14.0 MATERIAL ASSETS

14.1 INTRODUCTION

This chapter prepared evaluates the potential impacts, from the Proposed Development on Material Assets as defined in the EPA EIA Report Guidelines 2022, the EPA Draft Advice Notes for EIS 2015, and *European Commission Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (2017).

14.2 METHODOLOGY

The Directive 2011/92/EU defined Material Assets as '*resources that are valued and that are intrinsic to specific places; they may be of either human or natural origin'* this included architectural and archaeological heritage. The Directive 2014/52/EU included architectural and archaeological heritage as components of cultural heritage; this EIA Report has also done so within Chapter 12 (Archaeological, Architectural and Cultural Heritage).

The EPA EIA Report Guidelines 2022 state that material assets are taken to mean "*built services and infrastructure, roads and traffic and waste management*". The EPA Draft Advice Notes for EIS 2015 also gives examples of material assets including assimilative capacity of air and water; ownership and access; and tourism and recreational infrastructure. The European Commission Guidance (2017) refers to several examples of material assets including buildings, other structures, mineral resources and water resources.

In this EIA Report, the impacts on some of the material assets described in the above guidance have already been considered in the following chapters and therefore these aspects will not be addressed in specific detail within this chapter:

- Chapter 5, Population and Human Health;
- Chapter 6, Land, Soils, Geology & Hydrogeology;
- Chapter 7, Hydrology;
- Chapter 9, Air Quality & Climate;
- Chapter 10, Noise and Vibration);
- Chapter 12, Cultural Heritage;
- Chapter 13, Traffic and Transportation;
- Chapter 15, Waste Management.

This chapter assesses ownership and access, built services and infrastructure, which have not already been addressed elsewhere in this EIA Report. The likely significant effects on built services and infrastructure, if any, are assessed in under the following subheadings:

- Land Use, Property, and Access;
- Power and Electrical Supply;
- Surface water infrastructure;
- Foul drainage infrastructure;
- Water supply;
- Telecommunications.

14.3 RECEIVING ENVIRONMENT

Land Use, Property, and Access

The Proposed Development is located within the existing TILGC campus. The area subject to the planning application is entirely within the ownership of the Applicant. The existing TILGC campus contains a variety of buildings set within a 16.15 hectare flat terrain site.

The lands within the campus have zoning objective "*EE - To provide for enterprise and employment related uses.*" within the South Dublin County Council Development Plan 2016 – 2022, and the South Dublin County Council Draft Development Plan 2022 – 2028.

The main entrance to the site is security controlled and monitored at the northern end of the Campus. Access is provided via the New Nangor Road the Grange Castle Business Park internal road network and is located within 2km of the M7 motorway.

The area proposed for the TO and utilities workshop is characterised by a flat terrain comprising backfill from previous building projects on the site, and covered with ruderal vegetation with no trees, shrubs or hedgerows. The area proposed for the contractor's compound is a greenfield area that has predominantly grown wildly for biodiversity with a cut border around the perimeter.

The context of the site is described further in Chapter 2 (Description of Development) and Chapter 3 (Planning and Development Context).

Power and Electrical Supply

Electricity is provided to the existing TILGC campus via the national grid. There are also two emergency diesel generators on the campus which provide backup electrical supply to the site in the event of a failure of the electricity main supply. Under normal circumstance, these generators run for short periods estimated at a maximum of 30 no. minutes per month per generator, for testing and maintenance purposes only.

Natural Gas

The site is currently served with mains water supply via an existing connection to the Gas Networks Ireland network. Natural Gas is distributed around the existing TILGC campus using above ground pipe bridge / pipe rack.

Surface Water Infrastructure

All surface water from the existing TILGC campus is directed to the manhole chamber to the north of the site which is equipped with monitoring equipment and automatic diversion mechanism to the firewater retention tank. The surface water is passed through a hydrocarbon interceptor prior to flowing eastwards and out falling to a culverted public surface water drain. There is flow control device at the outlet also to regulate the flow from site.

Surface water is discharges from the public surface water drain into the River Griffeen immediately north of the site. The River Griffeen collects the majority of the surface waters from the Grange Castle Business park and flows in a northerly direction converging with the River Liffey at Lucan 3km north of the site.

Foul Sewer and Process Wastewater Infrastructure

All process wastewater from the existing TILGC campus is directed to the existing process drainage and treatment system via the overhead pipe rack for treatment prior to discharge to the TILGC Waste Water Treatment Plant (WWTP). The WWTP provides storage of process wastewater pending testing to ensure the wastewater meets IEL limits prior to controlled release (at EP-WW-01) in accordance with site operating procedures and IEL requirements. Thereafter the process wastewater connects with the site sanitary (foul) wastewater stream arising from P1 and the Administration Building, then it gets discharged to the SDCC sewer to the north of the site. Sanitary (foul) wastewater from P2 and P3 in the south of the site is collected in a separate onsite foul drainage system, which only collects sanitary (foul) wastewater and discharges to the east of the site out falling to the SDCC public foul sewer to the east. The wastewater from both discharge points ultimately discharges to Ringsend WWTP for treatment. The TILGC load contributions to the Ringsend WWTP are a very small fraction of the overall influent load to the WWTP.

Water Supply Infrastructure

The TILGC site is currently served with mains water supply of water via an existing connection to the Irish Water network. Water is provided to onsite storage vessels to balance demand.

14.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

14.4.1 Construction Phase

Land Use, Property, and Access

Access to the site location during and after construction will be via the main TILGC entrance gate. The existing internal access road and footpath allow safe access through the site and the introduction of a pedestrian crossing to the existing access road will connect this new development to the rest of the site.

The proposed VOC abatement system and associated plant will be positioned within an overall utility compound enclosed by a 2.4m high paladin weldmesh black fence. The compound will be accessible via 2 no. vehicular and 1 no. personnel locked gates by trained service personnel only. Within the compound the plinth is separated into two zones: bunded areas and non-bunded circulation space.

A temporary contractor's compound is required to facilitate works during construction activities. It is estimated that parking and facilities for a maximum of 30 people will be required. The proposed contractors compound measuring 58m wide x 58.9m long (3420m^2) will be established. The contractor's compound will be accessed via 1 vehicular and 1 personnel gate directly from the existing access road enclosed by a 2.4m tall black paladin weldmesh fence. The site lighting will extend into this area and the compound will be finished in compacted stone hardcore. The compound will be broken into 3 separate zones: contractor parking (30 spaces), material lay down area and welfare facility/office cabins. One hammer head turning point will be provided for delivery vehicles within the compound. The contractor's compound will be in use for 2 years. The construction of the new TO, utilities workshop and associated ancillary services is targeted to be completed within 1 year. Thereafter, the contractor's compound will be used for 1 year for existing TILGC site activities. After the 2 years, the compound will be removed and the material in the berm created to the north of the compound will be used to re-instate the ground in this area to its original condition.

Additional planting of the original native grasses will be carried out (to encourage the natural growth of pollinator friendly species such as dandelions, clover, celandines, buttercup and primroses).

Construction of the Proposed Development will require delivery of large equipment sections; all sections are to be delivered in road safe sizes as per NRA guidance.

Power and Electrical Supply

During construction, contractors will require power for onsite accommodation, and construction equipment/plant. The power requirements for the construction phase will be provided via a connection to the existing TILGC power supply with the TILGC site boundary.

Natural Gas

There will be no natural gas requirements during the construction phase.

Surface Water Infrastructure

It is proposed to construct the contractor's compound by removing the existing grassed topsoil and replacing with compacted hardcore. A geo liner membrane is to be installed below the hardcore onto a prepared surface to capture any contaminants and separate from the existing underlying stratums.

During construction, any surface water run-off water containing silt will be contained on site via settlement tanks and treated prior to discharge to the existing TILGC surface water drainage system. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and surface water drains, refuelling of machinery off site, where possible). As stated in Section 14.3, all surface water drainage from the TILGC site is treated via hydrocarbon interceptors prior to controlled discharge offsite.

Any minor ingress of groundwater and collected rainfall in the excavations will be pumped out during construction. It is estimated that the inflow rate of groundwater, if any encountered, will be low and limited to localised perched water. It is therefore proposed that the water be discharged via the existing surface water drainage system. Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the surface water drainage system. The use of silt reduction measures as outlined above (if required) will be adopted if the monitoring indicates the requirements for the same with no silt permitted to discharge to the surface water drainage system. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry.

Foul Drainage and Process Drainage Infrastructure

During construction allowance has been made for contractors' compound with a proposed occupancy of 30 people. Welfare facilities will be provided for the contractors via portable sanitary facilities within the construction compound site during the construction works.

A sump is to be constructed within the footprint of the contractor's compound will be pumped to the existing drainage system within the TILGC site. There is no trade effluent associated with the construction phase.

Further details on the proposed design of the foul water drainage are provided within the Engineering Infrastructure Report – Planning (Document Ref. A21DB035-CV-IR-001, DPS, 2022) and on accompanying drawing A21DB035-CV-100 included with the planning documentation.

Water Supply

Welfare facilities will be provided for the contractor's compound, via portable sanitary facilities within the construction compound site during the construction works. Water may also be required for dust suppression, concreting or other construction activities. A potable water supply will be provided from the existing TILGC campus mains.

14.4.2 Operational Phase

Land Use, Property, and Access

Access to the site location during and after construction will be via the main TILGC entrance gate. The existing internal access road and footpath allow safe access through the site and the introduction of a pedestrian crossing to the existing access road will connect this new development to the rest of the site.

Operation of the TO will require 2-3 operatives already involved in maintenance and operation activities at the TILGC facility. There will be no additional personnel required. Delivery of materials such as expendables will occur on an infrequent basis and as required as part of other deliveries to TILGC. It is not envisaged that the Proposed Development will result in any increase in traffic flows to the site.

The site will be accessed via the existing TILGC campus. No new accesses are proposed.

Power and Electrical Supply

Once in operation, electricity will be provided to the site via the national grid tying in with the existing TILGC infrastructure. This will be carried out in accordance with the requirements of the various service providers, working around the existing live infrastructure on the TILGC site.

Natural Gas

Natural gas is required to run the TO, there will be a tie to the existing site gas line along the pipe rack with no new mains gas connection required. A heat recovery solution has been included in the TO design to reduce the Natural Gas consumption and therefore the carbon footprint of the entire unit.

Surface Water Infrastructure

A SUDs strategy has been applied to minimise any increase in surface water discharge into the existing system, this means there is minimal impact on the downstream surface water drainage system which currently operates on the site and no impact on the discharge capacities.

No new increase in surface water flows are required, new access roads are to be constructed of permeable asphalt with an underlying stone build-up on top of a geotextile filter membrane.

Surface water collecting within the bunded areas within the VOC abatement compound will be treated as process waste and will be discharged to the onsite treatment system as per site operating procedures and EPA licence requirements.

The roof of the utilities workshop will be discharge to a local soakaway designed in accordance with BRE 354 soakaway design and in accordance with the requirements of the local authority.

The paved area adjacent the compound between the access roads will drain the onsite internal surface water system. The increase in area represents less than 0.1% of the total paved area on the TILGC site and will have an imperceptible impact on the downstream surface water drainage systems.

All other landscaping finishes are to be permeable and thus no additional discharge into the existing system is required. Refer to architectural drawings for landscape treatment and permeable areas.

Further details on the proposed design of the surface water drainage are provided within the Engineering Infrastructure Report - Planning (Planning Document Ref. A21DB035-CV-IR-001) prepared by DPS Group and on accompanying drawing A21DB035-CV-100 included with the planning documentation.

Foul Sewer and Process Wastewater Infrastructure

No new connections to the public foul sewers are required. A new handwash sink will be provided within the utilities workshop. Foul drainage from the new sink will be pumped into the existing TILGC foul drainage network.

Within the VOC abatement system plinth there will be two bunded areas for the VOC abatement system and the Urea tanks storage area. The concrete bund (designed in compliance with EPA guidance for design of containment bunds) at 350mm high encloses the concrete plinth laid at falls towards a process drainage sump, where any rainwater or potential contamination will be captured by the drainage sump. Liquid from the sump will be pumped up onto the proposed pipe rack to the existing onsite process drainage and treatment system prior to controlled discharge. No drainage from within the bunded areas will enter the surface water system or the ground directly.

Process wastewater from the VOC abatement system will be connected to the existing onsite process drainage and treatment system via the overhead piperack for treatment prior to discharge to the TILGC WWTP. The WWTP provides storage of process wastewater pending testing to ensure the wastewater meets the TILGC IE Licence limits prior to controlled release (at EP-WW-01) in accordance with site operating procedures and IE Licence requirements.

Further details on the proposed design of the foul water drainage are provided within the Engineering Infrastructure Report – Planning (Document Ref. A21DB035-CV-IR-001, DPS, 2022) and on accompanying drawing A21DB035-CV-100 included with the planning documentation.

Water Supply

The TILGC site is currently served with mains water supply via an existing connection to the Irish water network. Water is provided to onsite storage vessels to balance demand. Water demand for the Proposed Development will be minimal and will be provided from the TILGC onsite water storage within the limits of the existing connection agreement.

14.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

14.5.1 Construction Phase

Land Use, Property, and Access

The lands for the Proposed Development are within the existing TILGC campus and are zoned for development. The use of these lands will not result on a negative impact on land use, property or access.

During the construction phase the potential impact on land use, property, and access in the absence of mitigation, is ***localised***, ***neutral, imperceptible*** and ***short term***.

Power and Electrical Supply

Any excavations within the vicinity of existing electrical services will be carried out in consultation with relevant service providers to ensure there is no impact on existing users. The electrical connection should have no disruptions to the national grid during connection works.

During the construction phase the potential impact on power and electrical supply in the absence of mitigation, is ***neutral, imperceptible*** and ***short term.***

Surface Water Infrastructure

During the construction phase, there is potential for an increase in run-off due to the introduction of impermeable surfaces and the compaction of soils. This would potentially temporarily reduce the infiltration capacity and increase the rate and volume of direct surface run-off.

The potential impact of this is a possible slight increase in surface water run-off and sediment loading which could potentially impact local drainage. Run-off containing amounts of silt can cause damage to surface water systems and receiving watercourses. However, this potential effect is unlikely due to the scale and extent of the construction activity proposed and the mitigation measures included within the design and set out in Section 14.6.

During the construction phase the potential impact on surface water, in the absence of mitigation, is ***neutral, imperceptible,*** and ***short term.***

Foul Sewer and Process Wastewater Infrastructure

Welfare facilities will be provided for the construction workers on site during the construction works and wastewater will be sanitary waste only.

The works contractor will be required to apply to Irish Water for connection to discharge any contaminated surface water which collects in excavations, if it is required. The works contractor will be obliged to comply with any conditions of the discharge license to control discharge quality and rate of flow.

During the construction phase the potential impact on foul sewer and process wastewater infrastructure, in the absence of mitigation, is ***neutral, imperceptible,*** and ***short term.***

Water Supply

It is estimated that a maximum of 30 people will be required during the construction phase. A potable water supply will be provided from the existing TILGC campus mains.

During the construction phase the potential impact on potable water infrastructure, in the absence of mitigation, is considered to be ***neutral, imperceptible,*** and ***short term.***

14.5.2 Operational Phase

Land Use, Property, and Access

While it is noted that will be a permanent loss of land, the lands for the Proposed Development are within the existing TILGC campus and are zoned for development. The use of these lands will not cause a negative impact. There is no change to the existing access arrangements as a result of the Proposed Development.

Due to the zoning of these lands, the potential impact associated with land use and property, and access for the operational phase will be localised ***neutral, imperceptible,*** and ***long term.***

Power and Electrical Supply

During the operational phase, maintenance of utilities infrastructure on the site will be carried out in accordance with the relevant requirements of the various utilities' providers / authorities. As such, no significant impacts on services or utilities themselves are predicted to occur as a result of the operational phase.

During the operational phase the potential impact on power and electrical supply, in the absence of mitigation, is considered to be ***neutral, imperceptible,*** and ***long term.***

Surface Water Infrastructure

SUDs has been applied to minimise any increase in surface water discharge into the existing system, this means there is an imperceptible impact on the downstream surface water system which currently operates on the site and no impact on the discharge capacities.

During the operational phase the potential impact on surface water, in the absence of mitigation, is considered to be ***neutral, imperceptible,*** and ***long term.***

Foul Sewer and Process Wastewater Infrastructure

During the operational phase the foul sewer and process wastewater discharged from the site will ultimately discharge to the Ringsend Wastewater Treatment Plant. The discharge will be in compliance with the IE licence requirements.

During the operational phase the potential impact on foul sewer and process wastewater infrastructure, in the absence of mitigation, is considered to be ***neutral, imperceptible,*** and ***long term.***

Water Supply

During operation, there will be a single sink provided in the utilities workshop. Water demand for the project will be provided from onsite water storage within the limits of the existing connection agreement.

During the operational phase the potential impact on potable water infrastructure, in the absence of mitigation, is considered to be ***neutral, imperceptible,*** and ***long term.***

14.6 REMEDIAL AND MITIGATION MEASURES

14.6.1 Construction Phase

There is no potential of significant impacts identified to occur as a result of the construction phase of the Proposed Development.

Nevertheless, in order to minimise unlikely impacts insofar as practicable, the following mitigation measures shall be implemented during the construction phase:

- All possible precautions shall be taken to avoid unplanned disruptions to any services / utilities during the proposed works.
- Consultation with all relevant service providers shall be undertaken in advance of works, ensuring all works are carried out to the relevant standards and in a safe manner.
- There will be an interface established between the Contractor and the relevant utilities service providers / authorities during the construction phase of the Proposed Development. This interface will be managed to ensure a smooth construction schedule with no / minimal disruption to the local residential and business community.
- All new infrastructure will be installed in accordance with the applicable standards, guidelines and codes of practice.
- All mitigation measures in relation to site access / egress and construction traffic management are set out in Chapter 13 of this EIA Report (Traffic & Transportation) and will be included in the Construction Environmental Management Plan (CEMP) that will be prepared by DPS prior to commencement of construction and shall be fully implemented by the site contractors.
- Prior to the operational phase of the Proposed Development, utilities infrastructure connections will be tested by a suitably qualified person using an appropriate methodology, approved by the relevant service provide.

14.6.2 Operational Phase

There are no potential significant impacts on material assets as a result of the operational phase of the Proposed Development.

Nevertheless, in order to minimise unlikely impacts insofar as practicable, any necessary maintenance or upgrades of on-site utilities infrastructure during the operational phase of the Proposed Development, will be carried out in accordance with the specifications of the qualified service providers.

14.7 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

14.7.1 Construction Phase

The contractor will be contractually obliged to put best practice measures in place and work in accordance with the CEMP and relevant planning conditions. In addition, the implementation of mitigation measures detailed each chapter and detailed in Section 14.6.1 will ensure that the residual effects on the material assets during the construction phase will be ***neutral, imperceptible*** and ***short-term***.

14.7.2 Operational Phase

The implementation of mitigation measures within each chapter and detailed in Section 14.6.2 and adhered to TILGC site procedures and IE Licence requirements will ensure that the residual effects on the material assets during the operational phase will be ***neutral, imperceptible*** and ***long-term to permanent***.

14.8 MONITORING AND/OR REINSTATEMENT

No additional monitoring or reinstatement is required.

14.9 CUMULATIVE IMPACTS

The cumulative impact of the Proposed Development with any/all relevant other permitted or planned developments (as described in Chapter 3) are discussed below.

14.9.1 Construction Phase

The Proposed Development entails minimal use of material assets during construction therefore there is limited opportunity for the causation of cumulative impacts during the construction phase of the Proposed Development in combination with other planned or permitted developments (as described in Chapter 3).

Coordination and consultation will be had between the Construction contractor and ESB, Irish Water, Gas Networks Ireland, and other relevant service providers within the locality to facility the Proposed Development. The Proposed Development will be in accordance with the requirements of statutory providers for electrical infrastructure, surface water, foul drainage and water infrastructure.

The works contractors for other planned or permitted developments (as described in Chapter 3) will be obliged to put best practice measures to ensure that there are no unplanned interruptions to service from the existing telecommunications network, watermain, sewer and electrical grid, any planned interruptions will be agreed in advance with the utilities suppliers.

The implementation of mitigation measures within each chapter and detailed in Section 14.6.1; as well as the compliance of adjacent developments with their respective planning permissions, will ensure that the predicted impacts on the material assets during the construction phase for the Proposed Development will be ***neutral, imperceptible*** and ***short-term***. Thus, the likelihood of significant in combination effects with other planned or permitted developments (as described in Chapter 3) is ***unlikely***.

14.9.2 Operational

Once operational, the Proposed Development will result in minimal impact on surface water, foul drainage and water infrastructure. The Proposed Development will not generate significant air (including odour), noise or water emissions during normal operating conditions therefore the potential for cumulative with other permitted development is low; these have been discussed further in the respective EIA Report chapters, Chapter 7 (Hydrology), Chapter 9 (Air Quality & Climate) and Chapter 10 (Noise and Vibration).

Based on the above, it is predicted that the cumulative impact of the Proposed Development with other permitted, planned and existing developments is considered to be ***long-term*** and ***imperceptible*** during the operational phase.

15.0 WASTE MANAGEMENT

15.1 INTRODUCTION

This Chapter of the EIAR comprises an assessment of the likely impact, if any, of the Proposed Development on the waste generated from the development as well as identifying proposed mitigation measures to minimise any associated impacts.

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the demolition, excavation and construction phases of the Proposed Development and has been included as Appendix 15.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government (DoEHLG)(2006).

The Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR (2022) and the EU Commission Notice on changes and extensions to projects, 2021.

These documents will ensure the management of wastes arising at the Development Site in accordance with legislative requirements and best practice standards.

15.2 METHODOLOGY

The assessment of the impacts of the Proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the Proposed Development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including demolition, site preparation and excavation);
- Operational phase; and
- Decommissioning Phase

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the Proposed Development have been calculated and are included in section 15.4 of this chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the Proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 15.6.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 6 (Land, Soils, Geology and Hydrogeology).

15.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 15.1).

Figure 15.1: Waste Hierarchy (Source: European Commission)

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic

model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 15.2).

Figure 15.2: Circular Economy (Source: Repak)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy – *Waste Management Policy in Ireland, was published in 2020* and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, *A Resource Opportunity, in 2012.*

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). The guidance documents, Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the *Eastern Midlands Regional (EMR) Waste Management Plan 2015 – 2021*, *BS 5906:2005 Waste Management in Buildings – Code of Practice*, the South Dublin County Council (SDCC), *South Dublin County Council Household & Commercial Waste Bye-Laws (2018)*, the EPA National Waste Database Reports 1998 – 2019 and the EPA National Waste Statistics Web Resource.

15.2.2 Terminology

Note that the terminology used herein is consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
b) the adverse impacts of the generated waste on the environment and human health; or
c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

15.3 RECEIVING ENVIRONMENT

In terms of waste management, the receiving environment is largely defined by SDCC as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the EMR Waste Management Plan 2015-2021 (currently under review to be replaced in 2022) and the Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland.

The waste management plans set out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;

- Achieve a recycling rate of 55% of managed municipal waste by 2025; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Ireland achieved 84 per cent material recovery of such waste in 2019, and therefore surpassed the 2020 target and is currently surpassing the 2025 target. The National Waste Statistics update published by the EPA in November 2021 identifies that Ireland's current against "Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)" was met for 2020 at 51% however they are currently not in line with the 2025 target (55%).

The South Dublin County Development Plan 2016 – 2022 (2016) and the Draft South Dublin County Development Plan 2022 – 2028 (2021) set out objectives and policies for the SDCC area which reflect those sets out in the regional waste management plan.

In terms of physical waste infrastructure, SDCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the EMR Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, municipal waste landfills, material recovery facilities and waste transfer stations.

However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

15.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The Proposed Development will consist of a new VOC abatement system (TO), a supporting utilities workshop and associated ancillary services.

A full description of the Proposed Development can be found in Chapter 2 (Description of the Proposed Development). The characteristics of the Proposed Development that are relevant in terms of waste management are summarised below.

15.4.1 Demolition Phase

There will be some waste materials generated from modifications to the existing access road, install underground utilities, tie into existing utilities and modify hard landscaping.

15.4.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of metal, concrete, plastic, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

As detailed in Section 6.4 of Chapter 6 (Land, Soils, Geology and Hydrogeology), topsoil and subsoil stripping will be required during construction. It is estimated that approximately 3,900 m^3 of soils and stones will be excavated to facilitate construction of the temporary contractor's compound. It is anticipated that all of this soil can be reused onsite for to create a temporary berm along the northern perimeter of the temporary contractor's compound and for landscaping purposes. Once the contractor's compound is no longer required, the material in the berm will be used to re-instate the ground in this area. In addition, it is estimated that c. 7,400 m^3 of soils and fill material will be excavated to facilitate construction of the TO, utilities building and associated ancillary services. This material is to be removed and disposed of offsite by a permitted waste management company for recovery and/or disposal at a suitably permitted/licenced facility.

If any material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 15 (previously Article 27) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020. For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 15.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones and fill to be removed off-site, the material was classified. A Waste Classification Assessment as carried out by Ground Investigations Ireland (GII, 2022) and is included as Appendix 6.2 of Chapter 6 (Land, Soils, Geology and Hydrogeology). The assessment was based on site investigation (SI) works carried out in the proposed development area in January 2022. Based on the samples collected during the SI, the material would be classed as non-hazardous using the HazWasteOnline™ waste classification software. The material was also classified in accordance with waste acceptance criteria set out in Council Decision 2003/33/EC which sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability as well as landfill specific waste acceptance criteria. Based on the samples collected, all of the material would be classed as inert for disposal purposes. The majority of the material would be classed as inert Category A which would be suitable for disposal at an unlined soil recovery facility, with just one area which was found to have anthropogenic material (such as concrete, brick and timber) classed as Category B1 which would be suitable for an inert landfill.

In the unlikely event of hazardous material being encountered, it will be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 15.1). The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the Proposed Development. These are summarised in Table 15.2.

***Table 15.2**: Predicted on and off-site reuse, recycle and disposal rates for construction waste*

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	13.8	10	1.4	80	11.0	10	1.4
Timber	4.2	40	1.7	55	2.3	5	0.2
Metals	10.9	5	0.5	90	9.8	5	0.5
Concrete	6.7	30	2.0	65	4.3	5	0.3
Other	6.3	20	1.3	60	3.8	20	1.3
Total	**41.8**		**6.9**		**31.2**		**3.7**

15.4.3 Operational Phase

There will be no solid or liquid waste generated from the Proposed Development, once operational.

15.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

This section details the potential waste effects associated with the Proposed Development.

15.5.1 Construction Phase

The Proposed Development will generate a range of non-hazardous and hazardous waste materials during site demolition, excavation and construction (see Appendix 15.1 for further detail). General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound pending collection by a suitably permitted waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. However, it is anticipated that construction staff will be limited to c. 30 personnel which will generate relatively small amounts of waste that would attract vermin. In the absence of mitigation, the effect on

the local and regional environment is likely to be ***short-term, not significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***long-term, slight*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the Eastern Midland Region which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Proposed Development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, not significant*** and ***negative***.

There is a quantity of excavated material which will need to be excavated to facilitate the Proposed Development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 6 (Land, Soils, Geology and Hydrogeology). It is anticipated that c. 7,400 m^3 of excavated material will need to be removed off-site. Based on the sampling undertaken during the SI, the material has been classified as inert for disposal purposes. Nonetheless, visual and olfactory inspections of the excavated material will be required to ensure that in the unlikely event that any potentially contaminated materials are encountered, that they are identified, segregated, classified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. As the material has already been sampled and classified and the likelihood that contaminated material will be encountered is low, the effect on the local and regional environment is likely to be ***short-term, not significant*** and ***negative***.

15.5.2 Operational Phase

There will be no solid or liquid waste generated from the Proposed Development, once operational. As such the operational phase will have a neutral effect on waste management.

15.5.3 Do Nothing Scenario

If the Proposed Development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no additional demolition, excavation or construction waste generated at this site. Current or operational waste would continue to be generated at the same levels. There would, therefore, be a neutral effect on the environment in terms of waste.

15.6 REMEDIAL AND MITIGATION MEASURES

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

15.6.1 Construction Phase

The following mitigation measures will be implemented during the construction phase of the Proposed Development:

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the EPA, *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)* and is included as Appendix 15.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the Proposed Development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 15.1) in agreement with SDCC and in compliance with any planning conditions, or submit an addendum to the RWMP to SDCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases.

A quantity of topsoil and sub soil will need to be excavated to facilitate the Proposed Development. The Project Engineers (DPS) have estimated that 7,400m^3 of excavated material will need to be removed off-site. The material has been classified as inert based on the SI undertaken in January 2022 by GII. Nonetheless, visual and olfactory inspections of the excavated material will be required to ensure that in the unlikely event that any potentially contaminated materials are encountered, that they are identified, segregated, classified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete;
    - Metals;
    - Plastic.
- Excess construction materials shall be re-used on-site, where possible; (alternatively, they will be segregated for offsite re-use, recycling, recovery or disposal);
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);

- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 15 (previously Article 27) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020. TILGC and EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the Proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the EMR Waste Management Plan 2015 – 2021. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

15.6.2 Operational Phase

There will be no solid or liquid waste generated from the Proposed Development, once operational. Therefore, no remedial or mitigations measures are required for the operational phase.

15.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The implementation of the mitigation measures outlined in Section 15.5 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the Proposed Development during the construction phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved during the construction phase.

15.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 15.6.1 and adherence to the RWMP (which includes mitigation) (Appendix 15.1) during the construction phase will ensure that the predicted effect on the environment will be ***short-term, imperceptible*** **and** ***neutral.***

15.7.2 Operational Phase

There will be no solid or liquid waste generated from the Proposed Development, once operational. As such the operational phase will have a neutral effect on waste management.

15.7.3 Conclusion

Assuming the full and proper implementation of the mitigation measures set out herein and, in the RWMP (Appendix 15.1), no likely significant negative effects are predicted to occur as a result of the construction of the Proposed Development. Once operational, there will be no waste generated so the effect will be neutral.

15.8 RESIDUAL IMPACTS

The implementation of the mitigation measures outlined in Section 15.6 will ensure that high rates of reuse, recovery and recycling are achieved at the site of the Proposed Development during the construction. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved. The residual impact is predicted to be ***imperceptible*** and ***neutral***.

15.9 CUMULATIVE IMPACT ASSESSMENT

As has been identified in the receiving environment section all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such any further environmental impacts that the Proposed Development may have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

15.9.1 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions in the area. Conservatively multiple developments in the area could be developed concurrently or overlap in the construction phase.

Developments that potentially could overlap during the construction phase of note:

VA0655.309146 Construction of Aungierstown substation and Gridline connection to Castlebaggot substation Construction on these SID works is commenced and will be completed prior to proposed gridline connection

SD21A/0042 EdgeconneX Dub 05 data centre and gas powered generation plant. Scheduled to Commence Q1 2023, estimated completion Q 4 2024

SD19A/0042 / ABP Ref.: 305948-19 Edgeconnex Dub 04 data centre, Kishoge substation gas powered generation plant. Scheduled to Commence Q3 2022, estimated completion Q 4 2023

SD21A/0203 Development works on the Microsoft Campus in Grange Castle Business Park Works are currently ongoing

SD20A/0283 Development works including the construction of new datacentre on the Microsoft Campus in Grange Castle Business Park Works are currently ongoing

SD20A/0147 Expansion of production facilities at the Takeda Ireland Ltd. facility. Works are currently ongoing

Due to the high number of waste contractors in the Dublin region as evidenced from the National Waste Collection Permit Office and the EPA online databases there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar C&D waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the cumulative effect will be ***short-term, imperceptible*** and ***neutral.***

15.9.2 Operational Phase

There will be no solid or liquid waste generated from the Proposed Development, once operational. As such the operational phase will have a neutral cumulative effect with other planned or permitted developments on waste management.

15.10 DIFFICULTIES ENCOUNTERED IN COMPILING THE CHAPTER

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

There is a number of licensed, permitted and registered waste facilities in the Dublin and EMR regions and across Ireland and Northern Ireland. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability. The waste facilities selected will ultimately be selected to minimise the environmental impacts on the surrounding environment.

Provided all mitigation measures as set out in this chapter and the attached RWMP, the overall predicted impact of the Proposed Development is ***long-term, imperceptible*** and ***neutral.***

15.11 CONCLUSION

This chapter has reviewed and analysed the potential and the predicted the impact of the Proposed Development with regards to waste management. The cumulative impact of the Proposed Development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter and the attached RWMP, the overall predicted impact of the Proposed Development is ***long-term, imperceptible*** and ***neutral.***

15.12 REFERENCES

1. Waste Management Act 1996 - 2021 (No. 10 of 1996) as amended.
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017).
7. Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022)
8. Forum for the Construction Industry – Recycling of Construction and Demolition Waste.
9. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
10. DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'* (2021)
11. Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)*
12. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
13. FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and site Managers (2002).
14. South Dublin County Council (SDCC), South Dublin Development Plan 2016-2022 (2016)
15. SDCC, Draft South Dublin Development Plan 2022-2023 (2021)
16. SDCC, South Dublin County Council Household & Commercial Waste Bye-Laws (2018)
17. BS 5906:2005 Waste Management in Buildings – Code of Practice
18. Planning and Development Act 2000 (No. 30 of 2000) as amended
19. Environmental Protection Agency (EPA), Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2015)
20. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
21. EPA, *European Waste Catalogue and Hazardous Waste List* (2002)
22. EPA, National Waste Database Reports 1998 – 2015.
23. US EPA, *Characterisation of Building Uses* (1998);
24. EPA and Galway-Mayo Institute of Technology (GMIT), EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015)

APPENDIX 15.1

Resource and Waste Management Plan
Prepared by AWN Consulting Ltd.

APPENDIX 15.1

RESOURCE WASTE MANAGEMENT PLAN FOR A PROPOSED VOLATILE ORGANIC COMPOUND (VOC) ABATEMENT PROJECT

GRANGE CASTLE BUSINESS PARK, NANGOR ROAD, CLONDALKIN, DUBLIN 22

Report Prepared For

Takeda Ireland Ltd. Grange Castle (TILGC)

Report Prepared By

Chonaill Bradley
Principal Environmental Consultant

Our Reference

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awnconsulting
A Trinity Consultants Company

The Tecpro Building,
Clonshaugh Business & Technology Park,
Dublin 17, Ireland.

T: + 353 1 847 4220
F: + 353 1 847 4257
E: info@awnconsulting.com
W: www.awnconsulting.com

Cork Office
Unit 5, ATS Building,
Carrigaline Industrial Estate,
Carrigaline, Co. Cork.
T: + 353 21 438 7400
F: + 353 21 483 4606

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CONTENTS

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Resource Waste Management Plan (RWMP) on behalf of Takeda Ireland Ltd. The Proposed Development will consist of a new volatile organic compound (VOC) abatement system, a supporting utilities workshop and associated ancillary services in Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22.

The Environmental Protection Agency (EPA) of Ireland issued *'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* in 2021. These guidelines replace the previous 2006 guidelines issued by The National Construction and Demolition Waste Council (NCDWC) and the Department of the Environment, Heritage and Local Government (DoEHLG) in 2006. The RWMP would be the replacement document for the Construction & Demolition Waste Management Plan. Further detail can be found in section 2.

This plan will provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Act 1996* as amended and associated Regulations [1], *Environmental Protection Agency Act 1992* as amended [2], *Litter Pollution Act 1997* as amended [3] and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* [4]. In particular, this plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This RWMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the Proposed Development and makes recommendations for management of different waste streams. The RWMP should be viewed as a live document and will be regularly revisited throughout a project's lifecycle so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible

2.0 RESOURCE & WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998, *Changing Our Ways* [5], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*' [6] concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020, the Irish Government published a policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan, *'A Waste Action Plan for a Circular Economy'* [7] (WAPCE), replaces the previous national waste management plan, *"A Resource Opportunity"* (2012), and was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to an altered

economical model, where climate and environmental challenges are turned into opportunities.

The WAPCE sets the direction for waste planning and management in Ireland up to 2025. This reorientates policy from a focus on managing waste to a much greater focus on creating circular patterns of production and consumption. Other policy statements of a number of public bodies already acknowledge the circular economy as a national policy priority.

The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021) [8] to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021. It is anticipated that the Strategy will be updated in full every 18 months to 2 years.

The Environmental Protection Agency (EPA) of Ireland issued '*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects' in November 2021* [9]. These guidelines replace the previous 2006 guidelines issued by The National Construction and Demolition Waste Council (NCDWC) and the Department of the Environment, Heritage and Local Government (DoEHLG) in 2006 [10]. The guidelines provide a practical approach which is informed by best practice in the prevention and management of C&D wastes and resources from design to construction of a project, including consideration of the deconstruction of a project. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Design teams roles and approach;
- Relevant EU, national and local waste policy, legislation and guidelines;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for Resource Waste Manager (RM) and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Local Authority, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a RWMP for developments. The new guidance classifies developments on a two-tiered system. Developments which do not exceed any of the following thresholds may be classed as Tier 1 development:

- New residential development of less than 10 dwellings.
- Retrofit of 20 dwellings or less.
- New commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 1,250m^2.
- Retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area less than 2,000m^2; and
- Demolition projects generating in total less than 100m^3 in volume of C&D waste.

A development which exceeds one or more of these thresholds is classed as a Tier-2 project. This development is a Tier 1 development as it does not exceed these thresholds.

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [11], published by FÁS and the Construction Industry Federation in 2002 and the previous guildines, 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects' (2006).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The Proposed Development is located in the Local Authority area of South Dublin County Council (SDCC).

The *EMR Waste Management Plan 2015 – 2021* is the regional waste management plan for the SDCC area published in May 2015. Currently the EMR and other regional waste management plans are under review and the Regional Waste Management Planning Offices expect to publish the final plan in 2022.

The regional plan sets out the following strategic targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015.*

The *South Dublin County Council Development Plan 2016 – 2022* [12] sets out a number of objectives and actions for the South Dublin area in line with the objectives of the waste management plan.

Waste objectives and actions with a particular relevance to the Proposed Development are as follows:

Objectives:

- **IE5 Objective 1:** To support the implementation of the Eastern–Midlands Region Waste Management Plan 2015-2021 by adhering to overarching performance targets, policies and policy actions.
- **IE5 Objective 2:** To support waste prevention through behavioural change activities to de-couple economic growth and resource use.
- **IE5 Objective 3:** To encourage the transition from a waste management economy to a green circular economy to enhance employment and increase the value recovery and recirculation of resources.
- **IE5 Objective 8:** To secure appropriate provision for the sustainable management of waste within developments, including the provision of facilities for the storage, separation and collection of such waste.

Actions:

- Support and facilitate the separation of waste at source into organic and non-organic streams or other waste management systems that divert waste from landfill and maximise the potential for each waste type to be re-used and recycled or composted and divert organic waste from landfill, in accordance with the National Strategy on Biodegradable Waste (2006).
- Implement the objectives of the National Waste Prevention Programme at a local level with businesses, schools, householders, community groups and within the Council's own activities.
- Promote an increase in the amount of waste re-used and recycled consistent with the Regional Waste Management Plan and Waste Hierarchy and facilitate recycling of waste through adequate provision of facilities and good design in new developments.
- Implement the South Dublin Litter Management Plan 2015 - 2019.

The *Draft South Dublin County Development Plan 2022 – 2028* [13] will supersede the current development plan and is due to be complete and come into effect in August 2022. The following policy and objectives have thus far been incorporated into the draft plan:

Policy and Objectives

Policy IE6: Waste Management

Implement European Union, National and Regional waste and related environmental policy, legislation, guidance and codes of practice to improve management of material resources and wastes.

- **IE6 Objective 1**
  To encourage a just transition from a waste management economy to a green circular economy to enhance employment and increase the value, recovery and recirculation of resources through compliance with the provisions of the Waste Action Plan for a Circular Economy 2020 – 2025 and to promote the use of, but not limited to, reverse vending machines and deposit return schemes or similar to ensure a wider and varying ways of recycling.
- **IE6 Objective 2**
  To support the implementation of the Eastern Midlands Region Waste Management Plan 2015-2021 or as amended by adhering to overarching performance targets, policies and policy actions.
- **IE6 Objective 4**
  To provide for and maintain the network of bring infrastructure (e.g. civic amenity facilities, bring banks) in the County to facilitate the recycling and recovery of hazardous and non-hazardous municipal wastes.
- **IE6 Objective 7**
  To require the appropriate provision for the sustainable management of waste within all developments, ensuring it is suitably designed into the development, including the provision of facilities for the storage, separation and collection of such waste.
- **IE6 Objective 8**
  To adhere to the recommendations of the National Hazardous Waste Management Plan 2014-2020 and any subsequent plan, and to co-operate with other agencies including the EPA in the planning, organisation and supervision of the disposal of hazardous waste streams, including hazardous waste identified during construction and demolition projects.

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended.
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended [14].

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of *"Polluter Pays"* whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that TILGC ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a waste or IE licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESIGN APPROACH

The client and the design team have integrated the *'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects'* guidelines into the design workshops, to help review processes, identify and evaluate resource reduction measures and investigate the impact on cost, time, quality, buildability, second life and management post construction. Further details on these design principals can be found within the aforementioned guidance document.

The design team have undertaken the design process in line with the international best practice principles to firstly prevent wastes, reuse where possible and thereafter sustainably reduce and recover materials. The below sections have been the focal point of the design process and material selections and will continued to be analysed and investigated throughout the design process and when selecting material.

The approaches presented are based on international principles of optimising resources and reducing waste on construction projects through:

- Prevention;
- Reuse;
- Recycling;
- Green Procurement Principles;
- Off-Site Construction;
- Materials Optimisation; and
- Flexibility and Deconstruction.

4.0 DESCRIPTION OF THE PROJECT

4.1 Location, Size and Scale of the Development

The Proposed Development will consist of a new volatile organic compound (VOC) abatement system, a supporting utilities workshop and associated ancillary services at the Takeda Ireland Ltd. (TIL) site in Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22.

The Proposed Development consists of:

- A Volatile Organic Compound (VOC) Abatement system comprising of a Thermal Oxidiser (TO), associated plant equipment and scrubbers positioned on a bunded concrete plinth
- A single storey utilities workshop
- A new pipe rack with the addition of a second-tier extension to the existing pipe rack
- Contractors compound
- Modifications to the existing internal access road
- Permanent pedestrian crossing to the existing internal access road
- New access road and footpaths to perimeter of proposed development
- Modifications to the existing site lighting, signage, surface water, foul and process wastewater drainage, hard and soft landscaping

4.2 Details of the Non-Hazardous Wastes to be produced

There will be some waste materials generated from modifications to the existing access road, install underground utilities, tie into existing utilities and modify hard landscaping.

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of metal, concrete, plastic, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Topsoil and subsoil stripping will be required during construction. It is estimated that approximately 3,900 m^3 of soils and stones will be excavated to facilitate construction of the temporary contractor's compound. It is anticipated that all of this soil can be reused onsite for to create a temporary berm along the northern perimeter of the temporary contractor's compound and for landscaping purposes. Once construction of the Proposed Development is complete, the material in the berm will be used to re-instate the ground in this area. In addition, it is estimated that c. 7,400 m^3 of soils and fill material will be excavated to facilitate construction of the TO, utilities building and associated ancillary services. This material is to be removed and disposed of offsite by a permitted waste management company for recovery and/or disposal at a suitably permitted/licenced facility.

Waste will also be generated from construction and demolition workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction and demolition phases. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

4.3 Potential Hazardous Wastes to be produced

4.3.1 Contaminated Soil

An intrusive site investigation was carried out by Ground Investigations Ireland (GII) in January 2022 whose purpose was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification.

According to the Site Investigations carried out by GII in 2022, the risk of contaminated soils being present onsite is low and this was confirmed by onsite soil sampling and analysis. Site investigation and laboratory analysis has not identified any existing contamination.

According to the Waste Classification Report (GII, 2022), the material sampled across the site, if being considered a waste, can be classified as non-hazardous using the HazWasteOnline™ waste classification software. The material was also classified in accordance with waste acceptance criteria set out in *Council Decision 2003/33/EC* [15] which establishes the criteria for the acceptance of waste at landfills as well as landfill specific waste acceptance criteria. Based on the samples collected, all of the material would be classed as inert for disposal purposes. The majority of the material would be classed as inert Category A which would be suitable for disposal at an unlined soil recovery facility, with just one area which was found to have anthropogenic material (such as concrete, brick and timber) classed as Category B1 which would be suitable for an inert landfill. Asbestos was not detected in the soil samples.

In the unlikely event that any potentially contaminated material is encountered during construction, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [16] using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the waste acceptance criteria in accordance with *EC Council Decision 2003/33/EC*.

No asbestos was found during the SI. In the unlikely event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify SDCC and provide a Hazardous / Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal / treatment, in addition to information on the authorised waste collector(s).

4.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or stored in double-skinned tanks) and located in a dedicated, secure area of the site. Provided that these requirements

are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

4.3.3 Invasive Plant Species

A site walkover was undertaken by Moore Group in May 2022. This included a site walkover survey of the entire site, and around part of the outside perimeter to search for any invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011.

No Japanese Knotweed or any third schedule invasive species were detected. If any are detected during the construction phase of the development, then an invasive species management plan will be produced and submitted to SDCC.

4.3.4 Asbestos

4.3.5 Other known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or light bulbs and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes (if encountered) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

5.0 ROLES AND RESPONSIBILITIES

The *Best Practice Guidelines on the Preparation of Resource Waste Management Plans for Construction and Demolition Projects* promotes that a RM will be appointed. The RM may be performed by number of different individuals over the life-cycle of the Project, however it is intended to be a reliable person chosen from within the Planning/Design/Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project RWMP are complied with. The RM is assigned the requisite authority to meet the objective and obligations of the RWMP. The role will include the important activities of conducting waste checks/audits and adopting construction and demolition methodology that is designed to facilitate maximum reuse and/or recycling of waste.

5.1 Role of the Client

TILGC are Client and the body establishing the aims and the performance targets for the project.

- The Client has commissioned the preparation and submission of a preliminary RWMP as part of the design and planning submission;
- The Client is to commission the preparation and submission of an updated RWMP as part of the construction and demolition tendering process;
- The Client will ensure that the RWMP is agreed on and submitted to the local authority prior to commencement of works on site;
- The Client is to request the end-of-project RWMP from the Contractor.

5.2 Role of the Client Advisory Team

The Client Advisory Team or Design Team is responsible for:

- Drafting and maintaining the RWMP through the design, planning and procurement phases of the project;
- Appointing a Resource Manager (RM) to track and document the design process, inform the Design Team and prepare the RWMP.
- Including details and estimated quantities of all projected waste streams with the support of environmental consultants/scientists. This will also include data on waste types (e.g. waste characterisation data, contaminated land assessments, site investigation information) and prevention mechanisms (such as by-products) to illustrate the positive circular economy principles applied by the Design Team;
- Handing over of the RWMP to the selected Contractor upon commencement of construction of the development, in a similar fashion to how the safety file is handed over to the Contractor;
- Working with the Contractor as required to meet the performance targets for the project.

5.3 Future Role of the Contractor

The construction Contractors have not yet been decided upon for this RWMP. However, once selected they will have major roles to fulfil. They will be responsible for:

- Preparing, implementing and reviewing the RWMP during the construction phase (including the management of all suppliers and sub-contractors) as per the requirements of these guidelines;
- Identifying a designated and suitably qualified RM who will be responsible for implementing the RWMP;
- Identifying all hauliers to be engaged to transport each of the resources / wastes off-site;
- Implementing waste management policies whereby waste materials generated on site are to be segregated as far as practicable;
- Identifying all destinations for resources taken off-site. As above, any resource that is legally classified as a 'waste' must only be transported to an authorised waste facility;
- End-of-waste and by-product notifications addressed with the EPA where required;
- Clarification of any other statutory waste management obligations, which could include on-site processing;
- Full records of all resources (both wastes and other resources) will be maintained for the duration of the project; and
- Preparing a RWMP Implementation Review Report at project handover.

6.0 KEY MATERIALS & QUANTITIES

6.1 Project Resource Targets

Project specific resource and waste management targets for the site have not yet been set and this information will be updated for these targets once these targets have been confirmed by the client. However, it is expected for projects of this nature that a minimum of 70% of waste is fully re-used, recycled or recovered where possible. Target setting will inform the setting of project-specific benchmarks to track target progress. Typical Key Performance Indicators (KPIs) that may be used to set targets include (as per guidelines):

- Weight (tonnes) or Volume (m^3) of waste generated per construction value;

- Weight (tonnes) or Volume (m^3) of waste generated per construction floor area (m^2);
- Fraction of resource reused on site;
- Fraction of resource notified as by-product;
- Fraction of waste segregated at source before being sent off-site for recycling/recovery; and
- Fraction of waste recovered, fraction of waste recycled, or fraction of waste disposed.

6.2 Main C&D Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 6.1. The List of Waste (LoW) code (as effected from 1 June 2015) (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Table 6.1 Typical waste types generated and LoW codes (*individual waste types may contain hazardous substances)

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

7.0 WASTE MANAGEMENT

There will be some waste materials generated from modifications required to the existing internal access road and surface water, foul and process wastewater drainage systems.

Table 7.1 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports, the GMIT* [16] and other research reports.

Table 7.1 Waste materials generated on a typical Irish construction site

Waste Types	%
Mixed C&D	33
Timber	28
Metals	8
Concrete	6
Other	15
Total	**100**

Table 7.2 shows the predicted construction waste generation for the Proposed Development based on the information available to date along with the targets for management of the waste streams. The predicted waste amounts are based on an average largescale development waste generation rate per m^2, using the waste breakdown rates shown in Table 7.1.

Table 7.2 Estimated off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	13.8	10	1.4	80	11.0	10	1.4
Timber	4.2	40	1.7	55	2.3	5	0.2
Metals	10.9	5	0.5	90	9.8	5	0.5
Concrete	6.7	30	2.0	65	4.3	5	0.3
Other	6.3	20	1.3	60	3.8	20	1.3
Total	**41.8**		**6.9**		**31.2**		**3.7**

In addition to the information in Table 7.2, it is estimated that c. 7,400 m^3 of soils and fill material will be excavated to facilitate construction of the TO, utilities building and associated ancillary services. This material is to be removed and reused, recovered and/or disposed of offsite by a permitted waste management company for recovery and/or disposal at a suitably permitted/licenced facility.

7.1 Proposed Resource and Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the SDCC Region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arising's requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

Written records will be maintained by the contractor(s) detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit or licence for the receiving waste facility for all waste removed off site for appropriate reuse, recycling, recovery and/or disposal

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required.

The management of the main waste streams is outlined as follows:

<u>Soil, Stone, Gravel, Clay & Made Ground</u>

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase. However, all the soils and stones excavated to facilitate construction of the temporary

contractor's compound will be reused onsite for to create a temporary berm along the northern perimeter of the contractor's compound and for landscaping purposes. Once the contractor's compound is no longer required, the material in the berm will be used to re-instate the ground in this area.

When material is removed off-site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Regulation 15 (By-products) (Previously Article 27 and referred to as Article 27 in this report) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. The potential to reuse material as a by-product will be confirmed during the course of the excavation works, with the objective of eliminating any unnecessary disposal of material.

The next option (beneficial reuse) may be appropriate for the excavated material. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Regulation 15 (Article 27).

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Act 1996* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the unlikely event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed off- site for appropriate reuse, recovery and / or disposal.

Silt & Sludge

Silt and petrochemical interception will be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete generated as part of the construction works are expected to be clean, inert material and will be recycled, where possible.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber
Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal
Metals will be segregated where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Waste Electrical and Electronic Equipment (WEEE)
Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

Other Recyclables
Where any other recyclable wastes such as cardboard and soft plastic are generated, these will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste
C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 10.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Other Hazardous Wastes
On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

7.2 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project RM (see Section 9.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project waste manager (see Section 10.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project resource manager (Refer to Section 9.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.

8.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

8.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle/recovery/disposal costs associated with the requirement for a waste contractor to take the material off-site.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as access roads or capping material for landfill sites etc. This material is often taken free of charge or a reduced fee for such purposes, reducing final waste disposal costs.

8.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

8.3 Disposal

Landfill charges are currently at around €130 - €150 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

9.0 TRAINING PROVISIONS

A member of the demolition and construction teams will be appointed as the Resource Manager (RM) to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of the development.

9.1 Resource Waste Manager Training and Responsibilities

The nominated RM will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site.

The RM will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste

Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The RM will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The RM will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this RWMP.

9.2 Site Crew Training

Training of site crew in relation to waste is the responsibility of the RM and, as such, a waste training program will be organised. A basic awareness course will be held for all site crew to outline the RWMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Area (WSA). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

10.0 TRACKING AND TRACING / RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arisings on Site.

A waste tracking log will be used to track each waste movement from the site. On exit from the site, the waste collection vehicle driver will stop at the site office and sign out as a visitor and provide the security personnel or RM with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel will complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by, e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC / LoW

The waste vehicle will be checked by security personal or the RM to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the site.

The waste transfer dockets will be transferred to the RM on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the SDCC Waste Regulation Unit when requested.

Each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file

and available for inspection on site by the main contractor as required. These subcontractor logs will be merged with the main waste log.

Waste receipts from the receiving waste facility will also be obtained by the site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times and will be periodically checked by the RM. Subcontractors who have engaged their own waste contractors, will provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on site as required.

11.0 OUTLINE WASTE AUDIT PROCEDURE

11.1 Responsibility for Waste Audit

The appointed RM will be responsible for conducting a waste audit at the site during the C&D phase of the proposed Project. Contact details for the nominated RM will be provided to the SDCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

11.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site should be undertaken mid-way through the construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this will be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.

12.0 CONSULTATION WITH RELEVANT BODIES

12.1 Local Authority

Once the construction contractor has been appointed and they have appointed waste contractors, and prior to removal of any C&D waste materials off-site, details of the proposed destination of each waste stream will be provided to the SDCC Waste Regulation Unit.

SDCC will also be consulted, as required, throughout the excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

12.2 Recycling / Salvage Companies

The appointed waste contractor for the main waste streams managed by the construction and demolition contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations / permits / licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling / reclamation, the means by which the wastes will

be collected and transported off-site, and the recycling / reclamation process each material will undergo off-site.

13.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended.
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16.0 INTERACTIONS – INTERRELATIONS BETWEEN THE ASPECTS

16.1 INTRODUCTION

This chapter of the EIA Report in accordance with the guidance, the potential interactions and inter-relationships between the environmental factors discussed in the preceding chapters. This covers both the construction and operational phase of the Proposed Development.

Directive 2011/92/EU, as amended by Directive 2014/52/EU, and section 171A of the Planning and Development Act, as amended, both provide that an EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the interaction between the following factors:

a) human beings, fauna and flora population and human health;
b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
c) land, soil, water, air and climate and landscape;
d) material assets, cultural heritage and the landscape.

This chapter has been produced following the requirements of the EIA Directive and *Planning and Development Act 2000,* as amended. The contents of the chapter have been prepared following *European Commission 'Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report'* (2017) and the EPA EIA Report Guidelines 2022.

The interactions and inter-relationships between the environmental factors have been considered under the subheadings as set out in the EIA Report.

The majority of the EIA Report chapters have already included and described assessments of potential interactions between a number of environmental factors, where applicable. The quality, magnitude and duration of potential impacts are defined in accordance with the criteria provided in the EPA EIA Report Guidelines 2022 as outlined in Chapter 1 (Introduction). This section of the assessment presents a summary and assessment of the identified interactions.

16.2 POPULATION AND HUMAN HEALTH AND ITS INTERACTION WITH:

16.2.1 Land, Soils and Hydrogeology:

Construction Phase

The Proposed Development will be entirely located within the boundary of the existing TILGC lands. The site has limited natural resource value. The development of this site itself is in keeping with the zoning of the lands.

The Proposed Development will not impact on domestic wells or any groundwater protection areas.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there is no potential for negative interaction between Population and

Human Health, and Land, Soils and Hydrogeology during the construction phase. The interaction is considered to be ***neutral***, and ***temporary*** to ***short term***.

Operational Phase

The construction phase development has the potential to impact on the ground water and soil quality due accidental leaks or spills during the operational phase from the site, which have the potential to interact negatively on human health in the long term if not adequately mitigated.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there is no potential for negative interaction between Population and Human Health, and Land, Soils and Hydrogeology during the operational phase. The interaction is considered to be ***neutral***, and ***long term***.

16.2.2 Hydrology:

Construction Phase

The construction phase of the Proposed Development has the potential to impact on the surface water quality due to increased sediment runoff from the site, which have the potential to interact negatively on human health in the long term if not adequately mitigated.

The proposed construction phase mitigation set out in Chapter 7 has considered this the Proposed Development will not result in significant negative impact on surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapter 7 of this EIA Report, there is no potential for negative interaction between Population and Human Health, and Hydrology during the construction phase. The interaction is considered to be ***neutral***, and ***temporary*** to ***short term***.

Operational Phase

The operational development has the potential to impact on the hydrological regime due to alternations to site drainage, which have the potential to interact negatively on human health if not adequately mitigated. SUDs measures have been incorporated into the design to ensure the there is an imperceptible change to the hydrological regime.

The potential risk of flooding was also assessed. As stated in Section 2.7 of Chapter 2 (Description of the Development) and Section 7.3.5 of Chapter 7 (Hydrology), a Stage 3 Flood Risk Assessment was carried out by Malachy Walsh Partners in 2017 for the overall TILGC site. The site is in Flood Zone B as defined in the Flood Risk Management Guidelines. The development design has taken this into account and the Finished Floor Levels (FFL) have been set 0.60m above the 1% AEP MRFS flood level to ensure that the development is not at risk of flooding. Furthermore, the Proposed Development design has no potential impact on flood risk for the overall TILGC site and other neighbouring properties.

The wastewater from the Proposed Development and the overall TILGC site ultimately discharges to Ringsend WWTP for treatment. The TILGC load contributions to the Ringsend WWTP are a very small fraction of the overall influent load to the WWTP.

Taking into account the design and mitigation measures set out in Chapter 7 of this EIA Report, there is no potential for negative interaction between Population and Human Health, and Hydrology during the operational phase. The interaction is considered to be ***neutral***, and ***long term***.

16.2.3 Biodiversity:

Construction Phase

There are no potentially significant interactions identified between Population and Human Health, and Biodiversity during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Population and Human Health, and Biodiversity during the operational phase.

16.2.4 Air Quality and Climate:

Construction Phase

The construction phase of the Proposed Development has the potential to impact on air quality and climate and human health if not adequately mitigated. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues.

Mitigation measures proposed to minimise the potential effects on human health in terms of air quality during the construction phase are set out in Chapter 9, Section 9.6.1. These include measures for dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors.

Operational Phase

Mitigation measures proposed to minimise the potential effects on human health in terms of air quality during the construction phase are set out in Chapter 9, Section 9.6.2. The stack height of the proposed TO has been designed to ensure that an adequate height has been selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards beyond the site boundary (including background concentrations). No additional mitigation measures are proposed for the operational phase of the Proposed Development.

16.2.5 Noise and Vibration:

Construction Phase

Mitigation measures proposed to minimise the potential effects on human health in terms of noise and vibration during the construction phase are set out in Chapter 10.

Provided that the mitigation measures detailed in Chapter 10 (Noise and Vibration) are put in place, such as limiting the number of high-noise activities at the closest boundary to the properties, and best practice noise and vibration control measures will be employed by the contractor during the construction phase, the likelihood of a significant impact will be reduced sufficiently.

Operational Phase

The proposed building services plant has been mitigated through design to ensure there will be no impact from noise emissions or vibrations on human health. Chapter 10 of this EIA Report outlines the criteria for noise mitigation measures during the detailed design which will further reduce the likely noise impacts arising from the building services plant.

16.2.6 Landscape and Visual Impacts:

Construction Phase

The Proposed Development will be entirely located within the boundary of the existing TILGC lands. Much of the existing vegetation and built infrastructure within the site will heavily screen the construction from surrounding receptors with the Proposed Development barely discernible from even the immediate surrounds of the TILGC facility. The interaction is considered to be ***neutral,*** *and* ***temporary-short term***.

Operational Phase

As noted above, the Proposed Development will be entirely located within the boundary of the existing TILGC lands and much of the existing vegetation and built infrastructure within the site will heavily screen the majority of the Proposed Development from surrounding receptors, with Proposed Development barely discernible from even the immediate surrounds of the TILGC facility. The interaction is considered to be ***neutral,*** *and* ***long term.***

16.2.7 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Population and Human Health, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Population and Human Health, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.2.8 Material Assets, including Transport and Waste:

Construction Phase

The Proposed Development entails minimal use of material assets during construction. The contractor will be contractually obliged to put best practice measures in place and work in accordance with the CEMP and relevant planning conditions. In addition, the implementation of mitigation measures detailed each chapter and detailed in Section 14.6.1 of Chapter 14 will ensure there are no residual negative impacts on the local population.

In terms of traffic, HGV trips are anticipated to arrive and depart the site at a uniform rate throughout the day, to avoid pressure on the morning and evening peak hour periods and contractors' vehicles will be facilitated to park within the development site

area, in order to mitigate the impact of traffic movements on the surrounding road network.

Taking into account the design and mitigation measures set out in Chapters 13, 14 and 15 of this EIA Report, there is no potential for negative interaction between Population and Human Health, and Material Assets during the construction phase. The interaction is considered to be ***neutral,*** *and* ***temporary-short term***.

Operational Phase

The Proposed Development will have a minimal demand on material assets such as surface water drainage, water supply, wastewater drainage, power supply and no requirement for road infrastructure as there are no additional traffic movements anticipated. Chapters 13, 14 and 15 have reviewed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in these chapters will ensure there are no residual negative impacts on the local population.

Taking into account the design and mitigation measures set out in Chapters 13, 14 and 15 of this EIA Report, there is no potential for negative interaction between Population and Human Health, and Material Assets during the operational phase. The interaction is considered to be ***neutral,*** *and* ***long term***.

16.3 LAND, SOILS AND HYDROGEOLOGY AND ITS INTERACTION WITH:

16.3.1 Hydrology:

Construction Phase

The proposed construction phase mitigation set out in Chapter 6 and 7 has determined that the Proposed Development will not result in significant negative impact on surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapters 6 and 7 of this EIA Report, there is no residual negative interaction between Land, Soil, and Hydrology during the construction phase. The interaction is considered to be ***neutral***, and ***short term***.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Hydrology during the operational phase.

16.3.2 Biodiversity:

Construction Phase

Dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures set out in Chapter 6, and 8 of this EIA Report, the interaction is considered to be ***neutral***, and ***short term***.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Biodiversity during the operational phase.

16.3.3 Air Quality and Climate:

Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils. The interaction is considered to be ***negative***, but ***imperceptible*** and ***temporary-short term***.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Air Quality and Climate during the operational phase.

16.3.4 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Noise and Vibration during the operational phase.

16.3.5 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Air Quality and Climate during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Air Quality and Climate during the operational phase.

16.3.6 Archaeological, Architectural and Cultural Heritage:

Construction Phase

Archaeological assessment for the Proposed Development has not identified features of archaeological interest on the site. The site has been extensively and significantly developed in the past, and as such no mitigation is required with respect to archaeology, architectural or cultural heritage (Refer to Chapter 12). There will be no residual impacts on archaeology or cultural heritage. Therefore, there are no potentially

significant interactions identified between Land, Soils and Hydrogeology, and Archaeology and Cultural heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.3.7 Material Assets, including Transport and Waste:

Construction Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Material Assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Land, Soils and Hydrogeology, and Material Assets during the operational phase.

16.4 HYDROLOGY AND ITS INTERACTION WITH:

16.4.1 Biodiversity:

Construction Phase

In the absence of mitigation, surface water run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may damage downstream water quality and habitats.

Taking into account the design and mitigation measures set out in Chapter 7, and 8 of this EIA Report, there is no residual negative interaction between Hydrology, and Biodiversity during the construction phase. The interaction is considered to be ***neutral***, and ***temporary-short term***.

Operational Phase

The use of SUDs during operations will mean that the development will result in neutral water impacts in the operational phase with regard to runoff rates and flooding risk. Furthermore, with the implementation of mitigation (design) measures there will be no measurable impact on the receiving water quality as a result of the development.

Taking into account the design and mitigation measures set out in Chapter 7 of this EIA Report, there is no residual negative interaction between Hydrology, and Biodiversity during the operational phase. The interaction is considered to be ***neutral***, and ***long term***.

16.4.2 Air Quality and Climate:

Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions that may deposit in surface waters. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and hydrology. The interaction is considered to be ***negative***, and ***temporary-short term***.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Air Quality during the operational phase.

16.4.3 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Noise and Vibration during the operational phase.

16.4.4 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Landscape and Visual during the construction phase.

16.4.5 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Hydrology, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.4.6 Material Assets, including Transport and Waste:

Construction Phase

There are no potentially significant interactions identified between Hydrology, and Material Assets during the construction phase.

Operational Phase

As a part of the SUDs features, it is anticipated that small amounts of hydrocarbon sludge waste and debris may be generated in the hydrocarbon interceptors which will treat the surface water run-off from the hard standing areas. This waste stream will be managed in accordance with the relevant legislation identified in Chapter 1 such that the effect of the waste generation will be long-term, and neutral.

There are no potentially significant interactions identified between Hydrology, and Material Assets during the operational phase.

16.5 BIODIVERSITY AND ITS INTERACTION WITH:

16.5.1 Air Quality and Climate:

Construction Phase

There is the potential for interactions between air quality and biodiversity. Once the mitigation measures outlined within Section 9.6 are implemented dust related impacts are predicted to be ***temporary-short-term*** and ***imperceptible***.

Taking into account the design and mitigation measures set out in Chapter 9 of this EIA Report, there is no residual negative interaction between Air Quality and Climate, and Biodiversity during the construction phase. The interaction is considered to be ***neutral***, and ***short term***.

Operational Phase

There is the potential for interactions between air quality and biodiversity. Air dispersion modelling results based on conservative assumptions indicate that the Proposed Development in isolation will have an imperceptible impact on NO_X concentrations within the sensitive ecosystems. The interaction is considered to be ***imperceptible***, and ***long term***.

16.5.2 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Biodiversity during the operational phase.

16.5.3 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Biodiversity during the construction phase

Operational Phase

The landscape scheme proposes to enhance and strengthen the existing hedgerow using native hedgerow and woodland species, while retaining the existing trees planted in and around the hedgerow. In addition to strengthening the remnants of the existing hedgerow, planting of native hedgerow species is also proposed.

Planting along site boundaries and on earth berms create dense belts of native woodland spaces which act as native habitat and similarly to the native hedgerows, form ecological corridors which connect with other landscape elements throughout the site.

The implementation of a high-quality landscaping scheme will have a ***positive*** and ***long term*** interaction with biodiversity.

16.5.4 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.5.5 Material Assets, including Transport and Waste:

Construction Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

Operational Phase

There are no potentially significant interactions identified between Biodiversity, and Material Assets during the operational phase.

16.6 AIR QUALITY AND CLIMATE AND ITS INTERACTION WITH:

16.6.1 Noise and Vibration:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate and Noise and Vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate and Noise and Vibration during the operational phase.

16.6.2 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Air Quality and Climate and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality and Climate and Landscape and Visual during the operational phase.

16.6.3 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Archaeological, Architectural and Cultural Heritage, and Landscape and Visual Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Archaeological, Architectural and Cultural Heritage, and Landscape and Visual Heritage during the operational phase.

16.6.4 Material Assets, including Transport and Waste:

Construction Phase

The impacts of the Proposed Development on air quality are assessed (Chapter 9) by reviewing the change in annual average daily traffic on roads close to the site. The interaction is considered to be ***imperceptible neutral***, and ***short term***.

Operational Phase

There will be minimal use of material assessments, no additional traffic and no waste generated from the proposed development. The interaction is considered to be imperceptible ***neutral***, and ***long term***.

16.7 NOISE AND VIBRATION AND ITS INTERACTION WITH:

16.7.1 Landscape and Visual Impacts:

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Landscape and Visual during the operational phase.

16.7.2 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Noise and Vibration, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.7.3 Material Assets, including Transport and Waste:

Construction Phase

The interaction of the Proposed Development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be imperceptible due to the changes in traffic flows associated with the Proposed Development. The interaction is considered to be imperceptible ***neutral***, and ***short term***.

Operational Phase

There are no interactions between the noise and vibration assessment and traffic assessment as there will be no additional traffic and no waste generated from the proposed development.

16.8 LANDSCAPE AND VISUAL IMPACTS AND ITS INTERACTION WITH:

16.8.1 Archaeological, Architectural and Cultural Heritage:

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.8.2 Material Assets, including Transport and Waste:

Construction Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Landscape and Visual Impacts, and Material Assets during the operational phase.

16.9 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE AND ITS INTERACTION WITH:

16.9.1 Material Assets, including Transport and Waste:

Construction Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

Operational Phase

There are no potentially significant interactions identified between Material Assets, and Archaeological, Architectural and Cultural Heritage during the operational phase.

16.10 SUMMARY

In summary, the interactions between the environmental factors and impacts discussed in this EIAR have been assessed and the majority of interactions are neutral.

The reasoning behind the conclusion that certain interactions are considered to have a positive, neutral or negative effect is outlined in this Chapter.