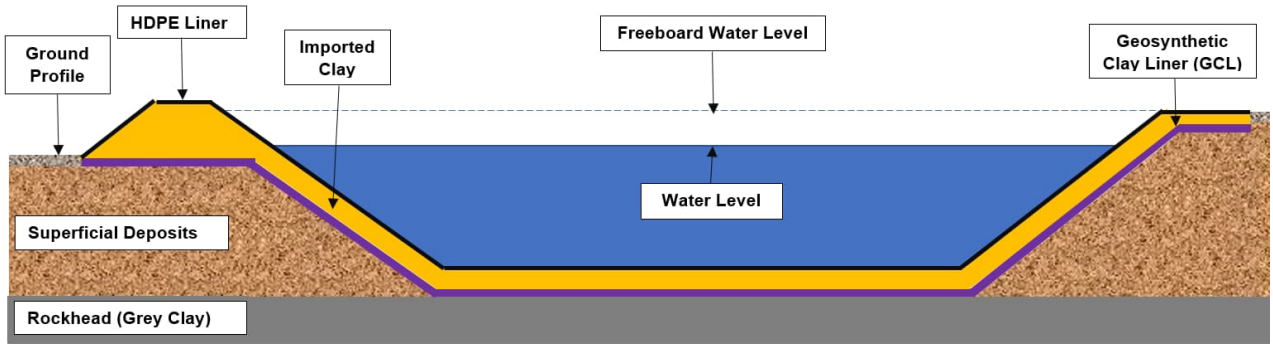


Image 8 – Overview of environmental control layers installed for the cuttings lagoon.

3.4.1. GEOSYNTHETIC CLAY LINER (GCL) (TERTIARY ENVIRONMENTAL CONTROL)

An initial basal geosynthetic clay liner will be installed between the underlying subsoil and the middle impermeable clay base layer. The GCL will act as a tertiary environmental control for the lagoon.

3.4.2. *Impermeable Clay Layer (Secondary Environmental Control)*

A 500mm highly impermeable middle clay layer will be constructed at the base of the lagoon (final thickness to be clarified in detailed design). Lagoon bund walls will also be formed with the imported highly impermeable cohesive material.

The highly impermeable cohesive material will be placed and compacted as per design requirements and following Highways Design Series 600 and the Design Specifications of Earthworks.

Material will be brought to site, during permitted delivery times of 07:00-19:00, by 20-30 tonne tipper wagons. Plant movements will be controlled by a traffic marshal. Specific controls regarding the tipping location and wind speeds will be put in place to minimise dust creation and ensure safe tipping operations. Where practicable the imported material will be tipped adjacent to its final location. Where required, dump trucks will be used to transport material to the required area.

Dozers and/or tracked excavators will be used to construct the bund walls and base clay layer. The impermeable clay layer will act as a secondary environmental control for the lagoon. Initial tests suggest permeability of the cohesive material as $k = 6 \times 10^{-11}$ following compaction tests.

3.4.3. *Lagoon Liner (Primary Environmental Control)*

A sealed lagoon liner will then be installed to provide a further impermeable barrier to contain the drill fluid. The membrane will be composed of High-Density Polyethylene (HDPE) or similar, the thickness of the liner will be clarified in detail design, thickness in the range 1 – 3mm. The membrane will be lifted and installed in rolls and then welded and tested to ensure watertight. The lagoon liner will provide a primary environmental control for the lagoon.

3.4.4. *Weir Walls*

Weir walls will be incorporated into the design to reduce suspended solid content in the drill water, these will be constructed of highly impermeable imported virgin clay. Once the bund walls and weirs are complete, the lagoon will be lined to ensure water used in the recirculation process is retained.

3.4.5. *Cuttings Pit*

An initial cuttings pit will be constructed between the drill pad and lagoon. The pit will be cast in situ, utilising water bar at concrete joints to minimise risk of leak.

The concrete base and walls will provide the initial discharge of the cuttings. The intent is for water to overflow into the lagoon for recirculation, whilst the spoil remains in the pit.

An attendant 360 excavator fitted with a dredging bucket (see **Image 9**) will be utilised to clear the spoil into an adjacent muck bay, giving the spoil time to naturally drain before being loaded into a tipper wagon for removal from site.

Image 9 – Dredging Bucket

The hardstanding around this area will be constructed with concrete, providing an impermeable surface, directing runoff into a perimeter drain which can then be over pumped back into the system. An exclusion zone and signage will be erected around the pond to minimise the risk of personnel falling into water.

Image 10 – Cuttings Lagoon at LWB similar to proposed lagoon at Ladycross

3.5. CONSTRUCTION OF ATTENUATION POND

During Phase 3 works the attenuation pond provided in Phase 2 will be formalized using the importation of highly impermeable clay as stated within **Section 3.5.2.** The base of this pond will be constructed of compacted clay and works will be undertaken with guidance from a third party CQA specialist. The attenuation pond batters will be hydroseeded once works are completed in accordance with the seed mix provided in the Soil Management Plan.

3.6. INSTALLATION OF WORKING PAD

The Phase 2 working platform will be increased to a working height of approx. +202mAOD. Phase 3 works comprise the importation of virgin material and the compaction of material to form a sub-base for the mounting drilling machinery. Aggregate removed from beneath the lagoon will be moved via dump truck and reused to construct working platform. A Geosynthetic Clay Liner (GCL) or similar will be installed prior to building up the working platform.

The impermeable layer will act as an environmental control. The working pad will have an independent drainage system to isolate dirty water from drill activities.

3.7. INSTALLATION OF GROUT PLANT AND ASSOCIATED SERVICES

A grout plant comprising of 2 x 60 tonne grout silos as illustrated in **Image 11**. Total height of silos are approximately 12m. The grout plant will also comprise a mixer unit and pump unit. The plant is to be installed on a sealed base concrete platform; the slab will be drained to a blind sump (wedge pit). The water collected within the sump will be assessed for contamination.

If contaminated the water will be tankered off site and appropriately disposed of by a licensed waste contractor. If the bund contains uncontaminated water, this will be pumped to an appropriate holding tank / lagoon. The silos will include safety features including an overfill system. Grout silos will be painted/manufactured RAL6008 (brown/green) or equivalent prior to arrival on site.

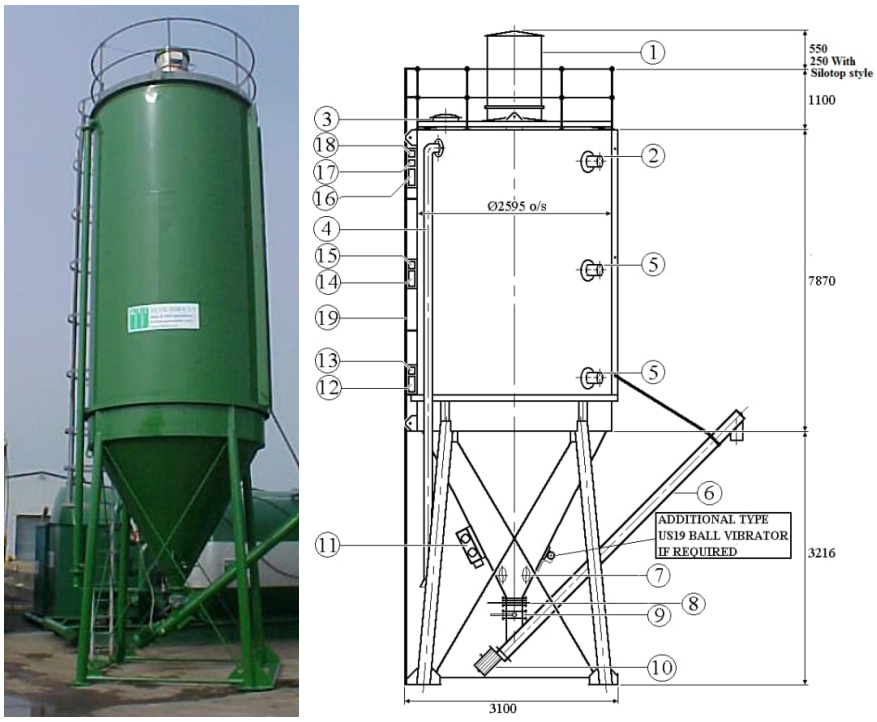


Image 11 - Grout Silo

3.8. INSTALLATION OF REFUELLING STATION

A re-fuelling station is to be constructed. The station will comprise of an impervious hard standing area with containment French drains and drainage to an oil interceptor. A double bunded tank will be used for the storage of diesel and a further IBC unit will be used to contain AdBlue these units will be further protected by installing an external bunded containment area. Toolbox talks regarding refuelling processes will be briefed to all relevant personnel.

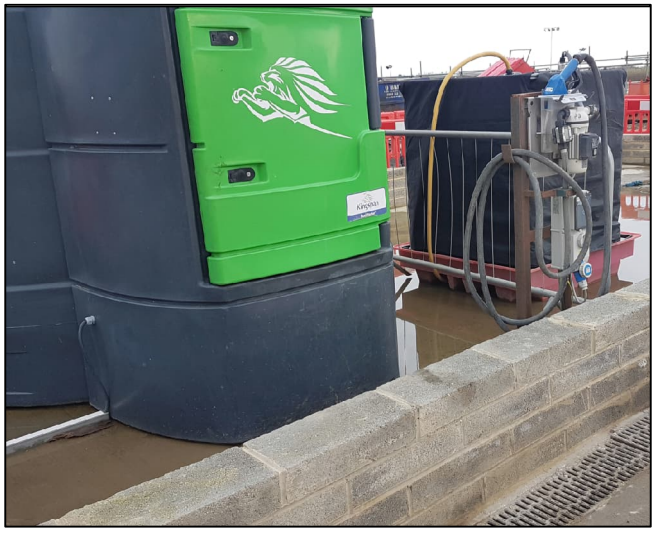


Image 12 – Refuelling compound

3.9. INSTALLATION OF WHEEL WASHING FACILITIES

A self-contained and recycling wheel washing facility is to be constructed into the southwestern section of the main haul road. All vehicles that have travelled off black topped surfaced access roads within site will be required to pass through the wheel cleaner before exiting the site.

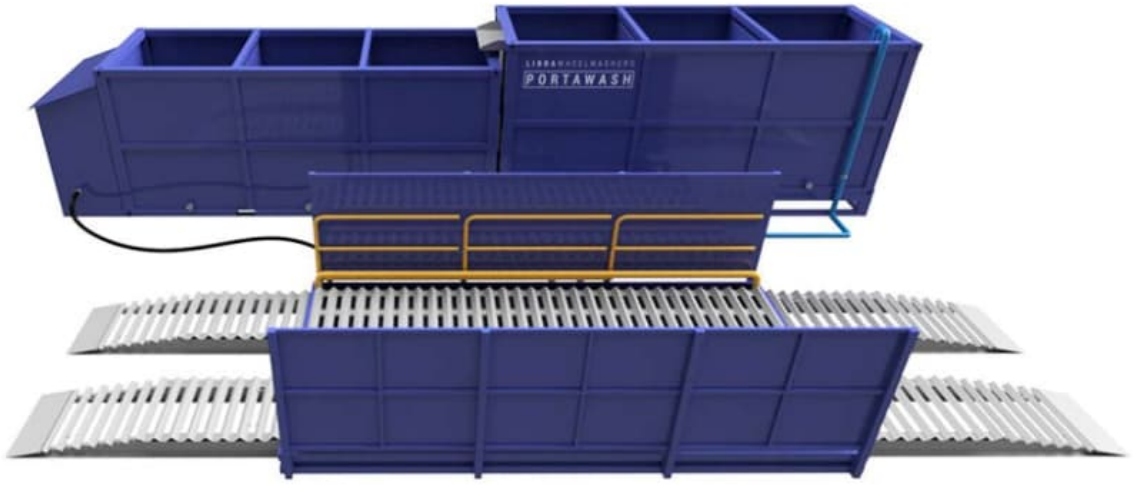


Image 13 – Wheel washing unit

3.10. AREAS OF HARDSTANDING

3.10.1. BLACK TOP

Black top (tarmac) is to be added along the haul road section running to the Welfare and across the car parking area.

Further black topping will be undertaken on a section to the west of the main haul road and east of the wheel washing unit. To mitigate dust on site, a strip of blacktop may be installed for muckaway wagons to cross the working platform.

3.10.2. CONCRETE/SLABS

Concrete base slabs will be limited onsite and will be installed only where required. To support installation of temporary structures / facilities, concrete slabs will be installed in the following areas:

- Grout Plant
- Workshop
- Cuttings pit

- Muckaway area
- Refuelling area
- Wheelwash

3.10.3. STONE/AGGREGATE HARDSTANDING

The remaining areas of site will consist of stoned/aggregate hardstanding. Most notable hardstanding will be the working platform area, laydown areas and welfare.

3.11. LOCKWOOD BECK SATELLITE TRANSPORT HUB

For Phase 3 and 3A works the current intermediate shaft site at Lockwood Beck is to be utilised as a satellite hub for transport and to minimise the requirement for traffic on the A171. Primarily minibuses are to be used by contractors to transport workers in and out of site as appropriate.

4. SURFACE WATER MANAGEMENT

The Phase 3 and 3A works includes the installation of further surface swales and site filter drainage. Further silt fencing around earthworks and additional check-dams within ditches and swales will be provided to control any silt run-off.

A 120m^3/hr Siltbuster Unit or similar water treatment unit is to be installed as part of mitigation measures; this unit is to be positioned to the north of the Ladycross Plantation attenuation pond. The unit will have associated infrastructure including up to a 120m^{3}hr^{-1} silent pump unit, generator, and fuel cube. Initially the unit will be used to control silts from the drainage network and swales via passive methods. Elevation levels and dimensions of the water treatment unit are specified in **Attachment B**.

Image 14 – 120m^3/hr Siltbuster, a similar unit will be used at Ladycross.

'Clean' and 'dirty' waters are to be segregated via the use of independent drainage systems and the addition of an oil interceptor unit. Arup drawing (40-STS-LC-2100-PA-22-20107) shows site installations.

Further details for surface water controls can be found within the Surface Water Management Plan (SWMP) 40-STS-LC-2100-PA-PL-20101. Monitoring of the effectiveness of these measures is to be implemented as that indicated within the Construction Environmental Management Plan.

Additional water management services such as tankers will be utilised as required.

5. TRAFFIC AND PEOPLE

5.1. TRAFFIC MANAGEMENT

Condition 34 requires that a Construction Traffic Management Plan (CTMP) is to be prepared and submitted to NYMNPA prior to each phase of construction, for detailed traffic information please see CTMP (ref. 40-STS-LC-2100-LG-PL-00001).

Additional information for Traffic Management is also detailed in the Phase 3 and 3A CEMP.

5.2. PARKING OF VEHICLES

Lockwood Beck is to be primarily utilised as a satellite hub for transport and to minimise the requirement for traffic on the A171. A requirement is for 20 vehicle spaces to accommodate intermittent site workers. All cars will be parked within the designated parking area within the site compound.

5.3. PUBLIC PEDESTRIAN MANAGEMENT

Pedestrian management is to be controlled via both site security fencing and access gate security, this is to be situated at the entrance to the main haul road see, Phase 3A General Arrangement Drawing (40-STS-LC-2100-PA-22-20113). Perimeter fencing along the sites boundary were installed as part of Phase 2 works.

6. LIGHTING

The Phase 3 and 3A Works will be illuminated when necessary, through temporary, task-specific directional lighting. The additional cabins will be fitted with motion sensor-controlled, discreet perimeter lighting for safe access and egress. Shutters on welfare buildings will be shut after nightfall to reduce light spill.

On-site exterior lighting will apply the following principles which will ensure that impacts on wildlife are minimised in accordance with 'Artificial Lighting and Wildlife' guidance[1]:

- Task lighting will be used where appropriate,
- Lighting will be directed downwards (0 to 20 degrees where possible), with all beam angles below 70°,
- Lighting will be kept as low as is safe and practicable for the works taking place and kept at a maximum height of 4m,
- Lights will be switched off when not in use or will be motion sensor controlled,
- Where safe and practicable, British Standards and guidance from the Institute of Lighting Professionals in the document 'Bats and Artificial Lighting in the UK' (September 2018) (https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/) will be followed where relevant, and
- All lighting will be directed to avoid light spill on to the perimeter woodland.
- Specific requirements will be considered when choosing the luminaire specifications and LUX levels as stated in the 'Bats and Artificial Lighting in the UK' (September 2018), key relevant specs are:
    - A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
    - All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources will not be used.
    - LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
    - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats

7. MATERIALS

7.1. LOADING AND UNLOADING OF MATERIALS

The areas for storage have been planned to prevent excessive handling of material and to facilitate loading and unloading. Measures to ensure the effective management of the unloading, storage and distribution of materials are set out in the Construction Environmental Management Plan.

7.2. MATERIAL STORAGE

Suitable and sufficient storage for plant, equipment and materials will be provided throughout Phase 3A works. This will include defined storage and laydown areas as close as practical to work zones to prevent excessive handling of material and to facilitate loading and unloading.

All materials will be stored in a manner that minimises risk to the environment and reduces the potential for wastage due to exposure to the elements or damage. For detailed information please refer to the Construction Environmental Management Plan.

8. PHASE 3 AND 3A SITE PREPARATION WORK

8.1.1. GENERAL SITE CLEARANCE

The Phase 3 and 3A Construction works include further site clearance of the Ladycross Plantation, as shown on the blue hashed area below. The grey areas show areas previously cleared for Phase 2 works. To preserve topsoil, some of the area highlighted may not be stripped. If the material required to build up the temporary topsoil mound to 3m is insufficient, cargo containers or other noise mitigation materials will be utilised.

Fig 5.1 Maximum area of additional vegetation clearance (blue hashed area) to facilitate Phase 3 and 3A works.

9. PROTECTED SPECIES

9.1. NESTING BIRDS, REPTILES AND OTHER PROTECTED SPECIES

The Environmental Statement that supported the original planning application concluded that if appropriate mitigation and enhancement activities were undertaken, the impacts on protected species would not be considered significant.

The following mitigation measures will be implemented during the Phase 3 and 3A Works:

- dust minimisation methods will be employed (see Phase 3 and 3A CEMP);
- construction lighting will be directed away from adjacent areas of retained habitat wherever possible (refer to Section 3.10 of this CMS);
- pollution prevention controls will be adheres to at all times (see Phase 3 and 3A CEMP);
- where practicable, excavations that could trap animals will be covered every night to reduce the risk of protected species falling into the excavation and becoming stranded, or a means of enabling their escape will be provided;
- where required, all tree and vegetation clearance will be undertaken under the supervision of a suitably qualified ecologist to prevent disturbance to nesting birds and other protected species; and
- where vegetation clearance is being carried out in teams, each team will be accompanied by a suitably qualified ecologist.

The Phase 3 Protected Species Management Plans submitted separately, and Phase 3 and 3A CEMP outlines precautionary methods of working which will be implemented to protect reptiles, birds, bats and other protected species which may be found on site.

The Arboricultural Method Statement submitted to partially discharge planning condition 70 and describes precautionary measures to be taken when removing trees. During Phase 3 and 3A works it is not anticipated that any trees will be removed.

10. PLANT & EQUIPMENT

10.1. SITE ESTABLISHMENT

Working platform and drainage

- 20t/30t tipper delivery wagon
- Dump trucks 6t-25t
- BOMAG roller
- 360 degree tracked excavators 8t-40t
- Fuel storage bowser
- Tractor/bowser (dust suppression)
- Plate Bearing Test Equipment

Power requirements

- MEWP
- 360 degree tracked excavator 8t-40t
- Hiab deliveries / telehandler

Concrete laydown areas

- 360 degree tracked excavator 8t-40t
- Concrete delivery wagons/ pump
- Dump trucks 6t-25t
- 2” vibrating pokers
- Compressor
- Formwork
- Power Floats
- Small tool generator
- Burning gear

General setup and attendance

- Telehandler
- Fuel storage bowser
- COSHH storage containment and bunded storage area for IBC’s and spill kits
- Waste compound setup and hazardous waste area

- Mobile crane and lifting accessories

Blacktop installation

- 20t delivery wagons
- Paver
- Planer
- Bobcat
- Road sweeper

10.2. CONSTRUCT CUTTINGS LAGOON

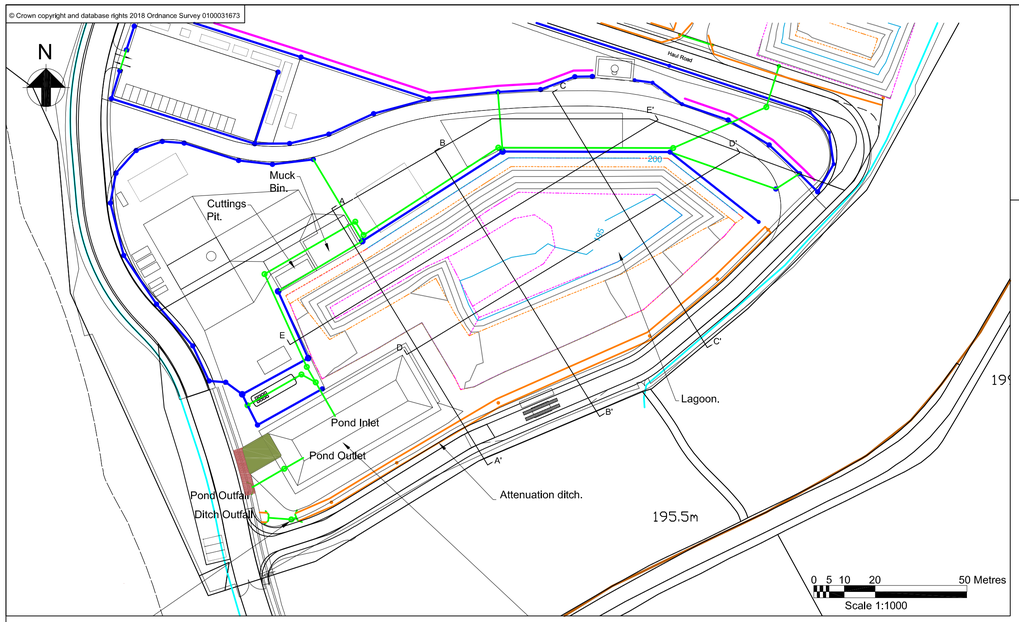
- 360 degree tracked excavators 13-35t
- Dozer
- Dump trucks 14t-25t
- 20t tipper delivery wagon
- Heat guns/equipment for liner
- Small tool generators
- Mobile crane

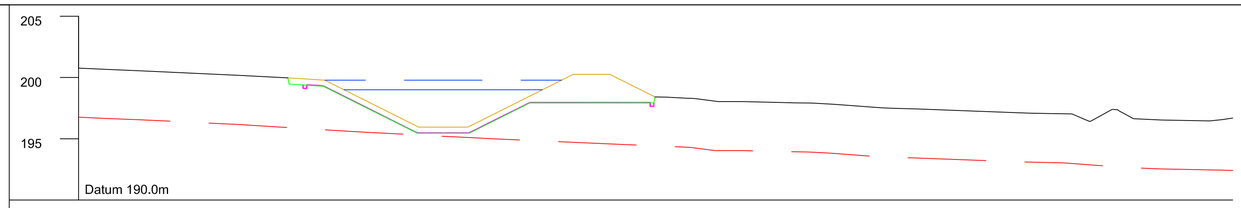
11. ATTACHMENTS

ATTACHMENT A – CUTTINGS LAGOON CROSS SECTION

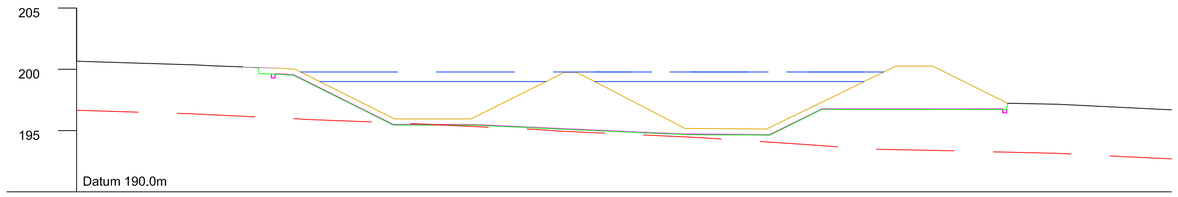
ATTACHMENT B – WATER TREATMENT UNIT

ATTACHMENT A - CUTTINGS LAGOON CROSS SECTION





Section A-A'



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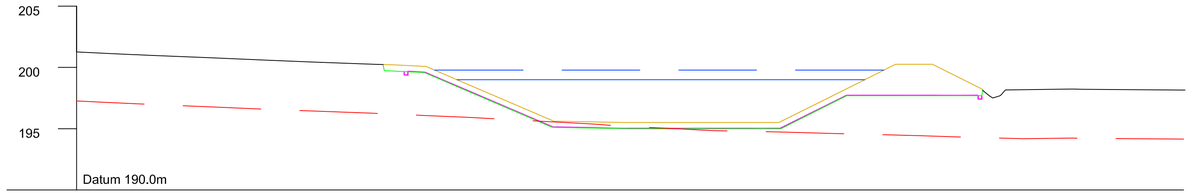

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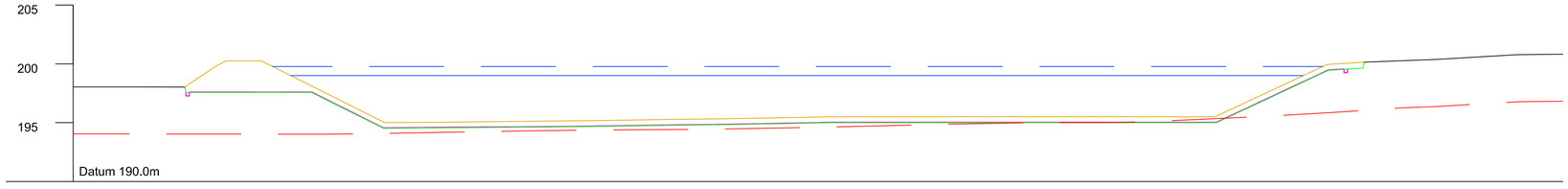
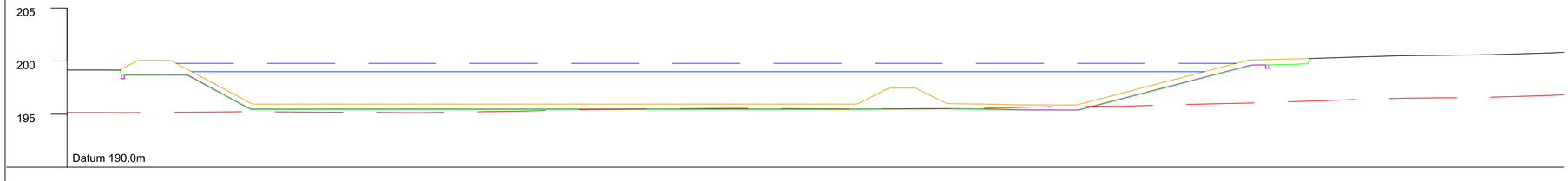


Section D-D'



Section E-E'

0 5 10 20 50 Metres

Scale 1:250

Notes:

1. This drawing shows the proposed surface water drainage network for the Phase 3 works.
2. Refer to the drainage detail drawings 40-STS-LC-2100-CN-28-90117 to 40-STS-LC-2100-CN-28-90122.
3. Refer to Drainage schedules for further details: 40-STS-LC-2100-CN-SC-90123
4. Refer to 40-STS-LC-2100-CN-10-90116 for attenuation pond cross sections.

Key:

- Land Ownership Boundary
- Proposed General Arrangement layout
- Carrier pipe with Manholes
- Swale or ditch
- Perimeter Ditch to Intercept Land Drains (already constructed)
- Filter Drain with Catchpits
- Current Ground Profile
- Base of Formation
- Top of Formation
- Approximate Rockhead Level
- Water Level - 199m AOD
- Freeboard Level - 199.78m AOD
- GCL (Geosynthetic Clay Liner)
- A A' Cross Section Locations
- Bottom Of Bank
- Top Of Bank
- Normal Contour (1m AOD)
- Prominent Contour (5m AOD)

DRAFT

	REVIEW CLIENT				
A (IFR)	FOR REVIEW				
A2 (IFR)	FOR REVIEW				
	TENDER ONLY				
REV	DATE	BY	CHKD	APPD	

Anglo American Woodsmith Project Ltd
Resolution House | Lake View | Scarborough | YO11 3ZB | North Yorkshire
T: +44 (0) 1723 470010 | W: www.angloamerican.com

Drawing: Ladycross Plantation
Lagoon 2
Base of formation
Cross Sections A-E

SCALE: 1: 1000 & 1:250

CONT No:
NORTH YORKSHIRE POLYHALITE PROJECT

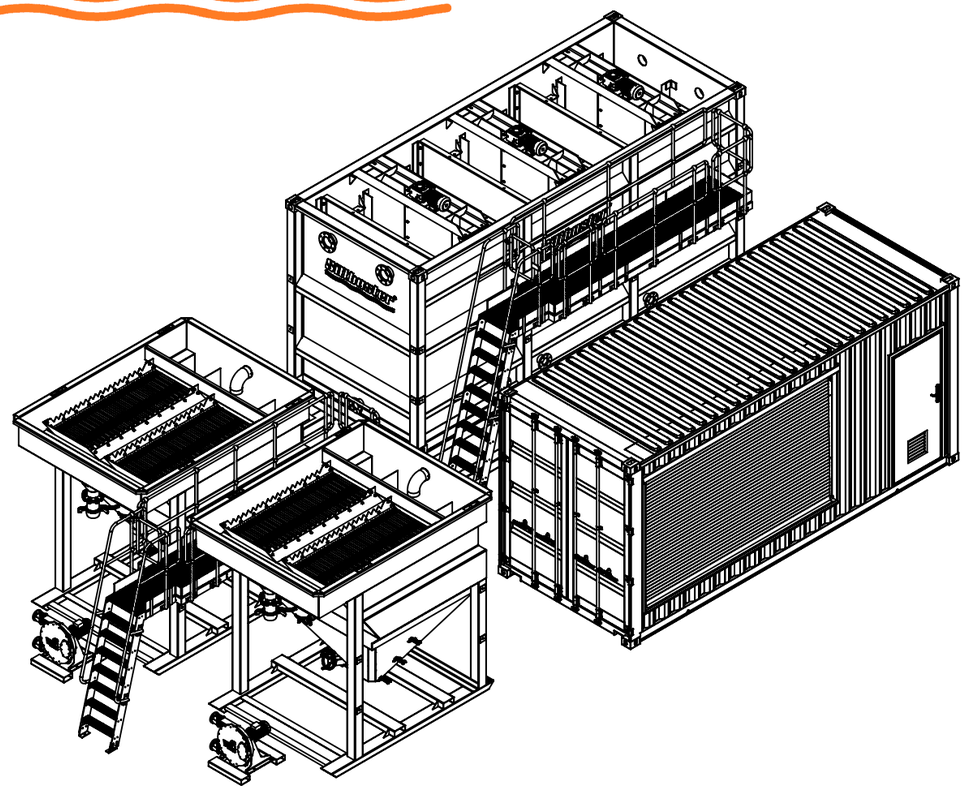
STRABAG

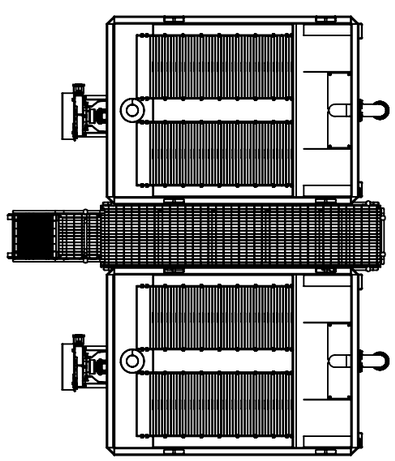
DRG No:

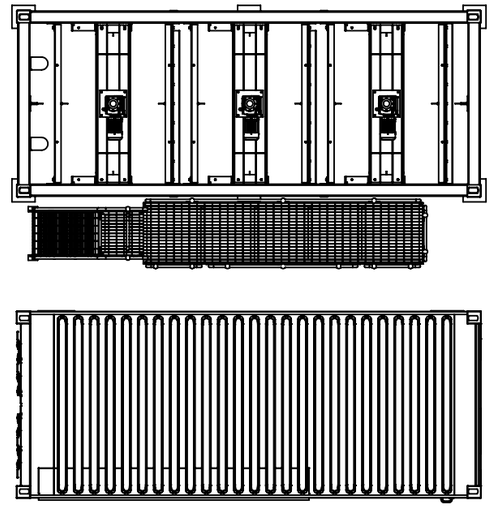
REV A

DOCUMENT CERTIFICATION

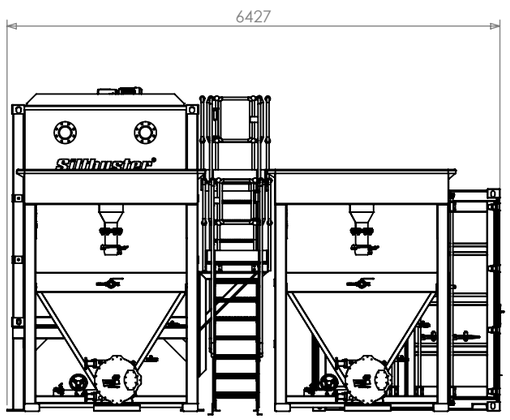
ATTACHMENT B - WATER TREATMENT UNIT



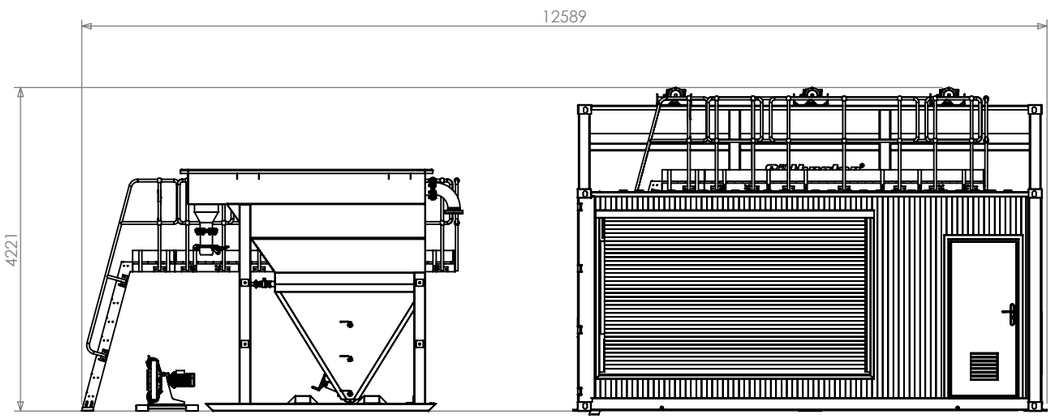




PLAN ELEVATION



FRONT ELEVATION



SIDE ELEVATION

ISSUE	DESCRIPTION	DRN BY	CKD	DATE

Project

SILTBUSTER LTD.
WILLIAMS BUILDING
KINGSWOOD GATE
MONMOUTH
MONMOUTHSHIRE
NP25 4EE

TEL: 01600 772256
FAX: 01600 775312

Title: GA 2xHB50M, MT30, ISO Container

Drawing No.

Rev

Project Title / Facility Name:

Woodsmith Project

Document Title:

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN - PHASE 3A - CONDITION 93 - LADYCROSS

NYMNPA

29/04/2022

Document Review Status

- [x] 1. Reviewed – Accepted – Work May Proceed — By: Angela Samuels
- [ ] 2. Reviewed – Accepted As Noted, Work May Proceed, Revise & Resubmit — On: 29 Apr 2022 11:23
- [ ] 3. Reviewed – Work May Not Proceed, Revise & Resubmit
- [ ] 4. For information only
- [ ] 5. On Hold – Pending Project Restart & Ramp Up

C	29-Apr-2022	Planning	PLA			
B	22-Apr-2022	Planning	PLA			
A	11-Apr-2022	Planning	PLA			
Rev.	Revision Date (dd mmm yyyy)	Reason For Issue		Prepared by	Verified by	Approved by

Document ID:

40-STS-LC-2100-EN-PL-00024

NORTH YORKSHIRE POLYHALITE PROJECT (788.5030)

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN – PHASE 3A – CONDITION 93 – LADYCROSS PLANTATION

40-STS-LC-2100-EN-PL-00024

Revision	Date of issue	Prepared by	Checked by	Approved by	Changes
A (PLA)	11/04/2022	William Hodgson	Carl Thomas	Paul Howlett	First Issue
B (PLA)	22/04/2022	William Hodgson	Carl Thomas	Paul Howlett	Review post Rev A comments
C (PLA)	29/04/2022	William Hodgson	Carl Thomas	Paul Howlett	Review post Rev B comments

STRABAG

TABLE OF CONTENTS

1. INTRODUCTION

1.1. PURPOSE OF THE DOCUMENT

In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the 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.

This Construction Environmental Management Plan (CEMP) has been prepared on behalf of Anglo American for the Phase 3 and 3A Works at Ladycross Plantation Intermediate Shaft Site (as described in **Section 1.2** below).

This CEMP has been prepared to discharge condition 93. Subsequent CEMP's will be prepared for future phases of works.

This document provides details of the previously submitted and approved Phase 3 works as well as the Phase 3A submission which incorporates the alterations required for the cuttings lagoon construction methodology. The Phase 3A Construction Environmental Management Plan (CEMP) (40-STS-LC-2100-EN-PL-00024), Phase 3A Construction Method Statement (CMS) (40-STS-LC-2100-CN-MS-00005) Phase 3A Hydrogeological Risk Assessment (HRA) (40-STS-LC-2100-EN-RA-00003), Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113), Phase 3A Phasing Plan (40-STS-LC-2100-PA-22-20111) and Phase 3A Landscaping Plan (40-STS-LC-2100-PA-22-20112) makes up the Phase 3A submission. No other adjustments are required from Phase 3 supporting documentation previously submitted to and approved by North York Moors National Park Authority (NYMNPA).

Alterations from the Phase 3 to the Phase 3A CEMP are detailed in **3.4**, **3.4.4** and **10** and the Phase 3A General Arrangement Plan. The Phase 3A works only concern a change to the cuttings lagoon construction methodology, as previously approved under Phase 3.

A site plan is provided separately.

Table 1 - 1 Condition NYMNPA-93: Construction Environment Management Plan

NYMNPA-93 Description	Compliance with Condition NYMNPA 93
Prior to the commencement of each Phase of Construction in accordance with the approved Phasing plan at either Doves Nest Farm or Lady Cross Plantation, an updated CEMP shall be based on the approved Construction Method Statement (CMS) and should be submitted and approved in writing by the MPA in consultation with the Environment Agency in respect of the area concerned.	This version of the CEMP is for Phase 3A as defined in **Section 1.2** below. Earlier versions of the CEMP were produced for preceding works.
The size, location and design of any site compounds, including how any potentially polluting materials will be stored to minimise the risk of pollution	**Section 3** and **Section 12** Phase 3A Construction Method Statement
An incident Response Plan to deal with any pollution that may occur during the course of construction;	**Section 13**
A protocol to deal with contaminated ground, should this be encountered, to ensure protection of water resources;	**Section 11**
Details of how surface water run off shall be passed through a settlement facility of settlement facilities prior to being discharged into any watercourse or soakaway;	**Section 10**
Plant and wheel washing including that it shall only be carried out in a designated area of hard standing at least 10 metres from any watercourse or surface water drain and that washings shall be collected in a sump, with settled solids removed regularly and water recycled and reused where possible;	**Section 3.13**

NYMNPA-93 Description	Compliance with Condition NYMNPA 93
A scheme for the recycling/disposing of waste resulting from demolition and construction works;	**Section 12**
Storage of waste not covered by the Mine Waste Directive;	**Section 12**
Measures to control glare from in-site lighting;	**Section 3.9**
Measures to manage deliveries by HGV including routing and timing for deliveries and details of the penalty system for breaches of the agreed control;	**Section 4**
Temporary Traffic Management	**Section 4**
The provision of a Dust management Plan relating to Phase 1 of the construction period (earthworks and bund formation) and Polyhalite handling and stockpiling to include dust generation modelling so as to identify sensitive receptors; likely dust generation and its disposition during the construction Phases and operation over time and under different weather conditions; the avoidance and mitigation measures required to ensure dust deposition levels at the sensitive receptors are maintained at the residual levels identified in the approved EIA, and monitoring arrangements. The Dust Management Plan must comply with the criteria set out in the 'Dust and Air Emission Mitigation Measures' best practice guidance for control of dust on construction sites from the Institute of Air Quality Management 2012. The monitoring arrangements will include dust deposition or dust flux or real-time PM_{10} continuous monitoring locations; baseline dust monitoring	**Section 6** Phase 3 Emissions to Air Construction Phase Dust Management Plan

NYMNPA-93 Description	Compliance with Condition NYMNPA 93
at least three months before construction commences; daily on-site and off-site inspections at monitoring locations with results recorded in a log to be made available to the MPA on request, and more frequent monitoring during periods of high dust generation;	
In the event that there is insufficient clay with the Lady Cross Plantation site to form 1m deep basal layer beneath the spoil storage area, a contingency plan to address the importation of clay, including the source, quantity and quality of such material, and how adverse effects on the water environmental would be avoided;	**Section 3 and 11** Phase 3 Soil Management Plan
How the requirements of the approved CEMP will be disseminated to all relevant staff/contractors throughout the construction period;	**Section 2.2**
The location of the site notice board;	**Section 2**
A scheme for parking, loading, unloading during construction;	**Section 4**
A scheme for security and lighting during construction;	**Section 3.1** and **3.9**
A protocol for the replenishment of tanks and containers, including that all refuelling of vehicles, generators, plant and equipment shall be supervised and shall take place within a suitable bunded, impervious hardstanding;	**Section 3.11**

NYMNPA-93 Description	Compliance with Condition NYMNPA 93
Contingency proposals for if fuel cannot be delivered for the generators, e.g. due to adverse weather;	**Section 3.6**
Proposals / contingency plans for waste not managed as part of the Mine Waste Permit comprising the storage and management of temporary mining waste stored on-site for less than three years (e.g. Pyritic Mudstone); non-inert and non-hazardous materials stored for less than one year, and unexpected hazardous waste stored for less than six months, including measures to prevent the dispersal of dust, leachate and surface water runoff;	**Section 12**
Precautionary Method of Working for Site Clearance (PMWSP) which shall be submitted to and agreed in writing by the MPA prior to commencement of Preparatory Works and shall be adhered to thereafter. The PMWSP shall set out proposals for tree clearance and the demolition of structures and shall include that between March and September each year surveys of areas to be cleared should occur no less than 48 hours before clearance occurs so that occupied wild bird nests can be identified and prevented from being destroyed;	**Section 7** Attachment C – Precautionary Method of Works
Alarms fitted to mobile plant and vehicles for the purposes of warning pedestrians of their movements;	**Section 5**

Additional conditions addressed in this CEMP are detailed in **Table 1 - 2**.

Table 1 – 2 Additional relevant conditions

Condition	Topic	Compliance with Condition
NYMNPA-18	Noise and Vibration Management	**Section 5** Phase 3 Noise and Vibration Management Plan
NYMNPA-34	Construction Traffic Management	**Section 4** Phase 3 Construction Traffic Management Plan
NYMNPA-42	Access Arrangements	**Section 4.2.2** Previous Phase 2 Construction Environment Management Plan and Phase 2 Construction Method Statement
NYMNPA-52	Protected Species	**Section 7.1** Phase 3 Protected Species Management Plan
NYMNPA-57	Landscape and ecological management	**Section 7.3** Phase 3 Landscape and Ecological Management Plan
NYMNPA-59	External Lighting	**Section 3.5**
NYMNPA-65	Temporary boundary treatments	**Section 3**
NYMNPA-68	Temporary Structures	**Section 3** Phase 3 and 3A Construction Method Statement
NYMNPA-70	Vegetation retained & clearance	**Section 7.2** Construction Phase Arboricultural Method Statement
NYMNPA-76	Soil Management Plan	**Section 11** Phase 3 Soil Management Plan
NYMNPA-86	Importation of clay	**Section 3.2.3** Phase 3 and 3A Construction Method Statement

Condition	Topic	Compliance with Condition
NYMNPA-92	Plant and Vehicle Management	**Section 4** Phase 3 Construction Vehicle and Plant Management Plan
NYMNPA-95	Written scheme of Archaeological Investigation	**Section 8** Phase 2 Written Scheme of Investigation for an Archaeological Watching Brief

This document details only the additional activities required for Phase 3 and 3A at Ladycross Plantation Site associated with the Anglo American Woodsmith Project. Updates to this plan will be prepared for subsequent phases and following any design or method changes. The NYMNPA, as well as the Environment Agency and Natural England agreed that they support this approach in meetings held in April 2016.

1.2. PHASE 3 AND 3A

Phase 3 and 3A comprises construction works, and **Section 3** details the strategy that will be undertaken to ensure construction and ongoing earthworks are carried out in a phased approach. The works will be prioritised and carried out to ensure no area is stripped and left exposed due to restrictions of the topsoil stripping window.

1.2.1. Phase 3 Works

Specific works include:

- Additional soil stripping and storage within temporary bunds,
- Installation and use of hardstanding for welfare, car parking, laydown areas, and haul road,
- Installation of foul drainage facilities,
- Installation of further site surface water drainage, including oil interceptor,
- Mobilisation of on-site facilities, including welfare, car park, wheel wash, refuelling, workshop, grout plant and associated services,
- Construction of cuttings lagoon and associated cuttings pit and muck-away area, and
- Installation of working pad for pre-grouting and shaft sinking works.

1.2.2. Phase 3A works

Changes to Phase 3 as part of Phase 3A works include:

- Revised cuttings lagoon construction methodology.

Specific works are shown on Strabag Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113).

1.3. SCOPE OF THIS DOCUMENT

This CEMP details how the Phase 3 and 3A works will be planned, monitored and managed in an environmentally responsible manner. The document outlines the management framework for the environmental requirements, commitments, and performance targets associated with the planning and implementation of Phase 3 and 3A of the project.

The CEMP refers to several management plans, which have been prepared to discharge a number of planning conditions. Collectively these plans incorporate all mitigation measures relevant to Phase 3 and 3A.

The Phase 3A CEMP should also be read together with the documentation listed below. Information in these documents is summarised in this CEMP where appropriate:

- Phase 3 Construction Traffic Management Plan (40-STS-LC-2100-LG-PL-00001)
- Phase 3 Noise & Vibration Management Plan (40-STS-LC-2100-EN-PL-00009)
- Phase 3 Landscape and Ecological Management Plan (40-STS-LC-2100-EN-PL-00014)
- Phase 3 Emissions to Air (40-STS-LC-2100-EN-PL-00013)
- Phase 3 Surface Water Management Plan (40-STS-LC-2100-PA-PL-20102)
- Phase 3A Construction Method Statement (40-STS-LC-2100-CN-MS-00005)
- Phase 2 Archaeological Watching Brief Written Scheme of Investigation (40-COT-LC-8324-EN-PL-00002)
- Phase 3 Soil Management Plan (40-STS-LC-2100-EN-PL-00007)
- Phase 3A Hydrogeological Risk Assessment (40-STS-LC-2100-EN-RA-00003)
- Phase 3 Surface Water Drainage Scheme (40-STS-LC-2100-PA-22-20107)
- Construction Phase Dust Management Plan (40-STS-LC-2100-EN-PL-00015)
- Construction Phase Arboricultural Method Statement (40-STS-LC-21-CN-MS-00003)

This CEMP will remain a live document, being reviewed and updated in consultation with the appointed contractor(s) or sub-contractor(s) as required. Each of these updated CEMP's will be submitted to NYMNPA for approval prior to the start of each phase of works.

2. ENVIRONMENTAL MANAGEMENT FRAMEWORK

2.1. STRUCTURE OF RESPONSIBILITIES

This CEMP addresses those environmental matters within the responsibility of Anglo American and the Contractors engaged on its behalf to deliver the Phase 3 and 3A construction works. While overall responsibility for compliance with environmental and approvals requirements will remain with Anglo American, the Contractors working on site are accountable for undertaking the works in line with the requirements of this CEMP as well as all legal and other requirements imposed via permits and licenses.

2.2. TRAINING, AWARENESS AND COMPETENCE

2.2.1. INTERNAL COMMUNICATION

All staff and sub-contractors working on site will be required to attend a site induction prior to commencing work. This will cover the key environmental aspects relating to the project and the roles and responsibilities of individuals.

Toolbox talks will be undertaken by the Environmental Manager or other nominated personnel throughout the project. The aim will be to communicate information to all staff and serve to educate, prompt and remind them of their responsibility to protect the environment during works.

Monthly progress meetings will be used to disseminate the results of monitoring and audit reports. At these meetings, a review of the environmental performance throughout the site to date will be undertaken, and any improvements required during the Phase 3 and 3A works will be identified. Details of where sustainable approaches to works activities have been implemented or developed as the work proceeds will also be discussed and recorded. Their suitability for implementation at other areas of the site will be considered and applied where appropriate. Decisions about amendments required to the processes and procedures will also be agreed.

2.2.2. EXTERNAL COMMUNICATIONS

Anglo American will lead communication with members of the public, including adjacent landowners, local residents and businesses in line with the Community Stakeholder and Engagement Framework (CSEF) see **Attachment A**.

The CSEF includes provision for a quarterly Liaison Group Forum meeting, which are open to members of the public to attend.

2.3. MONITORING OF COMPLIANCE

All Phase 3 and 3A construction works will be supervised by the Contractor's managerial staff with the support of members of their teams on a daily basis. The Contractor's managerial staff will receive a briefing from the Contractor's Environmental Manager to ensure that they are aware of the environmental requirements. The briefing will also ensure that they are able to assess whether the environmental requirements are being implemented properly.

Procedures relating to environmental management and monitoring of environmental performance identified within the CEMP will be subject to inspections by the Contractor at least once every week, with oversight and audit by the Anglo American Environmental Team. Records of inspections, audits and overall environmental performance will be submitted to Anglo American.

2.4. COMPLAINTS PROCEDURE

The implementation of the systems and procedures to protect the environment will effectively reduce or remove the risk of an environmental incident and/or exceedance of established thresholds. However, complaints may still be received and in this event the Complaints Procedure will be implemented, as detailed in **Attachment B**.

3. DESCRIPTION OF SITE

The following section partially discharges the planning conditions 65 and 68, providing details for the sites temporary boundary treatments, temporary compounds and structures.

3.1. FENCING AND SECURITY OF THE SITE

During Phase 2 the permanent black fencing was erected around the site boundary. Additional barriers / fencing may be erected within the boundaries of site to segregate high hazard risk zones.

As part of Phase 2 preparatory works, a site security cabin was installed. Further security barriers will be installed at the main entrance to site during the Phase 3 works. 24/7 security cover will be provided on site during the Phase 3 and 3A works.

Signage will be erected at the main entrance to the site which will include contact details of the relevant personnel to be contacted in the event of a complaint and also the telephone number of the NYMNPA as appropriate.

3.2. SITE LAYOUT AND COMPOUNDS

The site layout and compounds are detailed in the Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113) and the Phase 3 and 3A Construction Method Statement (CMS). As part of the Phase 3 and 3A works the following compounds / pads will be constructed.

3.3. WORKING PAD

The height of the working drill pad will be increased to approx. +202mAOD to form a flat sub-base for the drilling machinery and services required for future phases. The working platform will contain an appropriate drainage network to segregate ‘dirty’ water run-off and underlying Geosynthetic Clay Liner (GCL) or similar to act as an impermeable base. Details of the pad drainage are included within the Phase 3 Surface Water Management Plan and Surface Water Drainage Scheme.

3.4. GROUT PLANT AND SERVICES

A grout plant comprising of silos, pump unit and mixer unit will be installed. The grout plant will be constructed on a sealed base concrete platform, the slab will be drained to a blind sump (wedge pit).

The self-contained grout plant will be approx. 15m x 2.5m x 3m and will contain 2 silos approx. 12m in height for a 120-tonne capacity. These will be painted Brown Green (RAL 6008) or Juniper Green (RAL 160 20 10).

3.5. CUTTINGS LAGOON AND ATTENUATION POND

When assessing lagoon capacity, a key consideration is the allowance of an adequate freeboard as to ensure no site flood risk. The lagoon provides capacity for approximately 2 times the capacity of the drilled hole, as well as a storm event. The storage volume of the Phase 3A Ladycross Plantation lagoon is calculated as 12,000m^3 including freeboard capacity. Muck away works will be limited to dayshift working hours (7:00 am to 7:00 pm) only.

To facilitate construction of the lagoon, the initial 500mm of stone placed for hardstanding and area protection in Phase 2 will be removed and used to build up the working platform area. In a variation from Phase 3, in Phase 3A, the ground level will be lowered to an average of 3.2m within the lagoon footprint. Excavation depths will vary based on competent clay at location. Depths have been defined based upon recent geotechnical stability tests and explorations. During these works it was discovered that superficial deposits were homogeneous throughout trial holes and as such the depths of dig are designed within the superficial deposits situated above the grey clay aquiclude. The lagoon will be lined by a composite of three materials, an initial basal geosynthetic clay liner, a middle impermeable clay liner and a final lagoon membrane liner. This three-layer methodology is proposed as a means to control and mitigate against any losses of lagoon fluids. The methodologies will also be backed up by third party Construction Quality Assurance (CQA).

A total volume of approximately 15,000m^3 of highly impermeable clay will be imported to site for the construction of the lagoon bund walls, base layer and bunds for the construction of the Phase 3 attenuation pond (this pond will formalise the temporary pond constructed for Phase 2 works). The clay will only be utilised for these works and will be temporary.

3.6. AREAS OF HARDSTANDING

3.6.1. BLACK TOP

Black top (tarmac) will be installed on the haul road section running to the main welfare and across the car parking area. The haul road from east of site to the south-west will also be black topped along with the wheel wash and refuelling layby areas. The blacktop will be installed to minimise dust emissions and reduce fugitive mud leaving site from high trafficked areas of site.

3.6.2. *CONCRETE/SLABS*

Concrete base slabs will be limited on site and only installed where required. To support installation of temporary structures / facilities, concrete slabs will be installed in the following areas:

- Grout Plant
- Workshop
- Cuttings pit
- Muckaway area
- Refuelling area
- Wheel Wash

3.6.3. *STONE / AGGREGATE HARDSTANDING*

The remaining areas of site will consist of stoned / aggregate hardstanding. Most notable areas of stoned hardstanding will be the working platform area, laydown areas and welfare compound (excluding tarmacked car park).

3.7. INSTALLATION OF UTILITIES INCLUDING WATER, POWER AND FOUL DRAINAGE FACILITIES

The Ladycross Plantation Site is expected to remain stand alone in relation to water and power for the duration of the Phase 3 and 3A works.

3.7.1. *WATER SUPPLY*

The site will be serviced with potable water by tankers for both welfare and construction activities. Welfare units are supplied with self-contained water storage systems, which will be topped up as required. Bottled water dispensers will be provided for site staff. Where required, dust suppression bowsers will also periodically be topped up via tanker. Temporary tanks may be utilised for storage of water as stated in **Section 3.11.3**.

3.7.2. *ELECTRICAL SUPPLY*

The site is to be powered by either welfare integrated generator units or mobile generator sets.

All generators used on site will be super silent and installed in a manner to reduce noise impacts on local receptors. Further details for generators are supplied in the Phase 3 Emissions to Atmosphere. Practices to reduce noise impacts will include but not be limited to:

- Procurement of super silent generators with reduced noise impact,
- Positioning of generators during installation, and
- Noise attenuation fencing/panels installed around generators, where required.

3.7.3. FOUL DRAINAGE

Septic waste will be temporarily stored in a buried cesspit constructed and the contents will be removed and disposed regularly via tanker to a suitably permitted facility. The tank will be regularly inspected to ensure appropriate capacity in the tank is maintained.

3.8. WELFARE FACILITIES

Welfare facilities and associated car parking area will be established in the north west area of site. A car parking area is to be established to include 20 spaces. All visitors to the site will park within the designated car park.

The units will not exceed 7m height and will be lifted into place by a site mobile crane or HIAB. The units will be painted RAL6008 (brown/green) or equivalent prior to arrival on site. Discreet, sensor-controlled perimeter downlighting will be fitted to provide safe access and egress. All windows will be fitted with shutters. In addition, further details of the temporary structures and their layout can be found in the Phase 3 and 3A CMS.

3.9. LIGHTING

The Phase 3 and 3A Works will be illuminated when necessary through temporary, task-specific directional lighting. The additional cabins, workshops and grout plant area will be fitted with motion sensor-controlled, discreet perimeter lighting for safe access and egress. Shutters on welfare buildings will be shut after nightfall to reduce light spill. The majority of the Phase 3 and 3A works will only be carried out during day shift (07:00 – 19:00). However, surface water management will occur 24/7 as necessary.

On-site exterior lighting will apply the following principles which will ensure that impacts on wildlife are minimised in accordance with 'Artificial Lighting and Wildlife' guidance[1]:

- Task lighting will be used where appropriate,
- Lighting will be directed downwards (0 to 20 degrees where possible), with all beam angles below 70°,
- Lighting will be kept as low as is safe and practicable for the works taking place and kept at a maximum height of 4m,
- Lights will be switched off when not in use or will be motion sensor controlled,
- Where safe and practicable, British Standards and guidance from the Institute of Lighting Professionals in the document 'Bats and Artificial Lighting in the UK' (September 2018) (https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/) will be followed where relevant, and
- All lighting will be directed to avoid light spill on to the perimeter woodland.

3.10. MATERIAL STORAGE

The type of material stored on site will determine the storage methodology adopted. Fuel and chemical storage areas will be located as far from all open drains and watercourses as practicable, with at least 10m from these locations. In addition, the storage areas will not be located near any open excavation of natural ground.

Chemical containers will be stored in appropriate locations at least 10m away from any open drainage or watercourses. Additional storage requirements will be implemented based upon the associated manufacturers Material Safety Data Sheet (MSDS).

Storage areas within the compound area will not be positively drained. All non-polluting materials will be stored in designated areas, with surface water draining to adjacent permeable areas, surface swales and natural drainage channels. Runoff from areas of hard-standing and storage, away from the compound area will drain to surface water drainage as detailed in **Section 10**. Penstocks will be fitted, which will be closed in the event of a spill or detection of other contaminants.

3.11. FUEL OIL STORAGE AND REFUELLING ON SITE

3.11.1. STORAGE

If static fuel storage is required, it will be stored in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001, as follows:

Secondary containment will be provided for all surface oil and diesel tanks:

- For a single tank, the secondary containment will be at least 110% of the maximum storage capacity; and
- For two or more tanks in one secondary containment system, the secondary containment will be at least 110% of the biggest tank's maximum storage capacity or 25% of the total maximum storage capacity of all the tanks, whichever is the greater.

Storage must be more than 10 m away from any watercourse or the surface drainage system. Static fuel tanks (such as those linked to generators) will be sited on sealed, level ground adjacent to the generators. All fuel bowsers will have tanks with integrated secondary containment that holds a minimum of 110% of the volume of the inner tank.

Spill kits will be stored adjacent to the storage areas and relevant staff will be trained in the use of such equipment in the event that spillages occur.

3.11.2. REFUELLING

All replenishment of tanks and containers and all re-fuelling of vehicles, plant and equipment shall take place within bunded, impervious hardstanding where practical. A re-fuelling station will be constructed to the north east of the site. The station will comprise of an impervious hard standing area with containment French drains and drainage to an oil interceptor. A double bunded tank will be used for the storage of diesel and a further IBC unit will be used to contain AdBlue. Toolbox talks regarding refuelling processes will be briefed to all relevant personnel.

The following control measures will be implemented during refuelling processes:

- Supervision of all fuel deliveries
- Checks carried out on delivery of fuels to ensure correct fuel is delivered
- Ensure all valves on a bunded tank or secondary containment is closed when not in use
- Any static fuel bowsers are fitted with automatic cut-off or trigger nozzles
- Never leave vehicle or plant unattended during refuelling

3.12. SITE HOUSEKEEPING

The implementation of a good site housekeeping policy is key to reducing the likelihood of accidents and environmental pollution incidents. Good housekeeping measures that will be implemented on site include:

- Keeping the site tidy;

- Segregating waste and removing it from site regularly;
- Maintaining all site facilities, including welfare facilities;
- Maintaining site roads, ensuring internal roads and those surrounding the site are kept clean;
- Ensuring plant and vehicles on site are well maintained;
- Ensuring all materials are stored appropriately;
- Undertaking regular inspections of all areas of the site to ensure housekeeping requirements are being fully implemented; and
- Ensuring that detailed records of these inspections, their findings and any mitigation required are kept.

The Site Supervisor will monitor the cleanliness of the road daily to ensure that it is free of dirt and debris. Road sweepers will be deployed to clean the roads as necessary, under instruction of the Site Supervisor.

3.13. WHEEL WASHING FACILITIES

A self-contained and recycling wheel washing facility is to be constructed into the south western section of the main haul road. All vehicles that have travelled off the surfaced access roads within site will be required to pass through the wheel washing facilities before exiting the site. The wheel washing facility will be installed on impervious hardstanding with the layby and road being tarmacked. Regular maintenance of the wheel washing facility will be carried out in accordance with the manufacturers servicing specification.

3.14. EXTERNAL MATERIALS

In addition to the external materials outlined in **Section 3.2**. The following temporary structures will be installed during the Phase 3 works.

3.14.1. WATER TREATMENT UNIT

A Siltbuster Unit or similar water treatment unit is to be installed as part of mitigation measures; this unit is to be positioned to the south western corner of the Ladycross Plantation attenuation pond. The unit will have associated infrastructure including a silent pump unit, generator, and fuel cube. Initially the unit will be used to control silts from the drainage network and swales via passive methods.

Photo 1 –Siltbuster unit similar proposed unit for Ladycross.

‘Clean’ and ‘dirty’ waters are to be segregated via the use of independent drainage systems and the addition of an oil interceptor unit. Arup drawing (40-STS-LC-2100-PA-22-20107) shows site installations.

3.14.2. WORKSHOP

A temporary workshop is required for Phase 3 and 3A construction activities. The workshop dimensions will be approximately 15m x 10m. External material will be painted/manufactured either Brown Green (RAL 6008) or Juniper Green (RAL 160 20 10).

Photo 2 – Workshop, a similar configuration (painted either Brown Green (RAL 6008) or Juniper Green (RAL 160 20 10)) will be used at Ladycross Plantation.

3.14.3. BAKER TANKS (WATER STORAGE)

Temporary Baker Tanks will be kept on site for storage of site water. The tanks will be utilised for water storage in the event the water supply at the time of the Phase 3 and 3A works is not installed. The Baker Tanks will have dimensions of approx. 13m x 4m x 2.5m and will store up to 70m^3 of water. The tanks will be painted an appropriate shade of green, an example is shown in **Photo 3**.

Photo 3 – Baker Tank, a similar unit will be used at Ladycross Plantation.

4. TRAFFIC

4.1. CONSTRUCTION TRAFFIC MANAGEMENT PLAN

A Construction Traffic Management Plan (40-STS-LC-2100-LG-PL-00001) for Phase 3 at the Ladycross Plantation Site has been prepared and submitted to partially discharge condition NYMNPA-34. The CTMP contains a range of general measures for the management of transport during the Phase 3 and 3A works including:

- High occupancy travel for employees, including car-sharing, minibus pick up and utilising LWB as a transport hub, and
- All vehicles travelling to site using the designated routes only.

The CTMP also contains a Highway Communication Plan, covering all Phase 3 and 3A works. This plan outlines how communication with the public, the planning and local authorities, and any other stakeholders will be undertaken.

The CTMP also specifies prohibited routes for construction vehicles. To support this, Prohibitive and Directional Signage will be shared with all delivery drivers. This signage was installed prior to the commencement of Phase 2 of the project as part of the Phase 1 Highway works and will be maintained throughout the construction period for the Phase 3 and 3A works.

4.2. PARKING, LOADING AND UNLOADING

4.2.1. PARKING AND LOADING

4.2.1.1 PARKING

Parking will only be permitted within designated car parking areas and drivers will be required to display permits while parking on site. No access to the site by foot is permitted. Peak of up to 30 employees on site during the Phase 3 and 3A works.

4.2.1.2 LOADING AND UNLOADING

Loading and unloading of deliveries and materials on site will take place in designated areas dependent on works.

4.2.2. ACCESS

All construction traffic will use the permanent access road to access site. In addition to the physical measures proposed to prevent traffic having to wait on the highway or the potential for two vehicles to meet at the field access, the contractor will be required to provide a banksman and schedule deliveries and shift times. These measures are described further below.

The banksman will station themselves near to the field access and all drivers would be required to make the banksman aware before departing site. The banksman would then check to ensure there are no oncoming vehicles wishing to enter the site; if the way is clear the banksman will signal to the driver that it is safe to depart.

In addition to assisting the contractor to manage the total numbers of daily HGV movements, the requirement for planning and scheduling deliveries will also assist the contractor in ensuring that deliveries can be spread throughout the working day. The contractor will also be required to schedule shift times to try and avoid employees arriving and departing at the same time and to schedule deliveries outside of these hours.

5. NOISE AND VIBRATION

5.1. NOISE AND VIBRATION MANAGEMENT PLAN

The imposed noise limits for the Ladycross Plantation are 55dB $LAeq^{-1}hr$ during the day and 42dB $LAeq^{-1}hr$ in the evening (07:00-19:00 and 19:00-07:00 respectively). The Phase 3 and 3A works will comply with these limits. Noise monitoring will be carried out for the full duration of the Phase 3 and 3A works. A Phase 3 Noise and Vibration Management Plan (40-STS-LC-2100-EN-PL-00009) has been produced and will detail further mitigation, monitoring and controls to be implemented during the Phase 3 and 3A works and is considered conservative towards change proposed between Phase 3 and Phase 3A.

6. AIR QUALITY AND DUST MANAGEMENT PLAN

During the Phase 3 and 3A works Dust suppression measures will include:

- Damping down of road surfaces, additional road sweeping and potentially vehicle wheel washing will be utilised across the works area, as appropriate,
- Site fencing, barriers and other areas of dust accumulation will be kept clean using water spraying where there is the risk of dust accumulation. Any run-off will be filtered via the site surface water drainage system,
- Waste materials that have the potential to create dust problems will be removed unless they are to be re-used on site. Where possible these will be covered or contained in a fenced area until use,
- Burning of waste materials will be prohibited, and
- Plant and vehicles used on site will be well maintained to minimise pollutant emissions.

6.1. DUST MANAGEMENT PLAN

Dust emissions can arise from the preparatory work activities (mainly earthworks, topsoil and subsoil movements) being undertaken on site as part of Phase 3 and 3A. Measures and controls to minimise dust emissions from Phase 3 and 3A are provided in the Construction Phase Dust Management Plan (DMP). Daily inspections and monitoring will be undertaken by the contractors, in accordance with this procedure. Some of the dust management mitigation identified in the DMP is detailed in **Table 6-1** below. The Phase 3 Emissions to Air and Phase 3 CTMP will detail further air quality and dust mitigation to be adopted during the Phase 3 and 3A works.

Table 6 - 1 Dust Mitigation

Source / Activity	Mitigation Measures
Construction Traffic	• Implement speed limit on internal roads • Dust suppression used on roads when dust emissions noted • Provide wheel washes to reduce dust on public highways • Sheeting of vehicles carrying dust generating materials

Source / Activity	Mitigation Measures
	• Regular maintenance of vehicles and plant
Compound Areas	• Ensure areas used for welfare facilities and vehicle management (loading and unloading) are constructed of hardstanding • Sweeping / dampening down areas of hardstanding when required
Storage Areas	• Grass seeding temporary earth bunds until re-use • Profiling stockpiles of dust generating materials • Covering dust generating materials, if practical • Dampening down facilities for stockpiles
Preparatory Works (Earthworks)	• Monitor earth moving works, especially in dry and windy conditions

7. VEGETATION CLEARANCE

Additional vegetation will be cleared to facilitate works associated with site haul roads, working pad, laydown areas and topsoil and subsoil stockpiles. The area of vegetation clearance is shown in the Phase 3A CMS. All other areas of vegetation will be retained. During the Phase 3 and 3A works it is not anticipated any existing trees will require removal. If required, works to remove trees will be undertaken by a competent professional in accordance with details set out in the Construction Phase Arboricultural Method Statement (AMS).

Following vegetation and tree clearance, retained trees will be protected via the erection of site fencing to clearly demarcate the working area and prevent site plant from damaging trees or their root protection areas.

8. NATURE CONSERVATION

8.1. PROTECTED SPECIES AND PRECAUTIONARY METHOD OF WORKING FOR SITE CLEARANCE

An ecological Precautionary Method of Working (**Attachment C**) and Protected Species management plans for badgers, bats, birds, reptiles and water voles have been produced, on a precautionary basis, in order to ensure that the Phase 3 and 3A works are carried out with minimal ecological risk. The services of qualified and experienced independent ecologists will be retained for the duration of the Phase 3 and 3A works to ensure that the plans are implemented in full, as appropriate.

8.2. LANDSCAPING AND ECOLOGICAL MANAGEMENT PLAN

During Phase 3 and 3A works, areas of vegetation will be lost, some temporarily and some permanently.

During Phase 3 and 3A, landscape works will be undertaken as part of the environmental mitigation for the project see Phase 3 Landscape and Ecological Management Plan (40-STS-LC-2100-EN-PL-00014). This includes:

- seeding of the soil storage mounds to protect the soil resource and to help visually mitigate the preparatory works through rapid greening up of the storage mounds,
- maintenance of grass cover over parts of the site where soils are yet to be stripped, and
- seeding of surface water swales and the banks of the temporary settling ponds to help reduce soil erosion and subsequent impact on water quality.

9. ARCHAEOLOGY

9.1. INTRODUCTION

An assessment of the sites of archaeological interest within the footprint of Ladycross Plantation was undertaken during the development of the project and an archaeological desk-based assessment was undertaken. This assessment outlined that there were no sites within the area of Phase 3 and 3A that required detailed archaeological investigations.

9.2. WRITTEN SCHEME OF INVESTIGATION

There is potential for archaeology to be encountered during the Phase 3 earthworks. A Written Scheme of Investigation (WSI) was prepared for the Phase 2 works. The existing Phase 2 Written Scheme of Investigation for an Archaeological Watching Brief (40-COT-LC-8324-EN-PL-00002) procedures and practices will be adopted for any earthworks carried out in Phase 3 and 3A. Should any potential archaeological features be found, work will stop until any necessary measures have been confirmed with NYMNPA.

10. HYDROGEOLOGY, WATER QUALITY AND DRAINAGE

10.1. SURFACE WATER MANAGEMENT

The arrangements for Surface Water Management during the Phase 3 and 3A works are detailed in the ARUP Surface Water Drainage Scheme (40-STS-LC-2100-PA-22-20107) and Surface Water Management Plan (40-STS-LC-2100-PA-PL-20102). All surface drainage will outfall to Cat Scar Beck as part of Phase 3 and 3A works, an appropriate attenuation pond will be constructed as part of the Phase 3 works to ensure site run-off is appropriately flow and silt attenuated. The Phase 2 temporary attenuation pond will be formalised during the Phase 3 works. Details on construction methodology are included in **Section 3.2.3**. To aide erosion protection, the banks of the attenuation pond will be hydroseeded in accordance with the Phase 3 Soil Management Plan.

A Siltbuster or similar water treatment unit will be installed as part of the Phase 3 works to provide additional silt mitigation for site run-off water. Further details of the water treatment unit specification and operation are detailed in **Section 3.9** and the SWMP. The water treatment unit will operate in mechanical mode and use of chemical treatment will only be used following EA approval, or permitted activity.

An oil interceptor will be installed as part of the Phase 3 drainage works. The oil interceptor will collect and convey run-off prior to entering the surface attenuation pond.

10.2. SILT AND POLLUTANT MANAGEMENT

To minimise the impact of silt run-off during and immediately following the works, the following measures will be implemented:

- Disturbance of soils will be kept to a minimum by working on hard standing wherever possible;
- The invert level of the new surface ditches will be at least 300mm lower than the invert level of the watercourse that the ditch discharges into. This will slow the flow in the new ditch, provide a degree of attenuation and increase the ability for sediment to settle out;
- As soon as practicable after shaping the new ditch, coir netting or similar will be installed on the sides and bed of the new ditch to reduce erosion during rainfall events and reduce silt run-off. The coir netting will be installed to the manufacturer's specification and will be left in place as vegetation establishes; and,
- Any new ditches installed to provide surface water attenuation will incorporate temporary check dams at a maximum spacing of 30 m in the form of hay/heather bales fixed in the ditch to slow flow and assist in the settlement of sediment.

The Phase 3 and 3A construction works will be undertaken to minimise the risk of silt entering the adjoining off-site drainage ditches.

Any check dams and the downstream watercourses will be inspected daily during the construction works. If inspection identifies excessive sediment in the discharge, additional hay/heather bale and check dams will be installed in existing watercourses and on-site drainage downstream of the point where the new works are taking place, or piped drainage outfalls to slow flows further and assist in the settlement of sediment. The location of these check dams will be determined on site to maximise settlement of sediment. Records of all inspections will be kept along with the actions that were taken in the event of issues arising.

If the check dams accumulate silts, they will be cleaned out carefully and any extracted sediment will be redistributed thinly within the development site to dry out and become integrated into the landscaping. The check dams would not be cleaned out during rainfall events.

To minimise the potential for silt laden surface water run-off from access and haul roads during rainfall periods, frequent road sweeping will be undertaken to remove any silt.

After Phase 3 and 3A works are complete, monitoring will continue, and the check dams will be maintained until the run-off is running clear, with no impact on the receiving tributaries, the attenuation pond and associated drainage is installed.

If the above silt mitigation processes are insufficient, the use of a siltbuster or similar alternative method will be used, where required.

10.3. GROUNDWATER MANAGEMENT

The Phase 3 and 3A works are not anticipated to interact with groundwater at the Ladycross Plantation site. However, in the event groundwater is interacted during the Phase 3 and 3A works the methods and procedures to prevent the physical and chemical impact on the underlying aquifers are detailed within the Phase 3 and 3A Hydrogeological Risk Assessment.

11. SOILS AND CONTAMINATED LAND

As part of Phase 3 and 3A, areas of the Ladycross Plantation site will be stripped, and temporary earth bunds created during Phase 2 will be increased to accomodate the additional material. To ensure that this work is done in accordance with legal requirements and good practice guidance, this section is required to partially discharge condition NYMNPA-76 along with the Phase 3 Soil Management Plan (40-STS-LC-2100-EN-PL-00007).

Given the historic nature of the site, comprising virgin material, and the suitability for and certainty of reuse, the topsoils and subsoils are considered to not be a 'waste', in accordance with Article 2 of the Waste Framework Directive. As such, a Materials Management Plan under the CL:AIRE Code of Practice will not be required. All topsoil and subsoil are intended to be temporarily stockpiled, initially as screening (to mitigate impact of site works) and as part of restoration and habitat creation, following the completion of construction works.

11.1. TOPSOIL AND SUB-SOIL MANAGEMENT

The soil (topsoils and subsoils) will be moved only when it is in a dry and friable condition and shall not be moved between 1 October and 31 March, or after periods of heavy rain, unless soil is an appropriate condition and following agreement with the NYMNPA.

11.1.1. TOPSOIL

Soil removal will be carried out prior to all main construction activities within an area, utilising earthmoving plant in accordance with MAFF Good Practice Guide for Handling Soils (Ministry of Agriculture, Fisheries and Food, 2000).

11.1.2. SUBSOIL

Following removal of topsoil, upper subsoil will be stripped to an average depth of 0.25m – 0.30m following amendments made during Phase 2 Preparatory works, California Bearing Ratio Tests (CBR) have indicated that a strip of 0.5m was excessive given the geotechnical nature of the ground and height of groundwater.

11.1.3. STOCKPILE FORMATION

Temporary stockpiles for topsoil and for subsoil were partially constructed during the Phase 2 preparatory works. The stockpiles will be added to and completed using the materials stripped as part of the Phase 3 and 3A works.

No differentiation will be applied to different topsoil or subsoil materials generated and, as such, all topsoil materials may be stockpiled together, and all subsoil materials may also be stockpiled together. Temporary topsoil and subsoil stockpiles constructed as part of Phase 3 and 3A will be utilised on site for landscape and restoration works. Topsoil stockpiles will not exceed 3m high and subsoil stockpiles will not exceed 7m high; side slopes will be no steeper than 1 in 2.

Once the stockpile has been completed, the area will be cordoned off with secure fencing to prevent disturbance or contamination by other site activities. Temporary stockpiles that are to be in place for more than three months will be seeded with grass, to minimise soil erosion and to help reduce colonisation by nuisance weeds.

Appropriate drainage swales will be constructed around the footprint of the stockpiles to ensure management of silt and water run-off from the area.

The superficial deposits generated from the cuttings lagoon construction will be stockpiled in its own temporary stockpile (the material will not be mixed with topsoil or subsoil). The material will be used to infill the cuttings lagoon as part of future restoration works.

11.2. CONTAMINATED LAND

It is not anticipated that any contaminated land would be encountered during the Phase 3 and 3A works. Should contaminated land or ground that appears to be contaminated be discovered then works will stop in that area. The area will be demarcated, and any spoil removed will be kept separate on a layer of impermeable sheeting. Chemical testing will be carried out to determine the classification and waste status prior to the material being moved to an appropriate location or removed from site by a licensed waste contractor.

12. MATERIALS AND WASTE

A range of materials and waste materials will be stored on site and these will be stored in a designated area on site. The area used for storage of material have been planned to avoid excessive handling of material and to facilitate loading and unloading. Details of the measures taken to reduce potential pollution are detailed in **Sections 12.1 – 12.7**.

12.1. WASTE MINIMISATION

Waste management practices will ensure that the waste will be managed in accordance with the Environmental Protection Act 1990 Part II: (Duty of Care); The Waste (England & Wales) Regulations 2011: and the Environmental Permitting (England & Wales) Regulations 2016 Waste Duty of Care requirements are met.

The national hierarchy for waste will be used as reference for management of all wastes produced on site:

Reduce: we will seek to minimise waste through design

Re-use: Wherever possible we will utilise waste exemptions to enable waste to be re-used both on and off-site.

Recycle: We will recycle material wherever technically, environmentally and economically practicable.

Recover: We will look to recover energy and material from waste (digestion, incineration, gasification etc.)

Dispose: We will look to avoid the disposal of waste to landfill and only use disposal as a last resort. Wastes will be minimised through adoption of the following procedures:

- Appropriate procurement of materials (volumes, and options to use recycled materials);
- Use of 'Just in Time' delivery of raw materials to ensure that raw materials (aggregate etc.) are not wasted or lost to the environment;
- Operation of a take-back scheme for excess materials when possible; and
- Adoption of energy management practices minimising use of plant and fuels.

12.2. Segregation, Storage and Management

Specific waste compound(s) will be laid out and labelled to facilitate the separation and storage of materials for re-use, recycling, and disposal.

The wastes generated will be temporarily stored in suitable containers, skips or controlled areas (where possible, located on hard standing). The skips or waste storage areas will be clearly marked and segregated and suitable to contain the waste being stored.

Where materials cannot be re-used, recycled, or recovered, waste will be disposed of to an appropriately permitted waste management facility.

12.3. Oils, Greases and Other Hazardous Wastes

It is not anticipated that significant quantities of hazardous waste will be generated on site. All such waste will be stored separately from non-hazardous waste containers. Different streams of hazardous waste will be stored separately to prevent cross contamination before being disposed of in accordance with the legislation governing the storage, transportation and disposal of hazardous waste.

Liquid greases and oils will be stored with appropriate secondary containment.

12.4. Concrete/Grout Residues

A designated concrete wash-out skip, or similar sealed vessel will be located within the works area on existing hardstanding. Alkaline wash out water will be prevented from entering the site surface water systems.

Concrete wash out facilities will be appropriately signed, and all appropriate operatives and drivers trained in how to use it. Concrete wash out water will be removed to an appropriately licensed facility.

Solid concrete waste from the washout facility will be broken out. It may be reused on site as engineered fill if required or sent off site as inert waste.

12.5. General Office Waste

General waste will be stored within labelled skips and removed to a permitted waste facility for recycling or disposal as appropriate.

12.6. DOMESTIC WASTEWATER

Domestic wastewater will be collected in waste tanks and will be removed regularly by tanker to a suitably permitted facility.

12.7. SEPTIC WASTE

Septic waste will be temporarily stored in effluent tanks and will be removed regularly via tanker to a suitably permitted facility.

13. INCIDENT AND EMERGENCY PLANNING

Potential environmental issues and emergencies are considered as part of the project planning, and the appropriate prevention and control measures put into place. These measures are communicated to all people working on the project including subcontractors through the site induction and toolbox talks.

The emergency contacts list and drainage plan/ site plan (including the location of spill kits) will be posted on notice boards. Spill kits will be located within the stores in the site compound, at strategic points around the site and within all working vehicles. Vehicles will carry enough spill kit to clean up the amount of diesel/ oils they are carrying.

All employees will be instructed to bring any environmental incidents they identify to the immediate attention of Site Management, after first taking what steps, they can to contain/ remediate the incident (without putting the health and safety of themselves or others at risk).

Environmental Emergency Preparedness Plans (EEPP) have been prepared specifying the actions to be undertaken in the event of an environmental emergency or a breach of the measures set out in the EIA. The EEPP will be displayed on all site notice boards. In accordance with the EEPP, the Contractor's Environmental Manager will be notified of environmental incidents.

14. ATTACHMENTS

ATTACHMENT A – ANGLO AMERICAN COMMUNITY AND STAKEHOLDER ENGAGEMENT FRAMEWORK

ATTACHMENT B – ANGLO AMERICAN COMPLAINTS PROCEDURE

ATTACHMENT C – PRECAUTIONARY METHOD OF WORKING

ATTACHMENT A - ANGLO AMERICAN COMMUNITY AND STAKEHOLDER ENGAGEMENT FRAMEWORK

Community and Stakeholder Engagement Framework

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Community and Stakeholder Engagement Framework

Contents

Community and Stakeholder Engagement Framework

1 Purpose and Scope

1.1 Background

The Company takes its responsibility to the local area very seriously and is committed to taking an active and positive role in the local community. This means minimising the potential adverse impacts on people living and working in the area, making a meaningful contribution to the social and economic well-being of the area, keeping the community informed as the project develops and responding quickly to questions and concerns.

There is widespread interest in the Company's Woodsmith Project (the Project) at local, regional and national levels. This is demonstrated by the ongoing media and stakeholder enquiries, as well as the levels of participation during the planning consultations and at Company events.

Anglo American (the Company) successfully engaged the community and other key stakeholders during the planning period and has continued to do so beyond, gaining widespread support for the Project. This has helped to provide the Company with a social license to operate. Maintaining this throughout the construction period is important to the successful delivery of the Project and is a key objective of the Company's board and management team.

1.2 Purpose

This Community and Stakeholder Engagement Framework (CSEF or the Framework) aims to set out a clear communications approach during the construction period which, when implemented correctly, can help to maintain the Project's social license to operate.

1.3 Scope

The Framework sets out an approach to community and stakeholder communications during the construction period. It outlines the overall strategy, identifies the main stakeholder groups and details the engagement objectives and activities. Stakeholders have been identified as those groups in the local area who have the potential to be impacted by construction, and as such does not include wider corporate stakeholders such as investors or customers.

The Framework sets out the roles and responsibilities of the Company and the principle construction contractors for implementing and managing its delivery.

1.4 Standards and compliance

The Framework is in compliance with planning obligations relating to community and stakeholder engagement including: producing a communications plan; the establishment of the Liaison Group Forum and Traffic Management Liaison Group; notification to neighbours of construction activities, particularly in relation to noise; dealing with complaints and initiatives to promote local benefits.

It is not within the scope of this plan to include engagement with the planning authorities and other statutory bodies in relation to the compliance with planning obligations and further environmental requirements, other than those specifically regarding community engagement.

1.5 Document review

The Company is committed to regularly reviewing its approach. This is the third time this document has been updated since the off-site highways improvement works were undertaken on the main transport route and construction started at Woodsmith, Lockwood Beck and Wilton. The principles of the Framework therefore remain unchanged, with the addition of the good practice learnt over the last eighteen months.

The Framework will be reviewed on annual basis by the General Manager External Affairs and External Affairs Director, in consultation with the land, environment and planning team, and updated as necessary. It will be distributed to the list shown in section 1.6. Lessons learnt will be adopted into the working practices of the community relations team under the direction of the External Affairs Director.

1.6 Distribution list

- North York Moors National Park Authority
- North Yorkshire County Council
- Principle contractors

2 Engagement Strategy

2.1 Rationale

The strategy is based on the principle that the local community and key stakeholders should be kept informed of developments and in advance of them occurring. The failure to communicate often leads to a communications vacuum and this in turn leads to misinformation and rumours which is unhelpful for all stakeholders.

Similarly, providing channels for feedback to the Company in the first instance, including direct contact with the community relations team, allows local people or spokespeople to be engaged in matters that might affect them. Since construction started on the off-site highways works almost three years ago, the vast majority of questions or concerns about the Project have come directly to the Company. This demonstrates the importance of developing and maintaining relationships 'on the ground'.

Keeping people informed is not just about notification of physical activities during the construction period, but is also about allowing a channel for feedback that might raise an issue or local knowledge that the Company or its contractor teams were not aware of. It also enables a channel to promote the benefits of the Project as well as engaging in other positive public relations activities.

Any materials that are prepared for public consumption to explain parts of the construction work are designed and drafted in a manner that promotes the understanding of works or issues in as clear and straightforward manner as possible.

2.2 Approach

1. **Conduct pre-briefings for key events or activities**
   Providing clear information before each phase of works commences at the Project sites detailing what construction will involve, when it will take place and the measures to limit impacts. Since

construction started this has included newsletters, mailouts, direct face-to-face meetings, drop-in events, public meetings, press releases and notices in the local media.

2. **Have effective ongoing management of local communications**
   Providing ongoing updates about construction progress and establish mechanisms that enable concerns to be raised and acted upon. This includes participation in the various liaison groups and clear processes to manage incoming queries or complaints. These have worked well since construction started. The Company also operates a 24-hour community helpline.

3. **Community benefit initiatives**
   Undertaking and promoting regular initiatives that deliver community benefits such as education schemes and employment and business opportunity information sessions. These have been ongoing since construction started and have been well received by the community.

Further details on the methodology for pre-briefings, ongoing management and community benefits initiatives are available in sections 4.2 – 4.4.

3 Stakeholder Identification

Stakeholder groups have been identified and engaged as the Project has developed and can be broadly categorised as follows:

1. **Site neighbours**
   Residential neighbours and/or landowners, businesses and organisations close to the individual construction sites. This also includes those directly affected in other areas such as those living close to key transport corridors or junctions. Approximately 60 households have been identified as 'site neighbours' to the Woodsmith and Lockwood sites and regular contact has been maintained since construction commenced. In addition, links with the neighbourhood of Dormanstown have been established since construction commenced at the Wilton site.

2. **Community representatives**
   This group includes elected representatives of the community including parish and town councils, local authority officers and councillors, and local MPs.

3. **Interest groups**
   Business networks, environmental bodies, other local clubs and groups.

4. **Education Institutions**
   This includes local schools, colleges, universities and other training providers.

5. **Media**
   A wide range of online, print and broadcast outlets and journalists are considered key stakeholders.

6. **General public**
   The wider public as accessed through media channels, the website, social media or site signage etc.

A register has been developed for each Project site for of these broad groups, which is reviewed and updated. Stakeholder engagement takes into account the needs of vulnerable and disadvantaged groups, making sure that information about the Project is accessible and people are able to contact the

Company and receive a prompt response. This is ensured by utilising a broad range of engagement channels, as set out in section 4, and holding public events in accessible venues.

4 Engagement Methodology

This section sets out how community and stakeholder communications will be handled.

4.1 Identify stakeholders

The broad stakeholder groups have been identified, together with specific stakeholders relevant to each of the construction sites that are most likely to be impacted by the works. This includes landowners and local residents in close proximity to the sites.

4.2 Pre-briefings for key events

Before each phase of construction starts, or before a specific construction activity that has the potential to impact stakeholders, it is important to provide information to the local community. For the purpose of this Framework these stages are defined as "construction events" (these are listed in Appendix 1). Each construction event triggers the requirement for pre-briefing activities. The level of pre-briefing activity will vary, taking into account the extent of the local impact anticipated.

The pre-briefing information will include details about what construction will involve and how people can contact the Company if they have questions or concerns. Reassurance will be given that measures will be taken to limit adverse impacts to an acceptable level and that planning conditions and other requirements are in place to ensure that this happens. As a minimum, the pre-briefing activities will include:

- Letters – Letters and or emails should be sent to those that are likely to be immediately affected. This might include neighbouring residents or households and businesses on access routes. As a courtesy, the same information will be sent to the local Parish Council, borough and county councillors covering those areas.

- Visits and phone calls – In addition to letters, affected households and businesses will be visited, or at the very least receive a telephone call.

For construction activities that are more significant, in terms of their potential for stakeholders to be affected, the Company will use the following pre-briefing methods. The precise details and extent of pre-briefing will be a matter of judgement and as a result of discussions between the contractor and the Company and, where appropriate, the planning authorities. Activities may include:

- Newsletter / Leaflet – A short summary newsletter or leaflet about the works will be made distributed, including local noticeboards and community facilities.

- Exhibitions / Open days – In the case of certain key events, such as the main shaft sinking, it will be appropriate to inform local residents and the wider general public through open days prior to works starting. This includes further information on exhibition boards and will be attended by key personnel from the Company and contractors, who are be able to respond to queries and provide reassurance on potential concerns. Ten of these sessions have taken place since construction started.

- Press release – If appropriate (often where a wider audience is potentially affected or interested in the works planned) then a press release will be prepared detailing the key facts. Any press release needs to be signed off by the Company in a timeframe that makes sure newspaper deadlines are met. Where possible, coverage should always appear in the week prior to the proposed activities beginning. The local media has been particularly useful in instances where the community beyond the immediate site neighbours could be affected, such as public highways disruption.

- Website updates – Details of key events are uploaded to the Company website. Some works may also require more detailed information and documents to be uploaded.

- Social media updates – The Company will control its social media accounts. As above, the contractor will be expected to provide the relevant details to the Company in a timely fashion so the relevant information can be released through its social media channels.

- Stakeholder briefings – In some circumstances specific stakeholders will be individually briefed to inform them of key events. This may include elected representatives, local authority officers or interest groups. The Company will take the lead on such matters and will involve contractors where appropriate.

4.3 Ongoing management

Local residents and stakeholders will continue to be engaged throughout construction (i.e. general updates in addition to those covered under 'key events' in appendix 1). This will enable the Company to provide regular updates of the Project's progress, and that it is being delivered in accordance with planning consents and any other Company commitments. Alternatively, if the Project is not progressing as expected it is important that stakeholders are provided with an explanation and reassurance that corrective measures will be implemented.

In addition, on-going engagement will include a range of communication channels that enable stakeholders to raise issues and ask questions and for the Company to respond to these.

4.3.1 Liaison Group Forum

The Liaison Group Forum (LGF) was established prior to the commencement of construction and has met quarterly. There have been seven meetings to date and the LGF will continue to meet throughout the construction period. It is chaired by the Company and its membership includes representatives from the National Park Authority, parish and town councils and wider community stakeholder representation as appropriate. The meetings take place in community venues, such as village halls, close to the Woodsmith site and are open to the general public to attend and to ask questions.

The purpose of the group is to facilitate liaison between local stakeholders about construction, providing updates about progress, and to enable issues and concerns to be raised and resolved.

4.3.2 Industrial Business Group

The Industrial Business Group (IBG) was established to facilitate liaison between the businesses based at Wilton International and residents from the neighbourhoods in close proximity of the site.

Meetings are held bi-monthly and attended by the major businesses on the site, local councillors and residents. Sirius joined the group once construction started on the Wilton site.

4.3.3 Traffic Management Liaison Group

The purpose of this group is to facilitate liaison between local authorities and other interested stakeholders in regard to construction traffic. The group, which meets quarterly, oversees the management and monitoring of the Construction Traffic Management Plan (CTMP) and is chaired by the Company. The meetings take place after the LGF meetings, on the same day and venue, with traffic issues raised by the LGF addressed by the group.

There is representation from the National Park Authority, highways authorities, local authorities, the police and other stakeholders as invited. There have been seven meetings since construction started and traffic issues raised by the LGF are addressed.

4.3.4 24-hour community helpline

To ensure that there are accessible points of contact for the local community and wider stakeholders a 24-hour community helpline has been established, which is delivered by a specialist contractor. In addition there is a community email address, which is managed by the Company.

4.3.5 Regular briefings and updates

Key individuals and organisations are regularly briefed and updated. Similarly to pre-briefings for key events, updates are communicated through the following channels:

- Public meetings and presentations – Parish council and town council meetings are regularly attended, together with presentations to local interest groups.

- Site visits and meetings – visits to the Project sites for key stakeholders have been an effective way to communicate site activity and progress. In addition, drone footage of the project sites is regularly used to show progress and is used in Project presentations and on the Company's website.

- Press releases – the print and broadcast media are utilised extensively to communicate with the wider community and at a regional and national level.

- Newsletters, website and social media – regular updates produced throughout construction via the website, leaflets, newsletters, social media and publications relating to specific issues, such as careers. Videos, including footage of the sites and interviews with key Project personnel have also been an effective tool.

4.4 Community benefit initiatives

The Company has made a number of commitments to benefit the local area during construction such as providing employment and supply chain opportunities, training schemes, school outreach programmes and funding community projects. It important that these are implemented and widely promoted so that the community and stakeholders are aware that the Company's commitments are being delivered. The activities and initiatives, some of which are planning obligations in the S106 agreements, are outlined below:

- Funding to Scarborough Borough Council and Redcar and Cleveland Council to identify and prepare local people for employment opportunities.

- Funding to raise awareness of science, technology, engineering and maths (STEM) related careers in schools in North Yorkshire and Redcar and Cleveland.
- Targets specified in the S106 agreement - take on 50 apprentices, recruit 15 local students on the Company's Undergraduate Programme and train 300 adults.
- Quarterly employment opportunity sessions to promote job opportunities to local people and meet the buyer events for local businesses.
- Education outreach initiatives, careers events and presentations.
- Funding community projects through the Sirius Minerals Foundation.

4.5 Dealing with complaints

The Company aims to respond promptly to complaints and concerns, ensuring that issues are investigated and resolved as quickly as possible. The Company's approach is detailed in its Complaints Procedure – see Appendix C.

5 Roles and Responsibilities

This section provides a framework that identifies responsibilities for the delivery and management of community and stakeholder engagement, focusing on roles of the Company and the principle construction contractors. The Company will be responsible for all community and stakeholder engagement during construction, supported by each construction contractor as required.

5.1 Anglo American

The Company will be responsible for:

- Identifying key stakeholders likely to be impacted by the works.
- Undertaking pre-briefing activities before construction starts such as:
    - Open Days / exhibitions as appropriate.
    - Producing information outlining what is involved, impacts and mitigation, contact information, etc.
    - Direct correspondence with neighbours and landowners about construction events
- Liaison with the planning authorities and community representatives, including chairing the Liaison Group Forum and Traffic Management Liaison Group.
- Media relations.
- Manage the complaints procedure.
- Producing project newsletters, social media and updating the website.

- Direct engagement and briefings with key stakeholders including local residents, community representatives and interest groups.

5.1.1 Community relations team

The Company's community relations team is responsible for implementing the Framework in liaison with others in the Company as appropriate.

The Company's External Affairs Director has overall responsibility for all company communications and external relations. The External Affairs Director chairs the Liaison Group Forum.

The General Manager External Affairs, reporting to the External Affairs Director, manages the implementation of the approach detailed in the Framework. The Local Liaison Officerand Education Outreach Officer report to the GM External Affairs, and are further supported by the PA to the External Affairs Director.

The community relations team work closely with other departments in the Company in the implementation of the Framework, particularly the land, environment and planning team as well as the project development team. They assist in providing relevant information, investigating and resolving complaints, and attending Company events and public meetings as required. The Company's Logistics Manager chairs the Traffic Management Liaison Group.

5.2 Construction Contractors

Having developed and maintained positive relationships with key local stakeholders since the Project was launched in 2011, Anglo American takes the lead role in all community and stakeholder engagement. Each of the construction contractors will be required to support the Company's stakeholder engagement approach as follows:

- Provide expected durations of phases or work, their potential impact on the local community and mitigation measures where required.
- Provide details of any expected public transport diversions, delays, planned road closures, impacts on highways, interrupted access for residents/ businesses, or other expected community disruption.
- Participate in employment opportunity sessions, meet the buyer events, and education outreach events as required.
- Cooperate with Anglo American in media events and provide information to the Company for publications, the website, newsletters, etc.
- Adherence to Anglo American's communications protocols and guidelines.
- Attend the liaison groups, parish/town council meetings and assisting Anglo American as required.
- Ensure that all sub-contractors comply with stakeholder and community relations requirements.

Appendix A – Construction Events

The following provides a list of construction events which trigger the requirement for pre-briefing activities, as outlined in section 4.2. The list is not exhaustive and there may be other events or activities not listed here that could be classified as construction events as a result of discussions between the Company and its contractors.

The construction events for the purposes of this Framework are:

- Any significant geotechnical investigation or drilling works
- Main Woodsmith Mine shaft sink
- Main Lockwood Beck shaft sinking
- MHF construction
- Harbour construction
- Other construction activities with the potential to affect stakeholders including site neighbours or road users in regard to noise, light, disruption to the public highway, etc. Examples include an abnormal load arriving to site or a short period of piling.

Appendix B – Engagement Activities Summary

The table below provides an 'at a glance' overview of the main community and stakeholder engagement activities, together with the respective roles of Anglo American and contractors.

	Pre-briefing activities	Ongoing management	Community benefit initiatives
Anglo American	• Establish Liaison Group Forum and Traffic Management Liaison Group • Project update newsletter • Media, website update, social media • Briefings with site neighbours, landowners, community representatives and other key stakeholders as identified • Produce leaflet detailing upcoming construction activities • Send letters to stakeholders likely to be immediately affected • Hold public open days / exhibitions	• Chair Liaison Group Forum and Traffic Management Liaison Group • Attend the Industrial Business Group • Manage 24-hour community helpline and cropnutrients.info@angloamerican.com • Attend parish and town council meetings quarterly • Regular updates to site neighbours, landowners, community representatives and interest groups • Site visits • Media, website update, social media • Manage complaints procedure	• Training targets and promotion of initiatives funded by the S106 • Promote activities of the Sirius Minerals Foundation • Organise meet the buyer events • Organise regular employment opportunity sessions • Deliver education outreach programmes
Construction Contractor	• Provide information to Anglo American to be used in leaflets, letters, web content, etc., as required • Attend public open days/exhibitions and meetings with stakeholders as required	• Attend liaison groups, parish council and other meetings as required • Provide information to support on-going community and stakeholder relations • Participate in media events as required • Adherence to complaints procedure, media protocol and crisis response procedure	• Involvement in community benefit initiatives as required

Community engagement is tracked across these three elements. Activities and complaints are reported in the Company's annual Responsible Business Report. Minutes of the Liaison Group Forum, which includes community engagement as a standing agenda item, are published on the Company's website.

By being proactive in building and maintaining relationships in the community, the Company is always receiving feedback about its performance. This helps to inform the Company on what it could be doing better, enables it to respond quickly to concerns and pre-empt them in the future and is an important part of annual review of the Framework.

Appendix C – Complaints Procedure

This procedure outlines the Company's standards in handling complaints and the process of managing complaints from receipt through to resolution. The procedure has been updated to take into account the lessons learnt during the first two years of construction.

1 Standards for Handling Complaints

- All complaints will be treated seriously, fairly and with courtesy;
- Complaints will be responded to quickly – we will acknowledge a receipt of a complaint straight away wherever possible;
- We will investigate and aim to resolve complaints within a maximum of three days, making sure that initial feedback is provided within one day; and
- We publish information about complaints, with the identity of the complainant kept confidential, to the Liaison Group Forum and in the Company's annual Responsible Business Report.

2 Stages of the Complaints Procedure

2.1 Receipt of complaint

The vast majority of complaints are received directly by the Anglo American community relations team through a variety of channels, e.g. directly to a team member, via the general cropnutrients.info@angloamerican.com email, social media, parish council meetings or the 24-hour community helpline. Relationships with the regulatory authorities are well established and complaints received by them are forwarded to the Company's community relations team to investigate.

The team aim to acknowledge a complaint straight away and ascertain the relevant details as soon as possible.

Occasionally a complaint is made directly to a Project site. In this instance the community relations team will be informed and further communication with the complainant managed by them.

2.2 Investigation

In all cases the community relations team will notify the Anglo American site manager, the environment team and the logistics team (where complaints are related to traffic). The site manager will lead the investigation, delegating where appropriate and liaise with the relevant contractor. All relevant personnel will be kept updated.

If remedial action is required this will be implemented as quickly as possible in consultation with the environment and planning team, community relations team and others as appropriate.

2.3 Feedback

The community relations team will feedback to the complainant within a maximum of three days, with initial feedback given within one day. Further details will be sought from the complainant if required.

The complainant will be given the details of any remedial action taken and have the opportunity to discuss the outcome of the investigation with the community relations team, who will involve others as appropriate. If further relevant information comes to light, the complaint will be investigated again.

2.4 Log and Review

Complaints are logged and reported to the next Liaison Group Forum (LGF) meeting. The minutes of LGF meetings are published on the Company's website.

Complaints are reviewed to establish whether action can be taken to reduce the likelihood of similar complaints in the future, and whether the way in which the complaint was dealt with could be improved.

ATTACHMENT B - ANGLO AMERICAN COMPLAINTS PROCEDURE

Complaints Procedure

Document Number: 40-SMP-GE-0000-PU-PR-00001

Document Verification				
Revision	**Date**	**Prepared by**	**Approved by**	**Reason for Issue**
0	22/03/2019	M. Parsons	G. Edmunds	Issued for Use
1	17/12/2020	M. Parsons	G. Edmunds	Issued for Use

Complaints Procedure

Contents

Complaints Procedure

This procedure outlines the Company's standards in handling complaints and the process of managing complaints from receipt through to resolution. The procedure has been updated to take into account the lessons learnt during the first three and half years of construction.

1 Standards for Handling Complaints

- All complaints will be treated seriously, fairly and with courtesy;
- Complaints will be responded to quickly – we will acknowledge a receipt of a complaint straight away wherever possible;
- We will investigate and aim to resolve complaints within a maximum of three days, making sure that initial feedback is provided within one day; and
- We publish information about complaints, with the identity of the complainant kept confidential, to the Liaison Group Forum.

2 Stages of the Complaints Procedure

2.1 Receipt of complaint

The vast majority of complaints are received directly by the Woodsmith community relations team through a variety of channels, e.g. directly to a team member, via the general Crop Nutrients email, social media, parish council meetings or the 24-hour community helpline. Relationships with the regulatory authorities are well established and complaints received by them are forwarded to the Company's community relations team to investigate.

The team aim to acknowledge a complaint straight away and ascertain the relevant details as soon as possible.

Occasionally a complaint is made directly to a Project site. In this instance the community relations team will be informed and further communication with the complainant managed by them.

2.2 Investigation

In all cases the community relations team will notify the Woodsmith site manager, the environment team and the logistics team (where complaints are related to traffic). The site manager will lead the investigation, delegating where appropriate and liaise with the relevant contractor. All relevant personnel will be kept updated.

If remedial action is required this will be implemented as quickly as possible in consultation with the environment and planning team, community relations team and others as appropriate.

2.3 Feedback

The community relations team will feedback to the complainant within a maximum of three days, with initial feedback given within one day. Further details will be sought from the complainant if required.

The complainant will be given the details of any remedial action taken and have the opportunity to discuss the outcome of the investigation with the community relations team, who will involve others as appropriate. If further relevant information comes to light, the complaint will be investigated again.

2.4 Log and Review

Complaints are logged and reported to the next Liaison Group Forum (LGF) meeting. The minutes of LGF meetings are published on the Company's website.

Complaints are reviewed to establish whether action can be taken to reduce the likelihood of similar complaints in the future, and whether the way in which the complaint was dealt with could be improved.

ATTACHMENT C - PRECAUTIONARY METHOD OF WORKING

Precautionary Method of Working (PMoW) for Site Clearance (Ecology)

The Precautionary Method of Working (PMoW) for site clearance predominantly relates to the protection of reptiles and nesting birds which may be present within the development site although requirements for otters and badgers have also been included for completeness.

General overview

The construction site manager will ensure that anyone undertaking construction works on the site (including sub-contractors) is made aware of the potential for the site to support nesting birds, common reptile species and other protected species, where to expect them, their protected status and the procedure (see below) to follow in the unlikely event that nesting birds or common reptiles are discovered during works. Where applicable this advice will be given through site inductions, ecological tool box talks or similar.

Should any nesting birds, reptiles or other species be discovered during construction, which are likely to be effected by the development, works will cease immediately. The construction site manager will then seek the advice of a suitably qualified and experienced ecologist and works will only proceed in accordance with the advice they provide.

Reptiles

Within the development's construction zone the following methods of working will be adopted:

- All clearance works will be undertaken when reptiles are likely to be fully active i.e. during the period March/April to September/October inclusive, but this is weather and temperature dependent;
- Where clearance works cannot be undertaken within this period, additional surveys and/or mitigation measures may be required to confirm the absence of reptiles prior to clearance works, and a suitably qualified ecologist (the project ecologist) should be on site during the works to inspect areas immediately prior to clearance;
- Clearance of dry stone walls, logs, brash, stones, rocks, or piles of similar debris will be undertaken carefully and by hand and supervised by a suitably qualified ecologist;
- Clearance of tall vegetation (any vegetation over 150mm) should be undertaken using a hand held strimmer or brush cutter with all cuttings raked and removed the same day. Cutting will only be undertaken in a phased way which may either include:
    - Cutting vegetation to a height of no less than 30mm, clearing no more than one third of the site in anyone day or;
    - Cutting vegetation over three consecutive days to a height of no less than150mm at the first cut, 75mm at the second cut and 30mm at the third cut;
- Following removal of tall vegetation using the methods outlined in above remaining vegetation will be maintained at a height of 30mm through regular mowing or strimming to discourage common reptiles from returning;

- Ground clearance of any remaining low vegetation (if required) and any ground works will only be undertaken following the works as above;
- Any trenches left overnight will be covered or provided with ramps to prevent reptiles from becoming trapped and enable escape; and
- Any building materials such a bricks, stone etc. will be stored on pallets to discourage reptiles from using them as shelter. Any demolition materials will be stored in skips or small containers rather than in piles on the ground.

Nesting Birds

Within the development's construction zone the following methods of working will be adopted:

- Vegetation clearance that is required will be undertaken outside of the breeding bird season (i.e. the works will be undertaken between September and February);
- Any demolition work that is required will be undertaken outside of the breeding bird season (i.e. between the works will be undertaken September and February);
- Where clearance works or demolition works cannot be undertaken out with this period, additional surveys maybe required to verify absence of breeding birds prior to clearance works and an ecologist should be on site during the works to inspect areas immediately prior to clearance, or at least no less than 24 – 48 hours before the works commence. The area of inspection should extend for at least 500m from the area of works;
- Where felling outside the breeding season is not possible a sensitive felling methodology will be implemented, involving the identification of specific areas to be felled, followed by surveys for occupied nests (or nests being built) being carried out by a suitably qualified ecologist (the project ecologist) undertaken a maximum of 24 - 48 hours prior to the commencement of works) and extending over an area of at least 500m from the area of works;
- If active birds' nests are found within the following distances from site, the area should be roped off and no works should be undertaken in the these exclusion areas until the birds have fledged and the nests are empty:
    - Common crossbill - 150m;
    - Nightjar - 500m;
    - Goshawk - 150m; and
    - All other species - 10m.
- Alternatively, liaison with Natural England may be undertaken to agree the approach to working within the exclusion zones of the nest sites specified above.

Other Protected Species

Within the development's construction zone the following methods of working will be adopted:

- Dust minimisation methodologies will be implemented and adhered to at all times;
- Construction lighting will be directed away from areas of retained habitat wherever possible;
- Pollution prevention controls will be implemented and adhered to at all times; and
- All excavations will be covered every night to reduce the risk of otters, badgers or any other species falling into the excavations and becoming stranded or if this is not possible then a means of enabling their escape will be provided.

Project Title / Facility Name:

Woodsmith Project

Document Title:

HYDROGEOLOGICAL RISK ASSESSMENT - PHASE 3A - NYMNPA CONDITION 88 - LADYCROSS

NYMNPA

29/04/2022

Document Review Status

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NORTH YORKSHIRE POLYHALITE PROJECT (788.5030)

HYDROGEOLOGICAL RISK ASSESSMENT - PHASE 3A - NYMNPA CONDITION 88 - LADYCROSS PLANTATION / 40-STS-LC-2100-EN-RA-00003

Revision	Date of issue	Prepared by	Checked by	Approved by	Changes
A (PLA)	11/04/2022	Carl Thomas	William Hodgson	Paul Howlett	First issue
B (PLA)	22/04/2022	Carl Thomas	William Hodgson	Paul Howlett	First issue

TABLE OF CONTENTS

1. INTRODUCTION

1.1. GENERAL BACKGROUND

STRABAG has been commissioned by Anglo American to construct the Mineral Transport System (MTS) tunnel, a part of its wider Woodsmith Project. The tunnel will be used to transport polyhalite from the Woodsmith Mine site to the Material Handling Facility (MHF) at Wilton, Teesside.

In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to the 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. This permits the construction of intermediate shafts, including at Ladycross Plantation.

Phase 2 of the works at the Ladycross Plantation site comprised the mobilisation of STRABAG to site, topsoil and subsoil stripping, drainage works, and construction of roads and drill pad. Phase 3 and 3A will comprise additional surface works. These surface works will allow pre-grouting and ultimately the construction of a shaft by blind boring techniques, which will be the scope of later phases.

This document provides details of the previously submitted and approved Phase 3 works as well as the Phase 3A submission which incorporates the alterations required for the cuttings lagoon construction methodology. No other adjustments are required from Phase 3 supporting documentation previously submitted to and approved by North York Moors National Park Authority (NYMNPA).

Alterations from the Phase 3 to the Phase 3A CMS are detailed in sections **3.4**, **3.4.4 and 4** and the Phase 3A General Arrangement Plan. The Phase 3A works only concern a change to the cuttings lagoon construction methodology, as previously approved under Phase 3.

A site plan is provided separately.

1.2. PHASE 3 AND 3A WORKS

Phase 3 and 3A comprises construction works, and **Section 3** details the strategy that will be undertaken to ensure construction and ongoing earthworks are carried out in a phased approach. The works will be prioritised and carried out to ensure no area is stripped and left exposed due to restrictions of the topsoil stripping window.

1.2.1. PHASE 3 WORKS

Specific works include:

- Additional soil stripping and storage within temporary bunds,
- Installation and use of hardstanding for welfare, car parking, laydown areas, and haul road,
- Installation of foul drainage facilities,
- Installation of further site surface water drainage, including oil interceptor,
- Mobilisation of on-site facilities, including welfare, car park, wheel wash, refuelling, workshop, grout plant and associated services,
- Construction of cuttings lagoon and associated cuttings pit and muck-away area, and
- Installation of working pad for pre-grouting and shaft sinking works.

1.2.2. PHASE 3A WORKS

Changes to Phase 3 as part of Phase 3A works include:

- Revised cuttings lagoon construction methodology.

Specific works are shown on Strabag Phase 3A General Arrangement Plan (40-STS-LC-2100-PA-22-20113).

1.3. PURPOSE OF THIS DOCUMENT

This Revised Hydrogeological Risk Assessment is required to partially discharge an element of condition NYMNPA-88 as stated in the planning permission ref. NYM/2017/0505/MEIA. Table 1-1 details where the relevant information has been provided within this report.

1.4. COMPLIANCE CONDITIONS

This document is required to partially discharge the first part of condition NYMNPA-88 and condition NYMNPA-90. These parts of the planning conditions state that:

Table 1-1 NYNMPA Discharge Condition No 88 – Revised Hydrogeological Risk Assessment

NYMNPA Description	Compliance with Condition NYMNPA 88
Prior to Commencement of Development for the MTS at Lady Cross Plantation and informed by the most up-to-date monitoring, a Revised Hydro-geological Risk Assessment shall be submitted to and approved in writing by the MPA in consultation with the Environment Agency.	Whole text.

Table 1-2 NYNMPA Discharge Condition No 90 – Groundwater Management Scheme

NYMNPA Description	Compliance with Condition NYMNPA 90
Following the approval of the Revised Hydro-Geological Risk Assessment for the MTS, but prior to the Commencement of the Development of the MTS at Lady Cross Plantation, a Groundwater Management Scheme (covering construction, operation and post-operation phases), shall be submitted to and approved in writing by the MPA. The Scheme shall include technical drawings detailing the conceptualised hydrogeology with the final detail designs of the proposed mitigation measures outlined in the York Potash Environmental Statement (September 2014 as updated by the Supplementary Environmental Statement dated February 2015). Development shall thereafter proceed only in strict accordance with the approved Scheme and a timetable to be included within it.	**Section 7**

1.5. SCOPE OF THIS DOCUMENT

The second part of condition NYMNPA-88 requires the submission and implementation of a Construction and Operation Phase Groundwater and Surface Water Monitoring Scheme. This has been addressed separately in the document Phase 3 Construction and Operation Groundwater and Surface Water Monitoring Scheme (40-STS-LC-2100-EN-PL-00012).

This Revised Hydrogeological Risk Assessment relates only to the surface activities which comprise the Phase 3 and 3A scope of works.

At the time of writing, the Ladycross Plantation site is the subject of further detailed ground investigation. These have been designed in part to improve the characterisation of the local groundwater flow regime to better understand the interaction of the shaft and near surface groundwater and surface waters. They will inform further Revised Hydrogeological Risk Assessments for subsequent phases which will consider in detail the interaction of the subsurface shaft construction works with the groundwater and surface water environments.

Whilst the Phase 3 and 3A scope of works only includes the construction and not the operation of the cuttings lagoon, this document does consider the risks related to its operation in order that the construction methodology can be considered.

1.6. STRUCTURE OF DOCUMENT

The structure of this document is as follows:

Section 1 – Introduction - this section,

Section 2 – Geology – provides a summary description of the ground conditions pertinent to the risk assessment,

Section 3 – Hydrology - provides a summary description of the surface water environment pertinent to the risk assessment,

Section 4 – Hydrogeology – provides a summary of the current hydrogeological understanding of the site,

Section 5 – Construction Methodology – describes a summary of the proposed Phase 3 and 3A works,

Section 6 – Risk Statement – a statement of water related risks from the Phase 3 and 3A works, and

Section 7 – Groundwater Management Scheme – describes proposed control measures to be used during the Phase 3 and 3A works to mitigate the identified risks.

1.7. RELATED DOCUMENTS

This document should be read together with the following documents:

- Phase 3 Remedial Action Plan (Phase 3 RAP) (40-STS-LC-2100-EN-PL-00011)
- Phase 3 Construction and Operation Groundwater and Surface Water Monitoring Scheme (Phase 3 GWSWMS) (40-STS-LC-2100-EN-PL-00012).
- Phase 3 Surface Water Management Plan (Phase 3 SWMP) (40-STS-LC-2100-PA-PL-20102)
- Phase 3 Surface Water Drainage Scheme (Phase 3 SWDS) (40-STS-LC-2100-PA-22-20107)
- Phase 3A Construction Environment Management Plan (Phase 3A CEMP) (40-STS-LC-2100-EN-PL-00024)
- Phase 3A Construction Method Statement (Phase 3A CMS) (40-STS-LC-2100-CN-MS-00005)

2. GEOLOGY

2.1. REGIONAL GEOLOGY

A geological section of the tunnel at the Ladycross Plantation site is shown in **Attachment A**.

2.2. LOCAL GEOLOGY

The local geological model is reproduced from the Hydrogeological Baseline Report, FWS, Sept 2014 (ref 1433AmtsOR27Rev2).

2.2.1. GEOLOGICAL SEQUENCE

A detailed geological sequence established from on-site and near site boreholes is presented in Table 2-1, below. Locally, the strata dip gently (~2°) to the southwest.

Table 2-1 – Ladycross Plantation geological sequence

Formation Name		Estimated thickness (m)	Geological description
Topsoil		-	Now removed over large parts of the site and stockpiled for reinstatement.
Superficial deposits		2.4 to 4	Glacial till to depths of 2.9 m in the northern part of the site. Fluvioglacial interbedded sands, gravels and clays to depths of 2.4 m to > 4 m in the southern part.
Scalby Formation (Long Nab Member and Moor Grit Member)	**Ravenscar Group**	9 to 15	Comprises two members: The upper Long Nab Member with yellow-grey sandstones and grey mudstones, siltstones with some heavily fractured zones. Up to ~12 m thick with up to 3 m of the upper surface weathered in places. The Long Nab Member is absent in the south-eastern half of the site. The lower Moor Grit Member which is mainly grey fine-grained sandstones, in places interbedded with siltstones and mudstones. Between ~5 m and ~ 7 m thick.
Scarborough Formation		12 to 16	Sandstone with thin beds of mudstones and siltstones that are often interlaminated and interbedded.

Formation Name	Estimated thickness (m)	Geological description
Cloughton Formation	54	Strong thinly laminated to medium bedded light to dark grey fine to medium sandstone with occasional interlaminations of mudstone, siltstones and thin coal laminae.
Saltwick Formation	32	The upper sandstone unit is a thinly bedded orange brown and medium grained with rare to occasional siltstone and coal/micaceous laminae and discontinuous coals. This is underlain by a sandy siltstone and a thickly bedded orange-brown sandstone basal unit with siltstone and carbonaceous mudstone laminae.
Dogger Formation	3	Thinly to thickly laminated grey to brownish grey argillaceous sandstone with laminae of mudstone and mica.
Whitby Mudstone Formation	60	Strong thinly interlaminated to thinly interbedded dark grey mudstone with pyritic inclusions and highly calcareous fossiliferous material.
Cleveland Ironstone Formation	27	A succession of grey mudstones, siltstones and sandstones with rare to occasional ironstone nodules and thin beds of ironstone. The upper sequence is calcareous with occasional fossils.
Staithes Sandstone Formation	28	Thinly to thickly laminated light to dark grey argillaceous silty fine sandstone. It contains occasional thin beds of shell fossils, ironstone nodules and green pyritic inclusions.
Redcar Mudstone Formation	Full depth not proven on site but expected to be > 190	The Redcar Mudstone Formation comprises grey silty mudstones and clayey siltstones with subordinate thin beds of limestone and sandstone. Bands of ironstone nodules and fossil shells as well as pyrite are present in places. The formation is divided into four main members, from youngest to oldest: • Ironstone Shale Member. Can be further subdivided into an upper ironstone shale and lower banded ironstone shale. Grey silty mudstone or clayey siltstone with occasional sandstone and siltstone laminations or beds and numerous ironstone bands and nodular horizons, as well as fossil shell

Formation Name	Estimated thickness (m)	Geological description
		(bivalve and belemnite) beds and occasional pyrite nodules. • Pyritious Shale Member. Similar to the ironstone shales above and also contains some ironstone bands / nodular horizons, but with a higher pyrite content. • Siliceous Shale Member. Grey silty mudstones and clayey siltstones with interbeds and laminations of calcareous or sandy siltstone and fine-grained sandstone. With rare pyrite and fossil shells. • Calcareous Shale Member. Grey silty mudstones and clayey siltstones with thin beds of shelly clayey limestone. Becoming sandy in places. This is unlikely to be encountered in the shaft.

2.2.2. STRUCTURAL GEOLOGY

No faults are recorded in site investigation boreholes or reported by the BGS within 800 m of the site.

3. HYDROLOGY

Prior to Phase 1 of the development, a number of watercourses were identifiable in the vicinity of the site:

- A stream exits from the Lady Cross Caravan Park, via a culvert then flows through the wooded area along the southern boundary of the works area. This was joined by field drainage from the site as it flowed through the wooded area towards a culvert under the Egton Road. On the southern side of Egton Road, the culvert discharges to a tertiary river that flows southeast away from the site.
- A road ditch runs the length of the Egton Road on the eastern boundary of the site, and
- Water also flows into this watercourse from an area of boggy/flooded ground in the adjacent woodland.

Beyond these, the following surface water features have been identified:

- A wet shallow valley with abundant water plants is located 450 m northeast of the site. This is located in the lowest area of Egton Low Moor and collects surface water draining from the moorland. The water collects and drains south in a tertiary river.
- An area of wet/saturated ground is located 400 m to the northeast. Water from this area feeds a tertiary river that drains south, 200 m east of the site, which collects in a pond/boggy area, by the entrance track to Coopers Farm, before entering a culvert,
- Water collects in a tertiary river 500 m east of the works area by Coopers Farm North that flows south in a tertiary river,
- A pond K is located 500 m north of the site that feeds a tertiary river that flows to the south around 500 m west of the site, providing base flow to the Cold Keld Beck, and
- There are a number of springs approx. 700 m north of the works area which form the head of a stream flowing north past Duns Bogs.

During Phase 1 and 2 of the development, surface water drainage were undertaken:

- A swale was installed alongside the site road. It also discharges to the culvert beneath Egton Road, and into the same tertiary river. The drainage from road junction built in Phase 1, including drainage from a significant length of Egton Road, also enters this swale,
- Site perimeter ditches have been installed to prevent notionally clean water from surface flow and field drainage from entering the site and becoming contaminated with silt. These ditches feedback into the stream that discharges beneath Egton Road,

- The pipe which collected field drains before discharging into the stream in the wooded area to the south of the site has been isolated in order to prevent silt laden run-off from discharging directly into the stream.

  At the time of writing, field drains are intercepted by an onsite surface drainage swale and is integrated into the site surface water drainage system, and

- A temporary site surface water drainage system has been installed within the works area to control surface water falling directly onto the area and any groundwater arising during the preparatory soil stripping activities. A temporary attenuation pond was constructed to provide additional storage of site surface water. At the time of writing, the system comprises a system of temporary ditches and sumps which are pumped into large mobile storage tanks for disposal off-site. This system will evolve during the Phase 2 and Phase 3 works to include a passive treatment system to remove sediment, allowing discharge of the otherwise clean water through the swale.

4. HYDROGEOLOGY

4.1. REGIONAL HYDROGEOLOGY

The site is located on the topographic high of the North York Moors and the prevailing gradient is downwards. Regionally, the formations of the Ravenscar Group have potential as aquifers although flow is restricted by numerous interbedded, thin mudstone aquitards (BGS, 2000). Of particular note, the thick sequence of the Whitby Mudstone Formation is a regionally significant aquiclude. Beneath the Whitby Mudstone Formation, the Staithes Sandstone Formation and Cleveland Ironstone Formation are generally found to be in close hydraulic connection, although the overall conductivity is limited. Whilst where the Redcar Mudstone Formation subcrops at the MTS portal site in Wilton, flow is dominated by bedding parallel fractures, it is anticipated that at the proposed tunnel depths at Ladycross Plantation, any bedding parallel fractures will be geomechanically tight and the conductivity will be low.

4.2. LOCAL HYDROGEOLOGY

At the time of writing the basic characterisation of local hydrogeological flow regime is incomplete. Some ground investigation has been undertaken. However, a further comprehensive ground investigation has been commissioned in part to provide sufficient understanding of the character of the aquifers present and their connection with receptors including watercourses and abstractors. The results of this latest ground investigation will be used to support the development of this hydrogeological risk assessment for the first intrusive development in Phase 4. In the meantime, the characterisation presented below is based upon the original ground investigation and the understanding of the hydrogeological properties of the aquifers inferred from the works at the Lockwood Beck and Woodsmith Mine sites. This is considered sufficient to understand the risks from the (non-intrusive) scope of works for this phase. However, it should be noted that the formations above the Whitby Mudstone Formation are thinner than is typically found in surrounding areas and some aquifer units may be less significant or absent, and so the assessment of risks particularly involving the Scalby, Scarborough and Cloughton Formations may be overestimated.

Table 4-1 presents a summary of hydrogeological conditions taken from a previous study.

Table 4-1 Summary of Hydrogeological Conditions

Stratigraphic Unit		Base level of unit (m AOD)	Inferred groundwater surface (m AOD)	Mean permeability** ($m \cdot s^{-1}$)	Water quality
Superficials – glacial tills / sands, gravels and clays		198.98	-	Clays- 3.3 x 10^{-10} to 2.9 x 10^{-11} Sands and Gravels– 1 x 10^{-5}	Good
Scalby Formation	**Long Nab Member**	193.88	195	5.6 x 10^{-6}	Good
	Moor Grit Member	186.7			
Scarborough Formation		171.92	188	2.8 x 10^{-5} to 6.8 x 10^{-6}	
Cloughton Formation		133.61		8.86 x 10^{-7} to 3.49 x 10^{-7}	
Saltwick Formation		101.99	-	5.21 x 10^{-6}	
Dogger Formation		98.69	-		
Whitby Mudstone Formation		20.93	120	-	-
Cleveland Ironstone Formation		-6.07	-	2.36 x 10^{-6}	Probably poor
Staithes Sandstone Formation		-39.02	-	2.5 x 10^{-6}	Probably good
Redcar Mudstone Formation	**Banded Ironstone and Pyritious Shale**	-136.17	-	1.43 x 10^{-8}	If present probably poor
	Siliceous Shale	< -153.69	165	1.40 x 10^{-8}	

** Measured, estimated or design

5. CONSTRUCTION METHODOLOGY

A detailed Construction Method Statement has been provided to accompany the submissions for the proposed Phase 3 and 3A works (40-STS-LC-2100-CN-MS-00005). A summary is provided below:

5.1. FURTHER TOPSOIL AND SUBSOIL STRIPPING TO PROVIDE WELFARE, CAR PARKING AND LAYDOWN AREAS, REFUELLING STATION, AND FURTHER SURFACE SUDS DRAINAGE

During Phase 2 most of the site area was stripped, only small areas remain to be stripped, which will be carried out in accordance with the Phase 3 Soil Management Plan. A phased approach will be carried out to ensure best practice and reduce exposure during the topsoil strip. All areas that require stripping in this phase will undergo a topsoil strip followed by a subsoil strip (250 mm – 300 mm but depending upon ground conditions encountered). All areas will be dressed with imported virgin granular material to protect the underlying subsoils.

5.2. INSTALLATION AND USE OF HARDSTANDING FOR WELFARE, CAR PARKING, LAYDOWN AREAS, AND HAUL ROAD

5.2.1. BLACK TOP

Black top (tarmac) is to be added along the haul road section running to the Welfare and across the car parking area. Further black topping will be undertaken on a section to the west of the main haul road and east of the wheel washing unit. To mitigate dust on site, a strip of blacktop may be installed for muckaway wagons to cross the working platform.

5.2.2. CONCRETE/SLABS

Concrete base slabs will be limited onsite and will be installed only where required. To support installation of temporary structures / facilities, concrete slabs will be installed in the following areas:

- Grout Plant
- Workshop
- Cuttings pit
- Muckaway area
- Refuelling area
- Wheelwash

5.2.3. *STONE/AGGREGATE HARDSTANDING*

The remaining areas of site will consist of stoned/aggregate hardstanding. Most notable hardstanding will be the working platform area, laydown areas and welfare.

5.3. INSTALLATION OF UTILITIES INCLUDING WATER, POWER AND FOUL DRAINAGE FACILITIES

The Phase 3 and 3A works will rely on alternative utility supplies from generators and tankers.

5.3.1. *WATER SUPPLY AND STORAGE*

The site will be serviced with potable water by tankers for both welfare and construction activities. Welfare units are supplied with self-contained water storage systems, these will be topped up as required. Bottled water dispensers will be provided for site staff. Where required, dust suppression bowsers will also periodically be topped up via tanker. Baker tanks may also be used as temporary storage vessels.

5.3.2. *ELECTRICAL SUPPLY*

The site is to be powered by welfare integrated generator units and mobile generator sets.

5.3.1. *Foul Drainage*

Septic waste will be temporarily stored in effluent tanks and will be removed regularly via tanker to a suitably permitted facility. A temporary twin walled 20m^3 cesspit will be installed at the welfare compound this will be set in a blinded excavation to mitigate against leakage.

5.4. INSTALLATION OF FURTHER SITE SURFACE WATER DRAINAGE, INCLUDING OIL INTERCEPTOR

The Phase 3 and 3A works includes the installation of further surface swales and filter drainage. Additional silt fencing around earthworks and additional check-dams within ditches and swales will be provided to control any silt run-off.

A modular water treatment system (Siltbuster) will be installed at the north-western corner of the attenuation pond. The unit will have associated infrastructure including a pump unit, generator, and integrally bunded fuel cube. ‘Clean’ and ‘dirty’ waters will be segregated via the use of independent drainage systems and the ‘dirty’ water system will discharge via an oil interceptor unit.

5.5. Construction of Attenuation Pond

During Phase 3 works the attenuation pond provided in Phase 2 will be formalized using the importation of highly impermeable clay as stated within **Section 5.7.** The base of this pond will be constructed of compacted clay and works will be undertaken with guidance from a third party CQA specialist. The attenuation pond batters will be hydroseeded once works are completed in accordance with the seed mix provided in the Soil Management Plan. The attenuation pond will be constructed with a storage capacity of 1200$m^{3,}$ further details provided in the Phase 3 SWMP and 3A CMS.

5.6. Mobilisation of On-Site Facilities, Including Welfare, Car Park, Wheel Wash, Refuelling, Workshop, Grout Plant, and Associated Services

The grout plant will comprise of 2 x 31 m^3 grout silos, pump unit and mixer unit installed on a sealed concrete platform which will be drained to a blind sump.

The refuelling station will be positioned on an impervious hard standing area with containment drainage to an oil interceptor. A double bunded tank will be used for the storage of diesel and an external bunded containment area will be used to store fuel additives.

A self-contained and recycling wheel washing facility will be constructed into the south western section of the main haul road.

5.7. Construction of Cuttings Lagoon and Associated Cuttings Pit and Muck-Away Area

The lagoon will be utilised for the recirculation of water during shaft excavation activities during a future phase of works. It will have a capacity of approx. 12,000 m^3. It will be constructed alongside the Phase 3 attenuation pond (constructed to supersede the temporary pond which was constructed for the Phase 2 works). In a variation from Phase 3, in Phase 3A, the ground level will be lowered to an average of 3.2m within the lagoon footprint. Excavation depths will vary based on competent clay at location.

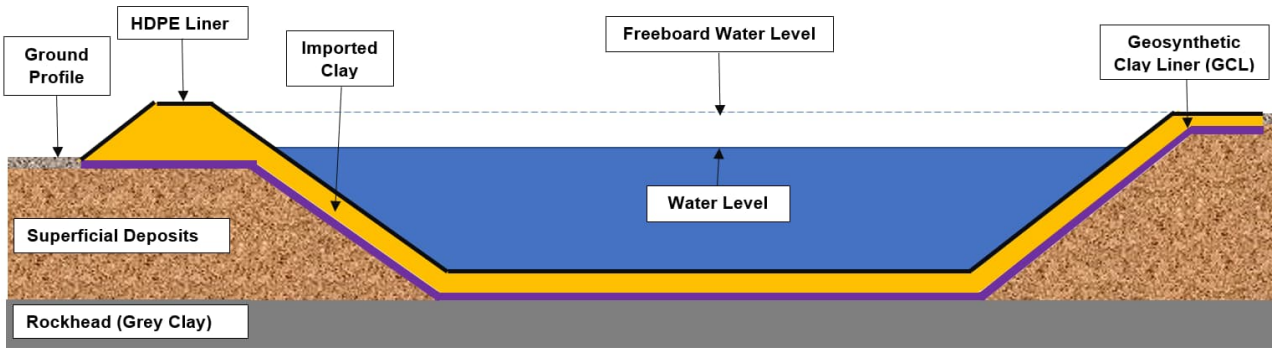
Approx. 15,000 m^3 of virgin, low permeability natural clay will be imported to site for the construction of the lagoon and attenuation pond bund walls and base layer. The clay will only be utilised for these temporary works and after completion of the shaft construction, the lagoon will be decommissioned, and the clay will be removed from site, the lagoon backfilled with the excavated superficial deposit material and ground levels will be restored.

The cuttings lagoon will be lined by a composite of three materials, an initial basal Geosynthetic Clay Liner (GCL), a middle impermeable clay liner and a final lagoon membrane liner. This three-layer methodology is proposed as a means to control and mitigate against any losses of lagoon

fluids. Full details of the cuttings lagoon construction methodology are provided in the Phase 3A CMS.

QA/QC testing will be carried out by a qualified CQA engineer to ensure all installations of GCL, sub base and lagoon liner are implemented to design standards and confirm a full seal of the liner.

Figure 1 – Cuttings lagoon design methodology



5.8. INSTALLATION OF WORKING PAD FOR PRE-GROUTING AND SHAFT SINKING WORKS

During Phase 3, the current Phase 2 working platform will be increased to a working height of approx. 202 mAOD through the importation of virgin material and the compaction of material to form a sub-base for mounting the drilling machinery. Some aggregate removed from beneath the lagoon will be moved via dump truck and reused to construct working platform. This aggregate was virgin material imported for Phase 2. Beneath the pad, a geosynthetic layer will be incorporated into the hardstanding design to provide a barrier to downward migration of any contaminants into groundwater.

5.9. BLACK TOPPING OF HAUL ROAD

The haul road section running to the welfare and car parking, a section to the west of the main haul road and east of the wheel washing unit, and across the working platform will be surfaced with tarmacadam.

6. RISK STATEMENT

The consideration of the risks from the Phase 3 and 3A activities is based on source-pathway-receptor linkages. The following sections describe the sources, pathways and receptors which have been considered here.

6.1. SOURCES

The sources of impact which have been considered are detailed in Table 6-1.

Table 6-1 - Sources

Source	Discussion
Physical effects	
Lowered groundwater level/pore pressure	Although no dewatering of groundwater is proposed in this phase, installation of the site drainage swales may result in the slight lowering of groundwater within the superficial deposits. In addition, the increase in hardstanding and in particular the lined cuttings lagoon may result in a small reduction of recharge to the shallow aquifers beneath the site.
Quality effects	
Fuels and oils Septic waste	Fuels, oils, fuel additives and septic waste will all be stored on site. Each has the potential to be spilled resulting in the contamination of surface waters, groundwater and the loss of potable quality.
Concrete	The use of significant volumes of concrete may increase the pH of the surface and shallow groundwater.
Silt	The importation of large volumes of granular material may result in the release of silt into surface and shallow groundwater. The Phase 3 and 3A works, including the construction of new drainage, platforms, hardstanding and cuttings lagoon may have potential to release silt into surface and shallow groundwater.
Process operation water (cuttings lagoon)	Leak or breach of the lagoon bunds or base may result in the release of process water into surface and shallow groundwater. This water may have high pH, elevated hydrocarbons and metals and/or high silt loading.

6.2. RECEPTORS

The receptors which have been considered are detailed in Table 6-2. The water quality in the Staithes Sandstone Formation, Cleveland Ironstone Formation and Redcar Mudstone Formation is likely to be poor and of limited resource value.

Strata beneath the Whitby Mudstone Formation and water within the superficial deposits have not been considered as receptors in this assessment.

Table 6-2 Receptors

Pathway	Discussion
Groundwater	
Ravenscar Group aquifers	There are a number of abstractions in the proximity of the site which take water from boreholes in the aquifer units within the Ravenscar Group, or from springs fed from the same aquifers. These include: 1) Duns Bog Farm - for general farming and domestic purposes, from springs issuing from the Cloughton Formation upgradient of the site. 2) Newbiggin Hall - for general farming and domestic purposes, from springs issuing from the Cloughton Formation or Saltwick Formation upgradient of the site. 3) Lamplands Farm - for general farming and domestic purposes, from springs issuing from the superficials downgradient of the site. It is possible that the source is actually the underlying Cloughton Formation. 4) Topstone Farm – private water undertaking and general farming and domestic purposes, from springs issuing from the Cloughton Formation upgradient of the site. 5) Ladycross Plantation Caravan Park – used for general domestic purposes from a borehole which abstracts from the Cloughton Formation up- or cross-gradient of the site, and
Surface Water	
All watercourses	All watercourses which flow in the proximity of the site have been considered together. They collectively have: 1) high ecological value (the River Esk and its tributaries support populations of salmonids and protected populations of Freshwater Pearl Mussels) 2) value as a water resource, and 3) high visual amenity value due to the location within the North York Moors National Park.

6.3. PATHWAYS/MECHANISMS

The pathways/mechanisms which have been considered are detailed in Table 6-3.

Table 6-3 Pathways

Mechanism			
Key	**Source**	**Receptor**	**Pathway**
1	Lowered groundwater level	Surface waters	Passive dewatering the superficial deposits by the site drainage system may result in a reduction of groundwater discharge to some surface watercourses.
2		Ravenscar Group aquifers	Reduction of recharge due to increased hardstanding and lagoon area may result in slight lowering of groundwater heads available to boreholes and reduction of discharge to springs.
3	Fuels and oils Septic waste	Surface waters	Accidental release of fuels and oils or septic waste may impact the quality of surface waters supported by the superficial deposits and Ravenscar Group aquifers.
4		Ravenscar Group aquifers	Accidental release of fuels and oils or septic waste may impact the quality of groundwater available to abstractions from the Ravenscar Group aquifers.
5	Concrete	Surface waters	Increased pH may impact the quality of surface waters supported by the superficial deposits and Ravenscar Group aquifers.
6		Ravenscar Group aquifers	Increased pH may impact the quality of groundwater available to abstractions from the Ravenscar Group aquifers.
7	Silt	Surface waters	Increased sediment load may impact the quality of surface waters supported by the superficial deposits and Ravenscar Group aquifers.
8		Ravenscar Group aquifers	Increased sediment load may impact the quality of groundwater available to abstractions from the Ravenscar Group aquifers.
9	Process operation water (cutting's lagoon)	Surface waters	Breach of the cuttings lagoon walls or leak through the base of lagoon may result in process water entering surface drainage and surface water supported by the superficial deposits and Ravenscar Group aquifers.
10		Ravenscar Group aquifers	Breach of the cuttings lagoon walls or leak through the base of lagoon may impact the quality of groundwater available to abstractions from the Ravenscar Group aquifers.

Table 6-4 Risk Statement

Key	Mechanism	Discussion	Magnitude of effect at receptor
1.	**Lowering of groundwater level in the superficial deposits results in reduction of discharge to surface waters**	The works for Phase 2 have revealed a significant field drainage system connecting the fields to the surface watercourse connected beneath Egton Road. This will be the discharge location for the improved drainage system. Due to the high groundwater levels encountered on site, the majority of works will take place above the drainage level and therefore it is unlikely that the works will significantly change the surface drainage characteristics of the site and the location of discharge of the superficials groundwater into the surface water system.	**Very Low**
2.	**Reduction of recharge into the Ravenscar Group aquifers resulting in reduction in head and reduced discharge at springs**	As discussed above, it is unlikely that the works will significantly change the surface water drainage characteristics of the site. Most impermeable areas of site will drain via on site SUDS, which will allow for some infiltration. Precipitation falling within the footprint of the cuttings lagoon will not reach the natural environment in this phase, however the life of the cuttings lagoon (~1 year) will be short and the change to recharge is unlikely to be discernible.	**Very Low**

Key	Mechanism	Discussion	Magnitude of effect at receptor
3.	**Accidental spillage of fuels and oils, or septic waste results in reduction in quality of groundwater/surface waters**	Septic waste will be stored in a buried storage tank and installed to BS6297:2007 code of practice for design and installation of wastewater treatment. The secondary containment of all stored fuels and oils will significantly reduce the probability of a spill to ground. The use of a geosynthetic layer within the hardstanding of the working pad will reduce the risk of migration in that area. There remains some risk that fuels and oils *in use* will be spilt and contamination of the aquifer will occur. In the event, robust spill response measures will reduce the impact. The risk of accidental spillage from earth moving plant or road haulage is considered similar to that from agricultural plant or leisure users nearby.	**Low**
4.			
5.	**Use of concrete in shallow ground results in elevated pH in groundwater, surface waters and cuttings lagoon**	In Phase 3 and 3A the use of concrete for surfacing areas will be strictly limited to those which will be subject to repeated trafficking by heavy plant or require a sealed surface. The total area will be small and the total impact on groundwater quality is unlikely to be discernible.	**Very Low**
6.			
7.	**The use of imported (virgin) granular material results in the release of sediment into ground and surface waters** **Exposed areas of earthworks from lagoon construction and site drainage (swales, attenuation pond etc.)**	Whilst it is plausible that pathways exist within the superficial deposits and Ravenscar Group aquifers with sufficient velocity to allow for the migration of some fines into abstraction boreholes, springs and surface waters, these effects would be likely to be low concentration and transitory.	**Low**
8.			

Key	Mechanism	Discussion	Magnitude of effect at receptor
9.	**Breach in liner or failure of bund walls of the cuttings lagoon results in release of contaminated water into the ground and surface waters**	Failure of the geotextile / geosynthetic membrane, clay liner or clay bunds could plausibly lead to discharge of contaminated water into surface water drainage system and migration via pathways in the local superficial deposits into the Ravenscar Group aquifers. This could result in the migration of rock fines into nearby abstraction boreholes, springs and surface waters. These effects would be likely to be of low concentration and transitory. The risk of breach or failure is limited by the QA/QC procedure undertaken by a qualified CQA engineer.	**Very Low (Phase 3 and 3A) / Medium (During operation)**

7. GROUNDWATER MANAGEMENT SCHEME

7.1. GROUNDWATER AND SURFACE WATER MONITORING

To demonstrate the effectiveness of the groundwater management measures adopted during the Phase 3 and 3A works, the Groundwater and Surface Water Monitoring Scheme (40-STS-LC-2100-EN-PL-00012) and the Remedial Action Plan (40-STS-LC-2100-EN-PL-00011) will be implemented.

7.2. CUTTINGS LAGOON CONSTRUCTION

The cuttings lagoon will be lined by a composite of three materials, an initial basal GCL, a middle impermeable clay liner and a final lagoon membrane liner. This three-layer methodology is proposed as a means to control and mitigate against any loses of lagoon fluids. The methodologies will also be backed up by third part Construction Quality Assurance (CQA). Further information on lagoon construction methodology and controls are detailed in the Phase 3A CMS and CEMP.

The cuttings lagoon construction will only be carried out within the Superficial Deposits (mixture of gravels and soft clays). An underlying low permeability grey clay layer (referred to as rockhead in design methodology) at approximately 3mbgl forms an aquiclude between the Superficial Deposits and underlying Scalby Formation. The grey clay formation is present within the footprint of the lagoon as identified by geotechnical testing and provides adequate stability for the lagoon construction. A borehole geological log is provided in **Attachment B**.

There is a small potential for groundwaters to enter the excavation within the Superficial Deposits, charged by surface waters during the construction and decommissioning of the cuttings lagoon. This will be controlled via over pumping and in compliance with Regulation 5 of the Water Abstraction and Impounding (Exemptions) Regulations 2017.

The temporary perimeter drainage network installed in previous phases of works has notably reduced the volumes of shallow groundwater within the superficial deposits within the site boundary. Intercepting existing field drains up-gradient of site and diverting water into perimeter drainage has in some part isolated the internal site from the groundwater within the Superficial Deposits. Therefore, it is anticipated low volumes of groundwater ingress will occur during the cuttings lagoon construction.

7.3. HARDSTANDING CONSTRUCTION

The working pad, and other areas subject to high frequency of traffic by vehicles or heavy plant, will be constructed to incorporate an impermeable layer. This geosynthetic layer is likely to be a Geosynthetic Clay Liner (GCL) or similar.

7.4. CONSTRUCTION ENVIRONMENT MANAGEMENT

The risks related to accidents and spills are controlled through the Phase 3 and 3A CEMP. The main controls in relation to Phase 3 and 3A activities are listed below:

Table 7-1 - CEMP Controls

CEMP Section	Control
3.2	Separation of 'clean' and 'dirty' drainage Sealed concrete slab beneath grout plant Lagoon construction Road surfacing
3.3	Foul drainage arrangements
3.6	Materials storage
3.7	Fuel storage in accordance with Control of Pollution (Oil Storage) (England) Regulations 2001 Refuelling protocol (including supervision and secondary containment) Spill kits
3.10	Siltbuster installation Temporary water storage
4	Construction traffic management
10.1	Surface water management
10.2	Silt and pollution management
11	Contaminated ground protocol
12.3	Storage of waste oils, greases and other hazardous substances
12.4	Concrete and grout wash-out
12.6	Domestic wastewater arrangements
12.7	Septic waste
13	Incident Response Plan

8. RELATED DOCUMENTS AND REFERENCES

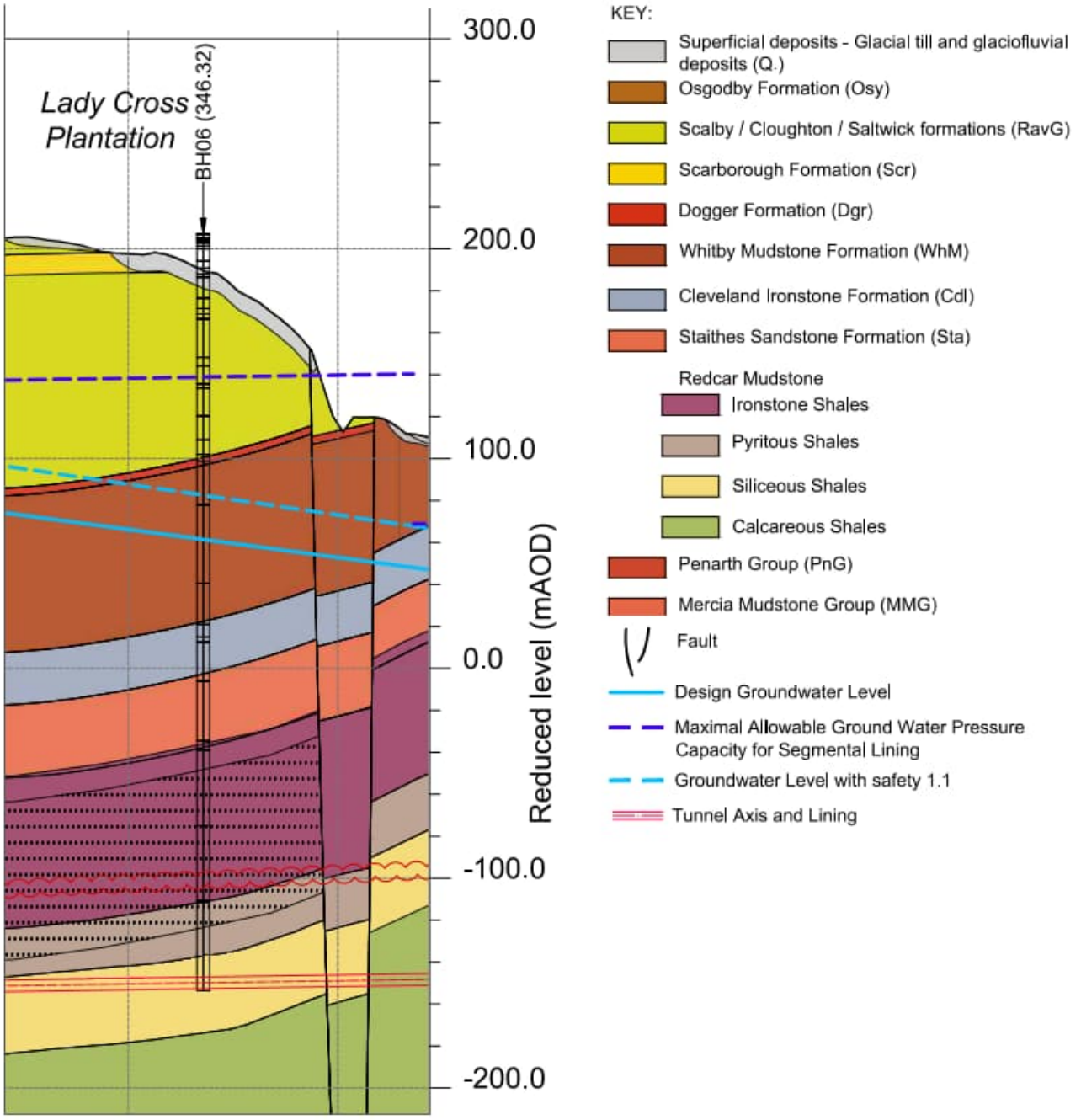
BGS, 2000 Jones, H K, Morris, B L, Cheney, C S, Brewerton, L J, Merrin, P D, Lewis, M A, MacDonald, A M, Coleby, L M, Talbot, J C, McKenzie, A A, Bird, M J, Cunningham, J, and Robinson, V K. 2000. The physical properties of minor aquifers in England and Wales. British Geological Survey Technical Report, WD/00/4. 234pp. Environment Agency R&D Publication 68.

9. DEFINITIONS AND ABBREVIATIONS

HRA	Hydrogeological Risk Assessment
mAOD	Metres Above Ordnance Datum
m bgl	Metres below ground level
MTS	Mineral Transport System
TBM	Tunnel Boring Machine

10. ATTACHMENTS

ATTACHMENT A – GEOLOGICAL SECTION



ATTACHMENT B – CUTTINGS LAGOON BOREHOLE LOG

Silkstone Environmental Ltd
7 Hall Annex, Thorncliffe Park
Chapeltown, S35 2PH
Telephone: 0114 2573487

BOREHOLE LOG

Project				BOREHOLE No
Ladycross Lagoon				WS9A
Job No	Date	Ground Level (m)	Co-Ordinates ()	
21287	18-02-22 18-02-22			
Contractor				Sheet
Geospek Ltd				1 of 1

SAMPLES & TESTS			Water	STRATA				Geology	Instrument Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
						(0.50)	MADE GROUND: Light brown SAND/GRAVEL with angular to sub-rounded cobbles. Geotextile separation layer at 0.15m.		
						0.50			
0.50-0.80	B						Soft brown mottled grey very sandy CLAY with angular to sub-rounded gravel.		
0.90-0.90	D						Becoming firm slightly sandy at 0.9m.		
1.00		N5				(1.10)			
						1.60			
1.60-2.00	U					(0.40)	Grey soft very silty CLAY with occasional angular to sub-rounded gravel.		
						2.00			
2.00		N2				(0.75)	Very soft grey silty CLAY.		
						2.75			
3.00		N27				(0.65)	Very stiff grey CLAY.		
						3.40			
3.80		N35				(0.60)	Hard friable dark grey mottled orange CLAY with angular gravel of mudstone (RESIDUAL WEATHERED MUDSTONE).		
						4.00			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	Hand dug pit to 0.5m. Water seepage at 0.5m.

All dimensions in metres Scale 1:31.25	Client Strabag	Method/ Plant Used Archway Competitor	Logged By AD Boggett

BH LOG GM 21287 LADYCROSS LAGOON WS.GPJ GINT STD AGS 3_1.GDT 3/3/22