10 LAND, SOIL AND GROUNDWATER

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10.1 Introduction

10.1.1 This environmental statement (ES) chapter provides an assessment of likely significant effects arising from the Proposed Development on land, soil and groundwater receptors. The construction and operational phases of the Proposed Development are assessed.

10.1.2 This chapter (and its associated figures and appendices) should be read in conjunction with other parts of the ES, and with particular reference to the ground conditions Preliminary Risk Assessment (PRA) (RSK, 315531 R01(01), dated June 2024) (see **Appendix 10.1**). The PRA report was commissioned by Tata Steel UK Limited (Tata Steel) (the Applicant).

10.1.3 The Study Area considered within this chapter is the Site (as shown in **Figure 10.1**), plus an area of 1 km outside the Site (justification for the Study Area is provided in **Section 10.5.3** below).

10.1.4 It should be noted that the red line boundary of the Site has been amended following the completion of the PRA report. The figure provided within this chapter reflects the application boundary. Potentially contaminative features identified in the original PRA report are still considered to be representative of the amended red line boundary.

10.2 Statutory and planning context

10.2.1 Legislation and guidance relevant to land, soil and groundwater receptors is summarised in **Table 10.1**. Whilst environmental regulatory duties are overseen by Natural Resources Wales, the Environment Agency guidance documents provided below are also considered relevant.

Table 10.1 Legislation and guidance relevant to land, soil and groundwater

Document	Summary
Legislation	
Part IIA of the Environmental Protection Act 1990.	Provides a statutory regime for identifying and remediating contaminated land.
The Water Resources Act 1991 as amended by the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019 (EU Exit Regulations)	Deals with the management and protection of water resources. It includes requirements to ensure sustainable use of water, prevent pollution and regulate activities that could affect availability or quality of water.
The Water Framework Directive 2000/60/EC as amended by the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019/558	Establishes a framework for action relating to water policy (including groundwater).
The Groundwater (Water Framework Directive) (Wales) Direction 2016	Sets out obligations to protect groundwater.

Document	Summary
The Priority Substances Directive 2008/105/EC as amended by 2013/39/EU	Relates to environmental quality standards for water.
The Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Provides a structure for overseeing activities which have the potential to harm human health or the environment. These regulations include provisions relating to groundwater discharges originally implemented by the Groundwater Directive 2006 (2006/118/EC).
Development Plan Policy	
Future Wales: the national plan 2040 (2021)	The development plan for Wales which influences the planning system at all levels.
Neath Port Talbot Adopted Local Development Plan (2011–2026) (adopted 2016)	The plan for enabling development within Neath Port Talbot, including strategies relating to pollution and land stability and mineral safeguarding.
Material Considerations	
Handbook for Scoping Projects: Environmental Impact Assessment (2012)	Guidance on the preparation of an EIA with regard to contamination issues is presented in this document, and there is a considerable body of guidance to assist both local planning authorities and practitioners in assessing the degree to which land is contaminated and deciding whether such land is contaminated within the meaning of Part IIA of the Environmental Protection Act
Land Contamination: Risk Management guidance, (LCRM) (Environment Agency, 2023)	Provides guidance on the risk assessment process for land contamination.
Guiding Principles for Land Contamination (Environment Agency, 2010)	Provides information for dealing with issues related to contamination, sets out guidance to encourage good practice and provides references to other relevant guidance.
A New Perspective on Land and Soil in Environmental Impact Assessment, Institute of Environmental Management and Assessment (IEMA, 2022)	Guidance for the methodology of assessments relating to land, soil and groundwater receptors in an EIA.
Environmental good practice on site guide (C811), (CIRIA, 2023)	Guidance to fulfil environmental requirements during development works.
Contaminated land risk assessment – a guide to good practice (C552) (CIRIA, 2001)	Guidance for good practice in the risk assessment of contaminated land.

10.3 Consultation undertaken

10.3.0 While no formal consultation has been undertaken on the scope of the land, soil and groundwater ES chapter with Neath Port Talbot Council (NPTC), preliminary discussions

have been held with NPTC relating to a site investigation (SI) which is underway at the time of preparation of this chapter. The site investigation has been scoped on the basis of those discussions and was commissioned by the Applicant, with an intended purpose to provide site-specific data to; inform the detailed design / preconstruction requirements for the Proposed Development, to further refine the conceptual site model for the Site and provide recommendations for remedial requirements. Currently, the intrusive site investigation is projected to be completed by November 2024. The time scale provided may be subject to change dependent upon the ground conditions and results obtained.

10.3.1 Primarily, this chapter has been prepared based on data provided within the PRA (**Appendix 10.1**). Where relevant and available, preliminary data obtained from the SI has been used to supplement the PRA information. In addition, a Coal Mining Risk Assessment was produced by Wardell Armstrong (ref. September 2024 (ref.ST20879/001/v2.0)). This has been referred to in the relevant sections of this chapter.

10.3.2 It is considered that, in combination with the use of a reasonable worst-case scenario applied for the assessments, the data presented within **Appendix 10.1** and **10.2** is sufficient to reach conclusions as to the significant effects associated with the Proposed Development. The assumptions that have been made to inform the following land, soil and groundwater condition assessment are therefore considered robust within the context of an EIA. The assumptions used to inform the worst-case scenario used are described in the limitations section (refer to **Paragraph 10.4.17**) and the site preparation works and typical industry best practice remedial measures for such sites described in **Paragraphs 10.6.10-10.6.12**.

10.4 Approach to the assessment

10.4.1 The PRA report (**Appendix 10.1**) includes a desk-based assessment comprising the following:

- Review of the history of development on the Site and surroundings;
- Review of Environmental Database report (Groundsure, 2024);
- Assessment of local geology, hydrogeology and hydrology;
- Consideration of potential risks from coal mining activities;
- Review of previous reports pertaining to the Site condition;
- Completion of a site reconnaissance survey to assess the visual condition of the Site (site reconnaissance was conducted on 13 to 15 May 2024);
- Development of an initial conceptual site model (CSM) and preliminary risk assessment;
- Preliminary consideration of geotechnical constraints and hazards; and
- Provision of recommendations for further works.

10.4.2 Data from the PRA report, site reconnaissance and the Environmental Database report has been used to determine the established baseline for the assessment of land, soil and groundwater. This information has been supplemented with historical British Geological Survey (BGS) borehole logs presented in **Appendix 10.3** and preliminary ground condition data obtained during the current SI.

10.4.3 Development of the established and interim baseline conditions for the Site has been undertaken using best professional judgement and follows the definitions presented in

Section 4.2 of **ES Chapter 4: Environmental assessment methodology**. Details of the interim baseline, and consideration of this within the assessment, are presented in **Section 10.5** below.

10.4.4 Following completion of the current programme of intrusive works, a SI report, will be produced, with the primary purpose of informing the detailed design, including associated documents such as Risk Assessment, Remediation Strategy Report, Validation Report, etc.

10.4.5 It is anticipated that NPTC would impose standard planning conditions requiring the SI report, plus associated documents such as appropriate Risk Assessment, Remediation Strategy Report, MMP, Piling Risk Assessment and Validation Report, prior to construction. These documents would be formally submitted to NPTC for their approval, and to satisfy the associated planning conditions, prior to any works commencing.

Assessment methodology

10.4.6 The Study Area for the land, soil and groundwater impact assessment is the area within the Site plus land up to 1 km from the Site. The size of the Study Area used for the land, soil and groundwater is based on professional judgement and is considered appropriate because it makes it possible to identify all relevant receptors that may be impacted by the construction and operational phases of the Proposed Development. It is considered to be reasonably unlikely that any aspect of the development could have an impact associated with land, soil and groundwater beyond 1 km.

Value and sensitivity of receptors

10.4.7 There are no regulatory criteria for assessing and evaluating effects on land, soils or groundwater within the context of an EIA. The sensitivity criteria used in the assessment have therefore been derived using best professional judgement with guidance from the Construction Industry Research and Information Association (CIRIA) document Contaminated land risk assessment, A guide to good practice (C552). In addition, the IEMA guide; A new perspective on land and soil in environmental impact assessment has also been referred to when producing the definitions for receptor value and sensitivity criteria. The sensitivity criteria are defined in **Table 10.2**.

10.4.8 The sensitivity of receptors to hazards associated with land, soil and groundwater can be assessed through consideration of the nature of surrounding land uses, proposed end-use, type of construction operations necessary as part of the Proposed Development, surrounding sites of conservation importance and the quality of existing land, soils and groundwater of the Site. The sensitivity of a receptor to an impact is based on the relative resource value of the receptor, the potential resource value of the receptor and the ability of the receptor to adapt to or absorb the change.

10.4.9 The value and sensitivity of potential receptors is judged qualitatively according to the criteria in **Table 10.2.**

Table 10.2 Receptor value and sensitivity criteria.

Value or sensitivity	Definition	Examples
High	The receptor is of high sensitivity and is of value at a national or regional level. The receptor is vulnerable to the effects of the Proposed Development and recovery would be slow and/or costly (e.g. remedial measures to groundwater may be required to prevent a wider impact).	Soils at high risk of damage during construction. Peat at ground surface, particularly with active vegetation. Principal aquifers. Areas of existing mineral extraction, or areas designated for mineral extraction.
Medium	The receptor is of medium value and is likely to be of local importance. The receptor is slightly vulnerable to impacts from the Proposed Development and would be expected to recover over a moderate timescale (e.g. up to 5 years for groundwater to return to its current or an improved condition).	Soils including buried peat deposits with medium risk of damage during construction. Secondary A, B or undifferentiated aquifers.
Low	The receptor is of low value and has little contribution to local, regional or national resources. The receptor is not generally vulnerable to impacts that may arise from the Proposed Development and/or will recover over a short timescale (e.g. up to 1 year before groundwater returns to its current or improved condition).	Soils with low risk of damage during construction. Unproductive strata.
Negligible	The receptor is of negligible positive value. The receptor is not vulnerable to impacts that may arise from the Proposed Development and/or will recover quickly.	N/A

Magnitude of impact

10.4.10 The magnitude of impact has been classified using the criteria presented in **Table 10.3**. These are also derived from CIRIA's Contaminated Land Risk Assessment (A guide to good practice) C552 and the IEMA guide; A new perspective on land and soil in environmental impact assessment. Impacts can be beneficial or adverse.

Table 10.3 Impact magnitude criteria.

Magnitude	Definition	Examples
Major	High likelihood of immediate and significant pollution of sensitive water resources. Total loss or substantial alteration of features of national geological importance.	Irreversible or long-term change well outside the range of natural variation, where recovery could be greater than 10 years, to a large area or an area remote from the development.

Magnitude	Definition	Examples
Moderate	Pollution of sensitive water resources. Significant changes to features of national geological importance.	A change outside the bounds of natural variation to a large area or an area remote from the development, which will recover over a medium period of time (5 to 10 years).
Minor	Pollution of non-sensitive water resources. A minor change in baseline conditions; detectable but not material. The underlying character of the affected feature will be similar to the pre-development situation.	A slight change (within the bounds of natural variation) to an area in close proximity to the development, which will recover over a short time period (1 to 5 years).
Negligible	Very little change from baseline conditions. Changes are barely discernible, similar to a 'no change' situation.	No impact detectable.

Effect significance

10.4.11 Effects are assessed herein by considering the sensitivity of receptors against the magnitude of identified impacts. The matrix (derived from C552) provided in **Table 10.4** has been used to assist in the professional judgement of the effects.

10.4.12 Negligible effects represent no change or a barely perceptible change from the baseline position.

10.4.13 A major or moderate effect is considered significant. A minor or negligible effect is considered not significant (shaded cells in **Table 10.4** indicate significant effects). Where the significance matrix indicates a range for the effect significance (e.g. major to moderate), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied.

Table 10.4 Effect significance matrix

Magnitude of impact	Sensitivity of receptor			
	High	Medium	Low	Negligible
Major	Major	Major – Moderate	Moderate – Minor	Negligible
Moderate	Major – Moderate	Moderate – Minor	Minor	Negligible
Minor	Moderate – Minor	Minor	Minor - Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

10.4.14 An effect is considered to be significant if it meets any of the following criteria:

- It could lead to an exceedance of defined guidelines or widely recognised levels of acceptable change;

- It is likely that the consenting authority will reasonably consider applying a planning condition, requirement or legal agreement to the consent to require specific additional mitigation to overcome the effect;
- It threatens or enhances the viability or integrity of a receptor of concern; or
- It is likely to be material to the ultimate decision about whether the planning application should be approved.

10.4.15 The nature of the effect may be further described in terms of whether it is adverse or beneficial, and the duration, persistency and frequency can be included, as detailed in **Table 10.5.** Mitigation measures for identified effects are listed in **Section 10.7**, with any residual effects considered where appropriate.

Table 10.5 Nature of effect descriptors

Term	Nature of effect descriptors
Adverse	An effect which has the potential to decrease receptor value or status relative to baseline conditions.
Beneficial	An effect which has the potential to increase receptor value or status relative to baseline conditions.
Short-term	Effects that persist only for a short time, e.g. during the construction phase only; includes reversible effects.
Medium-term	Effects that may persist until additional mitigation measures have been implemented and become effective.
Long-term	Effects that persist for a much longer time, e.g. for the duration of the operational phase (essentially until the development ceases or is removed/ reinstated); includes effects which are permanent (irreversible) or which may decline over longer timescales.
Temporary	A reversible effect where recovery is possible and for which effects would persist only for a short or medium-term.
Frequent	Refers to a recurring effect that occurs repeatedly; in some cases a lower level of impact may occur with sufficient frequency to reduce the ability of a receptor to recover effectively.

Limitations

10.4.16 Data on site history has been obtained from third party information and historical maps, which have been assumed to be comprehensive and complete. These are considered to be reputable and standard sources, which provide robust data for the purposes of interpretation.

10.4.17 As would typically be the case during preparation of an ES chapter, current understanding of the Site's underlying geology and hydrogeology is conceptual at this stage. Preliminary data obtained during the site investigation regarding the geology present at the Site (including peat deposits) has however been reviewed and commented upon, where appropriate in the relevant sections below. For the purposes of development of this ES chapter the initial conceptual site model (CSM) developed in the PRA for the Site is reasonable and largely assumes worst-case scenarios. The exception to this is that the CSM set out in the PRA considers groundwater at this site to be a pathway rather than a receptor based on its anticipated reduced quality and sensitivity given the industrial and

coastal context. For the purpose of this ES chapter, a more conservative approach has been taken in considering groundwater as both a pathway and a receptor.

10.5 Established, interim and future baseline

Established baseline conditions overview

Current land use

10.5.0 For the purpose of this assessment the Site has been separated into two zones; Area 1 and Area 2. Area 1 consists of the area that is subject to the detailed planning application for the EAF and Area 2, consists of the area relating to the outline element of the application, which will contain the associated infrastructure for the development, including the widening of existing roadways, car parking, lay down areas and scrap handling. **Figure 10.1** provided in **ES Volume 4** of the ES, illustrates the extent of these zones of the Site. **Figure 10.2** shows the larger site features within the entire development boundary.

10.5.1 The Site is currently being used for a variety of operations. The centre of the Site is being used as a scrapyard, with the majority of the material processed being scrap metal from old appliances, industrial equipment, cars, and other items. The area just north of the scrap yard is used to store and process slag.

10.5.2 The north eastern area of the Site is mainly being used as steel slab storage yards. South of the slab yards are the HAA railway wagon hopper stockyards, which store and sort multiple types of aggregate such as slag, concrete, and other types of industrial rubble.

10.5.3 To the west of the slab and stock yards is an area of vegetation with bushes and grass. The northern part of this area is being used to store more aggregate, waste wood and other materials. Immediately south of this is an area being used to store coal, and associated infrastructure to supply the Morfa Coke Ovens (prior to their closure) to the west.

10.5.4 Directly west of the disused coal storage area is a cylindrical structure used to store gas, which is also associated with the neighbouring coke ovens. The southern end of the Site is an undeveloped flat grassland area with no other current land use.

10.5.5 The extreme north west of the Site encroaches onto the works lagoon, a water body located within the wider steelworks.

Area 1

10.5.6 Area 1 (as shown in **Figure 10.1**) is located to the east and north of a reservoir and the majority of the Proposed Development will cover the existing areas of the Harsco yard, BOS (Basic Oxygen Steelmaking) Plant, HRP (Hot Rolled Products) North Slab Yard and continuous casting plant.

10.5.7 The Harsco Yard, which is located north of the lagoon, is used for the processing of slag and comprises a number of large stockpiles. There is a central roadway for plant movement which is raised several metres. During a site walkover undertaken by RSK as part of the PRA, evidence of surface oil spillages was noted in this area. The Harsco Yard comprises approximately 10 hectares of the Proposed Development area.

10.5.8 The BOS plant is in an approximately rectangular building with railway lines leading in from the north. The area runs north to south adjacent to the Harsco Yard. The BOS Plant and associated rail lines cover approximately 5.60 hectares.

10.5.9 The HRP-North Slab Yard is the storage yard for the steel slab post-production and is located on the north-eastern boundary of the Proposed Development. This comprises surface road stone and rough vegetation and some above ground utility pipes and covers approximately 4.5 hectares.

Area 2

10.5.10 There are multiple roads running through the Site and several rail lines generally running north to south in the eastern part of the Site. These connect the coal storage, slab and stock yards for the Paddington to Swansea main line railway to the north-east.

Surrounding land

10.5.11 The area surrounding both Area 1 and Area 2 is predominately part of the wider steelworks site. Directly west of the Site are the Morfa Coke Ovens and associated infrastructure, where coal was blended and heated to form coke for iron production (prior to closure in March 2024). Approximately 450m west is the Bristol Channel. South of the works lagoon and adjacent to the Site is a steel service centre. North of the works lagoon is the BOS Plant and the Concast Plant, where steel is made, treated and processed to ultimately form steel slabs. North of the BOS and Concast Plants are various stock storage yards that also contain aggregates such as slag, and two gas holders for the BOS Plant and blast furnace. Further north of this is the sinter plant and raw materials stock yards where iron ore, limestone, coal and coke are stored. To the east of the sinter plant are the blast furnaces and power plant where iron is produced from coke, iron ore and sinter as well as other materials.

10.5.12 The area directly east of the Site and situated in the south-east of the wider steelworks is the Hot Mill where Hot Rolled Coils are produced from steel slabs. Access roads and rail lines are present to transport products and raw materials.

10.5.13 Beyond the steelworks itself are residential and commercial areas to the north, residential areas and hilly open fields to the east, a reservoir approximately 360m to the south-east, moorland to the south, with Morfa beach and the Bristol Channel to the west.

Site history

10.5.14 Historical mapping shows a legacy of coal mining at the Site and the surrounding area with mapping from 1876 to 1921 indicating that the majority of the Site was undeveloped, with the only buildings on-site located on the west and associated with the Morfa Colliery. Historical features noted to be within the Site include; multiple railway lines, a reservoir and several buildings/structures. A main railway line is shown to the east trending from north to south. Historical mapping then shows a general reduction in the extent of mining features over time, with the Site shown in its current configuration by the map edition of 1965.

10.5.15 Within Area 1 specifically, the historical mapping from 1876 to 1921 shows that numerous buildings and several railway lines are present on-site associated with the Morfa Colliery on the southern portion of Area 1. Railway lines are shown associated with the pits. The

majority of Area 1 is shown as marsh land. From 1947, the pits are no longer present and the colliery operation appears to have reduced in extent. From the 1965 map edition, Area 1 is shown to be similar to its current condition, with the lagoon dominating the centre and the current steel works present on the north, east and south-east of Area 1.

10.5.16 Within Area 2, the historical mapping shows the area to have been predominately undeveloped agricultural land and moorland from 1876 to 1965, with the colliery noted on the north. From 1965, the majority of Area 2 is dominated by the development and expansion of the steelworks. Features identified within the steelworks include railway lines, tanks, gas holders, coke ovens and chimneys (the majority of which were identified during the site reconnaissance completed for the PRA).

10.5.17 No new historical features have been identified within the applications redline bound since the production of the original PRA report.

Information from environmental database report

10.5.18 Relevant information from the environmental database search is summarised below:

- Discharge consents:
  - On-site consent for final/treated effluent from Site into Swansea Bay, effective from 26/03/2021; and
  - Five active discharge consents within 250 m of the Site – two for the discharge of storm waters, two for the discharge of final/treated effluent and one for sewage discharge. Receiving waters are either the Swansea Bay or the Croeserw Brook.
- Registered radioactive substances:
  - There is a single permission for the disposal of radioactive substances on-site, which has been active from 01/06/1998. The latest entry in the environmental database effective from 2008 and updated in 2015 indicated that the permission (ref.BA6321) had been revoked / cancelled.
- Landfill and waste
  - Active landfill - the nearest is located 263 m south, operated by Tata Steel UK Limited (Tata Steel), accepting industrial waste (landfill reference 34270);
  - Historical / closed landfills – “refuse tip” noted 16 m west on 1974 mapping and 76m north on 1952 mapping, but no further details provided; and
  - Waste transfer station - one noted 223 m south associated with a historical planning application for the construction of a facility to recover quality material from waste tyres.
- Hazardous substances/ industrial land uses
  - Control of Major Accident Hazards (COMAH) sites - COMAH upper tier operator on-site for the current Tata Steel UK Limited (Tata Steel) activities; and
  - Notification of Installations Handling Hazardous Substances (NIHHS) – the Site is a historical NIHHS facility for the British Steel stripping products.

Unexploded ordnance

10.5.19 A detailed unexploded ordnance (UXO) risk assessment has been carried out by RSK Ordnance, which shows that the northern half of the Site is classified as medium risk with the southernmost area classified as low risk. The full UXO report is available within the PRA report and highlights the following:

- The overall risk from both German and Allied UXO is moderate
- The overall risk of harm to human health is given as severe.

10.5.20 Details of UXO mitigations which should be incorporated into any subsequent ground investigations are given as the following:

- UXO safety awareness briefings
- Intrusive magnetometer survey
- Non-intrusive magnetometer survey
- UXO watching brief.

10.5.21 Details provided within Chapter 2.9 of the UXO risk assessment indicates that foundation solutions for the Proposed Development will likely comprise an estimated 3,000 piles using a combination of driven precast concrete and cast in situ installation. For the construction phase, it is recommended that a construction specific UXO risk assessment is undertaken and any mitigation requirements are incorporated into the construction phase health and safety plans.

Geological units

10.5.22 According to the British Geological Survey (BGS) interactive map, the published geological maps show the Proposed Development is underlain by made ground at the surface in all areas. The historical mapping indicates that the Site has undergone various phases of demolition and significant redevelopment. As such, made ground is anticipated to be of variable thickness.

10.5.23 Superficial geological deposits underlying the Site comprise a combination of Marine Beach deposits (typically sand and gravel), Tidal Flat Deposits (typically clay, silt and sand) and Blown Sand. Till and Glaciofluvial deposits are noted to be mapped to the east of the Site, with occasional pockets of peat.

10.5.24 Bedrock geology comprises a combination of the Middle and Lower South Wales Coal Measures Formation.

10.5.25 It is anticipated that the geological succession underlying the Site will comprise a combination of Marine Beach deposits, this in turn may be underlain by Tidal Flat and Glaciofluvial deposits followed by Till. These units will rest on sedimentary rock cycles of the Middle and Lower South Wales Coal Measures Formation.

10.5.26 Historical borehole records, (dated between 1940 and 1957) available on BGS interactive viewer, and presented in **Appendix 10.3**, for the vicinity of the Site confirm the anticipated geological sequence, showing made ground deposits to a depth of between 0.5 m and 4.5 m below ground level (bgl), with natural deposits comprising predominately granular material over cohesive strata interbedded with thin bands of peat. Till deposits were typically reported in the BGS boreholes at depths of 15.0 m to 24.0 m bgl. Given the age and limited distribution of the historic boreholes available for the Site, the depths presented may not be fully representative of the ground conditions currently at the Site.

10.5.27 No additional geological units have been noted within the redline boundary since production of the original PRA report.

10.5.28 However, preliminary ground investigation information obtained from the intrusive site investigation indicates ground conditions (i.e. geological succession) similar to the historic published information.

10.5.29 Information presented on the BGS interactive UK Radon map indicates that the Site is not located within a radon reporting area.

Peat deposits

10.5.30 Peat deposits are varied across the Site and are all buried to a depth of 4.5 m or deeper. The available ground investigation results indicate that layers of peat of up to 1 m in thickness are present at various levels, with various additional layers of superficial deposits described as ‘peaty’ or ‘containing peat’.

10.5.31 The more continuous peat deposits are described as fibrous to pseudo-fibrous, amorphous in some locations and variably stiff, firm or hard.

10.5.32 Peaty elements of other superficial layers are likely to represent re-working of previously formed peat bodies.

10.5.33 As all of the peat material is buried, there are no areas of active peat present at the site and therefore are no areas of active carbon sequestration. However, all the peat material will be acting as a carbon store.

Sites of geological importance

10.5.34 Information presented within the Environmental Database report indicates that there are no designated sites of geological importance on-site or within 1 km of the Site.

Mineral resources

10.5.35 The Site is located within a coal mining reporting area and includes a development high risk area. A Coal Mining Risk Assessment (CMRA) was undertaken by Wardell Armstrong on behalf of the Applicant in September 2024 (ref.ST20879/001/v2.0). The CMRA report indicates that several named coal seams subcrop beneath the ground within the Site. A BGS log for Grange Pit is referenced which indicated rockhead at this location at a depth of approximately 25m below ground level (bgl) with thin seams of coal from approximately 28m bgl. BGS data indicates that coal mining was undertaken in four seams but based on borehole and other records, Wardell Armstrong suggest that up to 13 proven or conjectured seams might be present. Coal Authority records indicate that three mine entries are present within the boundary, identified as mineshaft 277186-001; Grange Pit, mineshaft 277186-002; Abbot Upcast Pit, and mine entry 277186-003. With respect to this latter feature reference, Wardell Armstrong suggest that based on inconsistencies in the source mapping, this may not be an erroneous reference to a mine entry.

10.5.36 The CMRA concludes that potential geotechnical constraints are present at the site as a result of historic coal mining activities which are potentially within a depth at which there is the potential for influence on the proposed development without mitigation. It is understood that the Proposed Development layout has already considered some aspects of the coal mining risk, which includes the positioning of sensitive plant and structures

away from known/potential mine shafts. Wardell Armstrong recommend that an intrusive investigation is required, to include determination of the position of rockhead and a mine gas risk assessment. The current ground investigation undertaken by RSK includes investigation of bedrock to confirm the presence and condition of shallow coal seams. The site investigation data may provide additional information on coal mining risks which will allow mitigation through detailed design. The CMRA concludes with a statement to highlight the fact that, construction on sites with a coal mining legacy is common practice and that the features and potential hazards on site are not unusual and can be overcome with engineered mitigation.

10.5.37 The site is shown to be within a Mineral Safeguarding Area (Policy M1) with respect to safeguarded coal resources in the Neath Port Talbot Local Development Plan. Whilst geological mapping indicates the presence of sand and gravel deposits including Blown Sands and Glaciofluvial deposits to the west of the Site, the Site itself is not mapped as being located within a Mineral Safeguarding Area for these deposits.

Soil resources

10.5.38 Due to the industrial legacy of the Site, large areas are occupied by hardstanding. However, according to SoilScapes mapping (LandIS), there are two main soil associations within the Site, with one further association within the Study Area. The Site is predominantly underlain by soils from SoilScape 21, which are defined as loamy and clayey soils of coastal flats with naturally high groundwater. A strip of land within the Site, parallel to the south-western boundary, and also off-site to the south, is occupied by SoilScape 4, described as sand dune soils. Land to the north and north-east of the Site (within the Study Area) is classified as SoilScape 6, which includes freely draining slightly acid loamy soils. No agricultural land is located within the Study Area.

10.5.39 As set out in **Paragraphs 10.5.22-10.5.29**, the Site is underlain by superficial geology deposits which may comprise layers or pockets of peat. Land to the west of the Site is indicated to include sporadic pockets of peat (see section 14.3 of the Environmental Database report, provided within the PRA report, **Appendix 10.1**), which is corroborated by records from BGS boreholes.

Groundwater

10.5.40 The Environmental Database report indicates that the bedrock geology underlying the Site (South Wales Lower and Middle Coal Measures) is classified as Secondary A aquifer. The superficial Tidal Flat Deposits across the majority of the Site are classified as Secondary (undifferentiated) aquifers. The north-eastern corner of the Site is classified as a Secondary A aquifer relating to the Blown Sand deposits.

10.5.41 The Environmental Database report indicates that no licences for groundwater abstraction have been identified within the Study Area and no designated aquifer source protection zones have been identified within the Study Area.

10.5.42 Given the proximity of the Site to the Bristol Channel it is likely that groundwater quality beneath the Site is affected by saline intrusion.

10.5.43 Given the industrial legacy of the Site and surrounding area and the anticipated saline intrusion, the quality of the water in the aquifers within both the superficial deposits and

the underlying bedrock is likely to be low, reducing the value of this receptor as a resource.

Geological hazards

10.5.44 Potential geological hazards which will need to be taken into account as part of the design process (foundation design) based on the Site geology and history may include the following, based on information from the Environmental Database Report:

- Sudden lateral changes in ground conditions;
- Shrinkable clay soils;
- Highly compressible and low bearing capacity soils, (including peat and soft clay);
- Silt-rich soils susceptible to rapid loss of strength in wet conditions;
- Running sand at and below water table;
- Ground subject to or at risk from coastal or river erosion;
- High groundwater table (including waterlogged ground);
- Underground mining including shafts and adits (e.g. coal, mineral);
- Existing sub-structures (e.g. tunnels, foundations, basements, and adjacent sub-structures);
- Filled and made ground (including embankments, infilled ponds and quarries); and
- Adverse ground chemistry (including expansive slags and weathering of sulphides to sulphates).

Baseline receptors

10.5.45 The description of the established baseline given in the sections above allows the land, soil and geology receptors to be identified. **Table 10.6** summarises the relative value of baseline receptors on the basis of their value and sensitivity. As outlined in the methodology section above, this will be used in combination with the assessment of the magnitude of impacts to determine the likely significant effects arising from the Proposed Development.

Table 10.6 Summary of Land, Soil and Geology receptors

Receptor type	Description	Value / sensitivity
Geological units	Marine Beach Deposits, Tidal Flat Deposits, Blown Sands, Middle Coal Measures.	Low
Peat deposits	Present within superficial deposits	Medium
Sites of geological importance	None within the Site or within 1km	Not considered further
Mineral resources	Marine Beach Deposits, Tidal Flat Deposits, Blown Sands (sand / gravel extraction), Middle Coal Measures.	Low
Soil resources	Loamy and clayey soils, sand dune soils, freely draining slightly acid loamy soils, superficial soils containing peat.	Low (no peat deposits anticipated at surface)

Hydrogeology	Tidal Flat Deposits: (Secondary aquifer (undifferentiated)) Blown Sands: Secondary A aquifer Middle Coal Measures: Secondary A aquifer	Medium

Interim baseline

10.5.46 As specified in **ES Chapter 4: Environmental assessment methodology**, established baseline is defined as "The steelworks with 'heavy end' as operating in early 2024 and for the majority of the preceding 50+ years". Land, soil and groundwater details provided above are considered to represent the current Site's established baseline.

10.5.47 The interim baseline is defined in **ES Chapter 4: Environmental assessment methodology** as "The steelworks as they will operate at the time of planning determination with closure of the 'heavy end'" with further detail indicating that operations will run down with plant, machinery and buildings to be made safe but retained on-site, with no demolition. Assuming that the structures will remain on-site, for the land, soil and groundwater factors, it is not anticipated that there would be a significant difference between the established baseline and the interim baseline. It has also been assumed the other operations will continue at the Site which will require a variation to be applied, rather than surrender of the Site's current Environmental Permit. Furthermore, comments have been provided below relating to potential climate change impacts (see **Paragraphs 10.5.48–10.5.50**). As such, it is considered that the established baseline is a suitable reference point for this ES chapter. The significance of effects will be reported relative to the established baseline only as it is unlikely that changes between the established and interim baseline will affect any conclusions.

Future baseline

Climate change

10.5.48 Potential uncertainties exist relating to climate change impacts, including predicted increases in extreme weather events and predicted long-term impacts, for example rising groundwater levels or tidal changes. Impacts of climate change are discussed in depth within **ES Chapter 13: Climate change**. Factors which have the potential to impact land, soil or groundwater are considered below.

10.5.49 Effects that may occur due to climate change could include increased rainfall and extreme weather events (i.e. flood and storms), increased seasonal variations in groundwater levels, resultant changes to soil moisture content, and potential for increased mobilisation of existing contaminants (if present) due to these effects.

10.5.50 It is considered that sites close to the coast are more likely to be susceptible to climate change effects due to risks of coastal flooding or erosion due to the action of the sea.

Potential for effects due to flooding and coastal erosion

10.5.51 Flood risk assessment data provided by Natural Resource Wales indicates that a portion of the southern section of the outline planning area is in Flood Zone 3 from river and

coastal flooding. In addition, numerous small areas present across the Site are mapped as Flood Zone 3 for surface and small watercourse flooding.

10.5.52 Given the proximity of the Site to the coast, and its current flood risk classification, there is a potential for impacts to occur to land, soil and groundwater due to climate change if flood and rainfall events increase over time.

10.5.53 The BGS interactive map provides data relating to coastal erosion and inundation for the entire UK. Data has been obtained from the Lavernock Point to St. Ann's Shoreline Management Plan 2 (SMP2), dated January 2012. This document encompasses the majority of the southern coast of Wales.

10.5.54 Details from within the SMP2 indicate that the current strategy is for addressing coastal issues through the "maintenance and upgrading of existing defences to reduce the risk…to industrial assets".

10.5.55 Resilience to climate change effects is not known, but the Proposed Development would not be expected to reduce the existing resilience, as long as coastal defences are maintained appropriately. As such, no additional mitigation measures are considered necessary to address potential coastal erosions and inundation.

Potential for effects due to shrink-swell clays

10.5.56 One of the likely geotechnical implications resulting from climate change impacts is that longer hotter summers will increase the zone of seasonal moisture variation in the upper soil horizon, potentially leading to an increase in shrink-swell effects in clay soils. Furthermore, warmer wetter winters can cause rebound of soil moisture levels, leading to swelling. These changes could give rise to increases in subsidence and heave issues and hence insurance claims for existing buildings. The effects can also be exacerbated where building near trees resulting in desiccation (NHBC Standards Chapter, 2024). This and other potential climate change-related impacts are considered in NHBC report NF93 – Foundation solutions: future proofing against climate change (NHBC, 2023a).

10.5.57 The BGS GeoClimate UK Climate Projections 2018 (UKCP18) study (BGS, 2023) considers the potential influence of climate change on the probability of subsidence. These BGS GeoClimate shrink–swell national datasets were developed by combining long-term UKCP scenarios for rainfall and temperature changes with the geotechnical properties of the ground, so as to identify areas projected to experience the largest increases in susceptibility to shrink-swell subsidence. The GeoClimate UKCP18 Open data is provided for two time periods, the 2030s and the 2070s, with one projection provided for each time period, based on the average outcome for the UKCP18 higher emissions scenario and the most susceptible value (i.e. worst case) within the GeoSure grid cell.

10.5.58 This data is available on BGS GeoIndex and the 2070 layer has been consulted for the Proposed Development at the Site. This indicates that it is improbable that foundations will be affected by increased clay shrink-swell due to climate change based on GeoClimateUKCP18.

10.5.59 Overall, potential climate change impacts are not considered to have any significant impact or effects on the established or interim baselines for the Proposed Development in relation to land, soil and groundwater.

10.6 Project characteristics and embedded mitigation

Construction phase

10.6.1 The Proposed Development is taking place on a site with extended historical use and as with all such sites, an assessment of soil and groundwater contamination through ongoing intrusive site investigation, and the preparation of a Remediation Strategy would form part of the pre-construction phase (as detailed in **Paragraphs 10.4** below). Construction of the Proposed Development would require initial site preparation through demolition of existing buildings and general site clearance followed by phased earthworks to enable creation of a development platform. Remedial works to address soil and groundwater contamination are anticipated to form part of this initial groundwork. Further embedded mitigation would be implemented throughout the construction phase.

10.6.2 Pre-construction assessment of the Site in terms of soil and groundwater contamination is being undertaken in accordance with UK guidance relating to the investigation and remediation of contaminated land (Environment Agency (2021a), Land contamination risk management, (LCRM), April 2021). Further information is provided in **Paragraphs 10.6.9-10.6.12**.

10.6.3 The majority of mitigation measures recommended are standard good practice for construction projects, and as such will be embedded mitigation measures as part of the construction environmental management plan (CEMP) for the Proposed Development. Generally, all of the proposed mitigation would be applicable for the construction stage of the development, with some elements also being relevant during the operation phase.

10.6.4 Specific measures relating to land, soil and groundwater that have been incorporated into the outline CEMP (provided in **Appendix 2.1** of this ES) are as follows:

- Construction site layout will be designed to reduce the likelihood of environmental issues or nuisance and good housekeeping should be maintained at all times;
- If appropriate, fencing or screening will be employed to segregate excavated materials prior to re-use or removal from the Site;
- Concrete used for the proposed foundation shall meet the design requirements specific to the made ground soil conditions at the Site. This shall be determined via soil testing from the Site;
- Infrastructure pipes and cables will be laid within suitable, clean backfill material;
- Any new areas of soft landscaping will comprise suitable fill of an appropriate thickness;
- A pollution incident control and emergency preparedness plan will be maintained by the construction contractor and this will consider sensitive receptors identified at the Site;
- The pollution incident control and emergency preparedness plan will include a list of measures and processes to be implemented in the event of environmental incidents;
- Control measures relating to prevention of impact from fuels or chemicals will include, but not necessarily be limited to, the following:
    - static plant will be used with secondary containment measures, such as plant nappies, to retain any leakage of fuel or oil and reduce the risk of pollution;
    - spill kits will be provided where appropriate to reduce the risk of pollution; and

    - oil interceptors will be used at site offices and work compounds.
- Unexpected contaminated soils, or contaminated groundwater encountered (i.e. that which was not detected during SI) where appropriate will be separated from other materials and, wherever reasonably practicable, be treated to remove or reduce the risk. Where practical, material will be reused within the Site where it is needed and suitable for use. Contaminated soil disposed of off-site will be taken to a soil treatment facility or an appropriately permitted landfill site (see **Paragraph 10.6.5**); and
- All waste will be managed in accordance with the waste hierarchy which aims to reduce waste at source and to reduce the quantity that requires final disposal to landfill. This applies to excavated material arising on-site, which will be reused within the Site as far as reasonably practicable.
- In the event that excavated material is to be sent for disposal, testing and classification will be undertaken by the contractor in line with industry guidance (including Dispose of Waste to Landfill and WM3 – Guidance on the classification and assessment of waste).

10.6.5 A materials management plan (MMP) would be developed prior to construction (to be secured by planning condition) in accordance with the Definition of Waste: Development Industry Code of Practice (Version 2 March 2011 CL:AIRE) to set out the processes to be adopted in respect of the reuse of excavated materials. This would identify the source areas from which materials to be re-used would be derived and the intended deposition areas. It would cross-reference the suitable for use criteria set out in the Remediation Strategy and the overall MMP document would be signed-off by a CL:AIRE registered Qualified Person (QP).

10.6.6 A Soil Management Plan (SMP) would be developed prior to construction (to be secured by planning condition), which will include methods to protect soil resources. These should conform to the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009). The Soil Management Plan will include, but not necessarily be limited to, the following:

- Details relating to the separate storage of different types of topsoil, subsoil and mineral substrate should be agreed and defined in advance;
- A requirement that, prior to removal and storage, the topsoil should be either bare or with short surface vegetation;
- Soil stripping should follow the guidance in the Defra Code of Practice (2009);
- Soil stockpiles should be constructed in accordance with Defra guidance, and not be within 8 m of surface water features;
- Stockpiles should be maintained by seeding to protect against erosion, minimise nutrient loss and maintain biological activity; and
- Soil reinstatement should be completed to restore the land to the original quality by returning the soil elements in the correct order and ensuring that drainage and root development will be optimised.

Embedded mitigation relating to addressing contamination affecting soil, geological units peat or groundwater (construction phase)

10.6.7 As noted above, pre-construction assessment of the Site in terms of soil and groundwater contamination is being undertaken in accordance with UK guidance relating to the investigation and remediation of contaminated land (Environment Agency (2021a), Land contamination risk management, (LCRM), April 2021).

10.6.8 The historical review and current Site activities baseline assessment above has identified potential sources of contamination at the site associated primarily with the Site use as a colliery from approximately 1876 to 1965. Site specific land, soil and groundwater condition data will be obtained during the current site investigation that is underway. The CSM will be updated to reflect the site-specific data.

10.6.9 In accordance with LCRM, the site-specific ground investigation report and associated quantitative risk assessment will determine the nature of mitigation measures required (if any) and these would be described within a Remediation Strategy (RS) document to ensure that significant adverse effects do not occur. This type of requirement would be conditioned through the planning process.

10.6.10 Preliminary information from the site investigation to date indicates soil and groundwater quality as might be expected for a former industrial site of this kind with contaminants present that can be addressed via standard remedial techniques.

10.6.11 Remediation measures could include, if required (and assuming a worst-case scenario), removal of shallow hotspots of soil contamination and associated earthworks including application of cover soils, groundwater remediation, installation of gas/vapour membranes beneath buildings and selection of appropriate concrete and infrastructure materials. Remedial works (if required) would be expected to achieve target criteria (in soils and or groundwater) set out in the RS which would demonstrate an improvement in soil and / or groundwater quality from baseline conditions. Remedial actions would also be expected to mitigate against potential effects during construction (e.g. removal of near surface contamination, preventing mobilisation of contaminants during the installation of foundation piles). A Remediation Validation Report would be prepared to demonstrate the works had been completed in accordance with the RS.

10.6.12 The MMP, aligned with the RS would be produced for the construction phase to allow all material types to be tracked, showing their point of origin, storage, re-use or disposal. The plan would be produced prior to the commencement of works and shall incorporate information obtained from site data, which will support the rationale for the methods of storage and re-use. Appropriately qualified technical personnel will produce the plan, which will also incorporate details of contingencies that can be initiated in the event of unexpected occurrences, such as discovery of non-compliant materials, or incorrect procedures having been followed. Any material destined for off-site disposal or to be imported to the Site will be subject to appropriate testing and validation in line with industry best practice and waste regulations.

Embedded mitigation relating to geological units (construction phase)

10.6.13 The site investigation will provide site-specific information on ground conditions at the Site, to enable suitable construction design and planning. Furthermore, the inclusion of a CEMP, MMP and SMP as detailed above, will reduce potential impact to superficial and bedrock geological units.

Embedded mitigation relating to hydrogeology (construction phase)

10.6.14 During the construction phase, all fuel management risk assessments will be incorporated in the CEMP. Fuel storage will comply with the relevant storage regulations and only trained and appointed personnel will be permitted to re-fuel vehicles and equipment.

Refuelling will be undertaken in designated areas; spill kits will be available so that immediate attention to spills can be given. All spills will be reported, and the impacted material removed.

10.6.15 Given the proximity of the Site to Swansea Bay and the presence of a water body within the Site, it is likely that dewatering of excavations will be required during the construction phase. Safe access and egress are to be incorporated into excavation design, which will also consider the flow of water into the void. Appropriate licences will be obtained for all de-watering operations that require discharge to either drainage systems, land or surface water channels. Actions appropriate to achieve the consent limits will be incorporated, including such requirements as limits on silt loading, chemical and temperature conditions and scouring of banks on surface channels.

Operational phase

10.6.16 Some elements of the management plans from the construction phase will need to remain in place for the operation phase, to ensure that activities such as storage of fuels and chemicals, refuelling of plant, and waste management, continue to be managed correctly.

10.6.17 As discussed in **ES Chapter 2: Proposed development** and mentioned above, the Site is a COMAH upper tier site and subject to the COMAH Regulation 2015. COMAH sites are obligated to hold and maintain a 'safety report' which will outline all necessary measures to limit the consequences for a major accident to people and the environment. The Site currently has an Environmental Contingency Plan (ECP) and an Environmental Emergency Plan (EMP). These will require updating and expansion to incorporate any changes at the Site. **ES Chapter 2: Proposed development** also indicates that local authority involvement is in place at the Site with a Major Emergency Plan (MEP) and Local Emergency Plan (LEP).

10.6.18 In addition, the Site is further regulated under an Environmental Permit (EPR/BL7108M) and operation of the Proposed Development would be undertaken under a variation to the existing environmental permit, which would require an updated Site Condition Report, a monitoring programme and emergency response plan. Pollution control measures set out in the permit would add certainty that activities during the operation phase will not result in significant effects on land, soil and groundwater receptors.

Embedded mitigation relating to geological units, peat, and soil resources (operation phase)

10.6.19 Controls implemented under the current Site regulatory requirements are designed to prevent any impact to land, soil and groundwater. Where any impact does occur, the ECP and EMP will ensure controls in place to minimise impacts (such as hardstanding and bunding in fuel storage areas) and require clean-up operations to be implemented.

Embedded mitigation relating to hydrogeology (operation phase)

10.6.20 Raw materials will be stored, handled and controlled in accordance with COSHH regulations with any specific requirements incorporated into the production process. Controls will be in place to prevent impact to groundwater (such as the presence of hardstanding and bunding in fuel storage areas). Any spill, leaks or discharges will be managed in accordance with the EMP.

10.7 Assessment of potential effects

10.7.1 The potential effects of the construction and operation phases of the project on issues associated with land, soil and groundwater are considered in this section. Each identified receptor is discussed in turn. **Table 10.5** provides details of the anticipated effects, alongside the magnitude of the effect, the sensitivity of the receptor and the significance of effect that have been calculated based on the definitions provided in **Table 10.2**, **Table 10.3** and **Table 10.4**.

Predicted construction effects

10.7.2 The following potential pollutant sources have been identified by the baseline assessment of the Site, and these have the potential to impact on sensitive receptors identified within this land, soil and groundwater chapter. Potential pollutant sources are listed in this section, with subsequent sections indicating how the sources could impact on geological units, peat, mineral resources, soil resources or groundwater receptors:

- On-site:
    - contaminants associated with made ground, the area of former coke ovens, the BOS plant and coal yards, areas of storage of oils/chemicals on-site, the warehouse/engineering works, underground/above ground storage tanks and associated pipework, the scrap yard and railway lines/sidings. These could be present in shallow unsaturated soils and/or shallow groundwater/perched groundwater and potential leaks and spills from the current and former use of the Site as a steel works.
- Off-site:
    - contamination in shallow groundwater/perched water and pollutants from nearby industrial processes associated with the wider steelworks to the north, Morfa Coke Ovens to the west and the railway lines bounding the Site to the east.

Geological units

10.7.3 Based on the data obtained from the baseline assessment, the Site is underlain by made ground deposits associated with the historical use as a colliery and subsequent redevelopment to the current use as a steel works. Made ground deposits potentially up to 4.5 m in thickness are likely to be underlain by predominantly granular superficial Marine Beach or Tidal Flat deposits. These are typically interbedded with cohesive deposits and occasional thin bands of peat and ultimately underlain by Till. Bedrock comprising the Lower South Wales Coal Formation consisting of cyclical sequences of sedimentary rock encountered at depths anticipated to be between 15 and 24 m bgl.

10.7.4 Effects relating to the geological units could include extraction of superficial geological units and bedrock (if required) for excavations for buildings and infrastructure (including effects from piling). During such excavation, there is the potential to mobilise existing known contamination or the release of unknown contamination, affecting the geological units over a wider area through direct mixing or leaching. It would also be possible to affect geological units during construction by incorrect storage or handling of fuels, materials, oils or chemicals or disturbance of made ground containing historical contaminants (e.g. asbestos) leading to physical mixing with natural geological units.

10.7.5 Demolition and removal of existing buildings and hardstanding could result in the removal of surface cover which could expose and facilitate leaching of near-surface contaminants into the underlying geological units through rainfall percolation.

10.7.6 Piled foundations may create a preferential pathway for vertical migration of contaminated groundwater, allowing pollution of deeper geological units. A Piling Risk Assessment would be expected to be undertaken as part of the design process, in order to determine mitigating actions to control such migration.

10.7.7 During construction, physical excavation of superficial deposits should be relatively straightforward. Initial SI data indicates ground conditions similar to anticipated geology and made ground composition as would be expected on a former steel works site including deposits of solidified slag. The presence of solidified slag is likely to provide a constraint to ease of excavation in some areas. Additional geotechnical constraints (which would be expected to be identified during the SI) could include groundwater ingress, running sands, instabilities in excavations, etc., which could potentially cause an impact on the construction programme. Any constraints identified would, however, be mitigated via the development design process. The construction phase embedded mitigation set out in **Paragraphs 10.6.10-10.6.13** above with respect to ground contamination would be expected to mitigate against the effects to geological units described above.

Proposed additional mitigation

10.7.8 No additional mitigation is proposed to reduce the impacts on geological units.

Residual construction effects

10.7.9 Based on a 'low' receptor sensitivity for Geological Units and a 'minor' impact magnitude for construction phase impacts, this would represent a **minor** direct and either medium or long term adverse effect, which is **not significant**.

Peat

10.7.10 Following consultation with NPTC, a Technical Note on Peat (**Appendix 10.4**) was produced to address concerns over peat disturbance during construction.

10.7.11 Available ground investigation results confirm that peat deposits are present within the Site at depths from 4.5 to >18 m below ground level. Although there is no peat at ground surface with an 'active' vegetation layer, peat bodies remain of importance for their carbon storage.

10.7.12 During construction, pile driving, excavation of foundations and horizontal directional drilling (HDD) for cable installation are likely to encounter peat bodies in some parts of the Site. Disturbed and excavated peat could be susceptible to drying out, causing release of stored carbon. In the absence of detailed design, there remains uncertainty over the potential volume of peat that would have to be excavated. Peat disturbance in situ is expected as part of the pile driving process and arisings can be stockpiled separately. Where HDD is proposed for cable routes it is unlikely to be possible to separate peat from other arisings brought to the surface but the volumes incorporated as the drilling equipment passes diagonally through peat horizons are likely to be very low.

10.7.13 Some principles of peat handling are necessary to minimise release of stored carbon from peat deposits. Where peat requires to be excavated, it would be stored in covered

stockpiles no more than 1 m in height. In dry weather water sprays would be used to minimise drying. All excavated peat would be reburied in suitable locations within the Site as part of the site reinstatement. Where possible, peat would be placed below the normal water table level to ensure it remains waterlogged and can retain its stored carbon in the long term as specified in a Peat Management Plan (PMP). The requirement for a PMP will likely be included within planning condition and mitigated via construction and development design.

Proposed additional mitigation

10.7.14 No additional mitigation is proposed to reduce the impacts on peat.

Residual construction effects

10.7.15 Based on a 'medium' receptor sensitivity for peat and a 'minor' impact magnitude for construction phase impacts, this would represent a **minor** direct and long term adverse effect, which is **not significant**.

Mineral resources

10.7.16 The established baseline section of this chapter (see **Section 10.5**) has identified that the Local Development Plan shows that the Site is within a Mineral Safeguarding Area (MSA) for safeguarded coal resources.

10.7.17 Given the Site's legacy for coal extraction and the current use of the Site as a steel works, is it unlikely that any remaining coal reserves would be considered for extraction. Impacts on important mineral resources are therefore not anticipated as a result of construction works associated with the Proposed Development.

Proposed additional mitigation

10.7.18 No additional mitigation is proposed to reduce the impacts on mineral resources.

Residual construction effects

10.7.19 Based on a 'low' receptor sensitivity for mineral resources and a 'minor' impact magnitude for construction phase impacts, this would represent a **minor** direct and either medium or long term adverse effect, which is **not significant**.

Soil Resources

10.7.20 The established baseline section of this chapter (see **Section 10.5**) has identified that the soils within the Study Area are not of agricultural value, and much of the Site is occupied by buildings or hardstanding. Activities with the potential to affect soils at the Site include the removal of topsoil during construction, potential mobilisation of known existing contamination, potential mobilisation of unknown contamination and incorrect storage or handling of fuels, materials, oil or chemicals.

Proposed additional mitigation

10.7.21 No additional mitigation is proposed to reduce the impacts on soil resources.

Residual construction effects

10.7.22 Based on a 'low' receptor sensitivity for soil resource and a 'minor' impact magnitude for construction phase impacts, this would represent a **minor** direct and long term adverse effect, which is **not significant**.

Hydrogeology

10.7.23 The Tidal Flat deposits present across the majority of the Site are a secondary (undifferentiated) aquifer, with the Blown Sands on the north-east classified as a secondary A aquifer. The South Wales Lower Coal Measures are also as a secondary A aquifer. There are no licenced groundwater abstractions recorded within 1 km of the Site.

10.7.24 The foundation design has yet to be finalised but is understood to be likely to comprise a combination of precast driven and cast in-situ piled foundation solution interacting with the bedrock. The presence of Till deposits at depth is expected to provide protection to the bedrock secondary A aquifer from near-surface contaminants. However, the thickness and lateral extent of Till is unknown. Piles driven though the Till have the potential to allow downward migration of mobile pollutants from the shallow deposits to the bedrock.

10.7.25 Shallow groundwater may be present within the natural superficial deposits, as well as any shallow granular made ground. This has the potential to fill excavations through seepages (or if under pressure, it could enter rapidly, potentially causing excavation instability). The volume of this water could be significant and, if it is in areas of the Site with historical contamination, it could be contaminated and therefore difficult to dispose of and hazardous to work with. Contaminated water entering excavations could also have impacts on the project programme.

10.7.26 Some areas of the Site are currently covered by buildings and hardstanding or infrastructure that will be removed during development. The Proposed Development will consist of new facilities with associated access, utilities and soft landscaping. With the removal of existing structures and hardstanding there will be a short-term increase in infiltration and leaching through potentially contaminated soils exposed during Site clearance and the early phases of construction.

10.7.27 In accordance with UK guidance for the assessment of contaminated land (LCRM 2021), the site-specific ground investigation report and associated risk assessment will determine the nature of mitigation measures required (if any) to ensure that significant adverse effects do not occur. Such measures could include remediation works to a proportionate level (e.g. if required, removal of shallow hotspots of soil contamination). This type of requirement would be conditioned through the planning process. Remedial works (if required) would be expected to achieve target criteria (in soils and or groundwater) which would typically demonstrate an improvement in groundwater quality from baseline conditions.

10.7.28 Based on a ‘medium’ receptor sensitivity for Hydrogeology and a ‘minor’ impact magnitude for construction phase impacts, this would represent a **minor** direct and long term adverse effect, which is **not significant**.. The magnitude of the impact for hydrogeology is classed as minor owing to the industrial nature of the Site and surrounding area and the presence of saline intrusion. These factors are considered likely to have reduced the quality of the groundwater resource and the overall magnitude of the impact.

Operational effects

Predicted operational effects

10.7.29 During the operation phase the processes undertaken at the Site are outlined in **ES Chapter 2: Proposed development**. This indicates that activities on-site will broadly comprise the importation and storage of bulk raw material (scrap metal, HBI, coal (lumps & fines), lime (lumps & fines) & do-lime (mix of burnt dolomite and lime) and ferroalloys), production of steel within the EAF as the product and generation of waste material (EAF slag and EAF dust). In addition to the steel production, there will also be the construction of new utilities to service the EAF process including electrical and water supplies.

10.7.30 The proposed activities during the operational phase would be undertaken in a controlled fashion with, for example, extensive hardstanding, materials appropriately stored and closed drainage systems. Without such standard mitigation measures in place, there would clearly be the potential for impact to land, ground and groundwater.

10.7.31 **Receptor sensitivity (value):** receptor sensitivities for each of the identified receptors are the same during both the construction phase and the operation phase. In summary, geological units, soil resources and mineral resources are considered to be of low sensitivity / value and peat and groundwater resources are of medium sensitivity / value.

10.7.32 **Magnitude of impact:** potential impacts to geological units, soil resources, peat and mineral resources would be expected to constitute a minor change from baseline condition which is not of material consequence and classed as minor. Groundwater impact would represent pollution of non-sensitive water resources only and also considered to have a magnitude of minor.

10.7.33 **Nature of effect**: the nature of the effect during operation would be direct and adverse for all receptors. For geological units, soil resources and mineral resources, the duration would be either medium-term or long-term. For groundwater receptors the duration would be either short-term or medium-term.

10.7.34 **Effect significance:** the effect significance during operation would be 'minor to negligible' according to the effect significance matrix for geological units, soil and mineral resources (determined as minor) and minor for peat and groundwater (based on **Table 10.4**), and categorised as not significant in EIA terms.

Residual operational effects

10.7.35 Residual operational effects for geological soil resources, peat and mineral resources and are expected to be unchanged and be categorised as minor.

10.7.36 Remedial works (if required) as part of the construction phase would mitigate hydrogeological effects at operation phase and no residual effects are anticipated.

10.8 Further survey and monitoring requirements

10.8.1 Completion of the current site investigation and a construction-specific UXO risk assessment are recommended to inform the construction phase. These reports will be required as submissions within the planning process to satisfy planning conditions.

10.8.2 For groundwater beneath the Site, there may be a monitoring requirement, subject to foundation requirements and the results of the contamination risk assessment (which will be undertaken as part of the ongoing site investigation works, July 2024).

10.9 Opportunities for enhancement

10.9.1 Completion of enabling works has the potential to improve soil and groundwater quality within the Site and surrounding area. However, any remediation works will be a requirement of the planning process and are not considered to represent an enhancement opportunity. Therefore, no opportunities for enhancement beyond the embedded measures have been identified with respect to land, soil and groundwater.

10.10 Cumulative effects

10.10.0 Cumulative effects on the condition of land, soil and groundwater have considered committed developments within the Study Area (the Site plus a 1 km buffer).

10.10.1 Four other committed developments have been identified within the Study Area for which cumulative effects for land, soil and groundwater should be considered. These comprise the following:

- National Grid Margam substation extension and cable connection, located directly adjacent to the Site, to the east;
- The Sandvik Osprey metal processing facility ('Land off J38 of the M4, Margam' - P2021/1255), located 850 m to the north;
- Y Bryn Wind Farm, located 1 km to the north-east; and
- Tata Steel UK Limited (Tata Steel) P Fields development, located within the Site (N.B. this is under a separate planning application);

10.10.2 Indirect cumulative impacts may occur as a result of increased volumes of contaminated soil or groundwater being removed from all the development sites, destined for disposal at licensed facilities (and associated reduction in capacity at the receiving facilities). Based on criteria provided in **Table 10.3** and **Table 10.5**, these effects would be minor and short-term. This effect is not likely to be significant based on the requirements for production of an MMP at the Proposed Development and the other committed developments, which will ensure the application of the waste hierarchy and reduce the total volumes for off-site disposal.

10.10.3 In relation to both the National Grid Margam substation extension and cable connection and P Fields development, direct cumulative impacts (e.g., exposure and release of ground contaminants, generation of dust during earthworks process, etc.) may occur during the construction or subsequent operational phases of development. The significance of the impact is considered to be minimal as the application of construction phase plans will include controls to minimise the release of contaminated dusts and soils; and include contingencies for encountered unforeseen contamination. The P Fields and Sandvik Osprey metal processing facility developments will comprise the laydown of concrete hard standing which will reduce the infiltration rate and limit the release of any mobile contaminants. Due to the distance from the Site to the proposed Y Bryn Wind Farm and the low contaminative potential of this land use, no cumulative impacts are anticipated as a result of those other committed developments being developed alongside the Proposed Development. Furthermore, given the distance to the Sandvik Osprey metal

processing facility the potential direct cumulative impacts specified above, are considered to be minimal due to the distance from the Proposed Development.

10.10.4 The Proposed Development has been assessed as having no significant residual effects in relation to land, soil and groundwater receptors. The potential for cumulative effects (if any) is likely to be restricted to the pre-construction works (e.g., ground preparation). It is unknown at this stage if the phases of the Proposed Development will overlap with the site clearance and ground preparation phases of the other committed developments. Assuming a worst-case scenario, and that the site preparation works are completed concurrently, then the potential for increased infiltration rates of rain waters may have an additive effect on the mobilisation of pollutants into the underlying aquifers discussed above. These effects are likely to be short term and have limited significance as site-specific ground investigations for each development will likely require the consideration of groundwater as a receptor.

10.10.5 Operationally, it is expected that the Proposed Development and other committed developments will adhere to local and national environmental controls and regulations (e.g. The Environmental Permitting (England and Wales) Regulations 2016 (as amended)). Therefore, any cumulative effect as a result of the Proposed Development and the other committed developments is not expected to be significant during operation.

10.11 Summary of effects

10.11.1 This chapter of the ES reviews existing land, soil and groundwater conditions within the Proposed Development area and assessed the potential effect of the construction and operation phases of the project on issues associated with land, soil and groundwater receptors. The geology underlying the Site comprises predominately granular deposits from a combination of Marine Beach, Tidal Flats and Blown Sand deposits. Bedrock geology is made up of sedimentary rock of the Lower and Middle South Wales Coal Measures Formations. Groundwater within the Blown Sand and bedrock is classified as a secondary A aquifers and the remaining geological units present are secondary (undifferentiated) aquifers.

10.11.2 During the construction phase for the development of the EAF, the embedded mitigation measures associated with standard construction management are considered sufficient to avoid impacts. Plans produced associated with the construction phase will be designed around Site specific data and risk assessments, meeting both standard guidance and legislation requirements. No significant construction phase residual effects are identified, with no additional mitigation measures required with the exception of measures to handle peat, if encountered.

10.11.3 During the operation phase of the EAF, the potential impacts to the identified receptors are assessed as being negligible or minor effect, as a result of mitigation of adherence to regulatory practices and permit requirements (e.g. The Environmental Permitting (England and Wales) Regulations 2016 (as amended)), reducing potential impacts. As such, no significant operational phase residual effects are identified, with no additional mitigation measures required.

10.11.4 Embedded mitigation includes the application of planning conditions to the construction phase and variations to the existing environmental permits and updating the current Site procedures to the operational phase. Furthermore, the application of CEMP and

construction management (including development specific MMP, SMP and PMP & RS) would ensure that residual impacts from the Proposed Development are not significant. A worst-case scenario for remedial works has been applied to the assessment of impacts to land, soil and groundwater. Following completion of the current programme of intrusive works, a SI report would be produced to inform the appropriate remedial works at detailed design stage. It is anticipated that NPTC would impose standard planning conditions requiring the SI report, plus associated documents such as and appropriate Risk Assessment, Remediation Strategy Report and Validation Report, prior to construction.

10.11.5 Since generation of the construction management plans and proposed development designs are informed by data gathered during the ground investigation and any subsequent remediation statements which are conditioned under the planning process, these embedded mitigation measures are considered when presenting potential effects in **Table 10.7** below.

Table 10.7 Summary of land, soil and groundwater residual effects

Environmental factor	Receptor	Impact	Potential effect	Additional mitigation proposed	Residual effect
Construction phase					
Land/soil	Geological units	Mobilisation of existing contamination during construction groundworks and other activities. Incorrect storage or handling of fuels, materials, etc. leading to physical mixing with natural geological units. Piled foundations creating mixing / pollution pathways.	Minor adverse	No additional mitigation is proposed	Minor (not-significant)
Land/soil	Peat	Excavation or exposure of peat during construction (e.g. changes in ground level or piling) causing release of stored carbon.	Minor adverse	No additional mitigation is proposed	Minor (not-significant)
Land/soil	Mineral resources	Potential disturbance of legacy coal reserves during works (if present)	Minor adverse	No additional mitigation is proposed	Minor (not-significant)

Environmental factor	Receptor	Impact	Potential effect	Additional mitigation proposed	Residual effect
Land/soil	Soil resources	Removal of topsoil resulting in potential mobilisation of known and unknown contamination, potential mobilisation / mixing of unknown contamination in made ground and incorrect storage or handling of fuels, materials, oil or chemicals.	Minor adverse	No additional mitigation is proposed	Minor (not-significant)
Groundwater	Hydrogeology	Potential to allow downward migration of mobile pollutants from the shallow deposits to the bedrock during piling or other groundworks. Potential for shallow ground water to fill excavations through seepages. If contaminated, could be difficult to dispose of or be hazardous. Removal of existing structures and hardstanding resulting in short-term increase in infiltration and leaching through potentially contaminated soils or former buried structures exposed during Site clearance and the early phases of construction.	Minor adverse	No additional mitigation is proposed	Minor (not-significant)
Operational phase					
Land/soil	Geological units	Contamination release resulting from the improper storage, handling and disposal of raw materials, products and waste products	Minor adverse	No additional mitigation is proposed	Minor (not significant)

Environmental factor	Receptor	Impact	Potential effect	Additional mitigation proposed	Residual effect
Land/soil	Peat	Contamination release resulting from the improper storage, handling and disposal of raw materials, products and waste products	Minor adverse	No additional mitigation is proposed	Minor (not significant)
Land/soil	Mineral resources	Contamination release resulting from the improper storage, handling and disposal of raw materials, products and waste products	Minor adverse	No additional mitigation is proposed	Minor (not significant)
Land/soil	Soil resources	Contamination release resulting from the improper storage, handling and disposal of raw materials, products and waste products	Minor adverse	No additional mitigation is proposed	Minor (not significant)
Groundwater	Hydrogeology	Contamination release resulting from the improper storage, handling and disposal of raw materials, products and waste products	Minor adverse	No additional mitigation is proposed	Minor (not significant)

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