

## 4. Land Quality

### Introduction

- 4.1 The original EIA submission (March 2014), assessed the land quality associated with the site and the wider area. As part of the original assessment, desk studies, site walkovers, and a targeted intrusive ground contamination assessment were undertaken followed by the completion of a Preliminary Risk Assessment (PRA) and a Generic Quantitative Risk Assessment (GQRA).
- 4.2 The key findings from the original 2014 assessment are as follows;
- Through the PRA a Conceptual Site Model (CSM) was created which identified areas of potential contamination on site. A number of potential issues were highlighted but the principal source of contamination for the site was due to historic activities on the quarry site and particularly the presence of fuel and other holding tanks within the site. A full GQRA was recommended which incorporated an intrusive ground contamination assessment; and
  - Samples (soil, water and gas) taken during the ground investigation were analysed for a range of determinants using appropriate Generic Assessment Criteria's (GACs). Following the completion of the GQRA, no significant pollutant linkages were identified. However, a number of appropriate mitigation measures were highlighted to further reduce the potential risks for contamination.
- 4.3 The EIA addendum (September 2014) included further information in respect of land quality. This information was requested by NIEA and included;
- Copies of the original laboratory analysis sheets for soil and water samples; and
  - Justification for the locations of the trial pits during the targeted soil sampling, along with photographic evidence of these being undertaken in lieu of trial pit logs.
- 4.4 The principal aim of this Chapter is to identify any additional land uses or events (since the March 2014 assessment) which might lead to unacceptable risk to health of the environment (including controlled waters). This addendum should be considered along with the original 2014 assessment Chapter and EIA Addendum (September 2014).
- 4.5 Any land quality issues (identified in addition to those examined in the 2014 assessment) within or near the site, are described alongside the potential environmental impacts that may occur during construction and operational phase.
- 4.6 It should also be noted that since 2014 Council boundaries have been reorganised and the application site now sits within the Antrim and Newtownabbey Borough Council Administrative area and adjacent to the Belfast City Council area.

## Methodology

- 4.7 This assessment is presented in keeping with the Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 produced by DEFRA in conjunction with the Environment Agency (EA).
- 4.8 A review of baseline information related to land quality was undertaken which then helped inform updates to the PRA and GQRA. This includes reviews of published information and updates to screening values for ground investigation results. A site verification walkover was also carried out on the 28<sup>th</sup> November 2018 to reaffirm the conditions of the application site. This verification exercise included discussions with a site representative to confirm what activities had occurred on site since the 2014 assessment.
- 4.9 Consideration has also been given to relevant third-party concerns relating to the application site and proposed works.
- 4.10 The information gathered has been used to update the existing CSM, to reassess any potential risks resulting from land quality on or surrounding the application site.

## Assessment

### *Preliminary Risk Assessment*

### *Baseline Information*

- 4.11 During the site walkover it was noted that blasting activity had occurred on two occasions since the last site visit. The first of these was carried out along the southern rockface in the upper platform of the site. This was to provide granular material for use on site, which was then piled in the upper yard as evidenced in Figure 4.1 below.



**Figure 4.1 Evidence of the larger blast carried out on the southern rockface in the upper platform**

- 4.12 The second of these was carried out very recently on the rock face to the south-west of the former asphalt plant area. The site representative stated that this was only a few metres deep.

- 4.13 The site walkover confirmed that there were no signs of contamination from historic or recent blasting activities.
- 4.14 The site representative also indicated that the abandoned building to the North of the banded fuel tanks, as evidenced in Figure 4.2, had been confirmed to have asbestos containing materials within the roof. However, it was discussed that this building was to be retained as it is an existing bat roost and is not situated within the construction site boundary.



**Figure 4.2 Abandoned building with asbestos containing materials in roof now used as a bat roost**

*Consideration of Third-Party Representations*

- 4.15 A concern has been raised regarding the potential presence of a hazardous mineral, erionite, at Hightown Quarry. Erionite is a naturally occurring fibrous mineral belonging to a group of minerals called zeolites. Zeolites are widely distributed within the Antrim Basalts and within the Basalts, the potential likely areas for zeolite presence are basalt lava flow tops, highly vesiculated zones and high fluid flow zones such as igneous intrusions. Studies conducted (mainly in Turkey and the USA) into erionite and human exposure state that erionite fibres only pose a potential hazard if they are disturbed and become airborne.

*Updated Conceptual Site Model*

*Rock / Soil / Overburden Contamination*

- 4.16 Generic assessment criteria used during the original GQRA included UK Soil Guideline Values (SGV's), the At-risk Soil Screening Values (SSV's) and the CL:AIRE soil GAC. As part of this

assessment update the screening values have been updated to reflect changes in guideline values that have occurred since the initial screening process took place.

- 4.17 Laboratory results for the soil samples all remained below the relevant updated GAC's (Appendix 4.1). Therefore, the conclusion drawn in the original GQRA remains valid.

*Groundwater / Surface Water Contamination*

- 4.18 Water samples obtained from the site were originally analysed against:

- Atrisk' Water Screening Values (WSV);
- Freshwater Environmental Quality Standards (EQS);
- Drinking Water Standards (UK and World Health Organisation);
- Private Water Supply Regulations (NI) 2010 – updated to 2017 Regulations.

- 4.19 The screening process has been updated to reflect changes in guideline values that have occurred since the initial screening process took place. Laboratory results for the water samples all remained below the relevant updated GAC's. (Appendix 4.2) Therefore, the conclusion drawn in the original GQRA remains valid.

*Erionite*

- 4.20 AWN Consulting have carried out a Risk Assessment in relation to the potential presence of Erionite at the application site (Appendix 4.3). An updated Construction Management Plan responds to this risk assessment (Appendix 4.4). A summary of the main findings is presented below.

- 4.21 A site survey was conducted in January 2019 and representative samples were collected from areas where zeolites were considered most likely to occur geologically. Laboratory analysis was carried out on 8 representative samples utilising optical microscopy and scanning electron microscope (SEM). It was concluded by the laboratory that erionite was not present in any of the samples.

- 4.22 AWN produced a Conceptual Site Model (CSM) based on the desk study review and from information obtained from the site survey. The CSM is summarised as follows:

**Source:** The desk study confirmed that the Antrim basalts within which this quarry occurs does have potential for presence of zeolites including erionite. The site assessment and representative sampling has confirmed presence of zeolites in the quarry including the rock face which requires blasting during construction phase. However, no evidence of erionite were identified on site or were present in any of the representative samples collected.

- 4.23 It was acknowledged however, that although erionite was not identified in the assessment, it is not possible to state that there is no occurrence of erionite present in this site or any area of the Antrim basalt. It is also noted that the presence of erionite in itself is not necessarily a hazard

unless it is present as fibres which can be released to air and there is an exposure route to a receptor by inhalation.

**Pathway:** During operation of the facility, much of the area will be covered in hardstanding which provides a barrier for any disturbance/erosion and there will be no requirement for rock disturbance.

4.24 Although no erionite has been detected on site, as sections of this rock face is known to contain zeolite bearing material, a precautionary approach has been taken for the management of dust generation during construction works and the following additional measures are to be included within the CMP. The appointed Principal Contractor will prepare specific Risk Assessments in relation to working in areas where rock disturbance is required and will include the following conservative measures:

- Potential blasting areas to be inspected for geomarkers i.e. to establish areas where zeolites might be present and probed using suitable coring or fracturing equipment. Cores will be inspected for the presence of zeolites by a geologist with laboratory analysis conducted as required;
- To further confirm any risk of exposure to construction workers (and need for appropriate Personal Protective Equipment (PPE)), representative air sampling and laboratory analysis for fibre release testing will be conducted during initial “trial” blasting works;
- Dust suppression techniques as outlined in the CMP to be utilised. Techniques include:
  - Use wet methods to reduce dust generation where erionite is present (e.g., when drilling rock, apply water through the drill stem to reduce airborne dust, or use a drill with a dust collection system); and
  - Prohibiting dry sweeping or the use of compressed air for cleaning;
- If fibres found to be present within air above recommended occupational exposure levels then the applicable areas will be subject to same exposure measurements and mitigation techniques that apply to sites containing asbestos. Mitigation would include:
  - Avoid/minimise any areas identified as containing erionite mineralisation where possible;
  - Areas of infill that are identified as containing erionite to be capped with a “blinding” layer of aggregate / geomembrane (or equivalent) to protect area from abrasion and any potential fibre release;
  - Consider different construction techniques if areas contain erionite e.g. drilling instead of blasting rock;
  - Protecting employees with PPE, including respiratory protection. Note: An occupational safety and health professional would be consulted for specific guidance

about the most appropriate personal protective equipment that should be used for the work being conducted and decontamination procedures required. Dampening and monitoring will be undertaken to avoid any potential for dust containing fibres extending beyond the works area;

- On-going monitoring of dust for fibres to manage the risk within the construction area and ensure no off-site risk.

**Receptors:** The primary receptors identified are on site construction workers during blasting of rock faces and the exposure to erionite is considered to be low. No identified erionite has been identified within the quarry, however, a precautionary approach is planned to further investigate and manage any credible exposure risk to site workers by coring the rock mass and assessing for erionite presence and assessing presence of erionite fibres in air during blasting works. Note the presence of erionite minerals alone within the rock matrix does not constitute a credible exposure risk to the construction workers and fibre release testing is required to confirm this exposure pathway.

- 4.25 With the further assessment for blast areas and the incorporation of the mitigation measures outlined, there is a low risk to on-site construction workers. Management of any generated dust within the blast area by dampening and monitoring of fibre release to air within the work zone and outside the work area will ensure that there is no likely risk to near neighbours outside of the construction site.
- 4.26 During operation, there is no requirement for disturbance of any rock faces and much of the area will be in hardstanding i.e. providing a barrier to any erosion of the natural rock. Rock faces will be assessed as part of the operational management plan and calcreted if required to reduce the potential for any erosion. As such there is a very low likelihood for exposure to rock containing the mineral.

### **Conclusions**

- 4.27 As part of this re-assessment we have updated the screening (generic assessment criteria) values for the both soil and water laboratory results. All samples remain below the generic assessment criteria and the conclusions made in the original risk assessment remain valid.
- 4.28 Erionite has been identified as an additional potential pollutant source during the construction phase only. Site surveys and sample analysis has not detected the presence of erionite. The operational development will effectively sterilise the use of the site as an active quarry and eliminate any potential erionite hazards.
- 4.29 In addition, a precautionary approach has been taken to consider the potential for unidentified erionite to release fibres during construction works. The proposed mitigation measures are significantly robust to ensure that the potential for the presence of erionite in its fibrous form during the construction phase of the proposed facility will not impact workers on, or near neighbours to the site.