



Community and Stakeholder Engagement Framework

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Community and Stakeholder Engagement Framework

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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 fifth 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, Ladycross Plantation, Lockwood Beck and Wilton. The principles of the Framework therefore remain unchanged, with the addition of the good practice learnt over the last five years.

The Framework will be reviewed on annual basis by the General Manager External Affairs and Corporate Relations 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 social performance team under the direction of the Corporate Relations 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 over five 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 70 households have been identified as 'site neighbours' to the Woodsmith, Ladycross Plantation 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. 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. The Company 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.

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 is 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 Woodsmith 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 Social performance team

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

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

The General Manager External Affairs, reporting to the Corporate Relations Director, manages the implementation of the approach detailed in the Framework. The Local Liaison Officer, Social Programmes Manager and Education Programme Manager report to the GM External Affairs, and are further supported by the EA to the Corporate Relations Director.

The social performance 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
- Main Ladycross Plantation 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Chair Liaison Group Forum and Traffic Management Liaison Group Attend the Industrial Business Group Manage 24-hour community helpline and cropnutrients.info@angloamerica.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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 – COMPLAINTS PROCEDURE

Complaints Procedure

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Complaints Procedure

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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.

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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 than 150mm 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 as 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 may be 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 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.

NYMNP

02/03/2023



Project Title / Facility Name:

Woodsmith Project

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**CONSTRUCTION & OPERATION GROUNDWATER & SURFACE WATER
MONITORING SCHEME - PHASE 6 - CONDITION 88 - LADYCROSS**

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**WOODSMITH PROJECT
(788.5030)**

**CONSTRUCTION AND
OPERATION GROUNDWATER
AND SURFACE WATER
MONITORING SCHEME –
PHASE 6 – CONDITION 88 /
40-STS-LC-2100-EN-PL-00029**

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1. INTRODUCTION

1.1. GENERAL BACKGROUND

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 document details the hydrological, hydrogeological and ecological monitoring to be undertaken from commencement of the Phase 6 works at the Ladycross Plantation Site, as defined in **Section 1.2** below.

1.2. PHASE 6 SCOPE OF WORKS

Phase 6 comprises:

- Installation of shaft infrastructure including tally hut, communications and ventilation fan;
- Installation and use of temporary cable laying sub-bases, winch and emergency rescue winch;
- Installation of Alimak and associated infrastructure;
- Backfill of the Lagoon;
- Installation and use of temporary shaft head house and associated services;
- Installation and use of grout plant and associated services;
- Installation of emergency back-up generators; and
- Construction of temporary overflow car park including tarmac hardstanding for an additional 10 car parking spaces.

1.3. COMPLIANCE WITH CONDITIONS

This document is required to partially discharge condition NYMNPA-88 as stated in the planning permission Ref. no NYM/2017/0505/MEIA. **Table 1-1** details where the relevant information has been provided within this report.

Table 1-1 – Summary of planning condition 88 and where the relevant details are provided in the report.

| NYMNPA Condition 88 Description | Compliance with Condition NYMNPA 88 |
|---|---|
| The scheme shall include: | |
| Groundwater quality and level triggers | Section 3.3.4 and Section 3.4.5 |
| Surface water quality triggers, including those necessary to protect the health of the River Esk Pearl Mussel beds | Section 3.6.5 |
| Details of the number, type and location of monitoring points | Section 3.3.2, Section 3.4.2 and Section 3.6.2 |
| A protocol for the removal and replacement of any existing monitoring points | Section 4 |
| Details of the frequency with which monitoring points will be monitored during construction and operation | Section 3.3.3, Section 3.4.3 and Section 3.6.3 |
| A list of the ground and surface water determinants to be tested for | Section 3.4.4 and Section 3.6.4 |
| Monitoring of groundwater levels and spring flows | Section 3.3, Section 3.4 and Section 3.5 |
| Monitoring of groundwater quality against ground water triggers | Section 3.4.5 |
| A scheme of periodic review and refinement of the monitoring regime to take account of any approved changes to site layout/design, construction methods and monitoring data | Section 5 |
| A protocol for notifying the MPA of any breach of the trigger levels, including the timing of any such notification | Section 5 |
| Details of the method and frequency with which monitoring results will be shared with the MPA and the Environment Agency | Section 5 |

This document should be read together with the following documents:

- Phase 4 Remedial Action Plan (40-STC-LC-2100-EN-PL-00017)
- Phase 5 Revised Hydrogeological Risk Assessment (40-STC-LC-2100-EN-RA-00002)
- Phase 3 Surface Water Management Plan (40-STC-LC-2100-PA-PL-20102)
- Phase 3 Surface Water Drainage Scheme (40-STC-LC-2100-PA-22-20107)

2. SITE DETAILS

The site details remain the same as previous phases. For information with regards to site geology, receptors and historic information refer to previous Groundwater and Surface Water Monitoring Schemes (GWSWMSs) along with the historic Hydrogeological Baseline Report (FWS, September 2014).

Table 3-1 Changes made to the monitoring requirements for Phase 6 works,

| Section | Changes |
|----------------------------------|--|
| 3.2 Meteorology | No changes, monitoring remains the same as detailed in the Phase 4 GWSWMS. |
| 3.3 Groundwater Levels | <p>The infrastructure and associated monitoring installed in Phase 4 remains unchanged.</p> <p>Amendments have been made to the trigger level values based on extended baseline monitoring.</p> <p>Amendments have been made to the monitoring frequency based upon reduced risk from Phase 6 operations</p> |
| 3.4 Groundwater Quality | <p>The infrastructure and associated monitoring installed in Phase 4 remains unchanged.</p> <p>Amendments have been made to the trigger level values based on extended baseline monitoring.</p> <p>Amendments have been made to the monitoring frequency based upon reduced risk from Phase 6 operations</p> |
| 3.6 Surface Water Quality | <p>The infrastructure and associated monitoring installed in Phase 4 remains unchanged.</p> <p>Amendments have been made to the trigger level values based on extended baseline monitoring.</p> <p>Amendments have been made to the monitoring frequency based upon reduced risk from Phase 6 operations</p> |

3.2. METEOROLOGY

3.2.1. OBJECTIVES

To provide rainfall and evapotranspiration information to confirm water balance inputs and outputs.

3.2.2. SCOPE OF MONITORING

Meteorological monitoring will be undertaken of the following parameters from the automated permanent weather station located at Ladycross Plantation.

3.2.3. METEOROLOGICAL DATA

Meteorological monitoring will consist of:

- Rainfall (mm),
- Evapotranspiration (mm),
- Temperature (°C),
- Wind Speed (km/hr) and Direction, and
- Barometric Pressure (m/bar).

3.2.4. MONITORING FREQUENCY

The monitoring frequency will be set for 15 minute intervals for all parameters and will be continually uploaded to the web portal via a data logger.

3.2.5. ASSESSMENT AND COMPLIANCE LEVELS

Not required, information obtained will confirm water balances and influences on shallow groundwater activity.

3.3. GROUNDWATER LEVEL MONITORING

3.3.1. OBJECTIVES

The objectives of this water level monitoring are to:

1. Demonstrate that construction activities, in the vicinity of the working platform, and bored shaft cause no adverse long-term impacts on water levels within the Superficial Deposits, Scalby Formations, Scarborough Formations, Cloughton / Saltwick Formations
2. Provide continual data to aid with shaft works.

3.3.2. MONITORING LOCATIONS

From the design layout of the Phase 6 works, monitoring of construction stage boreholes with response zones within the Superficial Deposits, Scalby, Scarborough, Cloughton / Saltwick aquifers will be undertaken as summarised below, for which the monitoring well positions are shown in **Attachment A**.

- Groundwater levels will be monitored within the superficial deposits (non-aquifer) using the series of monitoring wells detailed in **Table 3-1**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area. To compare soil moisture conditions in comparison with baseline conditions.
- Groundwater levels will be monitored within the Scalby Formation, the Long Nab and Moor Grit (Secondary A Aquifer) using the series of monitoring wells detailed in **Table 3-1**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area.
- Groundwater levels will be monitored within the Scarborough Formation (Secondary A Aquifer) using the series of monitoring wells detailed in **Table 3-1**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area.
- Groundwater levels will be monitored within the Cloughton / Saltwick Formation (Secondary A Aquifer) using the series of monitoring wells detailed in **Table 3-1**. The wells are orientated to monitor water levels both up and down hydraulic gradient of the working site area.

During the Phase 1 access works, BH401 was decommissioned due to the location of the access road.

During the Phase 3 construction works, BH413A, BH413B and BH413C were commissioned to allow for the construction of the working platform. Boreholes 34_BH04, 34_BH06 and 34_BH07 were installed as replacement monitoring boreholes.

Table 3-1 Groundwater Monitoring Boreholes ID, location, and geological description

| Monitoring Well ID | NGR Coordinates | Geology and description |
|--|--|---|
| BH402 BH403 BH405 BH406 BH407 BH408 | 481737, 507534 481807, 507620 481218, 507701 481452, 507744 481590, 507886 481423, 507919 | Monitor potential changes in the groundwater levels within the superficial deposits. |
| BH401A BH402A BH405A BH406A BH407A BH408A | 481571, 507474 481738, 507552 481221, 507693 481442, 507743 481583, 507881 481414, 507916 | Monitor potential changes in the groundwater levels within the Scalby Formation (Long Nab and/or Moor Grit Member). |

| Monitoring Well ID | NGR Coordinates | Geology and description |
|--|--|---|
| BH401B BH402B 34_BH07 ² | 481572, 507470 481736, 507547 481673, 507627 | Monitor potential changes in the groundwater levels within the Scarborough Formation. |
| BH401C BH402C 34_BH04 ² 34_BH06 ² | 481576, 507473 481730, 507540 481635, 507638 481607, 507648 | Monitor potential changes in the groundwater levels within the Cloughton Formation. |

Note¹ Additional monitoring boreholes installed during the 2022 GI works and will replace the BH413 series. 34_BH04 installed into the Cloughton / Saltwick Formation.

3.3.3. MONITORING FREQUENCY

The Phase 6 works will not constitute any further excavation works, with all operations limited to shaft fit out and surface infrastructure install. Therefore, a reduced risk on the groundwater environment has been evaluated based upon the associated activities within the Phase 6 scope.

A continuation of the groundwater level monitoring approach will be carried out using a dip meter from all boreholes listed in **Table 3-1**. Weekly monitoring will continue for three months following the completion of the Phase 5 works as a continuation of monitoring related to the shaft sinking works. Monitoring will become monthly following this period if no continual impacts are observed as a result of shaft sinking operations.

Periodic reviews will be carried out during the Phase 6 works and will determine any changes required to frequency and type of monitoring. Any details of changes to the monitoring scheme will be communicated to the Mineral Planning Authority (MPA).

3.3.4. GROUNDWATER LEVEL CONTROL AND COMPLIANCE TRIGGER VALUES

The GWL (Groundwater Levels) Control Trigger Values determined for the Superficial Deposits, Scalby, Scarborough and Cloughton / Saltwick formation in the area of the Site have been derived using the following methodology:

Control Trigger Values = mean baseline value – 2 × standard deviation of baseline data¹

Note¹ The monitoring undertaken during the Ground Investigation works showed potential for suppressed groundwater levels within the Scarborough and Cloughton Formations during drilling activities. Following on from the completion of the pre-grout works, recovery towards baseline levels is observed. No long-term impacts on groundwater levels have been noted.

The GWL Compliance Trigger Values determined for the Superficial Deposits, Scalby, Scarborough and Cloughton formation in the area of the Site have been derived using the following methodology:

Compliance Trigger Values = mean baseline value – 3 × standard deviation of baseline data¹

Note¹ The monitoring undertaken during the Ground Investigation works showed potential for suppressed groundwater levels within the Scarborough and Cloughton Formations during drilling activities. Following on from the completion of the pre-grout works, recovery towards baseline levels is observed. No long-term impacts on groundwater levels have been noted.

The above methodology was adopted for the monitoring wells where a comprehensive baseline was available. It was noted from the baseline during the summer months and periods of dry weather large fluctuations in GWL were observed in the superficial deposits and Scalby Formations. Further baseline data has been collected and captures further fluctuations with seasonal trends.

The Phase 5 and preceding HRA’s identified that the works will have a negligible impact on strata used for abstractions below the Cloughton Formation, the Saltwick was identified as low sensitivity with no active abstractions within this geology. The Ground Investigation works along with baseline monitoring has advised on appropriate exceedance values for the newly installed boreholes.

Table 3-2 VWP installations in 34_BH01

| VWP ID | Depth of install (mbgl) | Geology |
|-----------|-------------------------|--------------------------------|
| 34_BH01_1 | 12 | Scarborough Formation |
| 34_BH01_2 | 37 | Cloughton Formation |
| 34_BH01_3 | 53 | Cloughton Formation |
| 34_BH01_4 | 76 | Cloughton / Saltwick Formation |
| 34_BH01_5 | 111.5 | Saltwick Formation |
| 34_BH01_6 | 118.5 | Saltwick Formation |

3.3.4.1 Superficial Deposits

Table 3-3 - Control and compliance trigger levels for monitoring wells in the Superficial Deposits based on baseline data from 2020-2022.

| MONTH | CONTROL (mAOD) | | | | | | COMPLIANCE (mAOD) | | | | | |
|-------|----------------|--------|--------|--------|--------|--------|-------------------|--------|--------|--------|--------|--------|
| | BH402 | BH403 | BH405 | BH406 | BH407 | BH408 | BH402 | BH403 | BH405 | BH406 | BH407 | BH408 |
| Jan | 195.98 | 201.47 | 205.01 | 204.80 | 207.98 | 209.25 | 195.51 | 200.74 | 204.75 | 203.68 | 207.01 | 208.44 |
| Feb | 195.13 | 201.56 | 205.01 | 206.64 | 207.70 | 209.13 | 194.34 | 200.88 | 204.75 | 206.27 | 206.87 | 208.13 |
| Mar | 194.36 | 202.79 | 205.01 | 206.95 | 208.98 | 209.36 | 193.60 | 202.72 | 204.75 | 206.73 | 208.86 | 208.88 |
| Apr | 193.55 | 202.14 | 204.75 | 206.44 | 208.42 | 209.44 | 192.44 | 201.98 | 204.69 | 206.13 | 208.09 | 208.62 |
| May | 193.73 | 202.01 | 204.82 | 207.00 | 208.60 | 210.37 | 192.82 | 201.55 | 204.51 | 206.86 | 208.50 | 210.17 |
| Jun | 193.95 | 201.87 | 204.62 | 205.95 | 208.14 | 210.16 | 193.57 | 201.52 | 204.40 | 205.52 | 207.75 | 209.90 |
| Jul | 193.48 | 201.93 | 204.33 | 205.63 | 208.13 | 209.76 | 192.67 | 201.66 | 203.98 | 205.23 | 207.85 | 209.28 |
| Aug | 193.63 | 202.02 | 204.17 | 204.74 | 207.94 | 209.66 | 192.94 | 201.89 | 204.01 | 204.13 | 207.68 | 209.15 |
| Sep | 193.63 | 201.64 | 204.01 | 205.67 | 208.04 | 209.32 | 192.93 | 201.35 | 203.93 | 205.50 | 207.79 | 208.72 |
| Oct | 194.45 | 201.82 | 205.37 | 205.03 | 207.91 | 209.26 | 193.73 | 201.42 | 205.27 | 204.37 | 207.63 | 208.62 |
| Nov | 195.78 | 201.82 | 205.37 | 205.93 | 208.09 | 209.08 | 195.43 | 201.42 | 205.27 | 205.42 | 207.64 | 207.76 |
| Dec | 196.39 | 202.72 | 205.01 | 207.25 | 208.59 | 209.09 | 196.19 | 202.65 | 204.75 | 207.16 | 207.96 | 208.04 |

3.3.4.2 Scalby Formation

Table 3-4 - Control and compliance trigger levels for monitoring wells in the Scalby Formation based on baseline data from 2020-2022

| MONTH | CONTROL (mAOD) | | | | | | COMPLIANCE (mAOD) | | | | | |
|-------|----------------|--------|--------|--------|--------|--------|-------------------|--------|--------|--------|--------|--------|
| | BH401A | BH402A | BH405A | BH406A | BH407A | BH408A | BH401A | BH402A | BH405A | BH406A | BH407A | BH408A |
| Jan | 187.74 | 194.18 | 204.70 | 205.58 | 207.58 | 196.42 | 185.59 | 193.35 | 204.62 | 205.31 | 206.93 | 192.70 |
| Feb | 188.10 | 194.15 | 204.41 | 205.39 | 207.05 | 196.45 | 186.06 | 193.23 | 204.21 | 205.05 | 206.04 | 192.73 |
| Mar | 189.26 | 194.27 | 204.58 | 205.70 | 207.43 | 196.59 | 187.65 | 193.18 | 204.46 | 205.52 | 206.61 | 192.67 |
| Apr | 189.99 | 195.15 | 204.09 | 205.62 | 208.20 | 197.03 | 188.66 | 194.62 | 203.81 | 205.49 | 207.84 | 193.81 |
| May | 191.33 | 194.97 | 204.12 | 205.57 | 208.74 | 195.46 | 191.23 | 194.32 | 203.71 | 205.39 | 208.40 | 192.37 |
| Jun | 188.04 | 193.30 | 203.96 | 204.82 | 207.07 | 195.27 | 186.07 | 192.13 | 203.66 | 204.38 | 206.40 | 192.07 |
| Jul | 187.76 | 193.20 | 203.49 | 204.30 | 206.95 | 196.93 | 186.03 | 192.51 | 203.14 | 203.83 | 206.49 | 193.55 |
| Aug | 188.81 | 194.01 | 203.32 | 204.39 | 206.79 | 196.87 | 187.25 | 193.84 | 202.99 | 203.99 | 206.44 | 193.41 |
| Sep | 189.25 | 192.83 | 203.19 | 204.20 | 206.90 | 196.17 | 187.87 | 192.31 | 202.95 | 203.87 | 206.65 | 192.86 |
| Oct | 188.72 | 192.60 | 202.69 | 203.86 | 206.86 | 199.09 | 187.07 | 191.60 | 202.10 | 203.34 | 206.60 | 196.16 |
| Nov | 188.49 | 193.60 | 203.14 | 203.95 | 206.58 | 202.03 | 186.89 | 192.83 | 202.61 | 203.28 | 206.04 | 199.90 |
| Dec | 188.55 | 195.18 | 204.81 | 205.65 | 207.74 | 196.14 | 186.93 | 194.87 | 204.76 | 205.45 | 207.26 | 192.28 |

3.3.4.3 Scarborough Formation

Table 3-5 - Control and compliance trigger levels for monitoring wells in the Scarborough Formation based on baseline data from 2020-2022

| MONTH | CONTROL (mAOD) | | | COMPLIANCE (mAOD) | | |
|-------|---------------------|--------|---------------------|---------------------|--------|---------------------|
| | BH401B | BH402B | 34_BH07 | BH401B | BH402B | 34_BH07 |
| Jan | 184.33 | 183.54 | 178.01 | 184.10 | 183.49 | 177.58 |
| Feb | 185.02 | 183.21 | 169.38 | 184.94 | 182.88 | 166.62 |
| Mar | 185.02 | 183.87 | 176.44 | 184.91 | 183.74 | 175.95 |
| Apr | 185.11 | 183.96 | 178.03 | 185.05 | 183.89 | 177.51 |
| May | 184.56 ¹ | 183.90 | 179.73 | 184.38 ¹ | 183.80 | 179.41 |
| Jun | 184.56 | 183.85 | 179.73 ¹ | 184.38 | 183.81 | 179.41 ¹ |
| Jul | 185.05 | 183.71 | 172.79 | 185.01 | 183.62 | 172.30 |
| Aug | 184.64 | 183.43 | 174.82 | 184.53 | 183.30 | 174.54 |
| Sep | 184.54 | 183.31 | 176.63 | 184.47 | 183.23 | 175.99 |
| Oct | 184.35 | 183.08 | 178.70 | 184.24 | 182.91 | 178.46 |
| Nov | 184.05 | 183.08 | 178.86 | 183.82 | 182.91 | 178.58 |
| Dec | 184.05 | 183.79 | 178.86 ¹ | 183.82 | 182.91 | 178.58 ¹ |

¹ Limited or no baseline data available, values based upon neighbouring months.

3.3.4.4 Cloughton / Saltwick Formation

Table 3-6 - Control and compliance trigger levels for monitoring wells in the Cloughton Formation based on baseline data from 2020-2022

| MONTH | CONTROL (mAOD) | | | | COMPLIANCE (mAOD) | | | |
|-------|----------------|--------|---------------------|---------------------|-------------------|--------|---------------------|---------------------|
| | BH401C | BH402C | 34_BH04 | 34_BH06 | BH401C | BH402C | 34_BH04 | 34_BH06 |
| Jan | 183.47 | 183.05 | 143.84 | 176.05 | 183.39 | 182.79 | 142.81 | 175.87 |
| Feb | 183.70 | 183.70 | 143.91 | 160.95 | 183.62 | 183.62 | 142.44 | 156.48 |
| Mar | 183.67 | 183.71 | 147.29 | 169.87 | 183.50 | 183.60 | 147.21 | 168.28 |
| Apr | 183.81 | 183.79 | 147.29 | 174.56 | 183.74 | 183.72 | 147.14 | 173.81 |
| May | 183.36 | 181.88 | 147.29 | 177.09 | 183.16 | 180.90 | 147.07 | 176.94 |
| Jun | 183.36 | 183.69 | 147.29 ¹ | 177.09 ¹ | 183.16 | 183.65 | 147.07 ¹ | 176.94 ¹ |
| Jul | 183.42 | 183.54 | 148.93 | 168.41 | 183.22 | 183.44 | 148.73 | 167.43 |
| Aug | 183.13 | 182.66 | 148.98 | 171.93 | 182.93 | 182.06 | 148.85 | 171.80 |
| Sep | 183.02 | 182.87 | 148.17 | 172.93 | 182.80 | 182.67 | 147.99 | 172.55 |
| Oct | 183.04 | 181.66 | 147.91 | 174.28 | 182.92 | 180.55 | 147.75 | 174.01 |
| Nov | 183.04 | 181.66 | 147.36 | 175.19 | 182.92 | 180.55 | 147.13 | 174.99 |
| Dec | 184.30 | 183.09 | 147.36 ¹ | 175.19 ¹ | 184.27 | 183.02 | 147.13 ¹ | 174.99 ¹ |

¹ Limited or no baseline data available, values based upon neighbouring months.

3.4. GROUNDWATER QUALITY MONITORING

3.4.1. OBJECTIVES

From the results of the Hydrogeological Risk Assessment, the objectives of the quality monitoring are:

- Determine whether the previously completed phases of works and proposed Phase 6 works have an adverse chemical impact on the groundwater quality in the superficial deposits, Scalby, Scarborough, Cloughton / Saltwick aquifers.
- Determine if adverse chemical impact on groundwater quality of shallow aquifers is due to onsite pollution of surface water run-off from the Phase 6 works.

3.4.2. MONITORING LOCATIONS

Groundwater quality sampling will be undertaken at locations up hydraulic gradient and down hydraulic of the potentially polluting activities associated with the Phase 6 works.

As such, groundwater quality will be monitored in the superficial deposits, Scalby, Scarborough, Cloughton / Saltwick aquifers using a series of monitoring wells both up and down gradient of the development areas detailed in **Table 3-1**.

3.4.3. MONITORING FREQUENCY

All construction activities will be managed in accordance with the Phase 6 Construction Environmental Management Plan (CEMP). Monthly monitoring will continue throughout the Phase 6 lagoon restoration works and for three months post the completion of these works. Monitoring frequency will change to quarterly after this period if no long term exceedances are observed from the monthly monitoring schedule.

Monitoring of groundwater quality will continue for a minimum period of six months following completion of the Phase 6 works and until it has been demonstrated that no significant variance from the Control Trigger Values or exceedance above the Compliance Limits detailed below has been detected.

Phase 6 works are scheduled to follow directly after completion of the Phase 5. However, as stated in the Phase 6 CMS potential overlap between Phases may occur.

In the event significant exceedances are identified during Phase 6 works, additional rounds of monitoring at an increased frequency will be undertaken to help define extent, where appropriate.

3.4.4. GROUNDWATER QUALITY DATA

The baseline suite of analysis will include both onsite water analysis and laboratory testing, as detailed below. The suite of determinants will be carried out in accordance with the suite identified during baseline and is a continuation of previous phases of work.

Presented below are details of the onsite monitoring and of the sampling and laboratory testing that will be undertaken to obtain the groundwater quality data for the Phase 6 works. All chemical analysis will be undertaken by an MCERTS accredited laboratory.

3.4.4.1 Onsite Water Analysis

On site monitoring, using appropriately calibrated field equipment, will be undertaken for the following determinants:

- pH,
- Temperature,
- Electrical Conductivity, and
- Total Dissolved Solids.

3.4.4.2 Sampling

Prior to sampling of the up and down gradient boreholes, each well will be developed by pumping and either purged to three well volumes or the establishment of stable pH and conductivity readings (typically three consecutive field measurements of +/- 0.1 pH units and +/-250 μ S/cm) to ensure the groundwaters sampled are representative of the surrounding groundwater quality.

Unfiltered samples will be collected in two 1-litre coloured glass jars, and one 100 ml vial and as required by the laboratory, to complete the specified testing suites.

3.4.4.3 Laboratory Analysis

The laboratory chemical analysis will be undertaken for the following suite of determinants:

- pH,
- Conductivity,
- Metals (including Aluminium, Boron, Cadmium, Calcium, Chromium III, Chromium VI, Copper, Iron (total and dissolved), Lead, Magnesium, Manganese, Nickel, Potassium, Sodium and Zinc)
- Chloride,

- Sulphate,
- BTEX (Benzene, Toluene, Ethylbenzene and Xylene),
- Speciated Polycyclic Aromatic Hydrocarbons, and
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) (Aliphatic/Aromatic split).

3.4.5. GROUNDWATER QUALITY CONTROL AND COMPLIANCE TRIGGER VALUES

Groundwater Quality (GWQ) Control Trigger Values have been set for all monitoring well locations (as detailed in **Table 3-1**, above) for the determinants to be analysed by consideration of the baseline groundwater quality level range and typical variation. The Control Trigger value has been set at a value equivalent to the mean baseline value plus 2 x the Standard Deviation for that dataset. The GWQ Compliance Trigger Value has been set at the equivalent Drinking Water Standard (DWS), Environmental Quality Standard (EQS) or the baseline value determined where the current baseline value exceeds the EQS value.

Where the analytical detection limit (MRV) has been adopted as the Compliance Trigger Value, then no Control Trigger Value is included, as presented below.

3.4.5.1 Superficial Deposits

Table 3-6 Control and compliance trigger quality levels for monitoring wells in the Superficial Deposits based on baseline data from 2020-2022

| Determinants | LOD | Units | Control | Compliance | Source |
|-------------------------|------|-------|---------|------------|--------------|
| Aliphatic C10-C12 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C12-C16 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C16-C21 | 1 | µg/l | - | 1 | LOD |
| Aliphatic C21-C35 | 1 | µg/l | - | 1 | LOD |
| Aliphatic C5-C35 | 10 | µg/l | - | 300 | Combined DWS |
| Aliphatic C5-C6 | 0.1 | µg/l | - | 15000 | DWS |
| Aliphatic C6-C8 | 0.1 | µg/l | - | 15000 | DWS |
| Aliphatic C8-C10 | 0.1 | µg/l | - | 300 | DWS |
| Aluminium, Dissolved | 10 | µg/l | 1550 | 2100 | Max Baseline |
| Anthracene | 0.01 | µg/l | 0.34 | 0.47 | LOD / EQS |
| Aromatic C10-C12 | 1 | µg/l | - | 90 | DWS |
| Aromatic C12-C16 | 1 | µg/l | - | 90 | DWS |
| Aromatic C16-C21 | 1 | µg/l | - | 90 | DWS |
| Aromatic C21-C35 | 1 | µg/l | - | 90 | DWS |
| Aromatic C5-C35 | 10 | µg/l | - | 300 | Combined WHO |
| Aromatic C5-C7 | 0.1 | µg/l | - | 10 | DWS |
| Aromatic C7-C8 | 0.1 | µg/l | - | 700 | DWS |
| Aromatic C8-C10 | 0.1 | µg/l | - | 300 | DWS |
| Benzene | 1 | µg/l | - | 10 | EQS |
| Benzo(a)pyrene | 0.01 | µg/l | 0.11 | 0.15 | EQS |
| Benzo(b)fluoranthene | 0.01 | µg/l | 1 | 2 | Max Baseline |
| Boron, Dissolved | 12 | µg/l | 105 | 150 | Max Baseline |
| Cadmium, Dissolved | 0.03 | µg/l | 1.3 | 1.8 | Max Baseline |
| Calcium, Dissolved | 0.09 | mg/l | 365 | 485 | Max Baseline |
| Chloride | 0.1 | mg/l | - | 250 | DWS |
| Chromium III, Dissolved | 1 | µg/l | 5.7 | 7.9 | Max Baseline |

| Determinants | LOD | Units | Control | Compliance | Source |
|------------------------|------|-------|---------|------------|--------------------|
| Chromium VI, Dissolved | 7 | µg/l | - | 7 | LOD |
| Conductivity | 1 | µS/cm | 570 | 625 | Max Baseline |
| Copper, Dissolved | 0.4 | µg/l | 12 | 15 | Max Baseline |
| Ethylbenzene | 1 | µg/l | - | 300 | WHO |
| Fluoranthene | 0.01 | µg/l | 1.1 | 1.6 | Max Baseline |
| Iron, Dissolved | 5.5 | µg/l | 2965 | 3910 | Max Baseline |
| Iron, Total | 5.5 | µg/l | 268000 | 346000 | Max Baseline |
| Lead, Dissolved | 0.09 | µg/l | 8.5 | 11.5 | Max Baseline |
| Magnesium, Dissolved | 0.02 | µg/l | 13 | 15 | Max Baseline |
| Manganese, Dissolved | 0.22 | µg/l | 3850 | 5200 | Max Baseline |
| Nickel, Dissolved | 0.5 | µg/l | 16 | 21 | Max Baseline |
| PAH Total | 0.2 | µg/l | 13 | 18 | Max Baseline |
| pH | | | - | 6 to 9 | EQS |
| Potassium, Dissolved | 0.08 | mg/l | 16.5 | 18.5 | Max Baseline |
| Sodium, Dissolved | 0.07 | mg/l | 25 | 34 | Max Baseline |
| Sulphate as SO4 | 0.1 | mg/l | 40 | 250 | Max Baseline / DWS |
| Toluene | 1 | µg/l | - | 74 | EQS |
| TPH Ali/Aro Total | 10 | µg/l | 128 | 173 | Max Baseline |
| Xylene | 1 | µg/l | - | 30 | DWS |
| Zinc, Dissolved | 1.3 | µg/l | 133 | 181 | Max Baseline |

3.4.5.2 Scalby Formation

Table 3-7 - Control and compliance trigger quality levels for monitoring wells in the Scalby Formation based on baseline data from 2020-2022

| Determinants | LOD | Units | Control | Compliance | Source |
|-------------------------|------|-------|---------|------------|-----------------------------|
| Aliphatic C10-C12 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C12-C16 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C16-C21 | 1 | µg/l | 45 | 62 | Max Baseline |
| Aliphatic C21-C35 | 1 | µg/l | 71 | 99 | Max Baseline |
| Aliphatic C5-C35 | 10 | µg/l | 147 | 300 | Max Baseline / Combined DWS |
| Aliphatic C5-C6 | 0.1 | µg/l | - | 15000 | DWS |
| Aliphatic C6-C8 | 0.1 | µg/l | - | 15000 | DWS |
| Aliphatic C8-C10 | 0.1 | µg/l | - | 300 | DWS |
| Aluminium, Dissolved | 10 | µg/l | 1230 | 1650 | Max Baseline |
| Anthracene | 0.01 | µg/l | - | 0.11 | EQS |
| Aromatic C10-C12 | 1 | µg/l | - | 90 | DWS |
| Aromatic C12-C16 | 1 | µg/l | - | 90 | DWS |
| Aromatic C16-C21 | 1 | µg/l | - | 90 | DWS |
| Aromatic C21-C35 | 1 | µg/l | - | 90 | DWS |
| Aromatic C5-C35 | 10 | µg/l | - | 300 | Combined DWS |
| Aromatic C5-C7 | 0.1 | µg/l | - | 10 | DWS |
| Aromatic C7-C8 | 0.1 | µg/l | - | 700 | DWS |
| Aromatic C8-C10 | 0.1 | µg/l | - | 300 | DWS |
| Benzene | 1 | µg/l | - | 10 | EQS |
| Benzo(a)pyrene | 0.01 | µg/l | 0.11 | 0.15 | Max Baseline |
| Benzo(b)fluoranthene | 0.01 | µg/l | 0.08 | 0.11 | Max Baseline |
| Boron, Dissolved | 12 | µg/l | 75 | 90 | Max Baseline |
| Cadmium, Dissolved | 0.03 | µg/l | 1.5 | 1.8 | Max Baseline |
| Calcium, Dissolved | 0.09 | mg/l | 365 | 485 | Max Baseline |
| Chloride | 0.1 | mg/l | 60 | 250 | Max Baseline |
| Chromium III, Dissolved | 1 | µg/l | 3.5 | 5 | Max Baseline |
| Chromium VI, Dissolved | 7 | µg/l | - | 7 | LOD |
| Conductivity | 1 | µS/cm | 670 | 830 | Max Baseline |

| Determinants | LOD | Units | Control | Compliance | Source |
|----------------------|------|-------|---------|------------|--------------------|
| Copper, Dissolved | 0.4 | µg/l | 32 | 45 | Max Baseline |
| Ethylbenzene | 1 | µg/l | - | 300 | DWS |
| Fluoranthene | 0.01 | µg/l | - | 0.11 | Max Baseline |
| Iron, Dissolved | 5.5 | µg/l | 9400 | 12100 | Max Baseline |
| Iron, Total | 5.5 | µg/l | 865400 | 1100000 | Max Baseline |
| Lead, Dissolved | 0.09 | µg/l | 2.8 | 3.7 | Max Baseline |
| Magnesium, Dissolved | 0.02 | µg/l | 50 | 75 | Max Baseline |
| Manganese, Dissolved | 0.22 | µg/l | 3700 | 4800 | Max Baseline |
| Nickel, Dissolved | 0.5 | µg/l | 150 | 210 | Max Baseline |
| PAH Total | 0.2 | µg/l | 1.6 | 2.5 | Max Baseline |
| pH | | | - | 6 to 9 | EQS |
| Potassium, Dissolved | 0.08 | mg/l | 30 | 45 | Max Baseline |
| Sodium, Dissolved | 0.07 | mg/l | 75 | 90 | Max Baseline |
| Sulphate as SO4 | 0.1 | mg/l | 120 | 250 | Max Baseline / DWS |
| Toluene | 1 | µg/l | - | 74 | EQS |
| TPH Ali/Aro Total | 10 | µg/l | 175 | 250 | Max Baseline |
| Xylene | 1 | µg/l | - | 30 | DWS |
| Zinc, Dissolved | 1.3 | µg/l | 210 | 280 | Max Baseline |

3.4.5.3 Scarborough Formation

Table 3-8 - Control and compliance trigger quality levels for monitoring wells in the Scarborough Formation based on baseline data from 2020-2022

| Determinants | LOD | Units | Control | Compliance | Source |
|-------------------------|------|-------|---------|------------|-----------------------------|
| Aliphatic C10-C12 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C12-C16 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C16-C21 | 1 | µg/l | - | 300 | DWS |
| Aliphatic C21-C35 | 1 | µg/l | - | 1 | LOD |
| Aliphatic C5-C35 | 10 | µg/l | 32 | 300 | Max Baseline / Combined DWS |
| Aliphatic C5-C6 | 0.1 | µg/l | - | 15000 | DWS |
| Aliphatic C6-C8 | 0.1 | µg/l | - | 15000 | DWS |
| Aliphatic C8-C10 | 0.1 | µg/l | - | 300 | DWS |
| Aluminium, Dissolved | 10 | µg/l | 330 | 440 | Max Baseline |
| Anthracene | 0.01 | µg/l | - | 0.1 | EQS |
| Aromatic C10-C12 | 1 | µg/l | - | 90 | DWS |
| Aromatic C12-C16 | 1 | µg/l | - | 90 | DWS |
| Aromatic C16-C21 | 1 | µg/l | - | 90 | DWS |
| Aromatic C21-C35 | 1 | µg/l | - | 90 | DWS |
| Aromatic C5-C35 | 10 | µg/l | - | 300 | Combined DWS |
| Aromatic C5-C7 | 0.1 | µg/l | - | 10 | DWS |
| Aromatic C7-C8 | 0.1 | µg/l | - | 700 | DWS |
| Aromatic C8-C10 | 0.1 | µg/l | - | 300 | DWS |
| Benzene | 1 | µg/l | - | 10 | EQS |
| Benzo(a)pyrene | 0.01 | µg/l | - | 0.01 | EQS |
| Benzo(b)fluoranthene | 0.01 | µg/l | - | 0.01 | EQS |
| Boron, Dissolved | 12 | µg/l | 25 | 32 | Max Baseline |
| Cadmium, Dissolved | 0.03 | µg/l | 0.28 | 0.36 | Max Baseline |
| Calcium, Dissolved | 0.09 | mg/l | 110 | 130 | Max Baseline |
| Chloride | 0.1 | mg/l | 90 | 250 | Max Baseline |
| Chromium III, Dissolved | 1 | µg/l | 1.4 | 1.9 | Max Baseline |
| Chromium VI, Dissolved | 7 | µg/l | - | 7 | LOD |
| Conductivity | 1 | µS/cm | 690 | 850 | Max Baseline |

| Determinants | LOD | Units | Control | Compliance | Source |
|-----------------------------|------|--------------------|---------|------------|--------------------|
| Copper, Dissolved | 0.4 | µg l ⁻¹ | 6.7 | 9.3 | Max Baseline |
| Ethylbenzene | 1 | µg l ⁻¹ | - | 300 | DWS |
| Fluoranthene | 0.01 | µg l ⁻¹ | - | 0.01 | LOD |
| Iron, Dissolved | 5.5 | µg l ⁻¹ | 5650 | 7400 | Max Baseline |
| Iron, Total | 5.5 | µg l ⁻¹ | 1500000 | 2000000 | Max Baseline |
| Lead, Dissolved | 0.09 | µg l ⁻¹ | 0.4 | 1.3 | Max Baseline / EQS |
| Magnesium, Dissolved | 0.02 | µg l ⁻¹ | 12 | 15 | Max Baseline |
| Manganese, Dissolved | 0.22 | µg l ⁻¹ | 510 | 600 | Max Baseline |
| Nickel, Dissolved | 0.5 | µg l ⁻¹ | 17 | 20 | Max Baseline |
| PAH Total | 0.2 | µg l ⁻¹ | - | 0.2 | LOD |
| pH | | | - | 6 to 9 | EQS |
| Potassium, Dissolved | 0.08 | mg l ⁻¹ | 2.3 | 2.8 | Max Baseline |
| Sodium, Dissolved | 0.07 | mg l ⁻¹ | 19 | 22 | Max Baseline |
| Sulphate as SO ₄ | 0.1 | mg l ⁻¹ | 15 | 250 | Max Baseline / DWS |
| Toluene | 1 | µg l ⁻¹ | - | 74 | EQS |
| TPH Ali/Aro Total | 10 | µg l ⁻¹ | 24 | 33 | Max Baseline |
| Xylene | 1 | µg l ⁻¹ | - | 30 | DWS |
| Zinc, Dissolved | 1.3 | µg l ⁻¹ | 20 | 25 | Max Baseline |

3.4.5.4 Cloughton / Saltwick Formation

Table 3-9 - Control and compliance trigger quality levels for monitoring wells in the Cloughton Formation based on baseline data from 2020-2022

| Determinants | LOD | Units | Control | Compliance | Source |
|-------------------------|------|--------------------|---------|------------|-----------------------------|
| Aliphatic C10-C12 | 1 | µg l ⁻¹ | - | 300 | DWS |
| Aliphatic C12-C16 | 1 | µg l ⁻¹ | - | 300 | DWS |
| Aliphatic C16-C21 | 1 | µg l ⁻¹ | 18 | 25 | Max Baseline |
| Aliphatic C21-C35 | 1 | µg l ⁻¹ | 5 | 7.5 | Max Baseline |
| Aliphatic C5-C35 | 10 | µg l ⁻¹ | 75 | 300 | Max Baseline / Combined DWS |
| Aliphatic C5-C6 | 0.1 | µg l ⁻¹ | - | 15000 | DWS |
| Aliphatic C6-C8 | 0.1 | µg l ⁻¹ | - | 15000 | DWS |
| Aliphatic C8-C10 | 0.1 | µg l ⁻¹ | - | 300 | DWS |
| Aluminium, Dissolved | 10 | µg l ⁻¹ | 610 | 820 | Max Baseline |
| Anthracene | 0.01 | µg l ⁻¹ | - | 0.1 | EQS |
| Aromatic C10-C12 | 1 | µg l ⁻¹ | - | 90 | DWS |
| Aromatic C12-C16 | 1 | µg l ⁻¹ | - | 90 | DWS |
| Aromatic C16-C21 | 1 | µg l ⁻¹ | - | 90 | DWS |
| Aromatic C21-C35 | 1 | µg l ⁻¹ | - | 90 | DWS |
| Aromatic C5-C35 | 10 | µg l ⁻¹ | - | 300 | Combined DWS |
| Aromatic C5-C7 | 0.1 | µg l ⁻¹ | - | 10 | DWS |
| Aromatic C7-C8 | 0.1 | µg l ⁻¹ | - | 700 | DWS |
| Aromatic C8-C10 | 0.1 | µg l ⁻¹ | - | 300 | DWS |
| Benzene | 1 | µg l ⁻¹ | - | 10 | EQS |
| Benzo(a)pyrene | 0.01 | µg l ⁻¹ | - | 0.01 | EQS |
| Benzo(b)fluoranthene | 0.01 | µg l ⁻¹ | - | 0.01 | EQS |
| Boron, Dissolved | 12 | µg l ⁻¹ | 53 | 75 | Max Baseline |
| Cadmium, Dissolved | 0.03 | µg l ⁻¹ | 1.5 | 2 | Max Baseline |
| Calcium, Dissolved | 0.09 | mg l ⁻¹ | 300 | 400 | Max Baseline |
| Chloride | 0.1 | mg l ⁻¹ | 50 | 250 | Max Baseline |
| Chromium III, Dissolved | 1 | µg l ⁻¹ | 2.5 | 3.5 | Max Baseline |

| Determinants | LOD | Units | Control | Compliance | Source |
|-----------------------------|------|-------|---------|------------|--------------------|
| Chromium VI, Dissolved | 7 | µg/l | - | 7 | LOD |
| Conductivity | 1 | µS/cm | 550 | 750 | Max Baseline |
| Copper, Dissolved | 0.4 | µg/l | 1.2 | 1.6 | Max Baseline |
| Ethylbenzene | 1 | µg/l | - | 300 | DWS |
| Fluoranthene | 0.01 | µg/l | - | 0.04 | Max Baseline |
| Iron, Dissolved | 5.5 | µg/l | 2900 | 3900 | Max Baseline |
| Iron, Total | 5.5 | µg/l | 150000 | 200000 | Max Baseline |
| Lead, Dissolved | 0.09 | µg/l | 3.2 | 4.4 | Max Baseline / EQS |
| Magnesium, Dissolved | 0.02 | µg/l | 15 | 20 | Max Baseline |
| Manganese, Dissolved | 0.22 | µg/l | 860 | 1150 | Max Baseline |
| Nickel, Dissolved | 0.5 | µg/l | 10 | 15 | Max Baseline |
| PAH Total | 0.2 | µg/l | 10 | 14 | Max Baseline |
| pH | | | - | 6 to 9 | EQS |
| Potassium, Dissolved | 0.08 | mg/l | 125 | 200 | Max Baseline |
| Sodium, Dissolved | 0.07 | mg/l | 110 | 150 | Max Baseline |
| Sulphate as SO ₄ | 0.1 | mg/l | 12 | 250 | Max Baseline / DWS |
| Toluene | 1 | µg/l | - | 74 | EQS |
| TPH Ali/Aro Total | 10 | µg/l | 55 | 75 | Max Baseline |
| Xylene | 1 | µg/l | - | 30 | DWS |
| Zinc, Dissolved | 1.3 | µg/l | 95 | 120 | Max Baseline |

3.5. SPRING LEVEL AND QUALITY MONITORING

The purpose of the spring water monitoring strategy is to detect chemical and physical impact on the 5 spring confluences in **Table 3-10** as a result of the proposed Phase 6 works, so that appropriate remedial measures can be adopted should potentially detrimental impacts arise.

Table 3-10 Details of springs to be monitored during the Phase 6 works

| Location | Description | X | Y |
|----------|---------------|--------|--------|
| 1 | Newstead farm | 481795 | 506909 |
| 2 | Priory Farm | 482403 | 505584 |
| 3 | Grosmont Farm | 483234 | 506267 |
| 4 | Egton Bridge | 480589 | 505441 |
| 5 | Church Cliff | 479787 | 506762 |

The Ground Investigation works, and tracer testing carried out during previous phases has advised on the monitoring locations for the continual Aquatroll monitoring probes.

The continual monitors are set up to log pH, TDS and conductivity. The monitors were installed during the Ground Investigation (GI) works in early 2022. The monitors are configured to take readings every 4 hours and upload via telemetry units for remote logging every day. During the Phase 6 works these will be monitored for indications in changes to the pH, TDS, turbidity and conductivity. The probes will require quarterly battery changes and calibration in which visual inspections will be carried out.

Large fluctuations in values will trigger an assessment based upon meteorological changes and on-site activities. Any large fluctuations in readings from baseline will trigger a physical visual inspection of the spring confluences. Upon finding visual issues actions detailed within the Phase 4 Remedial Action Plan (RAP) will be carried out.

3.6. SURFACE WATER

3.6.1. OBJECTIVES

The purpose of the surface water monitoring strategy is to detect chemical and physical impacts on surface waters within Cat Scar Beck and Cold Keld Beck caused by the ongoing construction works, so that appropriate remedial measures can be adopted should potentially detrimental impacts arise.

From the results of the Revised Hydrogeological Risk Assessment and the Surface Water Drainage Scheme, potential impacts on Cat Scar Beck that could arise from the then completed and ongoing construction works, and therefore require evaluation by the surface water monitoring strategy include:

- Chemical pollution in the form of hydrocarbon (fuel, hydraulic oil, lubricant oil) spillage or leakage from construction plant and silt/particulate suspended solids entering surface water drainage via runoff and discharging into controlled waters.
- Chemical pollution in the form of cementitious materials from construction works entering the surface water drainage via runoff or pre-grouting works and discharging into controlled water.
- Physical impacts of the groundwater and surface water discharges to the surface water outfall system on Cat Scar Beck by causing siltation, scour or erosion of the stream bed.
- The outfall locations at Cold Keld Beck (LCSW3) will be monitored. However, as the outfalls do not lie within the catchment area of the Ladycross Site works, the impact of works is negligible, control and compliance trigger values will not be set for these monitoring locations.

3.6.2. MONITORING LOCATIONS

To meet the above objectives, the surface water monitoring locations have been designed to provide:

1. Further baseline data for Cat Scar Beck,
2. Early monitoring of surface water drainage within the onsite construction activities, and
3. Monitoring of surface water outfalls at downstream compliance points prior to discharge to Cat Scar Beck.

From the design layout of the Phase 6 Works, monitoring of the construction stage discharges up and down stream of the surface water drainage outfall points will be undertaken as summarised in **Table 3-11** and **Attachment A**.

Table 3-11 – Surface Water Monitoring Locations

| ID | X | Y | Description |
|-------|--------|--------|--|
| LCSW1 | 481868 | 507673 | Upstream monitoring location of unnamed tributary A running along South-East boundary of site |
| LCSW2 | 481633 | 507421 | Downstream monitoring location Highway drainage, outfall for site surface water |
| LCSW3 | 481344 | 507542 | Discharge to Cold Keld Beck from drain culvert |
| LCSW4 | 481641 | 507460 | Downstream monitoring location of unnamed tributary A running along South-East boundary of site. |
| LCSW5 | 481600 | 507440 | Monitoring location upstream of LCSW2, outfall for site surface drainage |

3.6.3. MONITORING FREQUENCY

Surface water quality samples will be undertaken on a monthly basis for laboratory analysis at monitoring location LCSW3. The other monitoring locations will continue to be sampled on a bi-weekly frequency or at frequencies detailed in site related discharge permits. Field measurements will be undertaken on a weekly basis for the parameters outlined in **Section 3.6.4.2**. Where no flow is observed at the monitoring location, this will be stated as part of the reporting procedure.

Monitoring of surface water quality shall continue for a minimum period of three months following completion of the Phase 6 Works and until it has been demonstrated that no significant variance from the Control Trigger Values has occurred and no exceedance above the Compliance Trigger Values detailed below has been detected.

Phase 6 Works are scheduled to follow directly after completion of the Phase 5 Works, although some cross over may be carried out as stated in the Phase 6 CMS. Consequently, an assessment of any Trigger Values breaches will evaluate the cumulative impact of previous works and Phase 6 to determine the cause and appropriate remedial actions.

3.6.4. SURFACE WATER DATA

To meet with the surface water monitoring objectives, the minimum baseline suite of analysis will include onsite analysis, sampling and laboratory testing.

The suite of determinants to be analysed to evaluate construction related pollution will include the specific Contaminants of Concern (CoC) associated with the Phase 6 Works.

3.6.4.1 Sampling

During the sampling visits, surface water sampling of the downstream monitoring points will be collected first, to minimise disturbed sediment impacting on the results. These samples are to be taken from sections of fast flowing water, where possible. In the event no flow is observed this will be stated.

Unfiltered samples will be collected in two litre coloured glass jars, and one 100 ml vial, or as required by the laboratory to complete the specified testing suites.

3.6.4.2 Onsite Monitoring

Visual inspection will be undertaken of the construction works surface water drainage systems to observe for evidence of high suspended solids, discolouration or hydrocarbon pollution.

On site monitoring using calibrated equipment will be undertaken for the following determinants: -

- Temperature,
- pH,
- Electrical Conductivity,
- Total Dissolved Solids, and
- Turbidity.

3.6.4.3 Laboratory Analysis

All chemical analysis will be undertaken by an MCERTS accredited laboratory. From the expected potentially polluting activities associated with Phase 6 Works the CoC that are to be analysed will include:

- pH,
- Conductivity,
- Suspended Solids,
- Biological Oxygen Demand,
- Free ammonia (NH₃),
- Chloride,
- Sodium,
- Sulphate,
- Aluminium,
- Cobalt,
- BTEX (Benzene, Toluene, Ethylbenzene and Xylene),
- Speciated Polycyclic Aromatic Hydrocarbons, and
- Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) (Aliphatic/Aromatic split).

Flow rates will not be quantified; however, consideration will be made of climatic conditions, particularly after high runoff storm events.

3.6.5. SURFACE WATER QUALITY CONTROL AND COMPLIANCE TRIGGER VALUES

Surface Water Quality (SWQ) Control Trigger Values have been set for all of the determinants to be analysed for by consideration of the baseline surface water quality testing undertaken to date from Cat Scar Beck. The SWQ Control Trigger Value have been derived using the following methodology:

Control Trigger Values = mean baseline value + 2 × standard deviation of baseline data¹

Note¹ The monitoring undertaken thus far during pre-commencements and early site establishment and construction works has demonstrated that 2 standard deviations is most appropriate considering the natural variation observed in the monitoring baseline data.

The Compliance Value has been set at the appropriate Environmental Quality Standard (EQS), DWS or the baseline value where this exceeds the EQS value using the below methodology:

Compliance Trigger Values = mean baseline value + 3 × standard deviation of baseline data¹

Note¹ The monitoring undertaken thus far pre-commencements and early site establishment and construction works has demonstrated that 3 standard deviations is most appropriate considering the natural variation observed in the monitoring baseline data.

Where the analytical detection limit (MRV), EQS or DWS has been adopted as the Compliance Trigger Value, then no Control Trigger Value is included, as presented below in **Table 3-12**.

Table 3-12 – Surface Water Monitoring Control and Compliance Trigger Levels

| Determinants | LOD | Units | Control | Compliance | Source |
|---|-------|--------------------|---------|------------|------------------------|
| Aliphatic C10-C12 | 1 | µg/l ⁻¹ | - | 300 | Max Baseline / WHO DWQ |
| Aliphatic C12-C16 | 1 | µg/l ⁻¹ | - | 300 | Max Baseline / WHO DWQ |
| Aliphatic C16-C21 | 1 | µg/l ⁻¹ | - | 300 | Max Baseline |
| Aliphatic C21-C35 | 1 | µg/l ⁻¹ | 250 | 350 | Max Baseline |
| Aliphatic C5-C35 | 1 | µg/l ⁻¹ | 250 | 350 | Max Baseline |
| Aliphatic C5-C6 | 0.1 | µg/l ⁻¹ | - | 15000 | WHO DWQ |
| Aliphatic C6-C8 | 0.1 | µg/l ⁻¹ | - | 15000 | WHO DWQ |
| Aliphatic C8-C10 | 0.1 | µg/l ⁻¹ | - | 300 | WHO DWQ |
| Alkalinity as CaCO ₃ (Automated) | 10 | mg/l ⁻¹ | 150 | 300 | Max Baseline |
| Aluminium, Dissolved | 10 | µg/l ⁻¹ | 2780 | 3500 | Max Baseline |
| Ammoniacal Nitrogen as N | 0.015 | mg/l ⁻¹ | 2.1 | 2.9 | Max Baseline |
| Anthracene | 0.01 | µg/l ⁻¹ | - | 0.1 | EQS |
| Aromatic C10-C12 | 1 | µg/l ⁻¹ | - | 90 | WHO DWQ |
| Aromatic C12-C16 | 1 | µg/l ⁻¹ | - | 90 | WHO DWQ |
| Aromatic C16-C21 | 1 | µg/l ⁻¹ | 20 | 90 | Max Baseline / WHO DWQ |
| Aromatic C21-C35 | 1 | µg/l ⁻¹ | 10 | 90 | Max Baseline / WHO DWQ |
| Aromatic C5-C35 | 10 | µg/l ⁻¹ | 25 | 300 | Max Baseline / WHO DWQ |
| Aromatic C5-C7 | 0.1 | µg/l ⁻¹ | - | 10 | WHO DWQ |
| Aromatic C7-C8 | 0.1 | µg/l ⁻¹ | - | 700 | WHO DWQ |
| Aromatic C8-C10 | 0.1 | µg/l ⁻¹ | - | 300 | WHO DWQ |
| Benzene | 1 | µg/l ⁻¹ | - | 10 | EQS |
| Benzo(a)pyrene | 0.01 | µg/l ⁻¹ | - | 0.05 | Max Baseline |
| Benzo(b)fluoranthene | 0.01 | µg/l ⁻¹ | - | 0.05 | Max Baseline |
| Boron, Dissolved | 12 | µg/l ⁻¹ | 75 | 100 | Max Baseline |
| Cadmium, Dissolved | 0.03 | µg/l ⁻¹ | 0.33 | 3 | Max Baseline / WHO DWQ |
| Calcium, Dissolved | 0.09 | mg/l ⁻¹ | 80 | 90 | Max Baseline |
| Chloride | 0.1 | mg/l ⁻¹ | 60 | 250 | Max Baseline / EQS |
| Chromium III, Dissolved | 1 | µg/l ⁻¹ | 5 | 50 | Max Baseline / DWD |
| Chromium VI, Dissolved | 7 | µg/l ⁻¹ | - | 7 | LOD |
| Conductivity | 1 | µS/cm | 650 | 800 | Max Baseline |
| Copper, Dissolved | 0.4 | µg/l ⁻¹ | 4.65 | 5.6 | Max Baseline |
| Ethylbenzene | 1 | µg/l ⁻¹ | - | 300 | WHO |
| Fluoranthene | 0.01 | µg/l ⁻¹ | 0.06 | 0.08 | LOD |

| Determinants | LOD | Units | Control | Compliance | Source |
|-----------------------------|------|--------------------|---------|------------|------------------------|
| Iron, Dissolved | 5.5 | µg l ⁻¹ | 1900 | 2400 | Max Baseline |
| Iron, Total | 5.5 | µg l ⁻¹ | 7500 | 10000 | Max Baseline |
| Lead, Dissolved | 0.09 | µg l ⁻¹ | 10.6 | 14.9 | Max Baseline |
| Magnesium, Dissolved | 0.02 | µg l ⁻¹ | 14.5 | 18 | Max Baseline |
| Manganese, Dissolved | 0.22 | µg l ⁻¹ | 120 | 150 | Max Baseline |
| Nickel, Dissolved | 0.05 | µg l ⁻¹ | 13.7 | 15.4 | Max Baseline |
| Nitrate as NO ₃ | 5 | mg l ⁻¹ | 15 | 50 | Max Baseline / WHO DWQ |
| PAH Total | 0.2 | µg l ⁻¹ | 0.6 | 0.9 | Max Baseline |
| pH | | | - | 6 to 9 | EQS |
| Potassium, Dissolved | 0.08 | mg l ⁻¹ | 55 | 80 | Max Baseline |
| Sodium, Dissolved | 0.07 | mg l ⁻¹ | 110 | 150 | Max Baseline |
| Sulphate as SO ₄ | 0.1 | mg l ⁻¹ | 225 | 300 | Max Baseline / DWS |
| Suspended Solids | 5 | mg l ⁻¹ | 90 | 120 | Max Baseline |
| Toluene | 1 | µg l ⁻¹ | - | 74 | EQS |
| TPH Ali/Aro Total | 10 | µg l ⁻¹ | 153 | 220 | Max Baseline |
| Xylene | 1 | µg l ⁻¹ | - | 30 | DWS |
| Zinc, Dissolved | 1.3 | µg l ⁻¹ | 120 | 180 | Max Baseline |

4. DECOMISSION AND REPLACEMENT OF EXISTING MONITORING POINTS

No boreholes are currently designated for decommissioning during Phase 6. If any boreholes do require decommissioning it will be undertaken in accordance with current guidance and best practice (Environment Agency, 2012) and will adopt one of the three decommissioning options detailed in **Table 4-1**.

Table 4-1 Summary of options for the removal and replacement of monitoring wells

| Option | Condition | Methodology |
|-----------------|--|---|
| Option 1 | In boreholes where there is more than 1m or less of plain pipework | Grout up standpipe from the base to 1.5m below ground level (bgl). Remove headworks and plain pipe from 0-1mbgl. Remove the gravel pack and slotted pipework from 1.0-1.5mbgl and replace with a bentonite/grout plug. Replace upper section 0-1.0mbgl with appropriate topsoil/arising mix. |
| Option 2 | In boreholes where there is greater than 1m of plain pipework | Grout up standpipe from the base to 1m below ground level. Remove headworks and plain pipe from 0-1mbgl and replace with appropriate topsoil mix. |
| Option 3 | In boreholes located on land that may be ploughed | Where boreholes are located on land that may be ploughed then guidance recommends that installations are removed to a minimum of 2.0 mbgl. Grout up standpipe from base to 2 mbgl. Remove headworks and plain pipe from 0-2mbgl. Remove the gravel pack and slotted pipework from 2.0-2.5m and replace with a bentonite/grout plug. Replace upper section 0-2.0mbgl with appropriate topsoil/arising mix. |

On completion of the decommissioning, a report of work undertaken will be prepared.

Additional monitoring boreholes were installed during the additional Ground Investigation (GI) works carried out in late 2021 / early 2022. Three new boreholes were installed and will be adopted on the monitoring scheme as stated in **Section 3.3**. These were installed as mitigation against the BH413 series of boreholes decommissioned during Phase 3 works.

5. REPORTING REQUIREMENTS

All exceedances of Control and Compliance Trigger Values and remedial actions that are implemented will be reported to Anglo American. A quarterly water report will detail the exceedance that occurred, the construction activities and antecedent meteorological conditions, the results of the site inspection, the established cause of the exceedance in Trigger Values and the remedial action specified together with the timescale for it to be implemented.

Where exceedances to Trigger Values are identified, associated with the site works a record of the data and site observations will be issued on receipt of results of the event. Where visual evidence of a significant change in stream flows, cloudy discharge or elevated turbidity or pH readings are identified associated with the works, the inspection report and remedial action specified will be issued to those identified in **Section 3.1** within 48 hours of that exceedance.

On completion of the remedial action, a record of the measures implemented, and their effectiveness will be reported to the relevant parties. The Anglo American Construction Manager or Environment and Permitting Manager will provide a copy of the report.

Remedial actions will remain in accordance with the Phase 4 Remedial Action Plan (RAP).

6. REFERENCES

- DEFRA. (2014). *Water Framework Directive implementation in England and Wales: new and updated standards to protect the water environment*. GOV.UK.
- Environment Agency. (2012). *Good practice for decommissioning redundant boreholes and wells*. Environment Agency.
- FWS. (September 2014). *Hydrogeological Baseline Report of the Lady Cross Plantation, North Yorkshire*. FWS Consultants LTD.
- WHO. (2017). *Guidelines for drinking-water quality: fourth edition incorporating the first addendum* (Fourth Edition ed.). World Health Organization.

7. DEFINITIONS AND ABBREVIATIONS

DWS – Drinking Water Standards

EQS – Environmental Quality Standards

HRA – Hydrogeological Risk Assessment

GWSWMS – Groundwater and Surface Water Monitoring Scheme

CoC – Contaminants of Concern

LOD – Limit of Detection

GWL – Groundwater Level

CEMP – Construction Environment Management Plan

GWQ – Groundwater Quality

SWG – Surface Water Quality

8. ATTACHMENTS

ATTACHMENT A – MONITORING LOCATIONS

ATTACHMENT B – SPRING MONITORING LOCATIONS

ATTACHMENT C – SPRING AND ABSTRACTION LOCATIONS



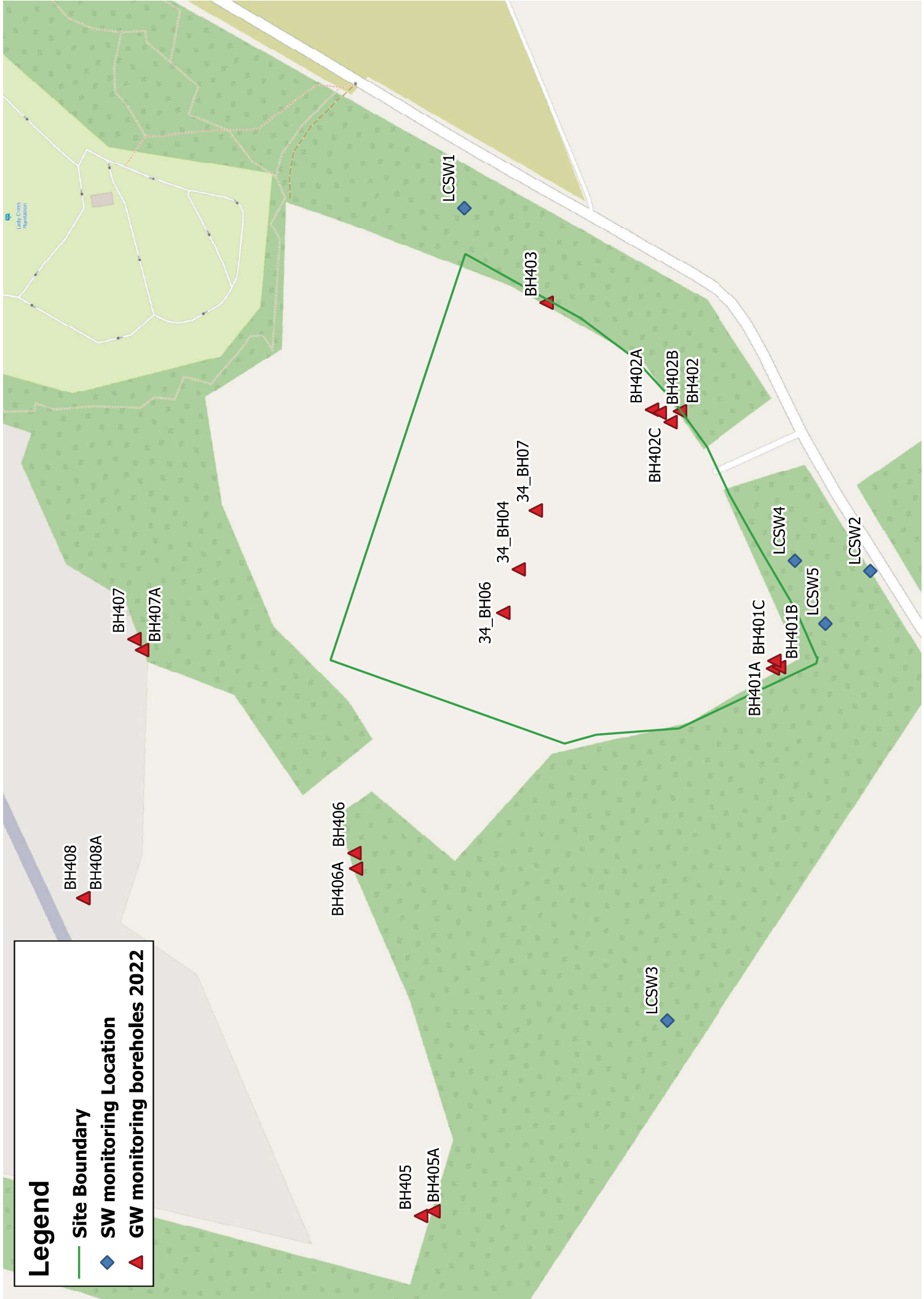
ATTACHMENT A – MONITORING LOCATIONS

Legend

— Site Boundary

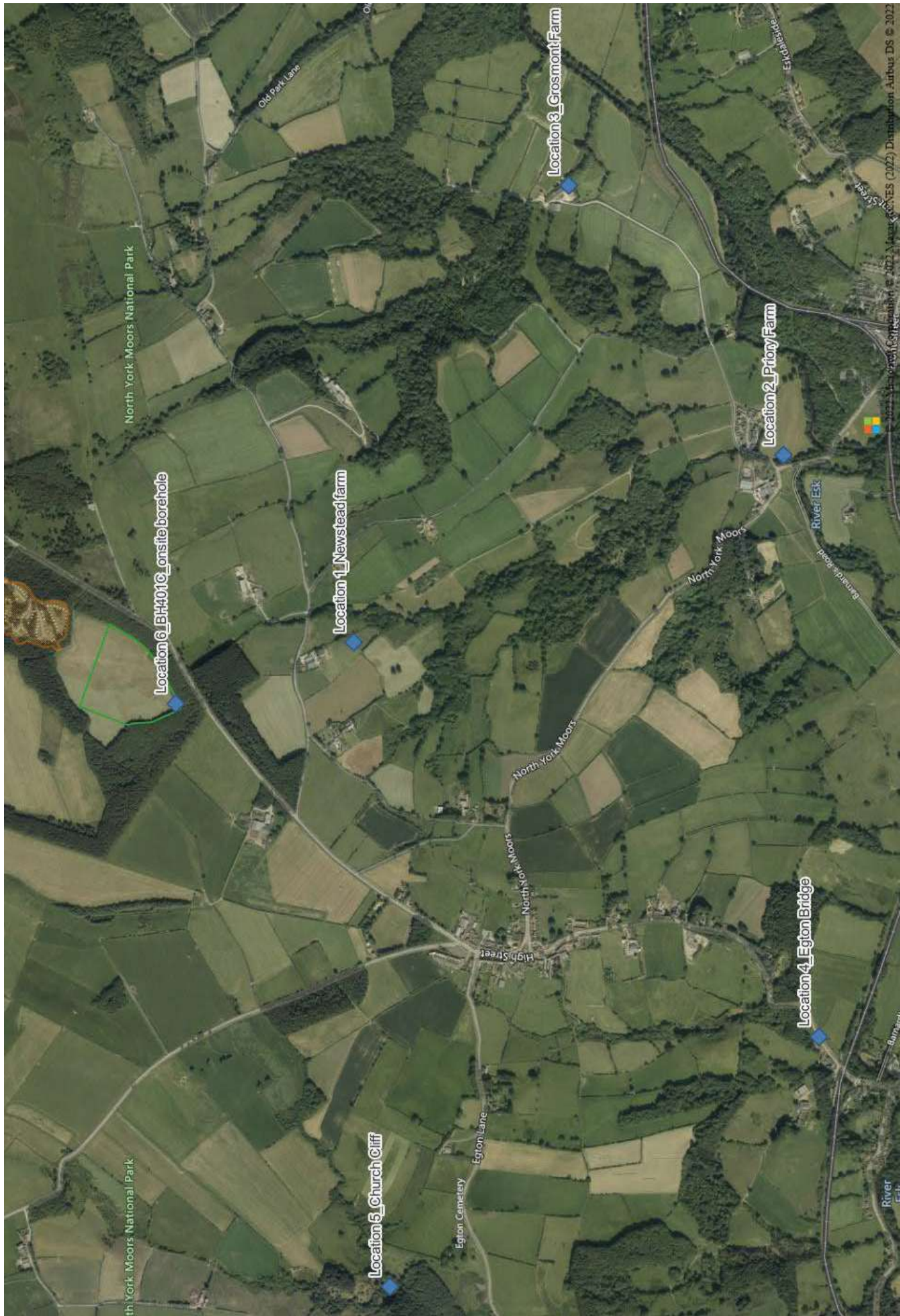
◆ SW monitoring Location

▲ GW monitoring boreholes 2022





ATTACHMENT B – SPRING MONITORING LOCATIONS



North York Moors National Park

Location 6 BH401C onsite borehole

Location 1 Newstead farm

Location 2 Grosmont Farm

Location 3 Priory Farm

Location 4 Egton Bridge

Location 5 Church Cliff

North York Moors National Park

Old Park Lane

North York Moors

North York Moors

North York Moors

River Esk

Egton Lane

Egton Cemetery

High Street

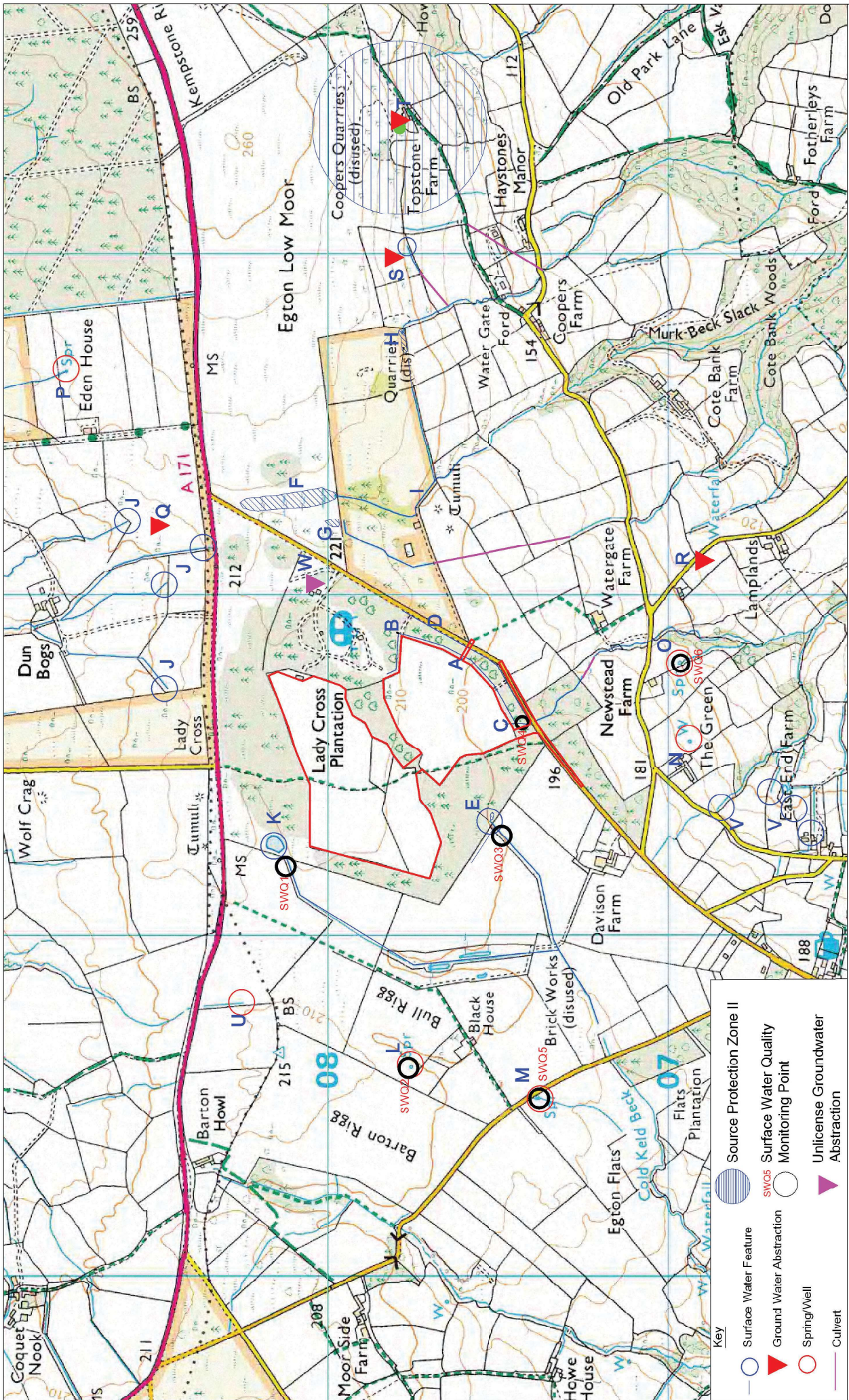
River Esk

Bainbridge

153 St

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ATTACHMENT C – SPRING AND ABSTRACTION LOCATIONS



| Key | |
|-----|--|
| | Surface Water Feature |
| | Surface Water Quality Monitoring Point |
| | Spring/Well |
| | Culvert |
| | Source Protection Zone II |
| | Ground Water Abstraction |
| | Unlicense Groundwater Abstraction |

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| | |
|----------|-----------------|
| CLIENT | York Potash Ltd |
| SCALE | 1:10,000 @A3 |
| DRAWN BY | KW |
| DATE | July 2014 |

JOB TITLE
 YORK POTASH - MINERAL TRANSPORT SYSTEM

DRAWING NUMBER
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DRAWING TITLE
 HYDROLOGICAL AND HYDROGEOLOGICAL FEATURES -
 LADY CROSS PLANTATION

NYMNPA
02/03/2023



Project Title / Facility Name:

Woodsmith Project

Document Title:

**NOISE & VIBRATION MANAGEMENT PLAN - PHASE 6 - NYMNPA CONDITION 18
(ROYAL HASKONINGDHV) - LADYCROSS**

Document Review Status

- 1. Reviewed – Accepted – Work May Proceed By: Robert Staniland
- 2. Reviewed – Accepted As Noted, Work May Proceed, Revise & Resubmit On: 10 Feb 2023 16:45
- 3. Reviewed – Work May Not Proceed, Revise & Resubmit
- 4. For information only
- 5. On Hold – Pending Project Restart & Ramp Up

| B | 01-Feb-2023 | Planning | PLA | | | |
|------|--------------------------------|------------------|-----|-------------|-------------|-------------|
| A | 16-Jan-2023 | Planning | PLA | | | |
| Rev. | Revision Date (dd mmm yyyy) | Reason For Issue | | Prepared by | Verified by | Approved by |

Document ID:

40-ST5-LC-2100-EN-PL-00030

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**WOODMITH PROJECT
(788.5030)**

**NOISE AND VIBRATION
MANAGEMENT PLAN - PHASE
6 - NYMNPA CONDITION 18 -
LADYCROSS PLANTATION**

/

40-STS-LC-2100-EN-PL-00030

(Royal HaskoningDHV)

| Revision | Date of issue | Prepared by | Checked by | Approved by | Changes |
|-----------------|----------------------|------------------------|------------------------|-------------------------|----------------|
| A (PLA) | 16/01/2023 | Tim Britton (RHDHV) | Tim Britton (RHDHV) | John Drabble (RHDHV) | First Issue |
| B (PLA) | 01/02/2023 | Tim Britton (RHDHV) | Tim Britton (RHDHV) | John Drabble (RHDHV) | Final Issue |