7.0 LAND, GEOLOGY AND SOILS

7.1 INTRODUCTION

This chapter addresses the magnitude of potential impacts to, and the significance of effects on, land, geology and soils from the proposed development and use of a soil recovery facility (the 'Proposed Development') at Kilmartin, Coynes Cross, Newcastle, County Wicklow (the 'Site', shown by the 'Application boundary' in Figure 7-1).

The chapter has been prepared by Anna Goodwin and Rhian Llewellyn. Anna has 19 years of consultancy experience and holds an MSci in Geology and an MSc in Hydrogeology. She is chartered through the Geological Society of London. Rhian has over ten years of experience and holds a MGeol and a PhD in Earth Science.

7.1.1 TECHNICAL SCOPE

The technical scope of this assessment is to consider the potential impacts and effects on land, geology and soils that can be reasonably foreseen as consequences of the normal construction and operation of the Proposed Development. The assessment considers the potential sources of change resulting from Proposed Development activities detailed in the project description (Chapter 3.0) and summarised in Section 7.3 below.

The potential for loss of agricultural soils will be considered, as will the potential to impact geologically important sites and land quality. Associated secondary potential impacts of changes to land quality on human health are also considered. It should be noted that this assessment does not, however, constitute a contaminated land risk assessment, a geotechnical/geohazard risk assessment, or detailed quantitative human health risk assessment.

The potential effects associated with hydrogeological and hydrological receptors are considered in Chapter 8.0 (Water). The effects of the Proposed Development on population and human health are addressed in Chapter 5.0 (Population and Human Health), although as noted above the potential effects of land quality on human health are considered in the current chapter. Any secondary effects on ecology or biodiversity due to changes in land quality or habitat removal are considered in Chapter 6.0 (Ecology and Biodiversity).

7.1.2 GEOGRAPHICAL AND TEMPORAL SCOPE

The geographical study area for the assessment covers the Proposed Development area and a buffer zone of 500 m from the Application boundary (see Figure 7-1), because most potential effects to land, geological and soil receptors are anticipated to occur within the Proposed Development footprint or immediately adjacent to it.

For the purpose of clarity, this assessment uses the term 'works phase' to describe the period of time comprising the following construction activities:

- Enabling works to provide facilities required for the operation of the soil recovery facility (I.e., entrance upgrades, establishment of office and welfare facilities, etc); and
- The operation of the soil recovery facility (i.e. acceptance of clean soil and stone to Site and its subsequent emplacement within the fill area).

A restoration phase (described in Chapter 3:0) has been scoped out of this assessment due to the nature of the works to be carried out in that project phase project and the short-term nature of the phase having limited potential to impact land, geology and soils. It is noted that soils will be stockpiled for later reinstatement upon closing of the proposed soil facility. Potential impacts associated with stockpiles are considered in the assessment of activities in the works phase.

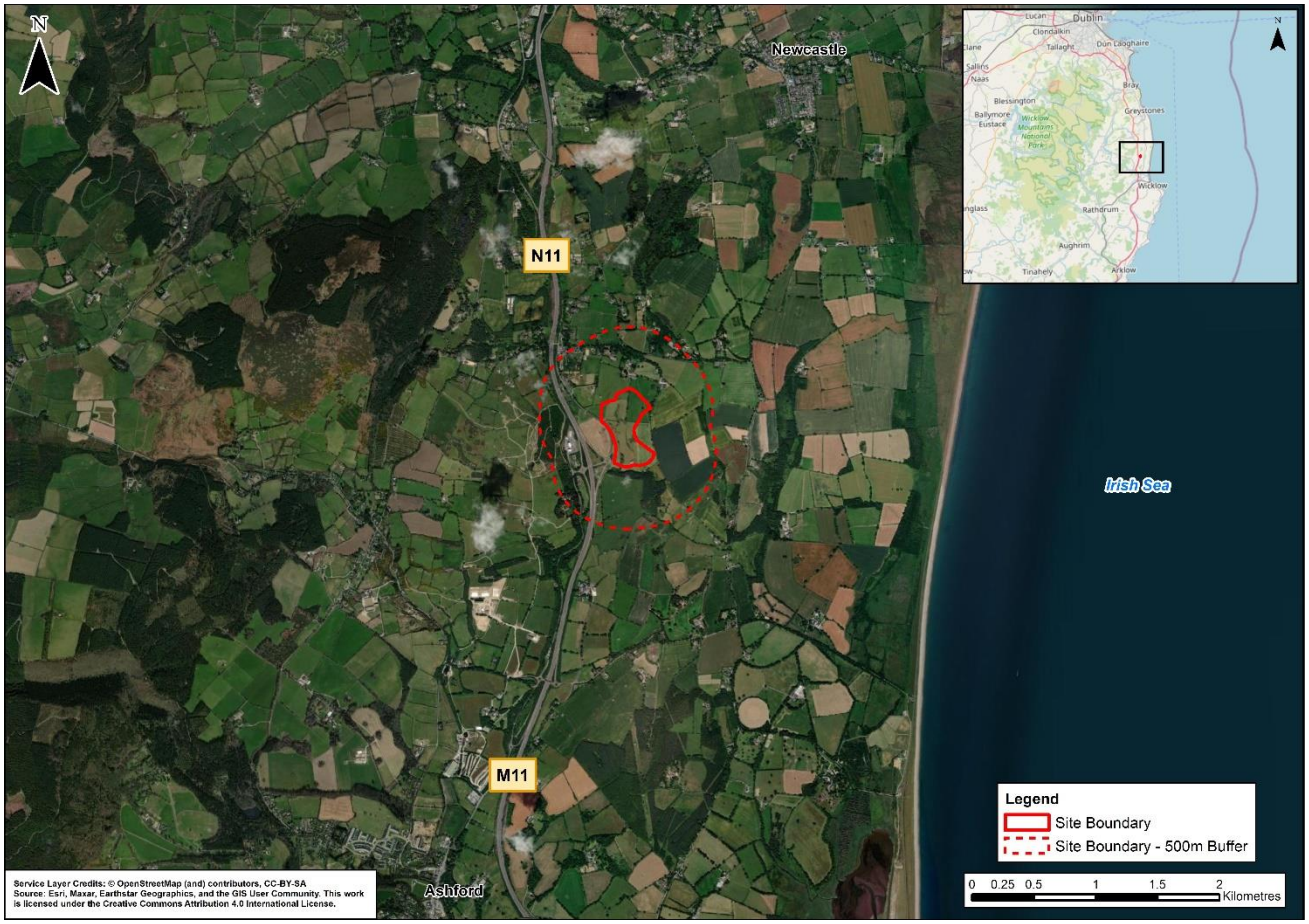

Figure 7-1 - Land, Geology and Soils Study Area (dashed red line) and Application Boundary (solid red line).

7.2 LEGISLATIVE AND POLICY CONTEXT

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to on land, geology and soils that has guided the focus of the assessment. The overarching EIA legislation under which this assessment is required is addressed separately in Chapter 2.0 (Scope and Methodology).

7.2.1 LEGISLATION AND GUIDANCE

In addition to the Regulations that underpin the EIA process (see Chapter 2.0), this assessment has been made with cognisance to relevant guidance, advice and legislation, including, but not limited to:

- The European Communities (Environmental Liability) Regulations 2008 (as amended) - These Regulations (SI 547/2008) transpose EU Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage. The purpose of these Regulations is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. The Environmental Protection Agency (EPA) is designated as the competent authority for all aspects of these Regulations.
- The Environmental Protection Agency Act 1992 and the Protection of the Environment Act 2003 – which detail the requirements associated with general pollution control and activities that come under integrated pollution prevention and control.
- The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) – which presents key topics of interest, high-level information on the interactions that should be considered in relation to EIA legislation, and overviews on the recommended approach to describing the baseline environment, completing impact assessments, describing effects, and addressing mitigation and monitoring.
- Department of Housing, Planning and Local Government. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018).
- The National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009) in relation to aspects to be considered and assessment approach (including relative receptor importance and cross discipline interactions).
- Institute of Geologists of Ireland. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (April 2013).
- The National Roads Authority Guidelines for the Creation, Implementation and Maintenance of an Environmental Monitoring Plan (undated) in relation to impact mitigation.
- CIRIA C741: Environmental Good Practice on Site (2015, Fourth Edition) in relation to source of impact and mitigation.
- Scottish and Northern Irish Pollution Prevention Guidelines (PPGs) and Guidance for Pollution Prevention (GPPs) – these, although not Irish guidance, provide environmental good practice guidance for activities such as oil and chemical storage, works in or near water, works on construction sites, and dealing with spills and pollution incidents.

7.2.2 POLICY

The National Planning Framework (Project Ireland 2040) includes National Policy Objective 60 to “Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance”.

The Wicklow County Development Plan 2022-2028 has an overarching objective with respect to natural heritage “To protect, sustainably manage and enhance the natural heritage, biodiversity, geological heritage, landscape and environment of County Wicklow in recognition of its importance for nature conservation and biodiversity and as a non-renewable resource”. The plan aims to “protect unique geology or geological features of importance and to allow the exploitation of our geological resources in an environmentally sensitive manner.” With respect to land quality, geology and soils, the following objectives that may be relevant to this Site and Proposed Development are presented:

- CPO 17.27 - Geological and soil mapping where available shall be considered in planning decisions relating to settlement, excavation, flooding, food production value and carbon sequestration, to identify prime agricultural lands (for food production), degraded/contaminated lands (which may have implications for water quality, health, fauna), lands with unstable soils / geology or at risk of landslides, and those which are essential for habitat protection, or have geological significance.
- CPO 17.28 - Protect and enhance 'County Geological Sites' from inappropriate development at or in the vicinity of a site, such that would adversely affect their existence, or value.
- CPO 17.30 - To facilitate public access to County Geological Heritage Sites, on the principle of "agreed access" subject to appropriate measures being put in place to ensure public health and safety and subject to the requirements of Article 6 of the Habitats Directive.
- CPO 17.33 - To have regard to the National Peatlands Strategy (NPWS 2015) as may be applicable.
- CPO 17.34 - Developments sited on peatlands have the potential to increase overall carbon losses, potentially undermining expected carbon savings (in the case of renewable energy developments) and damaging rare habitats of European importance. Project proposals for developments on peatlands shall ensure no adverse impacts arise in relation to:
    - Peatland stability;
    - Carbon emissions balance; and
    - Hydrology and ecology.

The County Wicklow Development Plan also highlights regional strategies for the Eastern and Midlands region, which includes the following in relation to agricultural soils:

- RPO 7.28 - Work with local authorities and relevant stakeholders, to identify areas of high value agricultural land and to ensure food security in the Region and to promote sustainable farming practices that maintain the quality of the natural environment, protect farm landscapes and support the achievement of climate targets.

7.2.3 PRE-CONSULTATION

A non-statutory pre-consultation process was carried out with prescribed bodies and other parties over 25 May- 26 June 2023 to seek their comments and observations about the Proposed Development. This process is fully documented in the Pre-Consultation Report accompanying the Strategic Infrastructure Development (SID) application submission. All comments relating to land, geology and soils have been considered in the preparation of this chapter.

Geological Survey Ireland (GSI) responded via letter dated 12 June 2023. In summary, this communication:

- Recommend using various publicly available data sets hosted on the GSI website when conducting the EIAR, planning and scoping processes.
- Advised on appropriate guidelines for conducting an impact assessment.
- Stated that the GSI would appreciate copies of reports detailing site investigation undertaken, if applicable.

The relevant GSI datasets have been considered in the development of this assessment and are attributed in the relevant sections below. The recommended guidelines have been considered in the impact assessment.

7.3 PROJECT DESCRIPTION

A full project description is provided in Chapter 3.0 (Project Description). A project description summary is provided below:

The Proposed Development is the establishment and operation of a soil recovery facility within a 17.08 hectare site at Kilmartin, Co. Wicklow (approximately 4 km north-east of Ashford). The soil recovery facility will import up to 2,160,000 tonnes of inert waste, primarily clean soils and stones from construction and development sites. Clean soil and stone will be used to progressively infill a steep-sided natural valley within the Site and raise ground levels to approximately 57mOD, tying in with the surrounding landscape. The infill area covers approximately 14 hectares.

The soil recovery facility will accept up to 100 loads per day on average (maximum 150 in exceptional circumstances) with a projected operational lifespan of up to 10 years depending on market conditions within the construction sector, followed by one year for final restoration and aftercare of the lands.

The Proposed Development will require the following structures be installed and maintained for the operational life of the Soil Recovery Facility: office and welfare facilities, six parking bays for private vehicles, weighbridge and associated weighbridge cabin, one wheel wash and one spray-system wheel wash, two waste inspection bays and one bunded waste quarantine area, hardstanding area (for vehicle movement and storage), surface water drainage infrastructure from hard standing and discharge to ground (including two interceptors and two soakaways), an internal access road, internal haul roads (constructed from recycled aggregates where available), security features including security gates and fencing, and power supply. These structures will be removed from the Site at the end of life point of the soil recovery facility.

Approval will be sought for a connection to the ESB Network for the site office and welfare facilities. Diesel generators will be used to power mobile lighting, if required. Temporary lighting, if required, will be cowled to prevent light spillage.

The temporary relocation of ESB poles within the fill area will be required. This will be subject to prior agreement with ESB.

Wastewater from office and welfare facilities will be managed by a third-party provider, with no connection to foul water mains.

All truck deliveries will access the Site via the N11/M11 and Coynes Cross Road, with internal queuing space provided within the Site and no parking on public roads.

The existing land entrance located on R772 will be upgraded and will be retained following the completion of the Proposed Development.

A groundwater abstraction borehole will be installed to supply water for wheel washes, dust suppression, and welfare facilities, and will be retained for monitoring after restoration.

Restoration will return the Site to grassland and hedgerow habitat, similar to its pre-development state. Approximately 140 m of fence and hedgerow opposite the entrance will be temporarily

removed to improve sightlines during the life of the soil recovery facility and this will be subsequently reinstated. Native species will be used in hedgerow planting. The restored land will revert to agricultural management.

Permission is sought from An Coimisiún Pleanála for a period of up to 10 years, with an additional year for restoration. The Proposed Development will require a waste licence[1] from the Environmental Protection Agency (EPA) and aligns with national and regional policy objectives to provide adequate licensed soil recovery capacity for the Dublin and Wicklow regions.

7.4 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7.4.1 INTRODUCTION

This section presents the method used to assess the impacts and effects of the Proposed Development on soils, land and geology, and to secondary associated human health receptors. It establishes the stages of the assessment, and the qualitative criteria used to assess impact magnitude and determine the level of effect significance.

7.4.2 QUALITATIVE ASSESSMENT METHOD

The assessment of potential effects has been undertaken using the qualitative assessment method outlined below and is supported by the baseline condition information and the Proposed Development design. The assessment follows a staged approach. A summary of the stages involved is included below:

1. Confirm baseline conditions – determine baseline and develop conceptual site model by consideration of available records and data sets, site reports and published information.
2. Confirm the key receptors and their value/importance.
3. Qualitatively characterise the magnitude of impacts on the receptors – describe what potential changes could occur to each receptor as a result of the Proposed Development, identify source-pathway receptor linkages, and assign the magnitudes of impact. This stage takes into account embedded design mitigation, good practice in construction environment management and pollution prevention.
4. Determine the initial effect significance of each potential impact on each sensitive receptor.
5. Consider the need for additional mitigation if it is considered necessary to reduce the initial magnitude of the impact and associated effect significance further.
6. Assess the residual impact magnitude and residual effect significance after all mitigation is applied.

Stages 1 and 2 have been completed using published literature and guidance and available information specific to the Proposed Development, which is presented in Chapter 3.0. For the identification of receptor value/importance that completes Stage 2, and for the description of impact magnitude (Stage 3), a common framework of assessment criteria and terminology has been used based on the EPA's Guidelines on the Information to be Contained in EIARs (EPA, 2022a), with

[1] The proposed development will be carried out in accordance with a waste licence from the EPA or in accordance with by-product regulations, Article 27 of the European Communities (Waste Directive) Regulations 2011 (see Section 3.5 in Chapter 3.0: Project Description of this EIAR for further detail).

some modifications made to increase clarity. The descriptions for value (sensitivity) of receptors are provided in Table 7-1 and the descriptions for magnitude of impact are provided in Table 7-2.

The potential for an impact to occur at a receptor has been determined using the understanding of the baseline environment and its properties and consideration of whether there is a feasible linkage between a source of impact and each receptor (i.e. a conceptual site model). This follows the method of preliminary assessment that is presented in some of the guidance documents listed in Section 7.2.

Table 7-1 - Environmental value (sensitivity) and descriptions

Value (sensitivity) of receptor / resource	Typical description
High	High importance and rarity, national scale, and limited potential for substitution. For example: Global/European/National designation; Large volumes of nationally or locally important peat; Well drained and highly fertile soils; Proven economically extractable mineral resource; and Human health.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. For example: Regionally important sites; and Moderately drained and/or moderate fertility soils.
Low	Low or medium importance and rarity, local scale. For example: Locally designated sites; and Poorly drained and/or low fertility soils.
Negligible	Very low importance and rarity, local scale.

Table 7-2 - Magnitude of impact and typical descriptions

Magnitude of impact (change)		Typical description
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. Harm to human health – death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Harm to buildings/infrastructure/plant - Structural failure, substantial damage.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.

Magnitude of impact (change)		Typical description
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

The assessment of magnitude of impact considers whether the change that causes the impact is positive or negative, and whether the impact is direct or indirect, short- medium- or long-term, temporary or permanent, and if it is reversible.

For the purposes of this assessment, a direct impact is one that occurs as a direct result of the Proposed Development and is likely to occur at or near the development itself. Indirect impacts (or secondary/tertiary impacts) are those where a direct impact on one receptor has another knock-on impact on one or more other related receptor(s) (e.g. the Proposed Development results in a change in land quality, which then has an indirect impact on human health). Indirect impacts can occur within the study area or away from the Proposed Development.

For the purposes of this assessment, the following definitions of duration have been used:

- Temporary – impact likely to last less than 2 years without intervention;
- Short term – impact likely to last 2 to 10 years without intervention;
- Medium term – impact likely to last 10 to 15 years without intervention;
- Long term – impact likely to last 15 to 60 years without intervention; and
- Permanent – impact likely to last over 60 years without intervention.

An irreversible impact is defined as a change to the baseline that would not reverse itself naturally. Such impacts will usually be long-term and irreversible, such as the removal of the best and most versatile agricultural soils. A reversible impact is defined as a change to the baseline conditions that would reverse naturally once the source of the impact is exhausted or has stopped.

7.4.3 SIGNIFICANCE CRITERIA

The approach followed to derive effects significance from receptor value and magnitude of impacts (Stage 4) is shown in Table 7-3. Where Table 7-3 includes two significance categories, reasoning is provided if the lower of the two significance categories is selected. A description of the significance categories used is provided in Table 7-4.

Table 7-3 - Significance Matrix

	Magnitude of Impact (Degree of Change)				
Environmental value (Sensitivity)		**Negligible**	**Low**	**Medium**	**High**
	High	Slight	Slight or moderate	Moderate or large	Profound
	Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
	Low	Imperceptible	Slight	Slight	Slight or moderate
	Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 7-4 - Significance categories and typical descriptions

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

Residual adverse effects of ‘large’ or ‘profound’ significance are considered to be ‘significant’ for the purposes of this assessment.

If required following the assessment of the level of effect significance, additional mitigation measures are presented that will be used to avoid, prevent or reduce the magnitude of the potential impact (Stage 5). The significance of the effect taking into account the additional mitigation is then assessed (Stage 6) to give the residual effect significance. Any monitoring that will be required to measure the success of the mitigation is also presented in residual impacts and effects tables (Stage 7) (see Section 7.7).

The effects of the Proposed Development are also considered cumulatively with those that could foreseeably result from other known developments in the assessment study area that are going through the planning process (See Chapter 15.0, Interactions, Cumulative and Combined Effects).

7.5 EXISTING ENVIRONMENT

This section presents baseline information on land use, land quality, soils and geology. Information about the water environment is included in Chapter 8.0: Water.

7.5.1 SOILS AND LAND USE

Soils mapped at the Site (Figure 7-2) are from the Clonroche soil series (EPA, 2022b). These are described as well draining, fine loamy drift with sillceous stones. Such soils are typically associated with use as improved grassland.

Surface material encountered during previous investigative work (White Young Green, 2008) was described in trial pit logs as topsoils that is light to dark brown, clayey in places, and ranging in thickness from 0.05 m to 0.9 m.

The 6-inch and 25-inch historical maps available for the area (Ordnance Survey of Ireland, 2022) cover the period from around 1829 to 1913 and show the area as having agricultural / pasture historical use. Current land use mapping (Corine 2018 dataset available at EPA, 2022b) shows that land is classified as agricultural pasture (Figure 7-3).

The land is currently used for sheep grazing and some small arable crop farming in the northern section. The presence of a steep sided valley in the centre of the Site, and periodically wet waterlogged ground at the base of the valley, limits the land's current agricultural potential. The adjacent lands are largely given over to agricultural use. There is some coniferous forestry to the south of the Site.

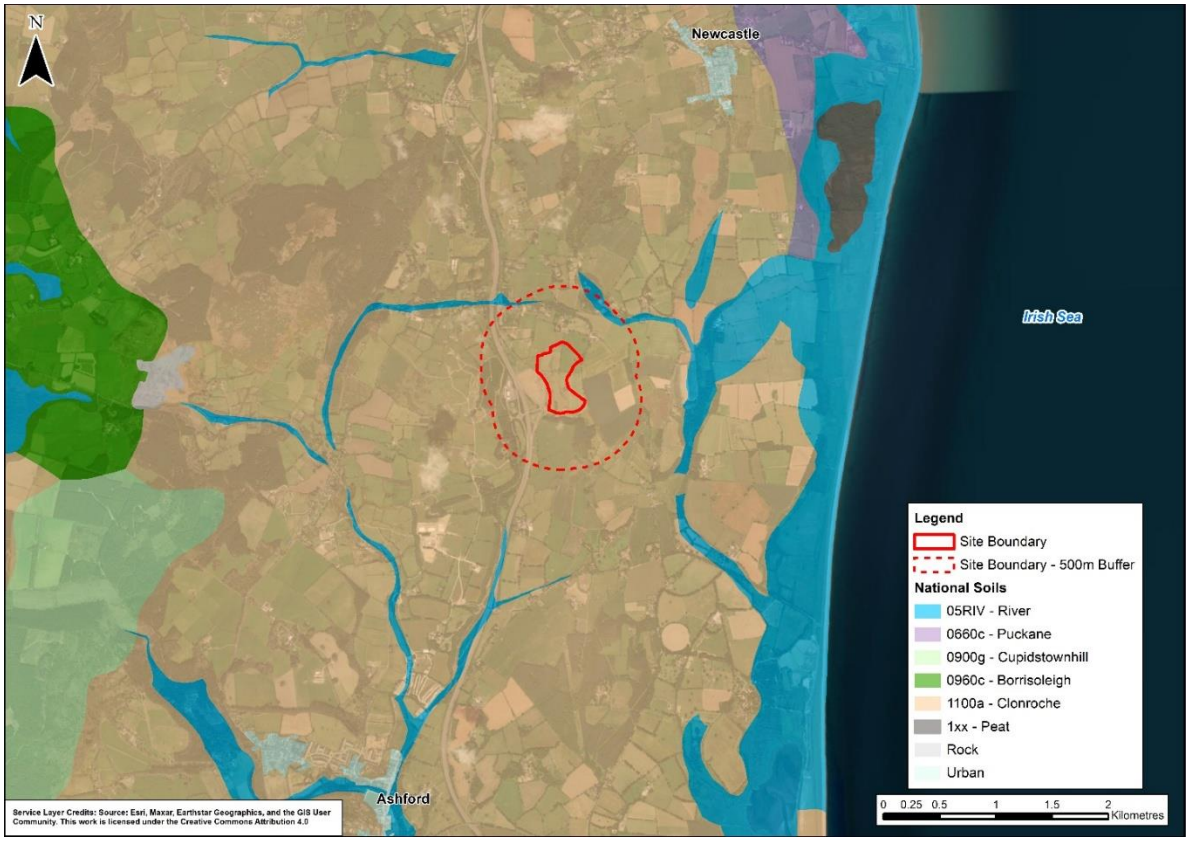

Figure 7-2 - Mapped Soil

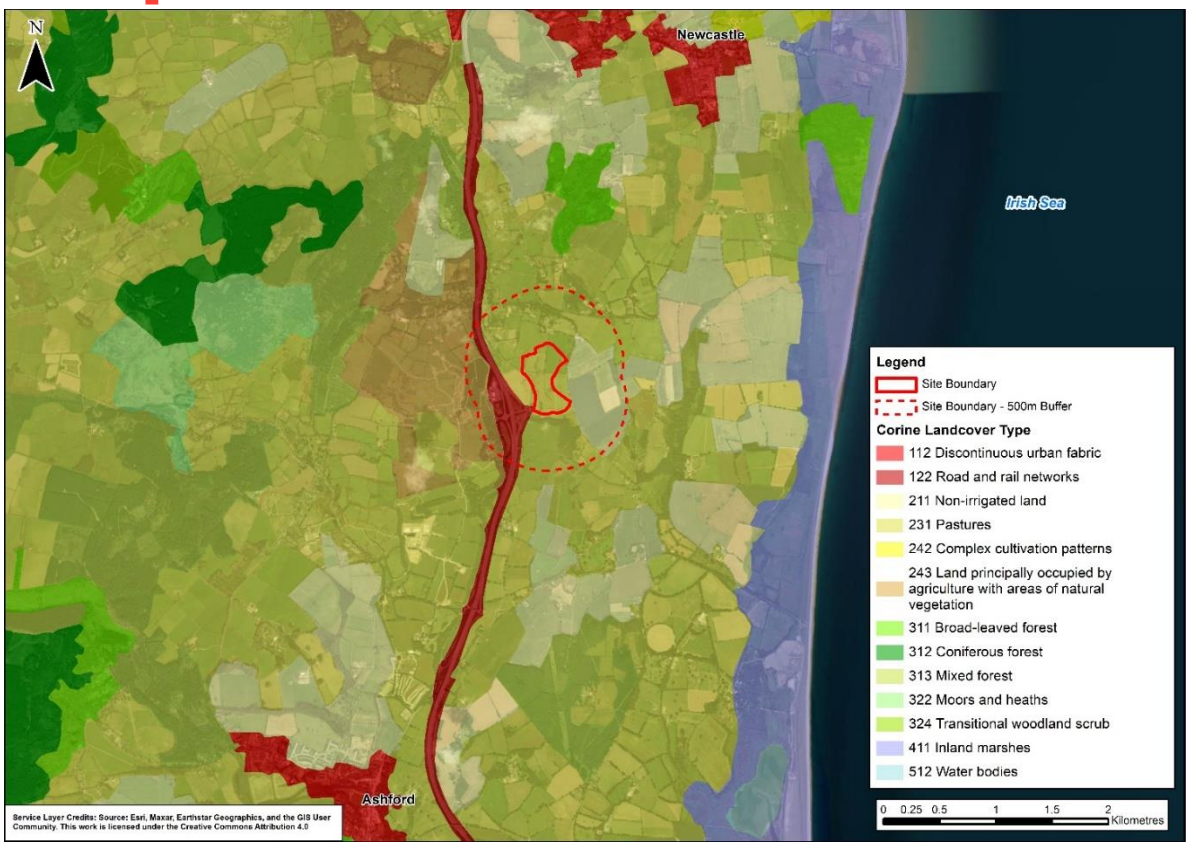

Figure 7-3 - Corine 2018 Land Use

7.5.2 MAPPED SUPERFICIAL (SUBSOIL) GEOLOGY AND BEDROCK GEOLOGY

Most of the western part of the Site is mapped as having bedrock at the surface (i.e. immediately below the soils). Where present, the mapped Quaternary sediments over the rest of the Site mainly comprise Till derived from Lower Palaeozoic sandstones and shales. There is a small area of alluvium mapped in the centre of the northern part of the Site (GSI, 2022). The mapped bedrock geology comprises greywacke and quartzite of the Bray Head Formation. The mapped superficial geology is shown on Figure 7-4 and the mapped bedrock geology is shown on Figure 7-5.

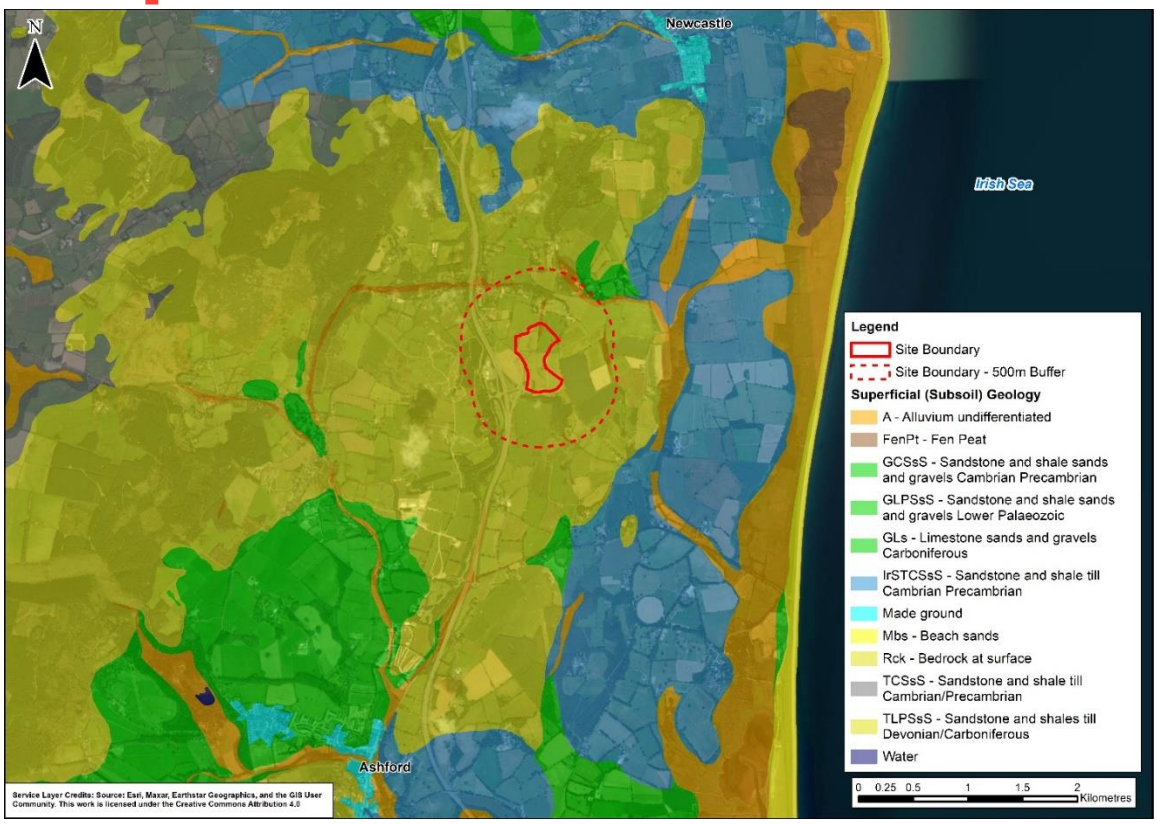

Figure 7-4 - Mapped Superficial Geology

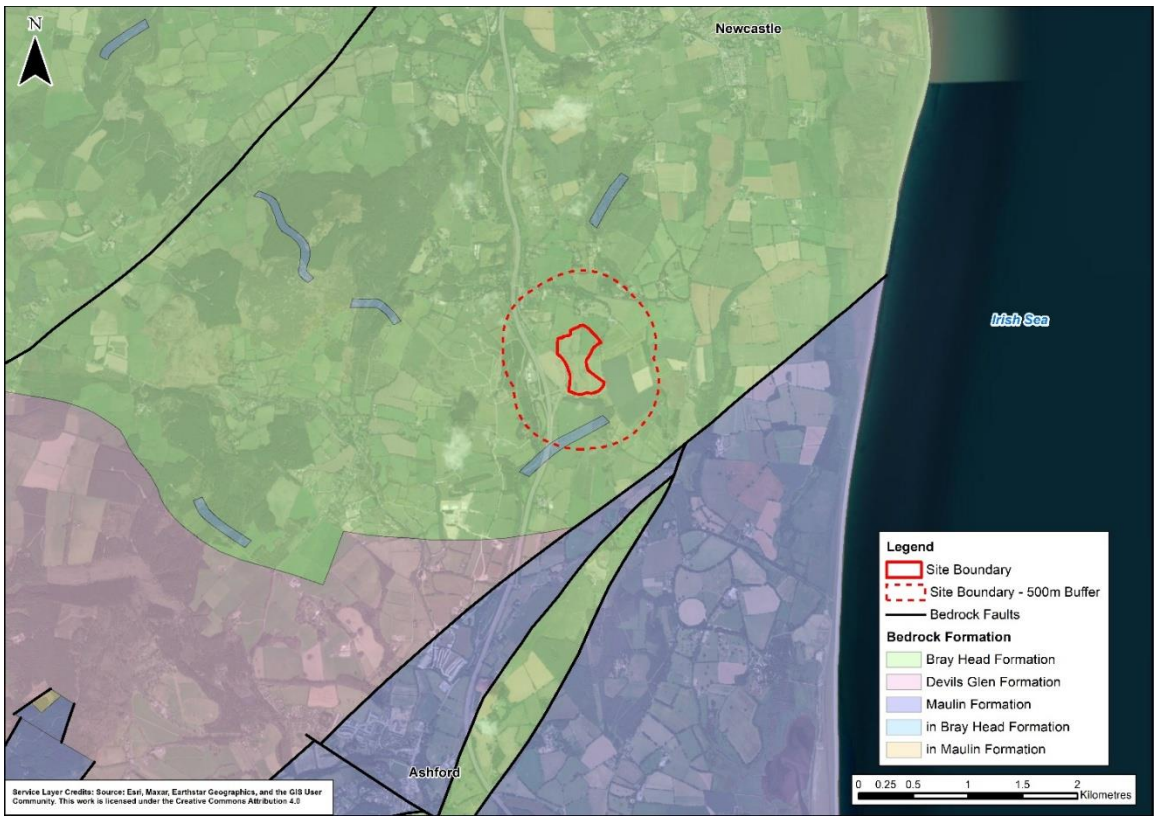

Figure 7-5 - Mapped Bedrock Geology

7.5.3 LOCAL GEOLOGY

Local geological information (White Young Green, 2008) indicates the Site, where investigated, is covered in Glacial Till underlain by a weathered shale.

The superficial materials encountered on either side on the central valley feature were described as light brown, very sandy silts/clays that range in thickness from 1.6 m to 2.1 m. Within the central valley feature, the material was described as being more like a grey sandy clay. No significant water inflows were recorded in trial pits excavated on higher ground. Water seepages were observed in some of the trial pits excavated in the valley floor. The depth of bedrock varied from 11 m below ground level (bgl) to 14.2 mbgl.

7.5.4 GEOLOGICAL ASSETS AND GEOHAZARDS

There are no active quarries or mineral sites at or near the Proposed Development (GSI, 2022). The crushed rock potential is mapped as very high, but there is no mapped granular aggregate potential (GSI, 2022).

An area of exposed sandy gravel on the Site was historically used as a local source of aggregate (see photograph in Figure 6-6, Chapter 6.0: Ecology). There are no formal records for this activity but the landowners (Norse Family *pers. comm*. 2023) have confirmed that gravels have not been sourced from the Site in at least 20 years.

Landslides/mass movements typically occur due to erosion of features such as cliffs, or due to factors such as slope, saturation/drainage, vegetation, soil structure and loading/disturbance on sites with unconsolidated deposits such as peat. The Proposed Development is in an area that is largely mapped as having low landslide susceptibility and no landslide locations are recorded within the study area (GSI, 2022). There are localised areas that are classified as having moderately low or moderately high landslide susceptibility in the north-west, west and south of the Site and study area.

7.5.5 RADON

The Radon Risk Map for Ireland (EPA, 2022b) indicates that the Proposed Development is located in an area where between 1 in 10 and 1 in 5 homes are likely to have high radon levels. These are medium and high-risk areas.

7.5.6 DESIGNATED GEOLOGICAL SITES

There is a County Geological Site (CGS) located within the study area (GSI, 2022). It is at the Wicklow Services Area, which is located approximately 200 m west of the Proposed Development. The CGS is described as a “long cutting behind a new motorway service station” where a “fresh and large exposure of Bray Group rocks gives a detailed picture of rock structure”. Designated sites are shown on Figure 7-6.

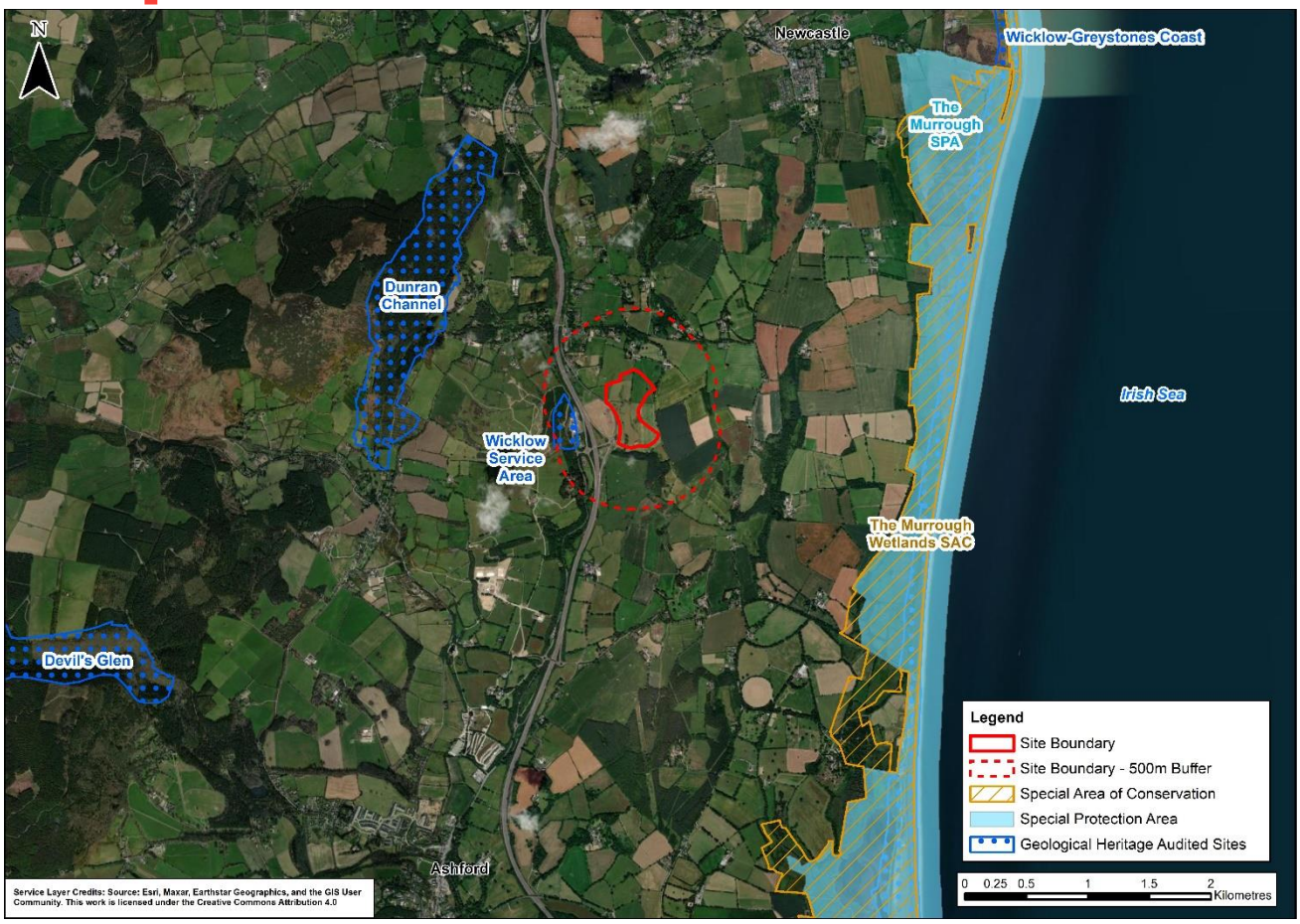

Figure 7-6 - Designated Sites

7.5.7 SELECTION OF SENSITIVE RECEPTORS

Taking account of the above and the receptor classification method described in Section 7.4, the receptors carried forward in this assessment and their assigned importance are presented in Table 7-5.

Table 7-5 - Soil, Land and Geology Receptors

Receptor	Importance and Reasoning
Land (soil/sub-soils) at and immediately adjacent to the Proposed Development	Negligible (no designation, no rarity, local importance)
Human Health (workers during works phase activities)	High (human health receptor)

The superficial tills are unlikely to represent a future resource and the bedrock geology beneath the Site that could be used as a crushed rock resource is ubiquitous across Ireland. Therefore, the impacts to, and effects on, mineral or aggregate reserves have not been considered further in this assessment.

There the Proposed Development activities within the Application boundary will not impinge on the CGS exposure, so no assessment of potential impacts to designated geological sites is considered.

7.6 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

7.6.1 PROPOSED DEVELOPMENT PLANS

The development proposals are described in Chapter 3.0 (Project Description) and summarised in Section 7.3. Key elements that could present sources of impact to land quality include the importation of materials for soil recovery, fuel/oil storage and use (if required), use of a wheel washes, surface water drainage systems, and the use and maintenance of welfare facilities.

7.6.2 EMBEDDED MITIGATION

This initial assessment of the significance of potential effects resulting from the Proposed Development takes into consideration embedded design, proposed construction and waste management methods, and commonly undertaken good practice mitigation. The elements of the Proposed Development design and good working practices that reduce the potential for impacts to soils/land and geology include the following:

- Vehicle movements outside the area where filling will take place will be restricted to dedicated routes or on areas of hardstanding.
- Existing topsoils in the footprint of the fill area will be removed prior to fill emplacement and temporarily stored in stockpiles.
- Topsoil will be stockpiled to heights that result in no deformation to the structure of the soil. The topsoil to be reused during the land reinstatement.
- Stockpiles of material will be evaluated and monitored and kept stable for safety and to minimise erosion.
- Should there be any requirement to for additional topsoil, this will be inert and imported to Site using a suitability licenced third party supplier.
- No deep excavation is planned; only shallow topsoil stripping and land raise.
- There is no known land contamination at the Site. If during works previously unidentified contamination is encountered, work will be undertaken to characterise this and determine if there is a risk to land quality or human health that requires action.
- The land raise, and all temporary operational facilities to enable the soil recovery facility to operate, will be developed using inert soil and stone (e.g. land raise), recycled aggregates (e.g. haul roads), and concrete slab (e.g. Site entrance curtain, waste inspection bays and bunded waste quarantine area).
- Material acceptance for the imported material will be as per the waste licence (or in accordance with by-product regulations, Article 27 of the European Communities (Waste Directive) Regulations 2011), where relevant). No contaminated soils will be accepted at the facility. Authorised vehicles only will be received. The origin and weight of incoming material will be known. Representative samples will be taken from a certain proportion of loads to make sure they comply with acceptance criteria.
- There will be 2 No. waste inspection bays and a bunded waste quarantine area that are enclosed on three sides and base-lined with concrete.
- During emplacement of materials, the site operative will inspect what is being laid down. Suspect or non-compliant material will be transferred to the quarantine area for further inspect and

classification. Materials that are not compliant with waste licence requirements (or Article 27 of the European Communities (Waste Directive) Regulations 2011, where relevant) will be removed from the Site for disposal at an appropriate facility.

- Temporary slopes in the infilled soils (and existing valley slopes) will be visually inspected, at least once a month, by site staff and records will be kept. Should these inspections give rise for concern, an inspection of the affected area(s) will be undertaken by a qualified geotechnical engineer, and measures will be implemented to address any instability issues with the infilling operation.
- There will be no underground storage tanks.
- There will be no on-site concrete batching.
- Any fuels stored onsite will be stored in double skinned tanks in an appropriately bunded storage area. Contained concrete bunds will have a minimum capacity of 110% of the fuel tank. Any pipes and valves associated with storage tanks will be located within a bund. A concrete apron will be constructed adjacent to the tank and vehicles loading or unloading diesel will park on the concrete apron. The edges of the apron will be ramped so that oil spillages occurring during loading or unloading will be contained on the concrete apron. Bunds will be inspected.
- If small quantities of lubricants and hydraulic oil need to be stored on on-site, these will be stored on a bunded pallet.
- Disposal of spills / leaks collected in bunded areas will be to an appropriate, licensed facility.
- Any refuelling of plant onsite will take place on the hardstanding area and drip traps will be used. Refuelling will be undertaken by a suitably responsible person.
- Spill kits will be maintained on Site to deal with all spills and leaks, and spill training will be provided to relevant staff members.
- Mobile plant parking will be available on the hardstanding for vehicle movement and storage. Drip trays and mats will be placed under parked plant.
- The spray wheel washing facility will be a wet-grate design, located upon concrete hardstanding that will be maintained for the duration of the Proposed Development. The effluent water from the wheel wash will be recycled within the system. The final design of the wheel wash will be agreed with local authority. A secondary wheel wash will be used for vehicles entering/exiting the active fill areas.
- All waste from the welfare facilities will be collected by a third-party provider and disposed of to a suitable off-site facility.
- All hard-standings adjacent to administration buildings, including the waste inspection and quarantine bays, the internal haul road, and the concrete apron at the Site entrance will be drained to a surface water drainage system. The run-off from hard-standing will be directed to an interceptor and discharged to a soak pit that will be constructed onsite. The interceptors will be maintained, as required.
- Any waste removal will be managed and undertaken by a competent contractor appointed by the Site Operator according to industry standard practice and disposed of accordingly by a licensed waste disposal contractor.

- An EMS (Environmental Management System) will be developed for the Site to support a waste licence application to the EPA and will be in keeping with industry best practice and statutory guidelines. Plans within the EMS will set out how the construction and operation of the Proposed Development will be managed. The plans will include widely used good practice measures to avoid or reduce the potential impact of construction works on workers, members of the public and the environment. These will include, but not be limited to, the following:
  - All works will be conducted in accordance with the appropriate site rules.
  - Appropriate Personal Protection Equipment (PPE) will be used by all workers.
  - Hazardous materials will be labelled clearly, transported with care by competent and trained persons, and stored in dedicated areas in appropriately bunded containers. Any liquid accumulating within the bunds, or secondary containment systems, will be disposed of at a suitably authorised facility.
  - Maintenance checks and procedures will be completed to reduce the potential for leaks and spills from plant and substance storage.
  - Pollution management measures will be implemented to prevent contamination by machinery pollutants, such as fuels, oils and lubricants during construction and operational (i.e. works phase) activities. These measures will be informed by guidance provided in relevant documents, such as the CIRIA guides to environmental good practice on site.
  - Other information on good practice to reduce the potential for environmental pollution that will be consulted includes the following documents developed by the Environment Agency (England and Wales), the Scottish Environment Protection Agency and the Northern Ireland Environment Agency:
    - GPP 1 Understanding your environmental responsibilities - good environmental practices;
    - GPP 2 Above ground oil storage tanks;
    - PPG 6 Working at construction and demolition sites;
    - GPP 8 Safe storage and disposal of used oils;
    - GPP 13 Vehicle washing and cleaning;
    - GPP 21 Pollution incident response planning;
    - GPP 22 Dealing with spills; and
    - GPP 26 Safe storage - drums and intermediate bulk containers.
- The groundwater borehole for abstraction will be installed by a suitably experience contractor and in line with EPA Well Guidelines. The well will be maintained through the works phase and decommissioned at the closure of soil recovery facility. The quality of water in the well will be analysed and monitored in line with EPA guidelines. It is not anticipated that the facility will have significant water requirements. However, abstraction will be registered with the EPA should 25 cubic meters (25,000 litres) of water or more per day be abstracted (as required by European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261 of 2018)).

7.7 POTENTIAL EFFECTS

The potential sources of impact that are considered in the assessment of effects relate to the following:

- Soil erosion or compaction resulting from plant movement during the works phase;
- Stockpile stability during works phase;
- Importation of materials that could be unsuitable for the intended after-use;
- Activities or events during the works phase that might impact land quality (e.g. leaks and spills from machinery or stored material and substances, or discharges); and
- Mobilisation of existing contamination in soils by construction works (e.g. during works phase soils stripping) and/or installation of a groundwater well should there be historical contamination at the Proposed Development, which could impact workers and land quality.

All potential impacts discussed below have been determined to be **Non Significant.**

7.7.1 WORKS PHASE - ENABLING WORKS IMPACTS

This section includes the consideration of potential sources of impact that could take place only within construction activities associated with enabling works during the works phase, or originate in the enabling works, but may also be present during the operation of the soil recovery acility in the works phase (referred to as 'operational activities'). Where a source of impact may also be present during operational activities of the soil recovery facility, this is stated at the start of the assessment of operational impacts and shown in the evaluation of initial impacts and effects that is presented in Table 7-6.

Construction activities will only take place where required. Vehicle movements outside of the area where filling will take place will be restricted to dedicated routes or on areas of hardstanding. Soils in the area of filling will be stripped and stored for use in the land reinstatement. Stockpiles will be designed and managed to limit erosion. This will limit the potential for unnecessary soil compaction and erosion and limit the impact on soil structure. The potential impact on soils is predicted to be 'low (adverse)'.

General earthworks during the construction activities (e.g. soil stripping) have the potential to affect human health of workers if they were to become unstable. Excavation will be limited to shallow soil stripping. The stability of stockpiles will be monitored and managed, so the potential impact human health is predicted to be 'negligible (adverse)'.

Through material imported as part of the construction process (e.g. recycled aggregate used for haul routes on the site), leaching from the import and use of contaminated materials has the potential to impact existing land quality or construction workers. The embedded mitigation associated with assessment of the suitability and quality of any imported materials means the potential impacts on adjacent land quality and human health are predicted to be 'negligible (adverse)'.

Fuel and other substance leaked or spilled from stored substances or from machinery/equipment could affect the chemistry of the soil and general land quality, or the health of workers that could come into contact with it. There will be no underground tanks, no septic tanks, no concrete batching, fuel will be stored in double skinned tanks in bunded areas, small quantities of potential polluting substances will be stored on bunded pallets, refuelling will take place in dedicated areas and drip trays will be used, spill kits and spill training will be provided, waste from the welfare facility will be

disposed of off-site, other waste will be disposed of by a competent contractor, the EMS and maintenance and management procedures will be followed. The potential impacts on land quality and human health are predicted to be 'negligible (adverse)'.

Wheel washing will be used to reduce the deposition of material on surrounding roads. The water will be reused within the wheel wash. The sludge that collects in the wheel wash has the potential to become contaminated with material washed off the vehicles. If this was to be discharged or leak to ground, this could affect the chemistry of the ground. Without management, localised land quality changes could occur. The potential impact to land quality is predicted to be 'low (adverse)'.

Current and historical land use is agricultural. In the mid- to late- 2000s the base of the valley was raised using clean and inert soil and stone. This process was carried out in compliance with the waste permit[2]. There is no evidence to suggest widespread contamination of the land. There are no planned deep excavations and only the top thin layer of soils will be stripped during construction and stored. The potential for construction works to encounter and mobilise existing contamination is considered to be limited. Work will be undertaken to assess previously unidentified contamination if it is encountered during construction. Therefore, the potential impacts on land quality and human health are predicted to be 'negligible (adverse)'.

7.7.2 WORKS PHASE – SOIL RECOVERY FACILITY OPERATIONAL IMPACTS

Many of the same source of impact identified for the construction activities associated with enabling works also apply to the operational activities of the soil recovery facility and have not been reconsidered here (e.g. welfare waste; wheel washes; storage, transport and use of fuels and other potentially polluting substances - i.e. leaks and spills).

Temporary slopes in the operational working areas have the potential to affect human health of workers if they were to become unstable. Slopes will be inspected and any that give concern will be evaluated by a qualified geotechnical engineer. Where necessary, measures to improve stability that are recommended will be applied. Therefore, the potential impact is predicted to be 'negligible (adverse)'.

Import of contaminated material for filling could impact human health of workers and land quality. The Applicant will seek a waste licence from the EPA and material acceptance for the imported material will be as per the licence[3]. No contaminated soils will be accepted at the facility. There will be load inspection and quarantine/removal (if required). The EMS will contain a plan that details material inspection protocols and any PPE required will be followed. Therefore, the potential impacts on land quality and human health are predicted to be 'negligible (adverse)'.

At the end of the operation of the soil recovery facility, the stripped soils will be replaced. There is not intended to be any change in land use. The Proposed Development is currently occupied by agricultural land. After land raising and replacement of soils, the land will be returned to agriculture. The intention is to improve drainage of parts of the Site by raising and altering the topography. Therefore, the potential impact to land and land use is predicted to be 'negligible (beneficial)'.

[2] No clean soil and stone was imported after the date the EPA licence was granted in September 2009 (Waste Licence No. W0252-01).

[3] Or in accordance with by-product regulations, Article 27 of the European Communities (Waste Directive) Regulations 2011, where relevant. See Section 3.5 in Chapter 3.0: Project Description of this EIAR for further detail.

7.7.3 EVALUATION OF EFFECT SIGNIFICANCE

The evaluation of effects takes into account the predicted impact magnitude combined with receptor sensitivity. The evaluation of effect significance from each of the initial impacts (taking account of embedded mitigation) discussed above is presented in Table 7-6.

Table 7-6 - Evaluation of Initial Impacts and their Effect Significance

Project Phase (Activities)	Receptor	Sensitivity	Source of Potential Impact/Description of Change*	Impact Magnitude*	Level of Effect *
Works Phase (Enabling Works Only)	Land / Soils / Land use	Negligible	Structure of stripped and stored soils due to vehicle movement and stockpiling	Low (adverse)	Imperceptible (mitigation considered sufficient for lower significance category)
			Potential change in land quality due to import of potentially contaminated construction materials	Negligible (adverse)	Imperceptible
			Potential change in land quality due to disturbance and mobilisation of existing ground contamination	Negligible (adverse)	Imperceptible
	Human Health - construction workers	High	Stability of soil stockpiles leading to injury	Negligible (adverse)	Slight
			Contact with potentially contaminated imported construction materials	Negligible (adverse)	Slight
			Contact with previously unidentified existing ground contamination	Negligible (adverse)	Slight
Works Phase (Enabling Works and Soil Recovery Facility Operation)	Land / Soils / Land use	Negligible	Potential change in land quality due to substance leaks and spills (various sources – see text)	Negligible (adverse)	Imperceptible
			Potential change in land quality due to discharge of wheel washing water/sludge	Low (adverse)	Imperceptible (mitigation considered sufficient for lower significance category)
	Human Health – workers	High	Potential change in land quality due to substance leaks and spills (various sources – see text)	Negligible (adverse)	Slight

Project Phase (Activities)	Receptor	Sensitivity	Source of Potential Impact/Description of Change*	Impact Magnitude*	Level of Effect *
Works Phase (Soil Revoery Facility Operation Only[4])	Land / Soils / Land use	Negligible	Potential change in land quality due to import of potentially contaminated fill materials	Negligible (adverse)	Imperceptible
			Potential change in land quality due to change in land use	Negligible (adverse)	Imperceptible
	Human Health - workers	High	Emplaced material slope stability leading to injury	Negligible (adverse)	Slight
			Import of potentially contaminated fill materials	Negligible (adverse)	Slight
* Taking account of embedded mitigation					

[4] Includes construction activities required for the emplacement of fill during the operation of the soil recovery facility

7.7.4 'DO-NOTHING' SCENARIO

In the event that the Proposed Development does not progress (i.e. the Site remains unchanged), there are unlikely to be impacts on the geological, land or soil environment in the area of the Site, or the associated impacts to human health. The central valley feature would remain, and waterlogging of the ground would continue to limit the agricultural potential of that part of the Site, so no improvement would be made.

7.8 MITIGATION AND MONITORING

7.8.1 MITIGATION

Additional mitigation and/or management is intended to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment. The initial assessment of potential effects (taking into account embedded mitigation) has not identified any significant adverse effects (i.e. those that have been evaluated as 'large' or 'profound'). However, to further mitigate the initial effects associated with land quality the following additional mitigation will take place:

Any sludge collected from wheel wash will be tested and either used as part of the soil recovery process (if the quality is acceptable) or disposed of to an appropriate licensed waste disposal facility.

Taking account of this additional mitigation, the potential impact to land quality is predicted to be reduced to negligible (adverse).

7.8.2 MONITORING

No monitoring requirement is foreseen to maintain and protect the conditions of the land, geology and soil. Any monitoring associated with licences or permits will be detailed within the licences or permit documentation.

7.9 RESIDUAL EFFECTS

A summary of the sources of impact, predicted magnitudes of residual impact (accounting for embedded mitigation and additional mitigation) and subsequent residual effect significance is presented in Table 7-7. In all cases the residual effect is not greater than 'Slight' and therefore **Not Significant.**

Table 7-7 - Evaluation of Predicted Residual Impacts and their Effect Significance

Project Phase (Activities)	Receptor (importance)	Potential Source of Impact	Direct or Indirect	Duration*	Reversible or Irreversible	Summary of Combined Mitigation (embedded and additional)	Residual Magnitude of Impact (direction)	Residual Effect Significance
Works Phase (Construction Only)	Land / Soils / Land use (negligible)	Structure of stripped and stored soils	Direct	Short term	Reversible	Appropriate temporary storage of soils. Designated areas for vehicle movements.	Low (adverse)	Imperceptible (not significant)
		Import of potentially contaminated construction materials	Direct	Permanent	Reversible	Material acceptance procedures.	Negligible (adverse)	Imperceptible (not significant)
		Disturbance and mobilisation of existing ground contamination	Direct	Permanent	Reversible	Procedure for dealing with previously unidentified contamination during construction.	Negligible (adverse)	Imperceptible (not significant)
	Human Health - construction workers (high)	Stability of soil stockpiles	Direct	Short term	Reversible	Stockpile design (strip and store only what required, appropriate stockpile heights and slopes) and inspection / monitoring	Negligible (adverse)	Slight (not significant)
		Contact with potentially contaminated construction materials	Direct	Short term	Reversible	Material acceptance procedures. Follow procedures in the EMS.	Negligible (adverse)	Slight (not significant)
		Contact with existing ground contamination	Direct	Short term	Reversible	Procedure for dealing with previously unidentified contamination during construction.	Negligible (adverse)	Slight (not significant)

Project Phase (Activities)	Receptor (importance)	Potential Source of Impact	Direct or Indirect	Duration*	Reversible or Irreversible	Summary of Combined Mitigation (embedded and additional)	Residual Magnitude of Impact (direction)	Residual Effect Significance
Works Phase (Construction and Operation)	Land / Soils / Land use (negligible)	Substance leaks and spills (various sources – see text)	Direct	Permanent	Reversible	No underground tanks (fuel or septic). No concrete batching. Appropriate substance storage. Refuelling protocols. Spill procedures and training. Waste management. Good practice pollution prevention measures. Waste management procedures. Follow procedures in the EMS. See main text for detail.	Negligible (adverse)	Imperceptible (not significant)
		Discharge of wheel washing water/sludge	Direct	Permanent	Reversible	Water will be recycled within the system. Sludge tested before disposal as part of the soil recovery process or to an appropriate licensed waste disposal facility. No used water or settled solids will be disposed of to land without prior consent of the EPA. Final design will be agreed with local authority.	Negligible (adverse)	Imperceptible (not significant)
	Human Health - workers (high)	Contact with substance leaks and spills (various sources – see text)	Direct	Short term	Reversible	Appropriate substance storage. Refuelling protocols. Spill procedures and training. Waste management. Good practice pollution prevention measures. Waste management procedures. Follow procedures in the EMS. See main text for detail. Abstracted groundwater will be tested quarterly and subject to regular visual	Negligible (adverse)	Slight (not significant)

Project Phase (Activities)	Receptor (importance)	Potential Source of Impact	Direct or Indirect	Duration*	Reversible or Irreversible	Summary of Combined Mitigation (embedded and additional)	Residual Magnitude of Impact (direction)	Residual Effect Significance
						inspection. Bottled drinking water will be available at the site facilities.		
Works Phase (Operation)	Land / Soils / Land use (negligible)	Import of potentially contaminated fill materials	Direct	Permanent	Reversible	Inert material only. Material acceptance and quarantine procedures.	Negligible (adverse)	Imperceptible (not significant)
		Change in land use	Direct	Permanent	Irreversible	Reinstatement of stripped agricultural soils with improved drainage	Negligible (beneficial)	Imperceptible (not significant)
	Human Health - workers (high)	Emplaced material slope stability	Direct	Short term	Reversible	Slope design and inspection. Follow procedures in the operational management plan.	Negligible (adverse)	Slight (not significant)
		Contact with potentially contaminated fill materials	Direct	Short term	Reversible	Inert material only. Material acceptance and quarantine procedures. Follow procedures in the operational management plan.	Negligible (adverse)	Slight (not significant)
* Maximum duration without intervention								

7.10 CUMULATIVE EFFECTS

General works phase activities may lead to soil and geological issues, and associated influences on human health, such as stockpile and slope stability, import of contaminated material, the mobilisation of existing ground contamination, or the accidental releases of substances. The potential impacts that have been identified within the technical assessment for the construction and operational activities (i.e. works phase) of the Proposed Development are sufficiently mitigated by design or good practice for the resultant effects to be considered **Not Significant**.

Cumulative and combined effects are considered in Chapter 15.0 of this EIAR.

There are unlikely to be additional combined / interaction effects on land from impacts linkages (i.e. via other pathways) considered in other topics as a result of the Proposed Development alone.

7.11 DIFFICULTIES ENCOUNTERED

No difficulties were encountered in undertaking the assessment of impacts and effects on soils, land and geology.

Historical land use does not suggest that the land is likely to be contaminated. All developments have the potential for encountering previously unidentified contamination; however, this has been addressed in the embedded mitigation.

7.12 REFERENCES

Environmental Protection Agency (EPA), (2022a), 'Guidelines on the information to be contained in Environmental Impact Assessment Reports', Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf .

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