Tionscadal Soláthair Uisce
Water Supply Project

Environmental Impact Assessment Report (EIAR)

Volume 3 of 6: Environmental Assessment

(Chapter 19) Resource and Waste Management

Document no: 32105801/EIARC19
Version: Final

December 2025

Uisce Éireann
Irish Water

Jacobs

TOBIN

Contents

Acronyms and Abbreviations

Acronym	Meaning
BPS	Booster Pumping Station
BPT	Break Pressure Tank
BRE	Building Research Establishment
C&D	Construction and Demolition
CWBPMP	Construction Waste and By-Product Management Plan
CEMP	Construction Environmental Management Plan
COR	Certificate of Registration
CRU	Commission for Regulation of Utilities
EC	European Commission
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESBN	Electricity Supply Board Networks
EU	European Union
FCV	Flow Control Valve
GAC	Granular Activated Carbon
GDA WRZ	Greater Dublin Area Water Resource Zone
HLPS	High Lift Pumping Station
IEMA	Institute of Environmental Management and Assessment
INCOPA	European Inorganic Coagulants Producers Association
LoW	List of Waste
Ml	Megalitres
n.d.	No date
OPR	Office of the Planning Regulator
RPO	Regional Policy Objective
RWI&PS	Raw Water Intake and Pumping Station
RWMPOs	Regional Waste Management Planning Offices
RWRM	Raw Water Rising Main
TPR	Termination Point Reservoir
WFP	Waste Facility Permit
WTP	Water Treatment Plant

19. Resource and Waste Management

19.1 Introduction

1. This chapter reports the assessment of the likely significant effects of the Proposed Project of resource consumption and the generation and management of waste on the environment. In accordance with the requirements of the Environmental Impact Assessment (EIA) Directive, it identifies, describes and assesses the likely significant effects resulting from materials use and waste generation and management associated with the construction and operation of the Proposed Project.

2. This chapter sets out the methodology used, describes the existing resource and waste environment, examines the predicted effects of the Proposed Project, proposes mitigation measures and identifies residual effects. The assessment has been conducted in accordance with current best practice guidance and methodology.

3. The assessment reported in this chapter has considered the mitigation that has been embedded into the design to avoid or reduce likely significant effects. Embedded mitigation is an intrinsic part of the Proposed Project design and therefore the assessment of effects assumes all embedded design measures are in place. Embedded mitigation relevant to this topic is included in Section 19.5.1.

4. Table 19.1 outlines the principal Proposed Project infrastructure elements that have been assessed within this chapter. A full description is provided in Chapter 4 (Proposed Project Description) of this Environmental Impact Assessment Report (EIAR).

Table 19.1: Summary of Principal Project Infrastructure

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
Permanent Infrastructure	
Raw Water Intake and Pumping Station (RWI&PS) (Infrastructure Site) County Tipperary	• The RWI&PS would be located on a permanent site of approximately 4ha on the eastern shore of Parteen Basin in the townland of Garrynatineel, County Tipperary. In addition, approximately 1ha of land would be required on a temporary basis during construction. • The RWI&PS has been designed to abstract enough raw water from the River Shannon at Parteen Basin to provide up to 300Mld of treated water by 2050. • The RWI&PS site would include a bankside Inlet Chamber, the Raw Water Pumping Station Building, two Microfiltration Buildings, an Electricity Substation and Power Distribution Building, and Dewatering Settlement Basins. The tallest building on the RWI&PS site would be the Microfiltration Buildings which would be 10.9m above finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. • Power for the RWI&PS would be supplied via an underground connection to the existing Birdhill 38 kV electricity substation. • A new permanent access road from the R494 would be constructed to access the proposed RWI&PS site. This access road would be 5m in width and 670m in length. • The RWI&PS site boundary would be fenced with a stock proof fence and a 2.4m high paladin security fence 5m inside the boundary. The site would be landscaped in line with the surrounding environment to reduce its visual impact.
Raw Water Rising Mains (RWRMs) (Pipeline) County Tipperary	• The RWRMs would consist of two 1,500mm underground pipelines made from steel that would carry the raw water approximately 2km from the RWI&PS to the Water Treatment Plant (WTP) at Incha Beg, County Tipperary. The water would be pumped from the pumping station at the RWI&PS to the WTP. • Twin RWRMs have been proposed so that one RWRM can be taken out of service for cleaning and maintenance while still providing an uninterrupted flow of raw water through the other RWRM. • The RWRMs would include Line Valves, a Lay-By, Air Valves and Cathodic Protection. • A 20m wide Permanent Wayleave would provide Uisce Éireann with operational access to the RWRMs.

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
Water Treatment Plant (WTP) (Infrastructure Site) County Tipperary	• The WTP would be located on a permanent site of approximately 31ha at Incha Beg, County Tipperary, 2.6km north-east of the village of Birdhill, and 2km east of the proposed RWI&PS. In addition, approximately 2.5ha of land would be required on a temporary basis during construction. • The WTP would treat the raw water received from the RWI&PS via the RWRMs. Once treated, the High Lift Pumping Station (HLPS) would deliver the treated water onwards from the WTP to the Break Pressure Tank (BPT) at Knockanacree, County Tipperary, via the Treated Water Pipeline. • The WTP would comprise of a series of tanks and buildings including the Raw Water Balancing Tanks, Water Treatment Module Buildings, Sludge Dewatering Buildings, Sludge Storage Buildings, Clear Water Storage Tanks and HLPS, an Electricity Substation and Power Distribution Building, and the Control Building. The tallest building on the WTP site would be the Water Treatment Module Buildings which would be up to 15.6m above finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. • There would also be a potential future water supply connection point at the junction between the permanent access road and the R445. • Power for the WTP would be supplied via an underground connection to the existing Birdhill 38 kV electricity substation. Solar panels would be placed on the roofs of the Chemical Dosing Manifold Building, the Water Treatment Module Buildings, Clear Water Storage Tanks and Sludge Storage Buildings, and at a number of locations on the ground to supplement the mains power supply. • A new permanent access road from the R445 would be constructed and would be 6m in width and 640m in length. • The WTP site boundary would be fenced with a stock proof fence and a 2.4m high palisade security fence 5m inside the boundary. The site would be landscaped in line with the surrounding environment to reduce its visual impact.
Treated Water Pipeline from the WTP to the BPT (Pipeline) County Tipperary	• The Treated Water Pipeline from the WTP to the BPT would consist of a single 1,600mm underground steel pipeline which would be approximately 37km long. The water would be pumped through this section of the Treated Water Pipeline by the HLPS. • The Treated Water Pipeline would include Line Valves, Washout Valves, Air Valves, Manways, Cathodic Protection and Lay-Bys. • A 20m wide Permanent Wayleave would provide Uisce Éireann with operational access to the pipeline (this Wayleave has been extended to approximately 30m at some Line Valves to provide access between the Lay-Bys and Line Valves). There would be an additional 10m wide Permanent Wayleave at certain locations for operational access to smaller pipes connecting Washout Valves with permanent discharge locations.
Break Pressure Tank (BPT) (Infrastructure Site) County Tipperary	• The BPT would be located on a permanent site of approximately 7ha in the townland of Knockanacree, County Tipperary. In addition, approximately 0.8ha of land would be required on a temporary basis during construction. • The BPT would be located at the highest point of the pipeline. It marks the end of the Treated Water Pipeline from the WTP to the BPT and the start of the Treated Water Pipeline from the BPT to the Termination Point Reservoir (TPR) in the townland of Loughtown Upper, at Peamount, County Dublin. It would act as a balancing tank and would be required to manage the water pressures in the entire Treated Water Pipeline during flow changes, particularly during start-up and shut-down. • The BPT site would include the BPT and a Control Building. The BPT would be a concrete tank divided into three cells covered with an earth embankment. The BPT tanks would be 5m in height and partially buried below finished ground levels. The Control Building would be 7.5m over finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. • Access to the BPT site would be via a new permanent access road from the L1064 which would be 5m wide and 794m in length. • Power for the BPT would be supplied via an underground connection from the existing overhead power line. Solar panels would be placed on the south facing side of the control building roof, on the BPT and at ground level to the south of the site to supplement the mains power supply. • The BPT site boundary would be bounded by the existing hedgerow / tree line with a 2.4m high palisade security fence around the permanent infrastructure. The site would be landscaped in line with the surrounding environment to reduce its visual impact.

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
Treated Water Pipeline from the BPT to the TPR (Pipeline) Counties Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)	• The Treated Water Pipeline from the BPT to the TPR would consist of a single 1,600mm underground steel pipeline, approximately 133km long. • The water would normally travel through the Treated Water Pipeline by gravity; however, flows greater than approximately 165Mld would require additional pumping from the Booster Pumping Station (BPS) in the townland of Coagh Upper, County Offaly. • The Treated Water Pipeline would include Line Valves, Washout Valves, Air Valves, Manways, Cathodic Protection, Lay-Bys and potential future connection points. • A 20m wide Permanent Wayleave would provide Uisce Éireann with operational access to the pipeline (this Wayleave has been extended to approximately 30m at some Line Valves to provide access between the Lay-Bys and Line Valves). There would be an additional 10m wide Permanent Wayleave at certain locations for operational access to smaller pipes connecting Washout Valves with permanent discharge locations.
Booster Pumping Station (BPS) (Infrastructure Site) County Offaly	• The BPS would be located on a permanent site of approximately 2.6ha in the townland of Coagh Upper, County Offaly. It would be located approximately 30km downstream from the BPT. In addition, approximately 3ha of land would be required on a temporary basis during construction. • The BPS would be required when the demand for water causes the flow through the pipeline to exceed approximately 165Mld. • The BPS site would consist of a single-storey Control Building with a basement below. It would have a finished height of 7.6m above finished ground level. There would also be a separate Electricity Substation and Power Distribution Building. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. • Power to the BPS would be supplied from an existing 38 kV electricity substation at Birr, through cable ducting laid within the public road network. There would be ground mounted solar panels on the southern side of the BPS site to supplement the mains power supply. • The site would be accessed directly from the L3003. • The BPS site boundary would be fenced with a stock proof fence and a 2.4m high palisade security fence between 5m -12m inside the boundary. The site itself would be landscaped in line with the surrounding environment to reduce its visual impact.
Flow Control Valve (FCV) (Infrastructure Site) County Kildare	• The FCV controls the flows in the Treated Water Pipeline from the BPT to the TPR. It would be a small permanent site of approximately 0.5ha in the townland of Commons Upper in County Kildare. In addition, approximately 0.6ha of land would be required on a temporary basis during construction. • It would consist of three 700mm diameter FCVs and three flow meters installed in parallel with the Line Valve and housed within an underground chamber. • Access to the FCV site would be directly off the L1016 Commons Road Upper. • Power supply to the FCV site would be provided from the existing low voltage network via a combination of overhead lines and buried cables. There would be ground mounted solar panels on the north-eastern side of the site to supplement the mains power supply. • Kiosks at the FCV site would house the Programmable Logic Controller, telemetry and power supply for the Line Valve. There would also be a telemetry mast, the top of which would be 14m above finished ground level. • The site boundary would be fenced with a stock proof fence and a 2.4m high palisade security fence 5m inside the boundary.

Proposed Project Infrastructure	Outline Description of Proposed Project Infrastructure*
Termination Point Reservoir (TPR) (Infrastructure Site) County Dublin (within the administrative area of South Dublin County Council)	• The TPR would be located on a permanent site of approximately 8.3ha adjacent to an existing treated water reservoir in the townland of Loughtown Upper, at Peamount, County Dublin (within the administrative area of South Dublin County Council) and would have capacity for 75Ml of treated water supply. In addition, approximately 1.1ha of land would be required on a temporary basis during construction. • It would be located at the downstream end of the Treated Water Pipeline from the BPT to the TPR and would be the termination point for the Proposed Project. It would be at this location that the Proposed Project would connect to the existing water supply network of the Greater Dublin Area Water Resource Zone (GDA WRZ). • The TPR would consist of an above-ground storage structure, associated underground Scour Water and Overflow Water tanks and a Chlorine Dosing Control Building. The TPR would be a concrete tank divided into three cells and covered with an earth embankment. The top of the TPR would be 11.2m above finished ground level. The Chlorine Dosing Control Building would be 8.4m over finished ground level. Additionally, there would be a telemetry mast, the top of which would be 14m above finished ground level. • Power for the TPR would be supplied via an underground connection to the existing electricity substation at Peamount Reservoir. There would be solar panels on top of a portion of the northern cell of the TPR to supplement the mains power supply. • A new permanent access road from the R120 would be constructed and would be 5m wide and 342m in length. • The TPR site would be bounded by the existing hedgerow to the west and existing fence to the east with a 2.4m high palisade security fence around the permanent infrastructure. The site itself would be landscaped in line with the surrounding environment to reduce its visual impact.
Proposed 38 kV Uprate Works – Power Supply to RWI&PS and WTP	
Proposed 38 kV Uprate Works Ardnacrusha – Birdhill (Power Supply) Counties Clare, Limerick and Tipperary	• The proposed 38 kV Uprate Works would be necessary to deliver adequate electrical power to the RWI&PS and WTP. • The proposed works would include the uprating of the existing Ardnacrusha – Birdhill Line and the replacement of polesets/structures with an underground cable along a section of the Ardnacrusha – Birdhill – Nenagh Line. • There would also be works at the existing Birdhill 38 kV electricity substation including the provision of a new 38 kV modular Gas Insulated Switchgear Modular Building, new electrical equipment and lighting, together with new fencing and associated works.
Temporary Infrastructure – Required for Construction Phase Only	
Construction Working Width Counties Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)	• A Construction Working Width would be temporarily required for the construction of the RWRMs and the Treated Water Pipeline, and the subsequent reinstatement of the land. • The Construction Working Width would generally be 50m in width but would be locally wider near features such as crossings, access and egress points from the public road network, Construction Compounds and Pipe Storage Depots.
Construction Compounds Counties Tipperary, Offaly, Kildare and Dublin (within the administrative area of South Dublin County Council)	• Eight Construction Compounds would be temporarily required to facilitate the works to construct the Proposed Project. Five Construction Compounds would be located along the route of the Treated Water Pipeline at the following Infrastructure Sites: RWI&PS, WTP, BPT, BPS and TPR, with an additional three Construction Compounds located at Lisgarriff (County Tipperary), Killananny (County Offaly) and Drummond (County Kildare). Construction Compounds would act as a hub for managing the works including plant/material/worker movement, general storage, administration and logistical support. • The Principal Construction Compound at the WTP would require 30ha of land during construction. • The other three Principal Construction Compounds would require land temporarily during construction ranging between approximately 12ha and 16ha. • The four Satellite Construction Compounds at the other permanent Infrastructure Sites (excluding the FCV) would require land during construction ranging between approximately 3ha and 12ha.
Pipe Storage Depots Counties Tipperary, Offaly and Kildare	• Nine Pipe Storage Depots would be temporarily required to supplement the Construction Compounds and would serve the installation of pipe between the WTP and the TPR. • Pipe Storage Depots would take direct delivery of the pipe for storage before onward journey to the required location along the Construction Working Width. • The Pipe Storage Depots would vary in size and require land temporarily during construction generally ranging between approximately 2ha and 7ha but with one site being larger at 11ha.

* Note all land take numbers in this table are affected by rounding to one decimal place.

5. The construction of the Proposed Project is anticipated to run from 2028 through 2032, with the first operational year anticipated to be 2033.

6. This chapter should be read in conjunction with the following chapters, and their appendices, which expand upon aspects of the Proposed Project:
    - Chapter 4 (Proposed Project Description)
    - Chapter 5 (Construction & Commissioning)
    - Chapter 6 (Noise & Vibration)
    - Chapter 7 (Traffic & Transport)
    - Chapter 9 (Water)
    - Chapter 10 (Soils, Geology & Hydrogeology)
    - Chapter 12 (Air Quality)
    - Chapter 13 (Climate)
    - Chapter 18 (Material Assets).

7. This chapter is also supported by the following documents:
    - Annex C (Construction Waste and By-Product Management Plan (CWBPMP)) of Appendix A5.1 (Construction Environmental Management Plan (CEMP)).

8. This assessment has been undertaken and reported by a team of competent experts. Refer to Chapter 2 (The Environmental Impact Assessment Process) for a description of the qualifications and expertise of the specialists that have inputted to this chapter.

19.2 Methodology

19.2.1 Scope of the Assessment

9. In accordance with the Institute of Environmental Management and Assessment (IEMA) Guide to: Materials and Waste in Environmental Impact Assessment (IEMA 2020) (hereafter, 'the IEMA guidance'), this chapter assesses the likely significant effects of resource (materials) consumption and landfill void capacity (inert, non-hazardous and hazardous) on the environment as a result of constructing and operating the Proposed Project. This guide is a recognised industry publication for the EIA process for assessing the impacts and effects of resources (materials) and waste on the environment and is produced by IEMA[1], a professional institution for practitioners working in environment and sustainability.

10. There would be no likely significant effects on the environment from consumption of resources and generation of waste during the testing and commissioning stage over and above those assessed for the Construction and Operational Phases. Therefore, testing and commissioning of the Proposed Project has not been considered further in this assessment.

11. The operational impacts of hazardous waste generation have been scoped out on the basis that it is anticipated that only small quantities would be generated and therefore no likely significant effects would be realised during the Operational Phase of the Proposed Project during the first representative operational year. The IEMA assessment considers the magnitude of impact of the Operational Phase should be assessed over the course of any one full and justifiably representative year within the first three years following commissioning only; future years (beyond year 4 of operation) are not within the scope of this assessment.

[1] Since July 2025, IEMA has officially rebranded as the Institute of Sustainability and Environmental Professionals.

12. Currently it is not yet possible to define Regulation 27[2] approval timelines and any off-site third-party end-uses with certainty. However, to the extent that it can be, material would be reused and registrations would be submitted to the Local Authority for consideration, or notifications would be submitted to the EPA for determination. For the worst-case (i.e. pre-mitigated) scenario it is assumed that all excavated waste is subject to disposal to landfill.

13. Chapter 10 (Soils, Geology & Hydrogeology) addresses the impact of the Proposed Project on the economic geology of the study area (including aggregate and extractive industries). Due to allocated mineral sites not being identified within Ireland in Local Plans, allocated mineral sites are not included within this chapter and are removed from the IEMA assessment criteria.

14. The effects of the generation and disposal of liquid wastes are outside of the scope of this assessment and are not considered by this chapter. Process waste in the form of liquid waste from the treatment process are treated on-site at the WTP and re-circulated through the WTP. Effects associated with discharges of water used during testing and commissioning activities are assessed in Chapter 9 (Water). Foul wastewater produced during construction and operation would be treated at a licensed wastewater treatment plant, and the associated effects are also considered in Chapter 9 (Water).

15. The Proposed Project would deliver nationally important strategic infrastructure with individual elements designed with a lifespan of 80 to 100 years. The strategic importance of the Proposed Project for water supply in the Eastern and Midlands Region is such that there is no plan to decommission these structures, and Uisce Éireann is committed to maintaining and repairing them into the future. Therefore, decommissioning of the Proposed Project has not been considered further in this assessment.

19.2.2 Study Area

16. In accordance with the IEMA guidance (IEMA 2020), the assessment of resources and waste has utilised two geographically different study areas to examine the likely significant effects of resource (materials) consumption and the generation, management and disposal of waste on the environment:

    - The first study area – which comprises the Proposed Project footprint/Planning Application Boundary and any areas required for temporary access, site compounds, working platforms and other enabling activities. This is the area where materials would be consumed, and waste would be generated
    - The second study area – which extends to the national availability of construction resources (materials) and regional (or where justified, national) availability of licensed waste management infrastructure and remaining landfill void capacity likely to be suitable to accept arisings and/or waste generated by the Proposed Project. The study area for inert and non-hazardous waste includes the areas of the former Eastern-Midlands[3] and Southern Waste Management Planning Regions[4]. The study area for hazardous waste includes the country of Ireland as a whole (on the basis that this waste type is generally managed at a national level) as well as the UK hazardous waste capacity given that there is no hazardous landfill capacity within Ireland.

19.2.3 Relevant Guidelines, Policy and Legislation

17. The methodology used to assess the likely significant effects associated with resources and waste has had regard to the relevant guidance, including the following list:

[2] Regulation 27 of the European Communities (Waste Directive) Regulations 2011.

[3] The Eastern-Midlands Region comprises Dublin City Council, Dún Laoghaire-Rathdown, Fingal, South Dublin, Kildare, Louth, Laois, Longford, Meath, Offaly, Westmeath and Wicklow County Councils. While the Eastern-Midlands Waste Management Planning Region is no longer active in 2025, it represents a proportionate study area based on the geographic extent of the Proposed Project.

[4] The Southern Region comprises the Carlow, Clare, Cork County, Cork City, Limerick City & County, Kerry, Kilkenny, Tipperary, Waterford City & County and Wexford County Councils. While the Southern Waste Management Planning Region is no longer active in 2025, it represents a proportionate study area based on the geographic extent of the Proposed Project.

- EU Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil' and associated waste targets for 2030 (European Commission (EC) 2021)
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (EC 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA) 2022b) (the 'EPA Guidelines')
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government 2018)
- Green Public Procurement, Guidance for the Public Sector (EPA 2024c)
- Buying Greener: Green Public Procurement Strategy and Action Plan 2024-2027 (Department of the Environment, Climate and Communications 2024)
- Circular Economy Checklists for Construction (Southern Region Waste Management Office 2021)
- Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects (EPA 2021a)
- IEMA Guide to: Materials and Waste in Environmental Impact Assessment (IEMA 2020)
- Management of Materials Arising from Roadworks, 2020 Guidance Document for the Local Authority Sector (County and City Management Association 2020)
- Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities (EPA 2020a)
- By-Product — Guidance Note. A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I No 126 of 2011) (EPA 2020b)
- End-of-Waste Guidance Document – Part 1 (Introducing End-of-Waste) and Part 2 (Preparing an End-of-Waste Application) (EPA 2020c)
- National By-Product Criteria, Reference Number BP-N001/2023, for site-won asphalt (EPA, 2023a)
- National By-Product Criteria, Reference Number BP-N002/2024 for greenfield soil and stone (EPA, 2024d)
- Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA 2019a)
- Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous (EPA 2018)
- The Management of Waste from National Road Construction Projects (GE-ENV-01101) (Transport Infrastructure Ireland 2017)
- Office of the Planning Regulator (OPR) Practice Note PN02: Environmental Impact Assessment Screening (OPR 2021)
- Design out Waste: A design team guide to waste reduction in construction and demolition projects (EPA 2014)
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (Transport Infrastructure Ireland 2008).

18. As part of the compilation of this EIAR chapter, the following European Union (EU), national, regional and local policy documents were reviewed with respect to waste management policies:
    - A New Circular Economy Action Plan for a Cleaner and More Competitive Europe (COM(2020) 98 final) (EC 2020)
    - EU Construction & Demolition Waste Management Protocol (EC 2024)

- National Waste Management Plan for a Circular Economy 2024-2030 (Regional Waste Management Planning Offices (RWMPOs) 2024))
- Sustainability Framework (Unpublished) (Uisce Éireann 2023a)
- National Water Resources Plan – Framework Plan (Irish Water 2021a)
- National Hazardous Waste Management Plan 2021-2027 (EPA 2021b)
- A Waste Action Plan for a Circular Economy (Department of Communications, Climate Action and Environment 2020)
- Construction & Demolition Waste: Soil and Stone Recovery/Disposal Capacity – Update Report 2020, Eastern-Midlands Region/Connacht Ulster Region/Southern Region Waste Management Plans 2015–2021 (RWMPOs 2020))
- Regional Spatial and Economic Strategy 2019–2031 (Eastern and Midland Regional Assembly 2019)
- Regional Spatial and Economic Strategy for the Southern Region (Southern Regional Assembly 2020)
- Tipperary County Development Plan 2022-2028 (Tipperary County Council 2022)
- Offaly County Development Plan 2021-2027 (Offaly County Council 2021)
- Kildare County Development Plan 2023 – 2029 (Kildare County Council 2023)
- South Dublin County Development Plan 2022-2028 (South Dublin County Council 2022)
- Clare County Development Plan 2023-2029 (Clare County Council 2023)
- Limerick Development Plan 2022-2028 (Limerick City & County Council 2022).

19. In addition to the guidance and waste management policies, the following legislation has been reviewed (any references to legislation include any amendments thereto):
    - Waste Framework Directive (2008/98/EC)
    - Revised Waste Framework Directive (2018/851)
    - Waste Electrical and Electronic Equipment Directive (2002/96/EC)
    - Waste Incineration Directive (2000/76/EC)
    - Landfill Directive (99/31/EC)
    - Integrated Pollution Prevention and Control Directive (96/61/EC)
    - Packaging and Packaging Waste Directive (94/62/EC)
    - Hazardous Waste Directive (91/689/EEC)
    - Circular Economy and Miscellaneous Provisions Act 2022 (No. 26 of 2022)
    - European Union (Waste Directive) Regulations 2020 (S.I. No. 323 of 2020)
    - European Union (Environmental Impact Assessment) (Waste) Regulations 2012 (S.I. No. 283 of 2012)
    - European Union (Environmental Impact Assessment) (Waste) Regulations 2013 (S.I. No. 505 of 2013)
    - European Union (Industrial Emissions) Regulations 2013 (S.I. No. 138 of 2013)
    - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011)
    - Protection of the Environment Act 2003 (No. 27 of 2003)
    - Waste Management Act 1996 (No. 10 of 1996).
    - Waste Management (Permit) Regulations 1998 (S.I. No. 165 of 1998)

- Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004)
- Waste Management (Licensing) (Amendment) Regulations 2010 (S.I. No. 350 of 2010)
- Waste Management (Waste Electrical and Electronic Equipment) Regulations 2005 (S.I. No. 340 of 2005)
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007)
- Waste Management (Facility Permit and Registration) (Amendment) Regulations 2008 (S.I. No. 86 of 2008)
- Waste Management (Facility Permit and Registration) (Amendment) Regulations 2019 (S.I. No. 250 of 2019)
- Waste Management (Tyres and Waste Types) Regulations 2007 (S.I. No. 664 of 2007)
- Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. No. 113 of 2008)
- Waste Management (Landfill Levy) Regulations 2008 – S.I. No. 199 of 2008.

20. The following section provides a summary of the key guidelines, policy and legislation that are applicable to the design, construction and assessment of the Proposed Project.

19.2.3.1 Directive 2008/98/EC on Waste (Waste Framework Directive)

21. The Waste Framework Directive (2008) sets out basic concepts, definitions and principles related to waste management. It requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.

22. The principles that the Waste Framework Directive introduces are the 'polluter pays' principle, 'extended producer responsibility' and the 'waste management hierarchy'. The Waste Framework Directive also requires that Member States adopt waste management plans and waste prevention programmes.

23. Furthermore, the Waste Framework Directive includes two relevant recycling and recovery targets to be achieved by 2020 and 2025:

    - By 2020, 70% (by weight) preparing for reuse, recycling and other recovery of Construction and Demolition (C&D) waste
    - By 2025, 55% (by weight of municipal waste) preparing for reuse and recycling of certain waste materials from households and other origins similar to households rising to 60% (by weight) by 2030.

19.2.3.2 A New Circular Economy Action Plan for a Cleaner and More Competitive Europe

24. The European Commission (EC) adopted this new Action Plan in March 2020 as part of the European Green Deal. This Action Plan announces initiatives along the entire lifecycle of products and introduces legislative and non-legislative measures targeting seven key product value chains. One of these value chains is construction and buildings. The Action Plan states that the construction sector is responsible for 35% of the EU's total waste generation and an estimated 5–12% of total national greenhouse gas emissions. Two of the circularity principles promoted by the Action Plan pertain to C&D waste and excavated soils as follows (EC 2020, p.11):

    - '*considering a revision of material recovery targets set in EU legislation for construction and demolition waste and its material-specific fractions*'
    - '*promoting initiatives to reduce soil sealing, rehabilitate abandoned or contaminated brownfields and increase the safe, sustainable and circular use of excavated soils*'.

19.2.3.3 National Waste Management Plan for a Circular Economy 2024-2030

25. The Regional Waste Management Planning Offices (RWMPOs), under the auspices of the County and City Management Association National Oversight Group, have co-ordinated the preparation of this plan which is the first 'National Waste Management Plan for a Circular Economy'. The plan sets out a framework for the prevention and management of waste in Ireland for the period 2024 to 2030 and seeks to influence sustainable consumption and prevent the generation of waste, improve the capture of materials to optimise circularity and enable compliance with policy and legislation. The plan responds to the requirement in A Waste Action Plan for a Circular Economy to include targets for reuse, repair, resource consumption and a reduction in contamination. Seven national targets have been developed as follows:

    - '*Target 1A Residual Municipal Waste - Waste destined for landfill or recovery by thermal treatment: 6% Reduction in rMSW* [residual municipal solid waste] *per person by 2030'*
    - '*Target 1B Construction Materials - Construction and Demolition Waste generated: 12% Reduction in C&D Waste by 2030'*
    - '*Target 2A Material Compliance Recycling - Material Compliance in the Dry Recycling Bin: 90% Material Compliance in the Dry Recycling Bin'*
    - '*Target 2B Material Compliance Residual - Material Compliance in the Residual Bin: 10% per annum increase in Material Compliance in the Residual Bin (90% by end of 2030)*'
    - '*Target 3A Reuse of Materials - Reuse of materials like clothes or furniture to prevent waste: 20kg per person/year*'
    - '*Target 3B Reuse Facilities - Provide for reuse at 10 Civic Amenity Sites, minimum: 10 sites for reuse (minimum)*'
    - '*Target 4A/B Repair of Materials - Develop a roadmap for a Repair Target and Provide 1 collection scheme for repairable materials in each region and align with repair practitioners. This target will also consider a roadmap for remanufacturing: 3 collection schemes*'.

19.2.3.4 A Waste Action Plan for a Circular Economy

26. A national waste policy entitled 'A Waste Action Plan for a Circular Economy' was issued by the Department of Communications, Climate Action and Environment in September 2020, outlining Ireland's updated goals, actions and policies to be implemented from 2020 to 2025. The new policy is structured around the framework provided in the EU's second Circular Economy Action Plan launched in March 2020. The policy is intended to move Ireland towards a circular economy shifting away from waste disposal, favouring circularity and sustainability by identifying and maximising the value of material through improved design, durability, repair and recycling. The plan sets out the following:

    - Prevention of soil arisings which have a large financial burden on the sector is to progress by placing value on the used material. There is a strong focus on Regulation 27 (by-products) and Regulation 28 (end-of-waste) decision-making process. These processes are to be streamlined, and detailed guidance will be developed for specific problematic materials
    - The use of recycled construction materials will be incentivised (potentially by introducing a levy on virgin aggregates)
    - The plan looks to make national end-of-waste decisions for specific C&D waste streams at the earliest possible stage

19.2.3.5 National Hazardous Waste Management Plan (2021–2027)

27. The EPA prepared a revised National Hazardous Waste Management Plan for the Republic of Ireland covering a six-year period from the date of publication (2021–2027). It sets out the priorities to be pursued over the next six years and beyond to improve the prevention and management of hazardous waste.

28. The objectives of the plan are to:
    - 'Drive priority prevention actions by industry and the public to reduce the generation of hazardous waste'
    - 'Support the identification of adequate and appropriate collection infrastructure for all hazardous wastes with a view to mitigating environmental and health impacts'
    - 'Endorse the proximity principle such that hazardous wastes are treated as close to the point of production as possible – including within Ireland, taking into account geographical circumstances or the need for specialised installations for certain types of waste'
    - 'Support effective regulation of the movement and disposal of hazardous wastes in line with national policy priorities'
    - 'Promotion of safe reuse and recycling pathways in support of the circular economy'.

29. The revised plan makes 20 recommendations around policy and regulation, prevention, collection and treatment and implementation.

19.2.3.6 EU Construction & Demolition Waste Management Protocol

30. The EU introduced non-binding guidelines for the recycling and reuse of C&D waste in late 2016 which has been subsequently updated in 2024, with the overall aim to increase confidence in the C&D waste management process and trust in the quality of C&D waste recycled materials. These guidelines are a part of the EC's drive towards a circular economy. It aims to achieve this through:
    - Improved waste identification, source separation and collection
    - Improved waste logistics
    - Improved waste processing
    - Quality management
    - Appropriate policy and framework conditions.

31. This document, while not binding, provides an outline of the best practice for the management of C&D waste. It is a useful guide on how to best manage waste from a construction project such as the Proposed Project so as to achieve the highest levels of C&D waste recycling in exceedance of statutory targets with the Waste Framework Directive.

19.2.3.7 National Water Resources Plan

32. The National Water Resources Plan – Framework Plan (Irish Water 2021a) sets out Uisce Éireann's 25-year plan for effective water services throughout Ireland. Technical Appendix K Residuals (Irish Water 2021b) of the Framework Plan covers residuals from water treatment plants. This document outlines Uisce Éireann's strategy for minimising and dealing with solid and water residuals which are produced as a result of water treatment operations (therefore, Operational Phase wastes).

33. The plan informs that new WTPs may increase the quantity of residuals produced from the initial water treatment process due to their design, so sets out proposals for this to be considered and minimised at the design stage, e.g. by the inclusion of additional processes to minimise the residuals quantity. It sets out an objective for Uisce Éireann to move towards a circular economy model with a focus on productive reuse and recycling of residuals. A number of circular economy options for the potential reuse of residuals are outlined in Technical Appendix K Residuals (Irish Water 2021b) of the Framework Plan, namely[5]:
    - In integrated constructed wetlands or reed bed systems as a beneficial product for nutrient removal

[5] Residuals from the water treatment process would not be used for land spreading

- In cement manufacturing as an alternative to aluminium-containing raw materials such as bauxite
- In brick manufacturing as an alternative to raw materials
- In landfill remediation, incorporated into the material used to cover and remediate old landfill sites
- Discharge to wastewater treatment plants to improve nutrient removal and dewatering of wastewater treatment plant residuals
- Long-term storage for future usage
- Export while suitable outlets are being developed in Ireland.

19.2.3.8 Uisce Éireann Sustainability Framework

34. The Uisce Éireann Sustainability Framework details a number of Sustainability Strategy Pillars including environment, social, collaboration and governance. There are a number of initiatives and targets within the collaboration pillar that are relevant to the Proposed Project including:

- Engage with 70% of our top suppliers, both sub-contractors & material suppliers
- Zero recoverable Waste to landfill by 2030
- Circular economy outlets for sludge by 2026
- Reuse of decommissioned materials in upgrade projects
- Use of more sustainable materials (e.g. low carbon cement, high % recycled content in pipes, bio-plastics etc.), switching to a circular business model approach.

19.2.3.9 County Council Development Plans

35. The Proposed Project would be located in counties of Clare, Limerick, Tipperary, Offaly, Kildare and South Dublin. Those development planning policies and objectives, that are of relevance to this chapter, are provided in the following sections.

19.2.3.9.1 Tipperary County Development Plan

36. The Tipperary County Development Plan 2022–2028 (Tipperary County Council 2022) sets out the following policies that are relevant to this chapter:

- Policy 10-4 states that it is the Policy of the Council to '*Ensure the sustainable management of waste and the application of the 'Circular Economy' concept in line with the provisions of the National Waste Management Plan for a Circular Economy and the Waste Management Infrastructure – Guidance for Siting Waste Management Facilities), in the development and management of new development*'.

19.2.3.9.2 Offaly County Development Plan

37. The Offaly County Development Plan 2021-2027 (Offaly County Council 2021) sets out the following policies and objectives that are relevant to this chapter:

- Policy ENVP-10: '*It is Council policy to promote circular economy principles, prioritising prevention, reuse, recycling and recovery, and to sustainably manage residual waste. New developments will be expected to take account of the provisions of the Waste Management Plan for the Region and observe those elements of it that relate to waste prevention and minimisation, waste recycling facilities, and the capacity for source segregation*.'
- Policy ENVP-11: '*It is Council policy to ensure that all waste disposal shall be undertaken in compliance with the requirements of the Environmental Protection Agency and relevant Waste Management Legislation*.'

- Policy ENVP-13: '*It is Council policy to require the provision of recycling infrastructure where it is considered necessary and will assess requirements for recycling facilities on a case by case basis as part of the development management process*.'
- Policy ENVP-25: '*It is Council policy to ensure that hazardous waste is addressed through an integrated approach of prevention, collection, and recycling and encourage the development of industry-led producer responsibility schemes for key waste streams*.'
- Policy ENVP-13: '*It is Council policy to require Construction and Environmental Management Plans (CEMPs) to be prepared for larger scale projects and this requirement shall be assessed on a case by case basis as part of the development management process. Where a CEMP is required, it shall be prepared in accordance with the criteria set out in Section 11.5.2 of this Plan*.'
- Objective ENVO-05: *'It is an objective of the Council to implement the Eastern-Midlands Regional Waste Management Plan 2015-2021; the Council's Litter Management Plan and Waste Bye-Laws*.'
- Objective ENVO-06: '*It is an objective of the Council to use statutory powers to prohibit the illegal deposit and disposal and collection of waste materials, refuse and litter, and to authorise and regulate, waste disposal within the county in an environmentally sustainable manner*.'
- Objective ENVO-08: '*It is an objective of the Council to promote the inclusion of adequate and easily accessible storage space that supports the separate collection of dry recyclables and food, as appropriate, within developments*.'

19.2.3.9.3 Kildare County Development Plan

38. The Kildare County Development Plan 2023-2029 (Kildare County Council 2023) sets out the following polices that are relevant to this chapter:

- Policy IN P6 states that it is the policy of the Council to: '*Implement European Union, National and Regional waste related environmental policy, legislation, guidance, and codes of practice, in order to support the transition from a waste management economy towards a circular economy*.'
- Objective IN O39: '*Encourage a just transition from a waste economy to a green circular economy in accordance with 'A Waste Action Plan for a Circular Economy 2020-2025' and the Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less*.'
- Objective IN O40: '*Provide, promote, and facilitate high quality sustainable waste recovery and disposal infrastructure / technology in keeping with the EU waste hierarchy to cater for anticipated population growth and the business sector in the County*.'
- Objective IN O42: '*Require the appropriate provision for the sustainable management of waste within developments, including the provision of facilities for storage, separation, and collection of waste*.'
- Objective IN O43: '*Require the submission of either a certificate of exemption or a valid planning permission for a Waste Facility Permit or a Certificate of Registration application, in accordance with the Waste Management Regulations 2007 (as amended)*'.
- Objective IN O44: '*Encourage waste prevention, minimisation, re-use, recycling, and recovery as methods for managing waste*.'
- Objective IN O46: '*Ensure the provision of waste management facilities in the county (both public and private) are subject to the specific requirements of the Eastern-Midlands Region Waste Management Plan 2015-2021 (or as amended / updated)*.'
- Objective IN O47: '*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, recycled or composted*.'
- Objective IN O48: '*Facilitate the development of waste management infrastructure and the ongoing operation of the Drehid waste facility at an appropriate scale to cater for the waste management needs of Kildare and the Eastern and Midlands Waste Region, subject to the protection of the environment, landscape character, road network and amenities of the area*.'

- Objective IN O51: '*Encourage the use of CCTV at appropriate locations to discourage fly tipping and illegal dumping*.'
- Objective IN O52: '*Examine the possibility of providing a recycling facility in each Municipal District within the County and seek new markets for recycling in existing centres, including North Kildare*.'
- Objective IN O53: '*Ensure that hazardous waste is addressed through an integrated approach of prevention, collection and recycling and encourage the development of industry-led producer responsibility schemes for key waste streams*.'

19.2.3.9.4 South Dublin County Development Plan

39. The South Dublin County Development Plan 2022-2028 (South Dublin County Council 2022) sets out the following policies and objectives that are relevant to this chapter:
    - Policy IE7 states that it is the policy of the Council to: '*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*.'
    - IE7 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*.'
    - IE7 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*.'
    - IE7 Objective 3: '*To provide for, promote and facilitate high quality sustainable waste recovery and disposal infrastructure / technology in keeping with the EU waste hierarchy and to adequately cater for a growing residential population and business sector*.'
    - IE7 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*.'
    - IE7 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*.'
    - IE7 Objective 9: '*To support the development of indigenous capacity for the treatment of non-hazardous and hazardous wastes where technically, economically and environmentally practicable subject to the relevant environmental protection criteria for the planning and development of such activities being applied*.'

19.2.3.9.5 Limerick Development Plan

40. The Limerick Development Plan 2022–2028 as varied (Limerick City & County Council 2022) sets out the following objectives that are relevant to this chapter:
    - Objective IN O17 Waste Management and the Circular Economy: *'It is an objective of the Council to:*
        - *Support innovative, smart solutions and processes, based on the principles of the circular economy to implement the Regional Waste Management Plan for the Southern Region 2015 – 2021 and any subsequent plan, including any targets contained therein.*
        - *Collaborate with the Regional Waste Management Office and other agencies to implement the EU Action Plan for the Circular Economy – Closing the Loop, 2015, its successor the Circular Economy Action Plan: A New Circular Economy Action Plan for a Cleaner More Competitive Europe, 2020 and the Resource Opportunity Waste Management Policy, DECLG, 2012 and any subsequent plans.*

- *Promote sustainable patterns of consumption and production in the areas of product design, production processes and waste management.*
- *Implement the provisions of the Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020 - 2025, DECC, 2020 in the assessment of planning applications.*
- *Protect existing civic amenity sites and bring sites throughout Limerick and support the development of additional sites in accordance with the Southern Regional Waste Management Plan 2015 – 2021 and any subsequent plans.'*

- Objective IN O19 Sludge Management: '*It is an objective of the Council to:*
  - *Support the provision of sludge management infrastructure at suitable locations in accordance with Irish Water's National Waste Water Sludge Management Plan, whilst not compromising environmental obligations.*
  - *Restrict the provision of sludge management facilities to the sites of existing public wastewater treatment facilities due to the nature and characteristics of existing operations on these sites and the need to strictly control the treatment of sludge.*
  - *Require that the treatment and management of sludge waste is carried out in a safe, efficient and sustainable manner, having regard to the protection of the environment and public health and in compliance with the Waste Framework Directive, the Nitrates Directive, the Waste Management Act and all relevant statutory instruments.'*
- Objective IN O21 Construction and Demolition: '*It is an objective of the Council to:*
  - *Require construction Waste Management Plans to be submitted as part of planning applications, to address waste management on site during construction and mitigation measures to address waste generation, in accordance with the principles of the circular economy and the principles of prevention, renewal and recycle.'*
- Objective IN O23 Hazardous Waste and Contaminated Sites: *'It is an objective of the Council to:*
  - *Implement the EPA's National Hazardous Waste Management Plan (NHWMP) 2014-2020 and any subsequent plans.*
  - *Collaborate and seek guidance from the Environmental Protection Agency (EPA), the Health and Safety Authority (HAS), Health Service Executive (HSE) and Southern Region Waste Management Office, on the technical requirements for clearance and redevelopment of any contaminated lands when dealing with planning applications at these locations.'*

19.2.3.9.6 Clare County Development Plan

41. The Clare County Development Plan 2023–2029 (Clare County Council 2023) sets out the following objectives that are relevant to this chapter:

- Objective CDP11.35 Waste Management: '*It is an objective of the Council:*
  - *To support and facilitate the implementation of the EU Circular Economy Action Plan 'A New Circular Economy Action Plan for a Cleaner More Competitive Europe' (2020), the EU Raw Material Initiative, A Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020-2025 and the Southern Region Waste Management Plan 2015-2021.*
  - *To support and promote circular economy principles prioritising prevention, reuse, recycling and recovery, to support a healthy environment, economy and society.*
  - *To encourage and facilitate the development of new options and technological advances in relation to waste management.*
  - *To support the development of waste recycling facilities at appropriate locations in County Clare as a means of facilitating a reduction in the quantity of waste that goes to landfill disposal sites.*

- *To promote environmental awareness measures and action programmes to ensure good environmental awareness and practices, the recycling of waste, water management, and energy conservation.*
- *To have regard to 'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects' (EPA 2021) and any subsequent guidelines in the management of waste from construction and demolition projects and to require the submission of a Construction and Demolition Waste Management Plan for projects in excess of the thresholds outlined in this objective.*
- *To require proposals for brownfield regeneration in strategic locations to be accompanied by a site risk assessment and a clear waste plan for any wastes arising, including consideration of hazardous or contaminated material.*
- *To support and facilitate the repurposing of previous landfill sites and where appropriate their reuse for community or recreational purposes.'*

- Objective CDP11.36 Waste Transfer and Recovery Facilities: '*It is an objective of the Council:*
  - *To support the development of waste transfer and recovery facilities at appropriate locations in County Clare as a means of facilitating a reduction in the quantity of waste that goes to landfill disposal sites.*
  - *To support the development of higher-value waste pretreatment processes and indigenous recovery practices.'*
- Objective CDP11.38 Construction and Demolition Waste: '*It is an objective of the Council:*
  - *To require that a C&D Waste Management Plan is prepared by the developer having regard to the 'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects' (EPA 2021a) and any subsequent guidelines for new construction or demolition projects and to require that where appropriate the maximum amount of waste material generated on site is reused and recycled.*
  - *To promote the production and reuse of aggregates from C&D waste and their use in construction projects in the Region.*
  - *To encourage the development of C&D waste recycling facilities at suitable sites, including quarries, subject to normal planning and environmental considerations.'*

19.2.3.9.7 Eastern and Midland Regional Assembly Regional Spatial and Economic Strategy

42. The Regional Spatial and Economic Strategy of the Eastern and Midland Regional Assembly identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives (RPOs). Although the Regional Spatial and Economic Strategy defers to the regional waste management plan for waste management policy, it states that '*Local authorities should achieve waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal*' (p.227) and the following RPO may be relevant to the parts of the Proposed Project within this region.
    - RPO 10.25: '*Development plans shall identify how waste will be reduced, in line with the principles of the circular economy, facilitating the use of materials at their highest value for as long as possible and how remaining quantums of waste will be managed and shall promote the inclusion in developments of adequate and easily accessible storage space that supports the separate collection of dry recyclables and food and shall take account of the requirements of the Eastern and Midlands Region Waste Management Plan*'. (Eastern and Midland Regional Assembly 2019, Section 10.4).

19.2.3.9.8 Southern Regional Spatial and Economic Strategy

43. The Regional Spatial and Economic Strategy for the Southern Region states that '*Policy is now focused on building a circular economy which recognises that all resources are scarce, and aims to maintain the value of all products, materials and resources through reuse, renewal and repair, so that products are reused continually, to minimise the generation of waste*' and includes the following RPOs:

    - RPO 107: '*It is an objective to support innovative initiatives that develop the circular economy through implementation of the Regional Waste Management Plan for the Southern Region 2015-2021 and its successor*.' (Southern Regional Assembly 2020, p.139)
    - RPO 108**:** '*It is an objective to support the work of local authorities, the Regional Waste Management Office and all state bodies in the Region to implement the EU Action Plan for the Circular Economy-Closing the Loop to ensure sustainable patterns of consumption and production in the areas of…Waste Management, From wastes to resources: boosting the market for secondary raw materials and water reuse in line with the EU Raw Material Initiative*'. (Southern Regional Assembly 2020, p139).

19.2.3.10 Legislative Exemptions

44. The Waste Framework Directive[6] sets out the exclusions from the scope of the Directive which includes the following under Article 2(1)(c):

    - '*Uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated*.'

45. Materials from the Proposed Project which fall within this provision are therefore not subject to the requirements of EU and national waste legislation.

46. The concept of a by-product was established by the European Waste Framework Directive (WFD). This concept has been transposed into Irish law through Regulation 27 of the European Communities (Waste Directive) Regulations 2011, as amended. This allows an economic operator to decide, under certain circumstances, that material is a by-product and not a waste. The following conditions must be met in this case:
    - '*Further use of the substance or object is certain*'
    - '*The substance or object can be used directly without any further processing other than normal industrial practice*'
    - '*The substance or object is produced as an integral part of a production*'
    - '*Further use is lawful in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts*.'

47. Classification of material as a by-product means that the material is of a type that is not regulated by waste management legislation and therefore is not required to be managed as per that legislation. For such construction projects, site-won asphalt and excavated greenfield soil and stone can be categorised under this exemption provided the material adheres to the conditions stipulated under the National By-Product Criteria and a Regulation 27 registration is submitted to the Local Authority. The economic operator and destination for the material must adhere to all applicable requirements for this exemption to be permitted.

[6] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.

48. Where material is considered to originate from a non-greenfield site, a Regulation 27 notification is submitted to the EPA with supporting documentation for its determination. For non-greenfield sites relevant evidence will need to be provided to demonstrate that the notified material is uncontaminated.

19.2.3.11 End-Of-Waste Materials

49. If material from the Proposed Project is categorised as a waste as opposed to a by-product, for example excavated waste stones and soils, Regulation 28 of the European Communities (Waste Directive) Regulations 2011 (Article 6 of the Waste Framework Directive (2008), as amended) allows for waste materials to be given end-of-waste status following recovery or recycling process, as long as it meets a set of criteria as outlined in the legislation. This means that a specific material with an intended use is no longer classified as a waste following a case-specific end-of-waste assessment but is rather a product and therefore no longer falls under the jurisdiction of any waste management legislation. The material can therefore re-enter the supply chain.

19.2.3.12 EPA Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities

50. The EPA issued guidance in January 2020, titled Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities (EPA 2020a). This guidance applies to licensed, permitted and registered facilities and provides guidance to facility operators for selecting maximum concentrations and/or trigger levels for relevant contaminants in soil and stone arising from non-greenfield sources.

19.2.4 Data Collection Methods

51. As part of the compilation of this EIAR chapter, the previously discussed guidance, policy documents and legislation were studied in order to fully understand the existing waste management context in which the Proposed Project would be constructed and operated.

52. Since the scoping exercise was carried out, the IEMA Guide to: Materials and Waste in Environmental Impact Assessment has been published (IEMA 2020). This is the first industry publication to offer guidance and recommendations for EIA practitioners and stakeholders concerned with the impacts and effects of resources (materials) and waste on the environment. This assessment has been carried out in accordance with IEMA methodology.

53. A review of the Essential Aggregates: Providing for Ireland's needs to 2040 report (Irish Concrete Federation 2018) has been carried out to ascertain the national and regional availability of construction aggregates, and ready-mix concrete. The availability of steel within Ireland has also been researched. Ireland relies on imports from global markets for the majority of its steel; therefore, reports such as the Organisation for Economic Co-operation and Development's (2020) Latest Developments in Steelmaking Capacity and Eurofer (European Steel Association 2020) Economic and steel market outlook 2020–2021 were reviewed to understand current and future trends. These reviews were used to inform the predicted sensitivity of these material supplies; however, it can be assumed that these markets also benefit from increasing demand and are likely to expand to meet market needs.

54. A review of existing and proposed waste management facilities was also completed within the second study area. In the first instance, all licensed or permitted facilities within the two regions covered by the Proposed Project (as per Section 19.2.2, the areas of the former Eastern-Midlands Region and Southern Region) were assessed; then, where applicable and based on professional judgement, this was expanded to national assessment for hazardous waste management facilities due to the known absence of hazardous waste landfills. This was carried out through online research, namely through review of Annual Environmental Reports held online by the EPA for waste management facilities (EPA undated), information contained in waste licences, permits or certificates, and/or capacity as set out in progress reports for the different waste regions.

55. There are no dedicated hazardous waste landfills in Ireland. Any hazardous waste produced in Ireland that requires disposal has to be exported. Hazardous waste is exported to the UK and other European countries including but not limited to, the Netherlands, Germany and Belgium. Therefore, the assessment of the baseline for determination of magnitude has been completed against the baseline of no dedicated hazardous landfill capacity in Ireland. For the assessment of effects post-mitigation, landfill capacity in the UK is used as an indicator of a realistic scenario for the export of hazardous wastes for disposal.

56. The availability of key construction materials and capacity of waste management infrastructure may also be impacted by other building and infrastructure projects taking place at the time of construction of the Proposed Project (refer to Chapter 21: Cumulative Effects & Interactions).

57. The assessment of resource consumption for the Operational Phase has been based on the materials which are typically and routinely required for the operation and maintenance of similar water supply infrastructure in the water industry, and does not include assessment of large-scale future renewal or improvement works. Uisce Éireann is committed to maintaining and repairing the infrastructure for the Proposed Project, and future renewal or improvement works would be undertaken as separate projects in accordance with the necessary requirements, including internal policy and guidance.

58. Resource types and consumption, and waste types and quantities arising from the construction of the Proposed Project, were estimated based on a planning stage design so as to inform the impact assessment of resource consumption and waste generated. Where likely significant effects are identified, mitigation measures have been proposed in accordance with the requirements in the guidelines, policy and legislation as set out in Section 19.2.3.

59. The current materials estimate provides a preliminary estimate of the key resources and materials likely to be required during the construction of the Proposed Project. The assessment parameters which form the basis of the resources and waste forecasting would inevitably be subject to some changes as the Proposed Project evolves through the construction stages but are based on reasonable, quantified estimates for the maturity of the design (see Sections 19.2.7 and 19.2.8).

19.2.5 Consultations

60. Consultation responses from key stakeholders, landowners and the public were reviewed and considered in compiling this chapter. Chapter 2 (The Environmental Impact Assessment Process) of the EIAR sets out the approach the Proposed Project has taken with regard to environmental scoping, in particular the EIAR Scoping Methodology Report (Uisce Éireann 2023) in respect of the Proposed Project and also the Environmental Impact Statement Scoping Report[7] (Irish Water 2016) relating to a previous iteration of the project.

61. The scoping consultation responses relevant to resource and waste management aspects received from stakeholders are provided in Table 19.2. Further detail on the Proposed Project consultation is included in Chapter 2 (The Environmental Impact Assessment Process) and responses received are in the Water Supply Project Eastern and Midlands Region – Consultation Report, which forms part of the Strategic Infrastructure Development planning application for the Proposed Project.

[7] As set out in Chapter 2 (The Environmental Impact Process), the Environmental Impact Statement Scoping Report (Irish Water 2016) was based on a previous iteration of the project, however, feedback received from stakeholders informed subsequent scoping and design development and has therefore been considered in Table 19.2 where relevant to the Proposed Project.

Table 19.2: Principal Resources and Waste Issues Raised During Scoping Consultation

Consultee	Comment	Relevant EIAR Section
Health Service Executive	Consideration should be given to the impact of foul waste from any temporary construction compound. This foul waste should be contained and taken off site to a licensed wastewater treatment plant.	Refer to Section 19.4.2 of this chapter for Construction Phase foul water management. Also refer to Chapter 5 (Construction & Commissioning) for further information.
Inland Fisheries Ireland	Waste resulting from the water treatment process must be contained, treated and disposed of appropriately in accordance with environmental legislation.	Refer to Section 19.5.2.2.3 and Section 19.5.2.2.4 of this chapter for information on the management of water treatment residuals. Also refer to Chapter 4 (Proposed Project Description) for further information.
Tipperary County Council	Need to address disposal of materials and facilities to receive such materials (permitting issues).	Disposal of different waste types covered throughout this chapter. Refer to Section 19.3.2 for detail on waste facilities.
Kildare County Council	The Drehid Waste Management Facility operated by Bord na Mona plc and licensed by the EPA is located in the townlands of Parsonstown, Loughnacush, Kilkeaskin, Drummond, Timahoe West, Coolcarrigan, Killinagh Lr., Killinagh Upr., Carbury, County Kildare. The original permission for this site was granted in 2005 and was for a period of 20 years. Subsequent to this a number of additional permissions have been applied for and been granted for this site.	Drehid Waste Management Facility is included in the list of licensed waste facilities provided in Section 19.3.2 of this chapter.
Offaly County Council	Consider waste material arising during construction.	Covered by this chapter.

19.2.6 Appraisal Method for the Assessment of Impacts

62. The impact assessment and identification of mitigation measures aims to manage Proposed Project resources (materials) and waste more efficiently in order to reduce the impacts associated with the acquiring of resources and materials, as well as reducing the amount of waste requiring final disposal during the Construction Phase. Any waste generated would be dealt with in adherence to the waste hierarchy (refer to Diagram 19.1) and circular economy principles, with the main priority being to prevent waste from being generated in the first place, and to prevent any waste which is generated from requiring disposal at a landfill. Landfill is the least favoured option to deal with waste, and the quantity of waste being landfilled is being considerably reduced across Europe. According to the EPA Waste infrastructure in Ireland Statistics (EPA 2022a), over the last decade the number of landfills accepting municipal waste in Ireland has fallen from 28 in 2010 to three in 2021.

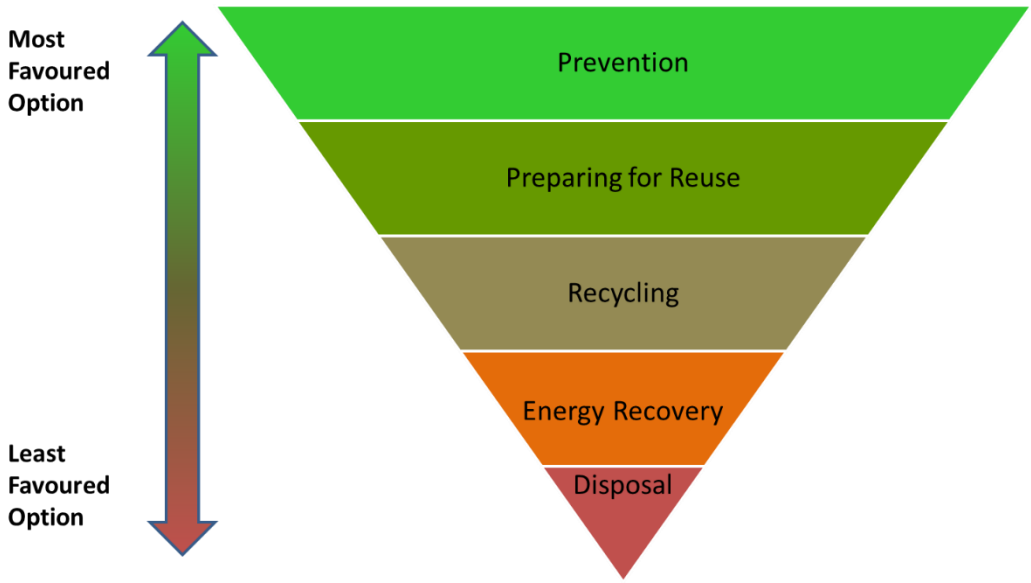

Diagram 19.1: Waste Hierarchy

63. The types and quantities of materials required and waste generated through the construction of the Proposed Project have been estimated based on information as set out in Chapter 5 (Construction & Commissioning), along with estimates of the quantities to be reused within the Proposed Project. All waste projected to leave the Proposed Project for management and/or disposal off-site has been assessed against the assessment criteria from the IEMA guidance (IEMA 2020) by considering the scale and nature of impacts within the context of the sensitivity on landfill capacity. Landfill is a finite resource and its use can have considerable environmental impacts. IEMA acknowledges the importance of the waste hierarchy, and it specifically uses landfill capacity as a key indicator of the impact of waste generation.

19.2.6.1 Impact Assessment Criteria

64. The assessment of the likely significant effects of the Proposed Project has been undertaken having regard to the IEMA guidance (IEMA 2020). The IEMA guidance sets out how to assess the significance of environmental effects based on the sensitivity of the receptor and the magnitude of the impact. This focuses on determining the likely significant effects of constructing and operating the Proposed Project on the environment resulting from the consumption of resources and the generation and management of waste.

19.2.6.2 Sensitivity of the Receptor – Materials

65. The sensitivity of the receptor relates to the availability and type of materials to be consumed by the Proposed Project. The sensitivity of materials can be determined by identifying where one or more of the criteria from the thresholds detailed in Table 19.3 are met. Materials are considered to be a receptor as well as a source of effect.

Table 19.3: Sensitivity Criteria for Materials (IEMA 2020)

Value	Description
	On balance, the key materials required for construction of a development …
Very high	• Are known to be insufficient in terms of production, supply and/or stock; and/or • Comprise no sustainable features and benefits compared to industry-standard materials*.
High	• Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock; and/or • Comprise little or no sustainable features and benefits compared to industry-standard materials*.
Medium	• Are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock; and/or • Are available comprising some sustainable features and benefits compared to industry-standard materials*.
Low	• Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock; and/or • Are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials*.
Negligible	• Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock; and/or • Are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials*.

*Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.

19.2.6.3 Sensitivity of the Receptor – Waste

66. As per the IEMA guidance, the sensitivity of waste relates to the availability of regional and/or national landfill void capacity in the absence of the Proposed Project. It is recognised that landfill capacity is a finite, unsustainable and an increasingly scarce option for the management of waste. The sensitivity of landfill void capacity has been assessed by following the two-step process:

- The volume of waste for disposal that is expected to be generated within the defined study area is calculated by analysing the available data and by providing justified forecasts over the Construction and Operational Phase of the Proposed Project
- The volume of forecast waste for disposal within the defined study area is then compared to the remaining landfill void capacity to identify expected losses over the Construction and Operational Phase of the Proposed Project.

67. The IEMA guidance recognises that waste processing and recovery facilities that are used to process and recover arisings (and hence divert them from landfill) are a beneficiary of waste feedstock and have the ability to reduce adverse impacts and are not a sensitive receptor. Hence, they create conditions that support the national and wider drive towards a circular economy and are part of a system that has the potential to reduce the magnitude of adverse impacts associated with waste generation and disposal.

68. The sensitivity of landfill void capacity has been determined through the criteria detailed in Table 19.4.

Table 19.4: Sensitivity Criteria for Regional Inert, Non-Hazardous and Hazardous Landfill Void Capacity (IEMA 2020)

Value	Description	
	Inert and Non-Hazardous Landfill	Hazardous Landfill
	Across construction, the baseline/future baseline (i.e. without development) of regional (or where justified, national) inert, non-hazardous and hazardous landfill void is expected to …	
Very high	Reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.	Reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.
High	Reduce considerably: by 6-10% as a result of wastes forecast.	Reduce considerably: by 0.5-1% as a result of wastes forecast.
Medium	Reduce noticeably: by 1-5% as a result of wastes forecast.	Reduce noticeably: by 0.1-0.5% as a result of wastes forecast.
Low	Reduce minimally: by <1% as a result of wastes forecast.	Reduce minimally: by <0.1% as a result of wastes forecast.
Negligible	Remain unchanged or is expected to increase through a committed change in capacity.	Remain unchanged or is expected to increase through a committed change in capacity.

19.2.6.4 Assessing Magnitude – Materials

69. The methodology for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of materials consumption on the baseline market capacity (production, stocks or sales), in construction. The approach for assessing the magnitude of impact for materials is detailed in Table 19.5.

Table 19.5: Assessing Magnitude for Materials (IEMA 2020)

Value	Description
	The assessment is made by determining whether through a development, the consumption of …
Major	One or more materials is >10% by volume of the regional* baseline availability.
Moderate	One or more materials is between 6-10% by volume of the regional* baseline availability.
Minor	One or more materials is between 1-5% by volume of the regional* baseline availability.
Negligible	No individual material type is equal to or greater than 1% by volume of the regional* baseline availability.
No change	No materials are required.

*or where justified, national.

19.2.6.5 Assessing Magnitude – Waste

70. As per the IEMA guidance, the magnitude of impact from waste has been assessed by determining the percentage of the remaining landfill void capacity that would be depleted by waste produced during the Construction and Operational Phase of the Proposed Project. This is the void capacity method that best suits the scale and nature of the Proposed Project; it is more suitable for larger developments and is considered a more robust method than assessing the percentage of waste diverted from landfill. The magnitude criteria are detailed in Table 19.6.

Table 19.6: Magnitude Criteria for Inert, Non-Hazardous and Hazardous Landfill Void Capacity (IEMA 2020)

Value	Description	
	Inert and Non-Hazardous Landfill	Hazardous Landfill
Major	Waste generated by the development will reduce national landfill void capacity baseline* by >10%.	Waste generated by the development will reduce national landfill void capacity baseline* by >1%.
Moderate	Waste generated by the development will reduce national landfill void capacity baseline* by 6-10%.	Waste generated by the development will reduce national landfill void capacity baseline* by <0.5-1%.
Minor	Waste generated by the development will reduce national landfill void capacity baseline* by 1-5%.	Waste generated by the development will reduce national landfill void capacity baseline* by <0.1-0.5%.
Negligible	Waste generated by the development will reduce national landfill void capacity baseline* by <1%.	Waste generated by the development will reduce national landfill void capacity baseline* by <0.1%.
No change	Zero waste generation and disposal from the development.	Zero waste generation and disposal from the development.

* Forecast as the worst-case scenario, during a defined Construction and/or Operational Phase.

19.2.6.6 Determining Significance

71. The potential for significant environmental effects is determined by considering the magnitude of impacts within the context of the sensitivity of receptors affected as shown in Table 19.7. For resources and waste management, for an environmental effect to be considered significant it must fall within the Moderate, Large or Very Large category. For an environmental effect to be considered not significant it must fall within either the Neutral or Slight category. Where an environmental effect falls within 'Large or Very Large', 'Moderate or Large', 'Slight or Moderate', 'Neutral or Slight', professional judgement has been used to determine a final outcome. This is a similar approach to that outlined in the EPA Guidelines (EPA 2022b), as set out in Table 2.3 of Chapter 2 (The Environmental Impact Assessment Process), however there is a slight difference in terminology for the significance categories in Table 19.7 used in this chapter compared to the EPA Guidelines (EPA 2022b).

Table 19.7: Determining Significance for Waste (IEMA 2020)

		Magnitude of Impact				
		No change	Negligible	Minor	Moderate	Major
Sensitivity (or Value) of Receptor	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

19.2.7 Construction Flexibility

72. At this stage of the development of the Proposed Project there are a number of points of detail which cannot be finalised. This is due to factors such as unknown site constraints or obstacles that may affect the construction of the permanent infrastructure. Although a high level of ground investigation has been obtained to inform the planning application for the Proposed Project, further site investigations will be undertaken following grant of planning permission. This will inform a confirmed design for construction. This is a standard delivery approach and as a result, for a linear project of this nature, scale and complexity, it is typical that a level of construction flexibility is required. This flexibility in construction is necessary to provide a mechanism to overcome these matters during the later stages of the Proposed Project. The elements which are subject to construction flexibility are summarised in Table 19.8 and this also explains how this flexibility has been accounted for within the assessment reported in this chapter. Chapter 4 (Proposed Project Description) and Chapter 5 (Construction and Commissioning) in Volume 2 of this EIAR provides further detail.

73. The construction works necessary to deliver the permanent design (including the construction flexibility defined in Table 19.8) would take place within the Construction Working Width which defines the extent of the Planning Application Boundary. For the assessment reported in this EIAR this means that the construction works could take place anywhere within the Construction Working Width.

74. The assessment reported in this chapter has taken account of this construction flexibility and assessed all the likely significant effects that could arise. For this assessment, the likely significant effects reported in this chapter would not change regardless of the alignment or location of infrastructure elements within the defined construction flexibility in Table 19.8 (i.e. the difference in effects would be imperceptible for the purpose of the assessment).

Table 19.8: Definition of Construction Flexibility

Design Element	Construction Flexibility	How this has been Applied / Assessed in this Chapter
Pipeline	Treated Water Pipeline and RWRMs horizontal alignment – to allow for construction flexibility to overcome site constraints or obstacles the pipeline could be anywhere within a 20m Pipeline Corridor as defined in Chapter 4 (Proposed Project Description).	The whole volume of excavated material displaced by the volume of pipe placed within the trench has been assessed in this chapter which takes into account the horizontal alignment of the pipeline being within the 20m Pipeline Corridor.
Pipeline	Treated Water Pipeline vertical alignment – to allow construction flexibility to overcome site constraints or obstacles, the vertical alignment of the pipeline could vary between 1.2m and 4.4m to the crown of the pipe. Exceptions would be at proposed trenchless crossing locations (which due to the construction approach would be deeper than 4.4m to crown) and where it has been identified that for hydraulic purposes, the crown of the pipeline would need to be deeper than 4.4m. These have been included in the vertical alignment set out in the Planning Application for the Proposed Project and consequently have been assessed for significant environmental effects as reported in this EIAR. These include e.g. TWB 27100 - 27700 and TWC 2600 - 2750. In these instances, the construction flexibility would be the crown of the pipe not being deeper than that shown in the Planning Application Drawings and not shallower than 1.2m. The excavation needed for the pipeline is assumed to be the largest needed for the lowest vertical parameter set out.	The whole volume of excavated material displaced by the volume of pipe placed within the trench has been assessed in this chapter which takes into account the vertical alignment of the pipeline being within this defined construction flexibility.
Valves	The location of valves, and associated pipeline features, that need to be above the pipeline could change if there is a change in the vertical or horizontal alignment of the pipeline, as a result of the construction flexibility defined in the two rows above. The construction flexibility would allow them to move within the 20m Pipeline Corridor. However, the location of these pipeline features would be limited to remaining within the land parcels as identified and assessed within the EIAR (but still remaining within the 20m Pipeline Corridor).	Not applicable to Resource and Waste Management as the volume of materials consumption and volumes of excavations for waste management would be the same regardless of the location of the valves.

Design Element	Construction Flexibility	How this has been Applied / Assessed in this Chapter
Outfall connections	To construct the smaller connection pipes between washout valves and washout outfalls, a small amount of construction flexibility would be required to overcome onsite obstacles or constraints. To allow for this, the connecting pipe could be anywhere within a 10m corridor.	Not applicable to Resource and Waste Management as the volume of materials consumption and volumes of excavations for waste management would be the same regardless of the location of the connecting pipe.
Outfall locations	The outfall headwalls and discharge point would have to move with the alignment of the outfall pipeline, as set out above, and so the discharge point could move within the same 10m construction flexibility. To allow for the headwalls to move 10m either side of the current pipeline alignment, a total construction flexibility width of 20m has been allowed for the headwalls.	Not applicable to Resource and Waste Management as the volume of materials consumption and volumes of excavations for waste management would be the same regardless of the location of the outfalls.

19.2.7.1 Variation in Construction Methods

75. In addition to the construction flexibility defined in Table 19.8 there may also be the potential for variation in the method of construction to be used to build the Proposed Project. This variation would be necessary to deal with, for example, uncertainties in ground conditions or on-site constraints. Chapter 5 (Construction & Commissioning) includes further detail on these, including the reasoning why different techniques may be required. This could include:

- Use of raft foundations or concrete piled foundations at the WTP
- Use of auger bore or pipe jacking for trenchless crossings
- Using trenchless crossing or open excavation for the crossing of low voltage power lines
- Different construction techniques for working in poor ground include peat materials.

76. The assessment reported in this chapter has been based on any of these construction techniques being adopted.

77. In addition, as set out in Appendix A5.3 (Methods of Working in Peat), four slightly different methods for constructing the pipeline in areas of peat soils have been defined. To allow for variation in ground conditions it has been assumed for the purpose of the assessment reported in this EIAR that either Method 2, 3 or 4 could be used in areas where the depth of peat is greater than 1m. Where the depth of peat is less than 1m, Method 1 is proposed to be used and it is not expected that there would be any deviation from this methodology. The environmental effects from Methods 2, 3, and 4 would be similar. However, Methods 3 and 4 would result in additional permanent infrastructure in the form of stone pillars (Method 3) or piled supports (Method 4) below the pipeline. Consequently, Method 4 would require piling and as such, would have a slighter greater environmental impact. Therefore, the EIAR is based on the application of Method 4 where the depth of peat is greater than 1m. However, in areas where Methods 2, 3, or 4 could be used, the environmental assessment has considered whether these different methods would result in different likely significant effects and therefore the assessment reported in this chapter has identified the likely significant effects from any of the three techniques. For this assessment, the likely significant effects reported in this chapter would not change regardless of the working in peat method used (i.e. the difference between the methods would be imperceptible for the purpose of the assessment).

19.2.8 Difficulties Encountered in Compiling Information

78. A review of data on the existing and proposed waste management facilities represents the most recently available stakeholder information. However, this information contains a data lag (in years) for materials, waste processing and landfill capacity data, and conditions may have changed since the publication of the baseline data presented in this chapter, meaning that some facilities identified may not be available or fully available to receive waste during the Construction or Operational Phases. The accuracy of

quantified assessment may diminish, the further forward any future available capacity for the Construction and Operational Phase assessments is projected.

79. Although some projections may show reducing trends (for example landfill capacity), policy, strategic, legislative, market adaptation and financial drivers are to some extent likely to ensure that sufficient capacity continues to be provided or that other viable options for management come to market.

80. This assessment of waste management capacities and facilities within the second study area, as well as the wider country, is based on the current, licensed waste management options available for solid waste only.

81. The assessment of by-product use options has been based on a review of the current options available and this is currently a developing market and focus for national and local government policy. As the Proposed Project Construction Phase is not anticipated to commence until 2028 and would continue through to 2032, an updated review of the options available would need to be carried out by the appointed Contractor prior to the Construction Phase, as part of the updating of the CWBPMP (Annex C of Appendix A5.1) for the Proposed Project. This may identify alternative more sustainable waste prevention and/or management options. Should this be the case, these would be adopted.

82. The availability of key construction resources and capacity of waste management infrastructure may be impacted by other building and infrastructure projects taking place at the time of construction of the Proposed Project (refer to Chapter 21: Cumulative Effects & Interactions). This assessment has been based on the most up to date publicly available data, including published data in relation to EIARs and planning. This information is subject to similar difficulties as outlined within this chapter and would therefore be subject to the same limitations.

83. A number of technical assumptions have been made during the assessment based on the information available at the time of writing, which have been resolved through the use of assumptions and professional judgement, including the following:

    - An assumption on the temporal generation of waste materials from the Proposed Project are based on information provided within Table 5.26 of Chapter 5 (Construction & Commissioning) which provides an estimate of the creation of the surplus excavated material for the pipelines and is used as a proxy for the Proposed Project. It is therefore assumed that wastes would be generated primarily within Year 2 and Year 3 of the Proposed Project, with a smaller amount generated within Year 4 but no wastes produced within Year 1 and Year 5. Based on this information, an assumption has been made on the amount of waste generated each year for disposal by the Proposed Project
    - Assessments of the capabilities of national and international sites which could potentially receive wastes from the Proposed Project are completed using the most recently available information, however, conditions may have changed since the date of the publication and waste management facilities may be subject to change, reduced capacities or closure during the Construction Phase of the Proposed Project. Any changes cannot be identified at this stage
    - Estimates on the cut and fill balance that have been provided are based on the assumption that a large portion of the surplus material would be suitable for direct reuse on-site and that some excavated materials from elsewhere in the Proposed Project would be reused at the WTP site
    - Assumptions on the density of raw materials and waste material have been used in converting volumes of raw materials and waste material into a weight of material consumption or waste, to be subsequently processed for recovery or disposal
    - It has been assumed for the baseline that waste generated from the Proposed Project would be processed in line with legislative requirements and contribute towards achieving current targets. Therefore, the EU Waste Framework Directive (2008) target of a minimum of 70% recovery of C&D wastes (excluding clean excavated wastes) by preparing for reuse, recycling and other material recovery is assumed to be achieved

- Desktop assessments, field surveys and ground investigations have taken place to provide detailed factual geotechnical information of the underlying ground conditions within the study area of the Proposed Project. Some ground investigations were completed for previous iterations of the project. These ground investigations indicate that the project route is predominantly virgin ground with only very limited risk of encountering contaminated ground. The information collected remains valid and relevant for the purposes of assessing the likely significant effects of the Proposed Project. However, to inform the quantitative assessment and provide a worst-case scenario, a standard percentage figure has been applied to excavated material, based on the Building Research Establishment (BRE) SmartWaste tool that 2% of materials excavated would be contaminated and classified as hazardous waste. As only a limited number of targeted contaminated land assessments have been completed within the study area of the Proposed Project, for the purposes of this assessment, no attempt has been made to quantify contaminated excavated material classified as hazardous at this stage
- It has been assumed that waste generated from the Proposed Project would be processed in existing facilities within Ireland that achieve existing levels of performance. Therefore, it has been assumed that 50% of hazardous C&D waste would be recovered/recycled and 50% of hazardous C&D waste would require disposal as per the current rates achieved within Ireland (EPA, 2025a)
- It has also been assumed that 99% of hazardous contaminated soils would be treated at facilities located within Ireland and just 1% of hazardous soils would require export for disposal, as per the current rates achieved within Ireland
- It has been assumed for the purposes of mitigation and assessment of residual effects that all hazardous waste for disposal is exported to the UK or other European countries in the absence of suitable facilities within Ireland
- It has been assumed that a proportion of construction materials are wasted or are surplus materials that become construction waste, based on average figures obtained from the BRE SmartWaste tool
- The assessment assumes that the volume of peat displaced is equivalent to the volume of pipe placed within the trench and all of the peat would be classified as wastes. A density figure of 1.5 tonnes/m^3 for soil and stone (as per the Waste Management (Landfill Levy) Regulations 2008 – S.I. No. 199 of 2008) is used.
- The quantity of asbestos waste generated from C&D activities is currently unknown. The structures requiring demolition include three buildings in a disused petrol station, a small shed in the middle of the WTP site, and a barn to provide an access over the Grand Canal (five buildings in total). The assessment assumes that asbestos containing materials are present within insulation, cement, floor and roof tiles, the walls and roof of the petrol station buildings.
- It has been assumed that raw materials used within water treatment are used proportionally when compared to the existing water treatment facilities.
- It has been assumed that there are no efficiency improvements from newer infrastructure.

84. If reuse or treatment of the operational residual water sludge is not possible, the residual water sludges during the Operational Phase would be required to be disposed of within non-hazardous landfill, and this forms the basis for the worst-case (pre-mitigated) assessment following the IEMA guidance. Non-hazardous landfill capacity is discussed in Section 19.3.2, and the forecast of capacity in Table 19.12 provides an estimate of capacity during the operational year (2033) considered for the IEMA quantified assessment.

85. The information that has informed the assessment is sufficient to identify the likely significant effects. The limitations described in this chapter are not considered to have a material impact on the assessment conclusions because it follows best practice guidance for completing an assessment using the IEMA methodology to identify the baseline environment and assess resource and waste sensitivity and magnitude.

19.2.9 Cumulative Effects Assessment

86. As noted in Chapter 2 (The Environmental Impact Assessment Process), intra-project cumulative effects are described within respective topic chapters, while inter-project cumulative effects are described in Chapter 21 (Cumulative Effects & Interactions). The EIA Directive includes the consideration of existing projects within the cumulative effects assessment, and this is addressed through a consideration of the incremental impact of the Proposed Project within the context of the existing baseline as described, and where applicable, the carrying capacity of the environment. The resources and waste management assessment has considered the national availability of construction resources (materials) and regional (or where justified, national) availability of licensed waste management infrastructure and remaining landfill void capacity. Therefore, this aspect does not require further assessment in the cumulative effects assessment.

87. There are no environmental effects of note described within other topic chapters that require consideration for the intra-project cumulative effects assessment in the resources and waste management topic chapter. Impacts associated with the transport of materials and waste have been assessed within other topic chapters, including Chapter 6 (Noise & Vibration), Chapter 7 (Traffic & Transport); and Chapter 12 (Air Quality).

19.3 Baseline Environment

88. A desk-based assessment has been undertaken in order to establish, for the first and second study areas, the baseline conditions (in the absence of the Proposed Project) for resources and waste. Baseline data have been collected at national and regional level, including: availability of construction aggregates; construction, demolition and excavated waste arisings; as well as information on regional and national waste transfer and treatment and disposal facilities capacity.

89. Following IEMA guidance (IEMA 2020), where appropriate, forecasts/estimates are provided of the availability of landfill capacity for the relevant project years:

- Construction Phase: it is anticipated that construction would start in 2028 and continue to 2032, for which excavated wastes would not be produced evenly throughout construction, but are anticipated to peak in volume during autumn of Year 2 and Year 3 with some generated in Year 4 but no waste expected in Years 1 and 5 (refer to Table 5.26 in Chapter 5 (Construction & Commissioning))
- Operational Phase: IEMA guidance requires Operational Phase impacts to be assessed over the course of any one full and justifiably representative year within the first three years of commissioning, in this case chosen to be 2033.

19.3.1 Baseline – Construction Phase Materials

90. The Construction Phase of the Proposed Project would require a variety of construction materials for each of the relevant elements of the Proposed Project. The most substantial construction materials (by volume) are expected to be aggregates, concrete and steel with these construction materials, along with others, expected to be required during the construction of the RWI&PS, RWRMs, WTP, BPT, BPS, FCV, TPR, Treated Water Pipeline from the WTP to the BPT and Treated Water Pipeline from the BPT to the TPR. Aggregates, concrete and steel are therefore used as proxy indicators, as three of the main construction materials to be used within the Proposed Project, to provide an assessment of the material impacts of the Construction Phase in the absence of detail on the available supply and stock of all Construction Phase materials.

91. The report Essential Aggregates: Providing for Ireland's needs to 2040 (Irish Concrete Federation 2018) details that Ireland has abundant natural reserves of high-quality aggregates (stone, sand and gravel). The Irish quarrying industry comprises approximately 350 large active quarries, which are supplemented by approximately 220 concrete manufacturing plants and 40 asphalt plants. These quarries produce

aggregates from crushed rock, sand and gravel. Aggregates are also the basic raw materials for concrete products which are ubiquitous in Ireland's built environment. Table 19.9 provides quantity information on the total aggregates production in Ireland between 2013 and 2022. Table 19.10 provides quantity information on the total ready-mixed concrete in Ireland between 2013 and 2023. Additional reference to the Annual Report 2022 (Irish Concrete Federation 2022) reports that the Irish aggregates industry generated approximately 37 million tonnes of aggregates in 2022 and 4.5 million m^3 of ready-mixed concrete in 2023. These production quantities are comparable with the figures reported in Table 19.9 and Table 19.10.

Table 19.9: Total Aggregates Production in Ireland 2013–2022

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Aggregates (million tonnes)	25	26	28	33	32	36	38	36	38	37

Table 19.10: Total Ready-Mixed Concrete in Ireland 2013–2023

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ready-mixed concrete (million m^3)	2.4	3	3.5	4.1	4.5	4.9	5	4.75	4.75	4.7	4.5

92. Due to the scale and location of the Proposed Project, materials would need to be sourced and procured from suppliers on a national basis, and therefore the baseline data have been gathered on a national level. Quantitative forecasting of future materials supply capacity has not been completed, but the data indicate an increasing supply to match market demand. In support of this, the Irish Concrete Federation (2018) indicates that supply to meet demand is sustainable on a national basis for the foreseeable years, and certainly through the Proposed Project Construction Phase. However, it is also reported that, in particular, products such as sand (from terrestrial sources) are becoming scarce in the eastern and midland regions and attention is drawn to the sustainability issues of haulage of heavy materials over long distances.

93. There are limited steel suppliers and manufacturers within Ireland. Ireland largely relies on imports for steel and steel products and therefore the Proposed Project is likely to import from global markets too.

94. In April 2021, the World Steel Association provided an estimation that the global steel demand would increase by 5.8% by 2028 as economies recover from the COVID-19 pandemic. Recent global market reports for steel by stakeholders such as Eurofer (the European Steel Association) and Organisation for Economic Co-operation and Development have identified issues with slow market demand, despite increases in steelmaking capacity planned worldwide from 2025 to 2027. However, World Steel Association indicates steel production has been stable since 2020, and it is likely that supply would be secure for the duration of the Construction Phase. This report relies on this qualitative assessment of steel supply. Reference to the 'World Steel in Figures 2025' (World Steel Association 2025) confirms that global crude steel production amounted to approximately 1,885 million tonnes in 2024.

19.3.2 Baseline – Construction Phase Waste

95. The IEMA guidance recognises that whilst waste processing and recovery facilities may not be able to divert all received resources from landfill, these operations are a beneficiary of incoming feedstock, and are ultimately being used to drive arisings up the Waste Hierarchy. Hence, they create conditions that support the national and wider drive towards a circular economy and diversion of waste from landfill.

96. Accordingly, the IEMA guidance does not consider waste processing and recovery facilities as sensitive receptors for the purposes of assessment. Waste processing and recovery facilities are, hence, different to landfills, in that the latter are finite resources. While the baseline conditions for these facilities have been included where practicable, such facilities are solely included on the basis of being an influencing

factor in the reduction of the magnitude of waste impacts on landfill void capacity, rather than being a sensitive receptor in their own right.

97. The following sub-sections provide a description of the current waste management baseline within these Local Authorities or a wider geographical area where deemed appropriate, including information on current waste management facilities and current capacity. Future forecasts of the inert/non-hazardous and hazardous landfill capacity have also been provided in line with IEMA guidance via straight line extrapolation assuming a 12% year-on-year reduction in available void capacity as detailed in Section 19.3.2.3.

19.3.2.1 Construction and Demolition and Excavated Waste – Disposal and Recovery Routes

98. The Waste Framework Directive (2008) requires that 70% of non-hazardous C&D waste (excluding naturally occurring soil and stone, thus excavated material fitting this description is not included) be reused, recycled or otherwise recovered. Uisce Éireann is committed to exceeding the requirements of the Waste Framework Directive and to send zero tonnes of recoverable waste to landfill,

99. According to the Construction & Demolition Waste Statistics for Ireland (EPA 2024a), Ireland achieved 89% material recovery of non-hazardous C&D waste (other than soil and stone) in 2022, thereby surpassing the 70% European target. An increasing trend has been seen in the quantity of C&D waste being managed nationally from 2014 to 2022, increasing from a low of 3.3 million tonnes in 2014 to a high of 9.0 million tonnes in 2021 according to the Construction & Demolition Waste Statistics for Ireland (EPA 2024a).

100. In 2022, soil and stone accounted for approximately 81% of total collected C&D waste, with 7.5% being concrete, brick and tile, 1.7% being mixed construction waste, 3.8% being metals, 1.2% being bituminous mixtures and 0.65% comprising segregated wood, glass and plastic.

101. It is of note that the vast majority (94%) of C&D waste underwent final treatment in Ireland in 2022, with only 6% (496,640 tonnes) being exported for final treatment. Most C&D waste was recovered by backfilling (81%), while 7.5% went for disposal and only 10% was recycled. Table 19.11 shows the breakdown of final treatments type for all C&D materials. This also demonstrates that for C&D waste (including soil and stone), Ireland achieved 91% material recovery in 2022. In 2022, approximately 496,640 tonnes of C&D waste were exported for final treatment outside Ireland. The RWMPOs (2024) report that hazardous and non-hazardous soil and stone material made up the majority of these exports, and suggest that this indicates the need for additional indigenous disposal capacity to treat these materials. Waste metals are identified as the other main constituent of C&D waste exports given the absence of any large indigenous metal recycling capacity within Ireland.

Table 19.11: Final Treatment Operation by C&D Waste Stream in 2022 (Source: EPA 2024a)

Treatment Type	Recycling (t)	Energy Recovery (t)	Backfilling (t)	Disposal (t)	Total (t)	Recovery (%)
Metal waste	314,020	0	11	4	314,035	100%
Segregated wood, glass & plastic	30,828	14,879	477	7,947	54,131	85%
Concrete, brick, tile & gypsum	348,105	4,789	254,913	10,564	618,371	98%
Waste Bituminous mixtures	53,352	0	45,747	0	99,099	100%
Mixed C&D waste	31,238	35,635	26,578	46,951	140,402	67%
Waste soils, stones & dredging spoil	5494	0	6,280,304	453,466	6,739,264	93%
Waste treatment residues	43,367	91,628	75,870	101,137	312,002	68%
Total	**826,404**	**146,931**	**6,683,900**	**620,069**	**8,277,304**	**93%**

102. Backfilling is the most notable treatment method of C&D waste in Ireland. Backfilling refers to a waste recovery operation carried out at authorised facilities, where suitable waste is used for land improvement, for reclamation purposes in excavated areas, or for engineering purposes in landscaping. Soil recovery facilities are typically worked out quarries in the process of being restored, or sites where soil and stone are imported to raise natural ground levels.

103. The prominence of backfilling as a final treatment operation reflects the high tonnages of waste soil and stone in the C&D waste stream. Recycling was the main treatment operation for metals (nearly 100%). EPA (2024a) comments that recycling rates for C&D waste can be improved by enhanced segregation of C&D waste into individual material streams, either at source or at waste processing facilities. Disposal was mainly used for C&D waste treatment residues, mixed C&D waste, and a smaller share of soil and stone, segregated wood, glass and plastics.

104. Within the baseline assessment these excavated wastes have been grouped with C&D wastes. This is because the quantified IEMA assessment methodology uses a combination of inert and non-hazardous landfill capacity as the sensitive receptor for the disposal of waste, and this would be common to both excavated and C&D wastes. In addition, the options for reuse, recycling and recovery (to avoid disposal of excavated waste to landfill) are generally the same for construction waste, demolition waste and excavated waste.

105. The degree of contamination of the excavated wastes and C&D wastes would determine the options for its reuse, recycling, recovery, treatment or disposal. In general:

- Soil recovery facilities are licensed for uncontaminated soil and stone
- Inert landfills, which are lined, can accept soil and stone with low contamination, for disposal and potentially recovery for landfill restoration activities
- Non-hazardous landfills can accept soil and stone and general C&D wastes with greater levels of contamination due to more robust engineering and lower environmental risk, with acceptance for either disposal or recovery for restoration.

106. Ireland generated 389,908 tonnes of hazardous waste in 2022. Approximately 77% (298,539 tonnes) of this was generated from industrial activities, 15% (60,368 tonnes) from the construction sector, and 8% (31,001 tonnes) from municipal sources, such as households, small businesses, and educational facilities (EPA 2024b).

107. Hazardous waste generation in Ireland has been increasing since 2015 (with a noted decline in exports and increase in on-site treatment during the COVID-19 pandemic), predominantly due to the increases in incinerator ash and contaminated soils. There has also been an increase in the treatment of hazardous waste in Ireland since 2019, with 2021 being the first year in which more hazardous waste was treated in Ireland than was exported for treatment.

108. Irish hazardous waste treatment facilities treated 169,738 tonnes of hazardous waste to non-hazardous status in 2022. This equates to 43% of hazardous waste being treated for recovery/recycling at facilities located within Ireland compared to 2019 when only 25% of hazardous waste was treated within Ireland. Treated waste types included used motor oil, healthcare wastes, sludges, filter cakes, absorbents, laboratory and chemical waste and household hazardous waste from civic amenity sites. This waste is treated until it is non-hazardous; the non-hazardous wastes that result are then further treated either in Ireland or exported.

109. In 2022, Ireland generated 41,082 tonnes of contaminated soil, of which approximately 41,072 tonnes were treated within, and 10 tonnes treated outside Ireland (EPA 2024b). Almost all (99%) contaminated soils generated in Ireland were treated at Irish hazardous waste facilities. It can therefore be inferred that any contaminated soils generated by the Proposed Project could be treated within Ireland and avoid being sent to landfill for disposal.

19.3.2.2 Construction and Demolition and Excavated Waste – Inert and Non-Hazardous Landfill Capacity

110. Following any prevention, minimisation, reuse, recycling and recovery measures employed by the Proposed Project, any residual C&D waste and excavated wastes would require disposal within landfill, and landfill capacity provides the baseline for the IEMA quantitative assessment as it represents a finite capacity sensitive receptor.

111. Whether generated wastes would be destined for inert or non-hazardous landfill would be dependent on their characteristics and chemical composition when compared to landfill Waste Acceptance Criteria. As such, the impact of the Proposed Project has been assessed against the total combined inert and non-hazardous landfill capacity. This is compliant with the IEMA guidance in Table 19.6.

112. The Construction & Demolition Waste: Soil and Stone Recovery/Disposal Capacity – Update Report 2020 (RWMPOs 2020) identifies landfills, both inert and non-hazardous, which have been and would be used for the management of C&D wastes and excavated wastes. The report identifies that the following landfills are available in the areas of the former Eastern-Midlands Region, but there are none available within the areas of the former Southern Region:

- Inert Landfills – Integrated Materials Solutions Ltd, Walshestown and Kyletalesha
- Non-hazardous Landfills – Knockharley, Ballynagran, and Drehid.

113. These facilities were researched for the baseline, providing the summary in Table 19.12 and a forward projection forecast of landfill capacity has been made through to 2033 in Table 19.13 of Section 19.3.2.3. In addition to the information provided in Table 19.12, reference to its Planning Application website confirms that the Drehid Waste Management Facility has submitted an application to An Bord Pleanála for permission for development in respect of an extension to the existing facility to increase the acceptance of non-hazardous household, commercial & industrial and C&D waste at the existing landfill of 120,000 tonnes per annum to 250,000 tonnes per annum until the permitted void space in the existing landfill is filled, and no later than the currently licensed end date of 2028.

Table 19.12: Licensed Regional Inert and Non-Hazardous Landfill Capacity Potentially Available for Disposal of C&D and Excavated Wastes (Sources: RWMPOs (2020) and/or EPA (2025b) and EPA (undated))

Facility Name	Licence Number	Status and Type	Annual Authorised Intake (Tonnes)	Annual Authorised Intake for Recovery (Tonnes)	Estimated Remaining Capacity in 2024 (Tonnes) (Capacity Projected in Table 19.11)	Year of Expected Closure	Source of Information
Inert Landfill							
Integrated Materials Solutions Limited Partnership (County Dublin)	W0129-02	Licensed	500,000	Not specified	1011,853	2026	RWMPOs (2020) and EPA (2025b) website
Walshestown Restoration Ltd (County Kildare)	W0254-01	Licensed	330,000	Not specified	243,393	2025	RWMPOs (2020) and EPA (2025b) website
Kyletalesha Landfill (County Laois)	W0026-03	Licensed	47,100	Not specified	Unknown – Landfilling activities ceased on-site in 2012 and completion of capping works on the final section of mini-cell 15b was completed in March 2022	Unknown	RWMPOs (2020) and EPA (2025b) website

Facility Name	Licence Number	Status and Type	Annual Authorised Intake (Tonnes)	Annual Authorised Intake for Recovery (Tonnes)	Estimated Remaining Capacity in 2024 (Tonnes) (Capacity Projected in Table 19.11)	Year of Expected Closure	Source of Information
Non-Hazardous Landfill							
Knockharley Landfill* (County Meath)	W0146-04	Licensed	188,000	25,000 C&D waste and 70,000 inert waste for waste recovery	1,168,478	2032	RWMPOs (2020) and EPA (2025b) website
Ballynagran Residual Landfill* (County Wicklow)	W0165-02	Licensed	150,000	28,000 tonnes C&D for recovery, restoration and site development works.	Unknown	2026	RWMPOs (2020) and EPA (2025b) website
Drehid Waste Management Facility* (County Kildare)	W0201-03	Licensed	120,000	No limit for inert waste where used in landfill engineering	363,527	2028	RWMPOs (2020) and EPA (2025b) website
Total 2024 Landfill Capacity Baseline			**1,335,100**	-	**2,787,251**	-	

*Note: this landfill also accepts municipal waste which takes priority over C&D waste.

19.3.2.3 Construction and Demolition and Excavated Waste – Future Forecast Inert and Non-Hazardous Landfill Capacity

114. This EIA uses best available knowledge of the baseline environment for availability of landfill capacity in Ireland. Some of the landfills are shown in Table 19.12 as closing prior to the Proposed Project construction years, and only Knockharley Landfill is shown as being active past 2028. However, this is likely to be because the closure date is based on planning and licensing information that is subject to change in the future. It is likely that operators of current landfills will apply for permission to continue operations beyond the current closure dates where facilities do not reach capacity before the current closure date. It is also expected that operators will apply for permissions with the regulators to operate new landfill sites (or new facilities at current landfill sites) which increase landfill capacity in Ireland. This assessment does not include information on current and future planning applications which are undecided.

115. While there would inevitably be some draw-down of available capacity as waste is deposited, the rate of draw-down would be dependent on a range of external factors including government policy and market forces. The demand for landfill void capacity would be spread over five years, and it is therefore assumed that legislative and policy drivers, including additional targets and restriction on landfilling of certain materials, would ensure that sufficient landfill disposal capacity is provided for at a regional (or where justified, national) level throughout the implementation of the Proposed Project. The National Waste Management Plan for a Circular Economy (RWMPOs 2024) identifies a national capacity deficit for non-hazardous C&D waste even while total C&D waste is anticipated to reduce. While this waste may be managed at non-hazardous landfills, dedicated facilities will need to be supported and expanded.

116. Available capacity or landfill void indicates that a number of the sites in Table 19.12 are likely to continue to operate past these current closure dates even if they were to fill at their maximum permitted rates. It is typical for landfill operators to apply to extend their planning permissions and licences, and it is likely that national capacity of landfill would need to be maintained through these years for general waste management purposes. However, there is an obvious reducing trend in landfill capacity to be considered during the extrapolation of the baseline. In the meantime, it is assumed that the RWMPOs would continue

to plan for new landfill sites, both to ensure continued capacity as available landfill void space is exhausted, but also to restore former mineral workings. The National Waste Management Plan for a Circular Economy (RWMPOs 2024; p. 29 Volume II) Core Policy CP12 identifies the need to support and protect existing and future 'nationally' and 'regionally' important waste infrastructure and move towards waste management self-sufficiency. Nationally and regionally important waste infrastructure includes non-hazardous landfill.

117. Projected future landfill capacity values have been estimated and illustrated in Table 19.13. There is a scarcity of historic long-term landfill data in Ireland on which to base extrapolation of future long-term trends in landfill capacity with confidence. The IEMA guidance provides example use of the data from England, Scotland and Wales to characterise the sensitivity and magnitude of impact upon landfill void capacity trends for inert, non-hazardous and hazardous waste. Due to the quality of Irish data, the data provided within the IEMA guidance for England, Scotland and Wales have been used, which assume landfill capacity across all waste types reducing by 12% per annum during the review period (IEMA 2020). In the absence of suitable data from Ireland it is considered that this fall in landfill capacity is broadly acceptable for use in an Irish context as the data are based on EU legislative drivers.

Table 19.13: Licensed and Remaining Capacity of Operational Landfills (Inert and Non-Hazardous) in Ireland

Timeline	Historic Baseline Capacity (tonnes)	Forecast Future Baseline Capacity (tonnes)
2024	2,787,251	N/A
2025	N/A	2,452,781
2026	N/A	2,158,447
2027	N/A	1,899,433
2028*	N/A	1,671,501
2029*	N/A	1,470,921
2030*	N/A	1,294,411
2031*	N/A	1,139,081
2032*	N/A	1,002,392
2033**	N/A	882,105

*Proposed Project construction years.

**Proposed Project operational year for assessment.

19.3.2.4 Construction and Demolition and Excavated Waste Recovery – Landfill Restoration

118. Where wastes are accepted at landfill, some may, subject to their properties, be used for recovery within landfill cover or other engineering purposes rather than subject to and accounted as disposal. Any landfills that have ceased landfilling at the time of construction, and are no longer accepting waste, may still require inert and non-hazardous materials for capping and restoration purposes, and therefore may be permitted to accept suitable surplus materials arising from construction subject to waste regulatory controls.

119. Excavated materials or C&D soil and stone wastes which are free from contamination may prove suitable for this use. The Annual Environmental Reports 2023, for the landfills within the areas of the former Eastern-Midlands Region and Southern Region, provide the quantities of wastes which were accepted for recovery purposes in 2023. These quantities, provided in Table 19.14, provide an indication of the demand for the use of waste in landfill restoration. The Annual Environmental Reports for these sites were sourced from the EPA's (n.d.) Licence and Enforcement Access Portal. No more recent information was available at the time of assessment.

Table 19.14: Landfill Restoration for Recovery of Wastes (Source: EPA Licence Search website (2025b))

Site	Waste Accepted for Recovery in 2023 (tonnes)
Integrated Materials Solutions	104,074
Kyletalesha	64,217
Walshestown	278,437
Drehid	276,676
Knockharley	229,671
Ballynagran	61,809
Total	**1,014,884**

120. These data indicate that substantial capacity via landfill restoration may be available for recovery of suitable wastes generated by the Proposed Project. Information provided within Table 19.15 indicates that a number of inert and non-hazardous landfills may be at a closure stage (full closure, or final capping of phases as the sites are extended) during the Proposed Project construction years and therefore may at that stage require substantial quantities of wastes and materials for restoration purposes.

19.3.2.5 Construction and Demolition and Excavated Waste Recovery – Soil Recovery Facilities

121. Soil recovery facilities above a set capacity threshold (>200,000 tonnes lifetime capacity) are authorised by the EPA, under the Waste Management (Licensing) Regulations 2004 as amended. These facilities can handle large tonnages of waste annually, compared to facilities authorised by Local Authorities under the Waste Management (Facility Permit and Registration) Regulations 2007, as amended, that are licensed to accept a maximum of 200,000 tonnes over the lifetime of the permit (five years).

122. Within the area of the former Eastern-Midlands Region, 8 soil recovery facilities, operating under waste licence with backfilling capacity, were determined to be either active or within the application process in 2023. Soil recovery facilities are generally worked-out quarries which are being restored using uncontaminated soil to raise natural ground levels.

123. The total active annual capacity for the area of the former Eastern-Midlands Region at that time was 3,340,000 tonnes, with a further 100,000 tonnes licensed but not yet commenced (EPA Licence Search website, 2025b). Whereas the area of the former Southern Region had a further five soil recovery facilities providing 1,280,000 tonnes of annual active capacity, with an additional 125,000 tonnes of licensed inactive capacity.

124. Table 19.15 provides examples of the facilities currently available within the two regions and their expected year of closure, and potentially available during the Proposed Project construction years. In addition to the facilities listed in Table 19.15, the landfills listed in Table 19.12 may offer appropriate facilities for the recovery of C&D and excavated wastes.

125. Regarding future capacity, it is of note that these facilities generally require the materials/wastes for restoration, which occurs in phases for specific durations; therefore, the appointed Contractor would require proactive planning prior to the Construction Phase to assess and ensure the availability of these facilities (and other facilities which may be subject to future planning permissions but are not included here), and whether it is available with suitable timings for acceptance of wastes arising.

Table 19.15: Existing Soil Recovery Licensed Capacities (Source: RWMPOs (2020) and/or EPA (2025b))

Facility Name/Location	Licence Number	Status	Annual Authorised Intake (Tonnes)	Remaining Capacity in 2025 (Tonnes)	Year of Expected Closure
County Kildare					
N&C Enterprises Ltd	W0292-01	Licensed (active in 2023)	345,000	277,872	2031
Kildare Sand & Gravel Ltd	W0295-01	Licensed (active in 2023)	225,000	779,513	2029
County Dublin					
Roadstone Ltd	W0272-01	Licensed (inactive in 2024)	400,000	1,102,574	2025
Roadstone Ltd*	W0277-04	Licensed (active in 2023)	1,500,000	18,760,000	2051
County Meath					
Kilsaran Concrete Unlimited Company	W0296-01	Licensed (active in 2024)	400,000	3,483,848	2033
Clashford Recovery Facilities Ltd	W0265-01	Licensed (inactive in 2024)	170,000	773,948	Unknown
Roadstone Ltd	W0278-01	Licensed (inactive in 2023)	100,000	1,800,000	Unknown
County Wicklow					
Roadstone Ltd	W0293-01	Licensed (active in 2023)	300,000	3,068,841	2040
County Kilkenny					
Crystalhill Inns Ltd trading as CHI Environmental	W0260-01	Licensed (last active in 2021)	125,000	221,559	Unknown
County Wexford					
Roadstone Ltd	W0280-01	Licensed (active in 2023)	400,000	122,635	Unknown/2024
County Cork					
Tulligmore Quarry Solutions Ltd	W0255-02	Licensed (active in 2024)	280,000	5,078,876	2037
Roadstone Ltd	W0299-01	Licensed (active in 2024)	300,000	397,255	Unknown
Roadstone Ltd	W0307-01	Licensed (active in 2024)	300,000	1,997,856	Unknown
		Approximate Indicative total	**4,845,000**	**37,864,777**	-

*The estimated remaining capacity at Huntsdown Quarry includes an extension to capacity applied for in 2021 and accepted in 2025 for 18,760,000 tonnes total.

126. This indicates a substantial (37,900,000 tonnes) remaining capacity of soil treatment facilities in 2025. The maximum licensed annual intake is 4,850,000 tonnes per annum. The data area indicates that if intake occurred at its maximum rate, the current identified capacity would be depleted within seven years, which would be by 2032. However, the facilities are unlikely to be depleted at these maximum rates, and these types of facilities are considered a beneficiary of wastes generated and are likely to expand to meet market needs.

127. As such, it is likely that there would be substantial capacity availability for these (or other similar, yet to be licensed) facilities available for the construction years for recovery of suitable soil and stone arising from the Proposed Project. For example, Roadstone Ltd (W0277-04) recently submitted a Waste Licence Review Application to the EPA to increase the total permitted (lifetime) soil and stone waste intake to the (extended) Huntstown Inert Waste Recovery Facility to 18.76 million tonnes (i.e. up from 9.40 million tonnes) which has been granted.

128. The Construction & Demolition Waste: Soil and Stone Recovery/Disposal Capacity – Update Report 2020 (RWMPOs 2020) concludes that the licensed national capacity is increasing with new facilities coming online and that these facilities offer a preferred long-term option for recovery of these wastes. It also concludes that the area of the former Eastern-Midlands Region is best served with these facilities and contains 80% of the active national soil recovery capacity.

129. It is therefore likely that more secure long-term licensed soil recovery facilities and a better geographical spread of facilities will be necessary to service the current and planned infrastructure development across the country, and to address short to medium-term capacity issues and encourage longer-term high-level waste and resource infrastructure. This is required and supported by the (2024) National Waste Management Plan for a Circular Economy. The National Waste Management Plan for a Circular Economy (RWMPOs 2024; p. 29 Volume II) Core Policy CP12 identifies the need to support and protect existing and future 'nationally' and 'regionally' important waste infrastructure and move towards waste management self-sufficiency. Nationally and regionally important waste infrastructure includes soil recovery facilities

130. Furthermore, the EPA (2024d) National By-Product Criteria for greenfield soil and stone (BP-N002/2024) under Regulation 27 is likely to substantially reduce the volume of this material reported as waste and consequently may reduce the demand for future facilities in the longer term.

19.3.2.6 Construction and Demolition and Excavated Waste Recovery – Waste Facility Permit or Certificate of Registration Soil Recovery Facilities

131. In addition to the EPA licensed facilities, there are currently a number of facilities which accept soils and inert waste from C&D works, operating under a Waste Facility Permit or Certificate of Registration from the County Councils where the Proposed Project is to be constructed. These facilities could be used for management of wastes arising from the Proposed Project, giving further opportunities for bulking, reuse and recycling. These facilities are all permitted or certified to operate Class 5, Class 6 and/or Class 7 waste activities as described in the Third Schedule of the Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007) and the Waste Management (Facility Permit and Registration) (Amendment) Regulations 2019 (S.I. No. 250 of 2019).

132. Under the Regulations, Class 5 activity is defined as:

- '*Recovery of excavation or dredge spoil, comprising natural materials of clay, silt, sand, gravel or stone and which comes within the meaning of inert waste, through deposition for the purposes of the improvement or development of land, where –*

    (a) the activity shall have the principal objective that the waste serves a useful purpose in replacing other materials which would have had to be used for that purpose, thereby conserving natural resources,

    (b) the waste-related activity consists of the direct use of the waste material without further processing other than normal industrial practice, and

    (c) the total quantity of waste recovered at the facility is less than 200,000 tonnes.'

133. Under the Regulations, Class 6 activity is defined as:

- '*Recovery of inert waste (other than excavations or dredgings comprising natural materials of clay, silt, sand, gravel or stone) through deposition for the purposes of the improvement or development of land, where –*

  (a) the activity shall have the principal objective that the waste serves a useful purpose in replacing other materials which would have had to be used for that purpose, thereby conserving natural resources, and

  (b) the waste-related activity consists of the direct use of the waste material without further processing other than normal industrial practice, and

  (c) the total quantity of waste recovered at the facility is less than 50,000 tonnes.'

134. Under the Regulations, Class 7 activity is defined as:

- '*Recovery of inert waste arising from the construction and demolition activity, including concrete, bricks, tiles, or other such material, at a facility (excluding land improvement or development) where –*

  a) the annual intake shall not exceed 50,000 tonnes, and

  b) the maximum quantity of residual waste consigned from the facility for collection, onward transport and submission to disposal at an authorised facility shall not exceed 7,500 tonnes per annum.'

135. Under the Regulations, Class 10 activity is defined as:

- '*The recovery of waste (not mentioned elsewhere in this part of the third schedule), other than hazardous waste, where –*

  (a) the annual intake does not exceed 50,000 tonnes, and

  (b) the maximum quantity of residual waste consigned from the facility for onward transport and submission to disposal at an authorised facility shall not exceed 7,500 tonnes per annum.'

136. In the case of Certificates of Registration, maximum allowable quantities vary from that outlined as follows: Class 5 – the total quantity of waste recovered at the facility shall not exceed 25,000 tonnes; Class 6 – the total waste recovered shall not exceed 10,000 tonnes; Class 7 – the annual intake limit is 10,000 tonnes; and Class 10 – the annual intake limit is 50,000 tonnes. With regard to Class 7 and 10 activities, the limit to the amount of residual waste leaving the facility is capped at 7,500 tonnes per annum.

137. The currently permitted or registered facilities which can operate under these classes of activity are listed in Table 19.16. The majority of the listed Waste Facility Permits and Certificates of Registration would have expired prior to the anticipated start of construction in 2028; however, Table 19.16 provides an indication of the types of facilities which may be in operation during the Construction Phase.

138. As described in the IEMA guidance (IEMA 2020), as these types of facility are beneficiaries of waste arising, it is considered they will generally increase or decrease in availability to match market needs. As these facilities are of a relatively smaller scale, they are more likely to be utilised to deal with discrete smaller quantities of wastes arising from the Proposed Project, such as smaller areas of excavations and demolition occurring outside of the main Construction Phase. The data provided in Table 19.16 have been compiled based on counties neighbouring the Proposed Project, as due to the smaller scale of these operations, the capacity is likely to be on a local rather than regional level.

Table 19.16: Existing Waste Facility Permit and Certificate of Registration Holders Accepting Soils and Inert Waste from C&D Works in the Counties in which the Proposed Project would be Constructed (Source: National Waste Collection Permit Office (2025))

Holder of Permit/Certificate	WFP or COR Number*	Activity Class	Capacity (Tonnes)	Expiration
County Tipperary				
Tom and Damien Byrne	COR-T-21-0002-01	Class 5 and 6	3,833 total	10/05/2026
Williams Sand & Gravel Ltd	COR-T-16-0001-02	Class 7	10,000 per annum	01/09/2025
Phelan Skip Hire and Waste Management Ltd	COR-T-21-0007-01	Class 7	7,000 per annum	18/10/2026
Andy Fogarty Sand and Gravel Ltd.	WFP-T-20-0001-02	Class 5 and 6	50,948 total	01/01/2028
Michael and Breda O'Neill	WFP-T-22-0001-01	Class 5 and 6	13,000 total	06/04/2027
Pride Point Ltd.	WFP-T-17-0001-03	Class 7 and 10	19,500 per annum	28/06/2027
Phelan Skip Hire and Waste Management Ltd.	WFP-T-12-0001-04	Class 7 and 10	11,000 per annum	20/10/2027
Falconhurst Ltd	COR-T-17-0001-02	Class 5 and 6	14,470 total	14/06/2027
Rory McDonnell	COR-T-22-0001-01	Class 5	19,700 total	08/07/2027
Quality Recycling Limited	WFP-TS-12-0002-06	Class 7 and 10	50,000 per annum	09/04/2028
English Tarmac Ltd	WFP-T-19-0002-02	Class 5, 6 and 7	17,500 per annum	16/07/2028
Seamus Walsh Plant Hire Ltd	COR-T-09-0001-04	Class 5 and 7	25,000 total	17/07/2028
Clonmel Waste Disposal Limited	WFP-T-11-0001-05	Class 7 and 10	49,983 per annum	20/12/2026
McGurie Plant Hire Limited	WFP-T-21-0001-02 (T)	Class 5 and 6	113,000 total	20/06/2026
County Clare				
Justin O'Grady	COR-CE-20-0002-01	Class 5 and 6	25,000 total	03/11/2025
James Lynch	COR-CE-20-0001-01	Class 5 and 6	25,000 total	24/09/2025
Clare Waste & Recycling Co. Ltd	COR-CE-20-0003-01	Class 5 and 6	2,300 total	15/12/2025
Lymar Contracts Ltd.	WFP-CE-20-0002-01	Class 5 and 6	75,000 total	15/02/2026
Joe McMahon	COR-CE-21-0001-01	Class 5 and 6	6,850 total	18/03/2026
Kieran Kelly Haulage Ltd.	COR-CE-21-0002-01	Class 5 and 6	25,000 total	25/03/2026
Western Excavations and Groundworks Ltd.	COR-CE-21-0003-01	Class 5	24,999 total	18/04/2026
Michael King	COR-CE-21-0004-01	Class 5	24,920 total	31/03/2026
Gerard Burke	COR-CE-21-0007-01	Class 5 and 6	19,000 total	24/06/2026
Kieran Kelly Haulage Ltd.	COR-CE-21-0008-01	Class 5 and 6	25,000 total	03/06/2026
Kieran Kelly Haulage Ltd	COR-CE-21-0009-01	Class 5 and 6	25,000 total	10/08/2026
Kieran Kelly Haulage Ltd.	COR-CE-21-0010-01	Class 5 and 6	25,000 total	24/08/2026
Donal Ward	COR-CE-21-0011-01	Class 5 and 6	25,000 total	15/12/2026
Glencore Construction Ltd.	COR-CE-21-0012-01	Class 5 and 6	5,000 total	07/12/2026
Kieran Kelly Haulage Ltd.	COR-CE-21-0013-01	Class 5 and 6	25,000 total	09/01/2027
Gerard Ryan	COR-CE-21-0014-01	Class 5 and 6	25,000 total	09/01/2027
Gerard Ryan	COR-CE-21-0015-01	Class 5 and 6	25,000 total	09/01/2027
Michael Begley	COR-CE-21-0016-01	Class 5 and 6	25,000 total	27/01/2027
Martin Kelly	COR-CE-21-0017-01	Class 5 and 6	25,000 total	13/02/2027
Western Excavations & Groundworks Ltd.	WFP-CE-22-0004-01	Class 5	50,000 total	23/03/2028
Kieran Kelly Haulage Ltd	COR-CE-23-0001-01	Class 5 and 6	25,000 total	25/04/2028
Ward & Ward Haulage	COR-CE-23-0002-01	Class 5 and 6	21,000 total	04/10/2028

Holder of Permit/Certificate	WFP or COR Number*	Activity Class	Capacity (Tonnes)	Expiration
Tom Marsh	COR-CE-23-0003-01	Class 5 and 6	22,500 total	29/11/2028
Tom Marsh	COR-CE-23-0004-01	Class 5 and 6	24,000 total	28/02/2029
McGrath Heavy Transport Limited	WFP-CE-24-0001-01	Class 5, 6 and 7	25,000 per annum	27/03/2029
DJK	COR-CE-24-0003-01	Class 6 and 7	10,000 total	12/07/2029
Thomas Crowley	WFP-CE-12-0002-03	Class 5 and 6	13,480 total	23/09/2029
County Limerick				
Shareridge Ltd	COR/L/2019/204	Class 7	10,000 total	13/11/2029
Michael Bagnell	WFP/L/2024/237	Class 5 and 6	40,500 total	15/01/2028
Dereen Concrete Ltd.	WFP/L/2021/119	Class 5	121,812 total	25/08/2026
Donal and Margo Humphreys	COR/L/2021/214	Class 5 and 6	23,000 total	23/11/2026
WM Fitzgerald SkipHire Limited.	WFP/L/2021/11/002/01/R3	Class 7	19,500 per annum	22/03/2027
Carrons Haulage Ltd.	COR/L/2021/216	Class 5	4,800 total	20/07/2026
Coolrus Plant Hire Ltd.	COR/L/2022/219	Class 5, 6 and 7	23,679 total	09/02/2026
Derry White Skip Hire Ltd.	COR/L/2022/218	Class 5 and 6	3,355 total	31/05/2027
McGrath Heavy Transport Limited	WFP/L/2022/223	Class 5	100,000 total	19/09/2027
Coolrus Plant Hire Ltd	WFP-L-2022-189-R2	Class 5, 6, 7 and 10	100,000 total	04/01/2028
Liam Mulcair	COR/L/2023/160/R3	Class 5	4,400 total	29/03/2028
Derry White Skip Hire Limited.	WFP/L/2023/17D/R6	Class 5, 6, 7 and 10	13,500 per annum	01/08/2028
Coolrus Plant Hire Ltd.	WFP/L/2023/226	Class 5, 6 and 7	78,000 total	12/11/2028
Valcroft Unlimited	WFP/L/2023/203/R3	Class 10	49,610 per annum	06/12/2027
Templeglantine Community Development CLG.	COR/L/2023/225/R1	Unknown	Unknown	01/08/2028
Rowen Haulage (Limerick) Ltd.	COR/L/2023/227	Class 5 and 6	25,000 total	06/06/2028
Michael Bagnell	COR/L/2023/228	Class 5 and 6	12,500 total	18/03/2027
Niaron Ltd.	COR/L/2024/229	Class 5	25,000 total	18/03/2029
Paul Callinan Plant Hire Ltd.	COR/L/2024/233	Class 5 and 6	14,000 total	03/11/2027
Derry White Skip Hire Ltd.	COR/L/2024/234	Class 5 and 6	8,000 total	03/10/2027
County Offaly				
Tom Bloggs	WFP-15-99999-01	Unknown	Unknown	31/01/2021
Pat Mangan	WFP-OY-14-0197-01	Class 5	45,000 total	08/07/2021
Killeshal Precast Concrete Ltd	COR-OY-11-0004-02	Class 7	50,000 per annum	22/06/2021
John Mallen	WFP-OY-18-0202-01	Class 5 and 7	25,500 total	26/10/2028
Healion Contractors Ltd	WFP-OY-17-0201-01	Class 5	57,000 total	26/10/2028
Guessford Limited	WFP-OY-10-0183-03	Class 7 and 10	24,900 per annum	21/01/2021
Kilmurray Pre-Cast Concrete Ltd	WFP-OY-19-0204-01	Class 5, 6 and 7	95,000 total	13/02/2025
Ellsport Ltd	COR-OY-20-0008-01	Class 5	25,000 total	08/09/2025
Dermot Nally Stone Ltd.	WFP-OY-20-0205-01	Class 5	42,500 total	12/02/2026
Anthony Cocoman	WFP-OY-16-0199-02	Class 5 and 7	60,170 total	01/12/2027
Hinch Plant Hire Ltd	WFP-OY-17-200-02	Class 5	47,018 total	30/11/2027
J. Ryan Haulage Ltd.	WFP-OY-23-0207-01	Class 5	108,500 total	04/12/2029

Holder of Permit/Certificate	WFP or COR Number*	Activity Class	Capacity (Tonnes)	Expiration
County Kildare				
Office of Public Works	WFP-KE-20-0102-01	Class 5	180,000 total	06/09/2025
Nickolas Walsh	WFP-KE-20-0104-01	Class 5	60,000 total	01/10/2025
J Ryan Haulage Ltd	WFP-KE-20-0103-01	Class 5	94,000 total	30/09/2025
Robertstown GFC	COR-KE-20-0036-01	Class 5	11,500 total	28/10/2025
Wilton Scrap Metals Ltd	WFP-KE-20-0105-01	Class 7 and 10	100,000 per annum	10/12/2025
G & J O'Neill Enterprises Ltd	WFP-KE-21-0106-01	Class 10	50,000 per annum	26/01/2026
Ballymore Ireland Contracting Services Ltd	COR-KE-21-0038-01	Not specified	25,000 total	15/06/2026
Eire Og Corra Choill Hurling Club	WFP-KE-21-0108-01	Class 5	25,000 total	10/03/2026
J Ryan Haulage Ltd.	COR-KE-21-0039-01	Class 5	14,040 total	15/09/2026
Apex Construction & Roofing Ltd	WFP-KE-21-0110-01	Class 5	40,050 total	18/10/2026
Warren Downey	COR-KE-21-0040-01	Class 6	5,000 total	23/11/2026
Callan Recycling Ltd	WFP-KE-20-0097-01	Class 7 and 10	50,000 per annum	06/12/2027
Michael Wilson Wright	WFP-KE-22-0111-01	Unknown	Unknown	06/07/2027
J.Ryan Haulage Ltd	COR-KE-22-0044-01	Class 5	20,000 total	28/09/2027
Callan Recycling Ltd.	WFP-KE-22-0114-01	Class 7 and 10	50,000 total	06/12/2027
Callan Recycling Ltd – Pluckerstown	WFP-KE-22-0115-01	Class 5	60,000 total	27/02/2028
Kilcullen GAA	COR-KE-23-0045-01	Class 5	13,650 total	05/05/2028
Apex Construction & Roofing Ltd.	WFP-KE-23-0117-01	Class 5	26,820 total	12/04/2028
Milford Quarries Ltd.	WFP-KE-23-0121-01	Class 5	100,000 total	20/11/2028
Arkil Limited	WFP-KE-23-0119-01	Class 7	50,000 per annum	12/09/2028
H McLaughlin & Sons Ltd.	COR-KE-24-0047-01	Class 5	18,000 total	24/04/2029
J Ryan Haulage Limited	COR-KE-24-0048-01	Unknown	Unknown	05/07/2029
John Kinsella	COR-KE-24-0049-01	Unknown	Unknown	04/11/2029
Cappagh Site Excavations & Plant Hire Ltd	WFP-KE-25-0125-01	Class 5	59,614 total	05/02/2030
County Dublin				
Peter Lawlor	WFP-DS-21-0002-01	Class 5 and 6	30,000 total	29/09/2029
KN Network Services (IRE) Limited	WFP-DS-15-0003-06	Class 7 and 10	250,000 total	31/10/2026
RDC Civil Engineering Limited	COR-DS-17-0001-02	Class 7	10,000 per annum	20/03/2027
Citius Limited	COR-DS-22-0001-01	Class 5, 6 and 7	49,750 total	02/01/2028
McIntyre Plant Hire (Dublin) Limited	WFP-DS-22-0004-01	Class 5, 6 and 7	225,000 total	31/03/2028
JFK Environmental Limited	WFP-DS-11-0002-08	Unknown	Unknown	02/10/2027
Buttermountain Golf & Leisure Club Limited	COR-DS-23-0003-01	Class 5	24,840 total	30/08/2025
GMC Utilities Group Ltd	WFP-DS-22-0002-03	Class 5 and 6	25,000 total	31/05/2025
L Behan Aggregates and Recycling Ltd	COR-DS-23-0004-03	Class 5 and 7	10,000 per annum	18/01/2029
Talbot Building & Civil Engineering Limited	COR-DS-24-0001-01	Class 5 and 7	10,000 per annum	24/04/2029
James Dunne	COR-DS-24-0003-02	Class 5 and 6	12,000 per annum	16/06/2025

Note: The expectation is that many of these waste permits will be renewed in due course as would typically occur.

* COR = Certificate of Registration; WFP = Waste Facility Permit

139. The facilities listed in Table 19.15 and Table 19.16 are indicative of the types of facilities available to take waste materials from the construction sites during the Construction Phase of the Proposed Project. The final decision on the destination of waste would be based on a number of factors, including using up-to-date information on the available facilities and their capacities during the Construction Phase of the Proposed Project. It would not be predetermined prior to the appointment of a contractor to carry out the works.

19.3.2.7 Construction and Demolition and Excavated Waste – Material Recovery Facilities and Waste Transfer Stations

140. In addition to the estimated capacity at EPA licensed soil recovery facilities and landfills, and National Waste Collection Permit Office Waste Facility Permit and Certificate of Registration holders as outlined, there are also a number of material recovery facilities and waste transfer stations throughout the counties in which the Proposed Project would be constructed which accept C&D and excavated waste.

141. Material recovery facilities and transfer stations are specialised plants that receive, separate and prepare waste and recyclable materials for further recovery or disposal. These facilities can reduce the cost and traffic impact of transporting waste as the transfer station facilitates the bulk haulage of waste in larger vehicles to its final destination, as opposed to a number of smaller vehicles transporting the same volume of waste to the same final destination.

142. The use of these facilities can also increase recovery and recycling rates due to the opportunities for bulking, then efficient transport to end-uses or treatment. All material recovery facilities and waste transfer stations which are currently licensed/operational throughout the counties in which the Proposed Project would be constructed are summarised in Table 19.17.

Table 19.17: Licensed Material Recovery Facilities and Waste Transfer Stations in the Counties in which the Proposed Project would be Constructed (Source: EPA (2025b))

Facility/Location	Licence Number	Annual Intake (tonnes)
County Tipperary		
Tipperary County Council	W0074-03	1,000
Tipperary County Council	W0078-03	11,500
Bord Na Móna Recycling Limited	W0240-02	1,991
Hi-Volt Ireland Limited	W0267-01	1,200
County Clare		
Clean (Irl) Refuse & Recycling Co	W0253-01	17,500
Clare County Council	W0170-01	200
Clare County Council	W0109-02	2,000
Enva Ireland Limited	W0041-01	14,000
County Limerick		
Valcroft Unlimited Company	P1136-01	3,000
Mr Binman Limited	W0061-01	1,000
Starrus Eco Holdings Limited	W0082-03	130,000
County Offaly		
Bord Na Móna Recycling Limited	W0104-04	20,000
KMK Metals Recycling Limited	W0113-04	35,000
County Kildare		
None identified	Not applicable	Not applicable

Facility/Location	Licence Number	Annual Intake (tonnes)
County Dublin		
Oxigen Environmental	W0208-01	80,000
Green Circular Economy Unlimited Company	W0205-01	3,000
Starrus Eco Holdings Limited	W0261-03	2,800
Padraig Thornton Waste Disposal Limited	W0044-02	30,000
Starrus Eco Holdings Limited	W0183-01	54,000
Starrus Eco Holdings Limited	W0188-01	5,000
Enva Ireland Limited	W0192-03	500
Bord Na Móna Recycling Limited	W0222-01	29,000
Padraig Thornton Waste Disposal Limited	W0227-01	20,000
Irish Packaging Recycling	W0263-01	50,000
Enva Ireland Limited	W0192-03	500
Rilta Environmental Limited	W0185-01	1,000
Padraig Thornton Waste Disposal Limited	P1014-01	22,800

19.3.2.8 Construction and Demolition and Excavated Wastes – Hazardous Waste Facilities

143. There are six facilities, throughout the counties in which the Proposed Project would be constructed, which accept hazardous C&D waste should these wastes be encountered during demolition and construction works, for example during works on the old petrol station, or within retired landfills should any hazardous materials be encountered during excavation. Details of these sites are provided in Table 19.18.

Table 19.18: Licensed Waste Facility Permit Able to Accept Hazardous C&D Waste in the Counties in which the Proposed Project would be Constructed (Source: EPA (2025b))

Facility Name	Licence Number & Facility Type	Annual Authorised Intake (tonnes)
County Tipperary		
Hi-Volt Ireland Limited	W0267-01 (IED)	9,000 tonnes per annum of a wide range of hazardous wastes including C&D wastes.
County Clare		
Enva Ireland Limited	W0041-01	20,000 per annum of a range of hazardous waste including C&D wastes.
County Offaly		
KMK Metals Recycling Limited	W0113-04	35,000 tonnes per annum of hazardous C&D metallic wastes, contaminated cables and mercury containing wastes.
County Dublin		
Enva Ireland Limited	W0192-03	68,100 tonnes per annum of a wide range of hazardous wastes including soil and stone containing dangerous substances, and insulation materials and construction materials containing asbestos.
Indaver Ireland Limited	W0036-02 (IED)	38,700 tonnes per annum of hazardous waste including contaminated rubble and soil, bagged asbestos.
Rilta Environmental Limited	W0185-01 (IED)	33,000 tonnes per annum of a wide range of hazardous wastes including asbestos and asbestos-containing materials and other small arisings.

19.3.2.9 Construction and Demolition and Excavated Waste – Hazardous Landfill Capacity

144. There are no commercial hazardous waste landfills in Ireland. Ireland exported over half (50%) of the hazardous waste generated in 2023, with 189,298 tonnes being exported compared to 191,466 tonnes treated domestically.

145. The absence of hazardous waste landfill capacity within Ireland forms the basis for the quantified assessment prior to mitigation for this assessment. However, given that a large quantity of hazardous waste generated in Ireland is currently exported, in the absence of domestic capacity to dispose of hazardous waste, export is also a likely option for any hazardous wastes generated by the Proposed Project.

146. EPA hazardous waste statistics (EPA 2024b) confirm that the majority of Ireland's hazardous waste was exported to the UK for final treatment in the period 2020-2022. 248,911 tonnes of hazardous waste was exported to the UK between 2020 and 2022. Hazardous waste was also exported to other European countries over the same period, including but not limited to: Belgium (128,160 tonnes), Norway (120,960 tonnes), Germany (93,877 tonnes) the Netherlands (55,649 tonnes), France (40,669 tonnes) and Portugal (7,080 tonnes). Table 19.19 provides details on the approximately 15.6 million tonnes of remaining hazardous waste landfill capacity in England and Scotland which has been obtained from the Environment Agency and Scottish Environment Protection Agency. Both publish landfill capacity data as a volume. The volumes have been converted into tonnes using a conversion factor of 1.5t/m^3 and presented in Table 19.19. It shows that at the end of 2023 there was approximately 15.6 million tonnes of hazardous waste landfill capacity.

Table 19.19: Remaining Hazardous Landfill Capacity in England and Scotland (as at End 2023) (tonnes) (Environment Agency (2024) and Scottish Environment Protection Agency (2025))

Location of Hazardous Landfill Site	Remaining Hazardous Landfill Capacity (tonnes)
England	
North East	5,688,000
North West	4,515,000
Yorkshire and Humber	699,000
East Midlands	3,000,000
West Midlands	802,500
East of England	-
London	-
South East	349,500
South West	508,500
Scotland	
Falkirk	31,000
Total	**15,593,500**

147. Projected future landfill capacity values have also been estimated and illustrated in Table 19.20. Within the baseline, future forecast of the landfill capacity has been estimated in line with IEMA guidance (IEMA 2020) via straight line extrapolation assuming a 12% year-on-year reduction in available void capacity as detailed in Section 19.3.2.3.

Table 19.20: Licensed and Remaining Capacity of Operational Landfills (Hazardous) in the UK

Timeline	Historic Baseline Capacity (tonnes)	Forecast Future Baseline Capacity (tonnes)
2024	15,593,500	N/A
2025	N/A	13,722,280
2026	N/A	12,075,606
2027	N/A	10,626,534
2028*	N/A	9,351,350
2029*	N/A	8,229,188

Timeline	Historic Baseline Capacity (tonnes)	Forecast Future Baseline Capacity (tonnes)
2030*	N/A	7,241,685
2031*	N/A	6,372,683
2032*	N/A	5,607,961
2033**	N/A	4,935,006

*Proposed Project construction years.

**Proposed Project operational year for assessment.

19.3.3 Baseline – Operational Materials

148. In accordance with IEMA guidance (IEMA 2020), 2033 has been selected as the single operational year for assessment within the first three years following commissioning. It is not anticipated that the new infrastructure installed for the Proposed Project would require any major maintenance, replacement or refurbishment. Therefore, the materials requirements assumed for the assessment would be those required for ongoing operations.

149. Operational Phase material consumption would include:

- Coagulant dosing and mixing
- Chemicals for the treatment processes, including those for pre-conditioning of the water
- Disinfection using chlorination
- Post treatment pH correction
- Fuel for running of associated plant and machinery
- General office consumables and other materials required by staff, e.g. personal protective equipment
- Routine maintenance materials such as grease, filters and consumables.

150. The materials listed above are standard requirements for the water industry and other industrial sectors with these materials already being supplied to Uisce Éireann and other companies on a national basis. Coagulants are expected to be the major consumable required by volume, particularly for consumption within the WTP, so the supply of this material is discussed in more detail below. However, in the absence of detailed information on the supply and stock of operational materials, the supplier markets are assumed to have capacity to adjust to meet the new levels' demand, as a beneficiary of the Proposed Project.

151. There are a number of national and international chemical manufacturers and suppliers operating within Ireland which provide water treatment chemicals for treatment of both drinking water and waste waters, as well as to other industrial and agricultural uses. In particular, for the supply of coagulants, there is capacity to produce four million tonnes of coagulants within the 30 member organisations of The European Chemical Industry Council and coagulants are manufactured at 80 locations within Europe, with the use a large range of possible raw material sources and inputs (European Inorganic Coagulants Producers Association (INCOPA) 2021).

152. According to information from the Irish Health Service Executive (n.d.), in 2013, nearly 4 million litres of hydrofluorosilicic acid was supplied for the purposes of water fluoridation, however, water treatment is not the only application for this chemical, indicating the supply of this raw material is likely to exceed 4 million litres per annum.

19.3.4 Baseline – Operational Wastes

153. Once operational, there would be a need to manage the water treatment residuals from the WTP. The EPA has a list of waste types, each given a classification number (EPA 2018). This is the List of Waste

(LoW) code (formerly the European Waste Catalogue code), with all waste types having to be classified by a LoW code. The main Operational Phase waste from the WTP would be '*wastes from the preparation of water intended for human consumption or water for industrial use*' (LoW code 19 09 category). The main component of this waste would be residual water treatment sludge.

154. There are a number of facilities throughout the country which accept such water treatment residual wastes. Table 19.21 lists current holders of waste licences and Waste Facility Permits which can accept sludges under the LoW 19 09 category, namely 19 09 02 and 19 09 03. All of the listed Waste Facility Permits will have expired prior to the commencement of operations at the proposed WTP; however, Table 19.21 provides an indication of the types of facilities which may be in operation once the WTP becomes operational, as these facilities and their capacities will react to market needs.

Table 19.21: Existing Waste Licence and Waste Facility Permit Holders in Ireland which are Permitted to Accept Sludges from Water Clarification (Source: National Waste Collection Permit Office (2025) and EPA (2025b))

Holder of Licence/Permit	Licence/WFP Number	Location	Expiration
EPA Waste Licence Holders			
Bord Na Móna Recycling Limited	W0194-02	County Laois	Unknown
Enva Ireland Ltd	W0041-01	County Clare	Unknown
Enva Ireland Ltd	W0184-02	County Laois	Unknown
Indaver Ireland Ltd	W0167-03	County Meath	Unknown
Waddock Composting Facility Limited	P1009-01	Co. Carlow	N/A
Enrich Environmental Limited	P1013-01 and P1163-01	Co. Meath	N/A
Ormonde Organics Limited	W0287-02	Co. Waterford	N/A
Enva Ireland Ltd	W0192-03	County Dublin	Unknown
Local Authority Waste Facility Permit Holders			
McBreen Environmental Drain Services Limited	WFP-CN-21-0003-01	County Cavan	30/03/2027
Clare Drains Environmental Ltd	WFP-CE-22-0003-01	County Clare	06/02/2028
Sidney McDaid	WFP-DL-20-006-04	County Donegal	15/06/2026
Walsh Waste Ltd	WFP-G-19-0002-02	County Galway	17/09/2029
O'Brien Fine Foods	WFP-KE-22-0112-01	County Kildare	15/08/2027
BEOFS Ltd	WFP-KK-19-0002-03	County Kilkenny	09/03/2025
Rockbrook AD Limited	WFP-LS-20-0001-01	County Laois	31/12/2025
Cremins Farm Compost Ltd	WFP/L/2022/23A/R11	County Limerick	13/12/2027
Lennon Quarries Ltd	WFP-MO-14-0034-03	County Mayo	03/11/2029
Heating Systems & Thermal Systems (Europe) Ltd	WFP-MO-18-0043-02	County Mayo	19/09/2026
Ballinrobe Waste Disposal Limited	WFP-MO-12-0024-03	County Mayo	09/11/2027
O'Reilly Group Transport Services Ltd	WFP-MO-17-0039-02	County Mayo	19/05/2027
Windtown Galtrim Limited	WFP/MH/17/0001/02	County Meath	02/07/2028
Biocore Environmental AD1 Limited	WFP-RN-11-0002-03	County Roscommon	17/10/2026
Evergreen Fields Ltd	WFP-RN-23-0003-01	County Roscommon	15/11/2028
OD Agri Ltd	WFP-TS-10-0002-06	County Tipperary	30/06/2025
Derryville Environmental Solutions Ltd	WFP-T-12-0003-05	County Tipperary	31/05/2026
Gannon Eco Ltd	WFP-WH-2021-0011-02	County Westmeath	05/10/2026
Enva Ireland Ltd.	WFP-WX-22-0061-04	Co. Wexford	14/11/2027
Starrus Eco Holdings	WFP-LH-16-0001-03 (T)	Co. Louth	19/11/2026
Emmet McElvaney	WFP-LH-14-0004-04	Co. Monaghan	26/05/2025

155. According to the National Water Resources Plan, Technical Appendix K Residuals (Irish Water 2021b), Uisce Éireann is moving towards a circular economy model with respect to sludge management, with water sludge viewed as a valuable resource and source of precious finite materials. To that end, it is intended that, where practicable, the operational residual water sludge would be put to a beneficial reuse.

156. Examples of the potential sustainable outlets and beneficial uses are outlined in Section 19.2.3.7 and include wetlands or reed bed systems as a beneficial product for nutrient removal; cement manufacture as an alternative to aluminium-containing raw materials such as bauxite; brick manufacturing as an alternative to raw materials; and landfill remediation, amongst others. These represent emerging treatment options, the uptake for which, and the driver for the introduction of treatment capacity, is the general industry shift towards Circular Economy approaches.

157. Currently, Uisce Éireann is sending 90% of water sludge from water treatment to sustainable outlets with the remaining 10% being used for landfill capping material (2023 figure, Commission for Regulation of Utilities (CRU) 2025). Therefore, for baseline and the worst-case assessment the capacity for these uses is presumed to match the existing performance of 90% diversion from landfill.

158. It is anticipated that when operation commences in 2033 sustainable/beneficial reuse outlets are likely to be more widely available for recovery of the operational residual water sludges. Sustainable outlets are businesses or industries (typically manufacturing) where water sludge can be used as an input to the manufacturing process; for example, in cement manufacturing where aluminium sludge can displace bauxite as a raw material in cement production.

19.4 Assessment of Effects

159. The following sections present an assessment of the potential significant resource and waste effects associated with the Construction and Operational Phases of the Proposed Project with respect to the appraisal methods that have been presented in Section 19.2.

160. This section presents an assessment in the absence of mitigation measures, with the exception of embedded mitigation that has been incorporated into the design (e.g. refining the choice of pipeline material, refining the diameter of the pipeline, selection of trenchless construction techniques and backfilling of suitable excavated materials). Mitigation measures have been proposed in Section 19.5 to prevent or reduce the potential significant effects, and the residual effects after the application of mitigation measures are reported in Section 19.6.

161. The likely significant effects as a result of the anticipated materials consumption and waste generation of the Proposed Project would be primarily within the Construction Phase. There would be some ongoing waste generated (from treatment operations) and materials used (primarily in the treatment process) once the Proposed Project is operating. The impact assessment reported in this section considers resource consumption in terms of the depletion of resources resulting in degradation of the environment and the impact of waste generated from the Proposed Project being disposed of to landfill and reducing landfill capacity.

19.4.1 Do-Nothing Scenario

162. The Do-Nothing Scenario is the scenario in which the Proposed Project does not go ahead and no development occurs. Under this scenario, there would be no effects as there would be no Construction Phase and Operational Phase occurring to use materials or generate waste. Trends in, for example, landfill capacity and volumes of recovery would continue unaffected, as described in Section 19.3 and these have been taken account of within the assessment of the Proposed Project.

19.4.2 Construction Phase

19.4.2.1 Construction Phase Activities

163. As is typical of any construction activities, materials would be required in order to construct the Proposed Project. Such construction materials include soil, aggregates, asphalt, concrete, steel, plant, fuel, oils, material finishes, glass and wood.

164. There may also be impacts associated with the generation of waste – an inevitable output of any construction project, no matter the scale. Such waste includes surplus materials which can arise from over-ordering or mishandling of construction materials, packaging waste, as well as mixed municipal waste and food waste associated with the construction staff working on the sites. There are also typically hazardous wastes generated which are associated with the maintenance of construction machinery or with chemicals required as part of the construction processes. An allowance of waste per material type is used, based on the best practice figures from the BRE SmartWaste tool. These are discussed further in Section 19.4.2.4 and Section 19.4.2.7.

165. Reference should be made to Chapter 6 (Noise & Vibration), Chapter 7 (Traffic & Transport), Chapter 12 (Air Quality), and Chapter 13 (Climate) for information on the impacts associated with the transportation of resources and waste as part of the Construction Phase of the Proposed Project.

19.4.2.2 Consumption of Materials During Construction Phase

166. The quantities of key materials likely to be consumed during the activities associated with construction of the Proposed Project pipeline and associated infrastructure including the WTP, RWI&PS, BPT, BPS, FCV, TPR and the proposed 38 kV Uprate Works are estimated in Table 19.22. The total granular material excludes the imported rocks and stones for the Temporary Construction Roads as these materials are not consumed as they do not form part of the permanent works but are considered below instead (see Section 19.4.2.4).

Table 19.22: Summary of Estimated Materials Consumption

Material Type	Tonnage	m^3
Blinding concrete (150-300mm)	22,620	16,160
Brick and blockwork	1,980	N/A
Concrete	1,007,740	419,890
Granular material (aggregate)	174,800	87,400
Glass	10	N/A
Kerbing	1,530	N/A
Mortar	950	500
Geotextiles – ground stabilising matting	8,230	N/A
Ground anchorage	2,910	N/A
Grout (bentonite)	16,410	27,670
Hot rolled asphalt	14,840	8,730
Insulation	40	N/A
Iron	67,570	N/A
Reinforcing steel	131,410	N/A
Plastics	1,470	N/A
Portal frames	81,220	N/A
Steel piles	160	N/A

Material Type	Tonnage	m^3
Steel pipe	60,830	N/A
Aluminium	23,480	N/A

167. Due to the current uncertainty of the Proposed Project's use of secondary, recycled or other sustainable products in replacement to primary materials, the IEMA guidance-based assessment has been derived on the certainty of supply of the key primary materials. Table 19.22 indicates that the key bulk materials which would be required for the Proposed Project are concrete and aggregates which would be required for bulk fill and used within concrete, asphalt and other materials, and steel which is used for the main pipeline, piles and reinforcing. The markets and potential supply for the main bulk materials for construction of the Proposed Project (steel and concrete/aggregate) were researched for the baseline within Section 19.3.1. The baseline assessment provides indication that the national supplies, from which the Proposed Project would draw on to provide the aggregate materials which would be permanently consumed during construction are known to be in short supply and are determined to be of 'medium' sensitivity. However, steel would be sourced from an international market which is showing increasing supplies in the short term. In the longer term there is greater uncertainty with historical fluctuations in supply and demand which may result in potential steel supply issues. Supply of steel is determined to be of 'medium' sensitivity.

168. The method for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of materials consumption on the baseline market capacity. Aggregates is used as a proxy indicator as they comprise as much as 60% to 80% of a typical concrete mix and 95% for asphalt. The total quantity of aggregates required for the Proposed Project can therefore be estimated at 1,016,810 tonnes of aggregates based on the totals in Table 19.23. Comparing this quantity to the estimated aggregate production in Ireland in 2022 of 37 million tonnes (based on Section 19.3.1), it equates to 2.75% of the national baseline availability.

Table 19.23: Estimate Aggregates Consumption

Material Type	Material Tonnage	Percentage Aggregates	Estimated Aggregates Consumption (Tonnes of Aggregates)
Blinding concrete (150-300mm)	38,020	80%	18,100
Brick and blockwork	1,980	80%	1,600
Concrete	963,380	80%	806,200
Glass	10	80%	10
Granular material (aggregate)	174,800	100%	174,800
Hot rolled asphalt	14,680	95%	14,100
Kerbing	1,530	80%	1,200
Mortar	950	80%	800
		Total	**1,016,810**

169. The magnitude of impacts for construction materials is considered to be 'minor' as consumption of one or more materials is between 1-5% by volume of the national baseline availability. The significance of effect for construction materials with a 'medium' sensitivity and a 'minor' magnitude of impact is Slight and are Not Significant for the purposes of the EIAR prior to mitigation.

19.4.2.3 Demolition Waste

170. The scope of the Proposed Project does not include any major demolition works as it is predominantly new infrastructure to be installed on greenfield land. There would be small amounts of demolition-type wastes during the Construction Phase, for example from the installation of the pipeline through roads, from installation of underground cabling and potentially small amounts of demolition-type wastes for the construction of the WTP access road, which would pass through the footprint of a former petrol station, and also during construction of the WTP site, which would require the demolition of a derelict structure. A further barn would need to be demolished in order to provide an access over the Grand Canal to the Construction Working Width. Hazardous waste produced as a result of demolition activities and contaminated material from roads is accounted for within the hazardous waste quantities from excavated waste detailed in Section 19.4.2.4. However, due to the relatively small quantities of demolition type wastes (assumed to be less than 50 tonnes from the demolition of one standard construction building of concrete materials) compared to other C&D and excavated wastes generated by the Proposed Project, these have not been included within the assessment of the wastes arising in the Construction Phase.

19.4.2.4 Excavated Waste

171. The majority of Construction Phase waste which would be generated by the Proposed Project would be from ground excavation works. Excavation works would be required for the construction of the different elements of the Proposed Project, particularly to allow for the pipeline to be laid. There would also be excavation required for the construction of the WTP, RWI&PS, BPT, BPS, FCV, TPR and proposed 38 kV Uprate Works.

172. It is of note that the Proposed Project has undergone design changes to reduce or limit the quantities of wastes which would be generated by the Construction Phase, in accordance with the waste hierarchy. This has included refinement in the choice of pipeline material and the diameter of the pipeline required. This has reduced the volume of material to be excavated to allow for the installation of the pipe. The proposed pipeline route combines open-cut and trenchless methods as described in Chapter 5 (Construction & Commissioning). Along the majority of the proposed pipeline the construction methodology to be employed is proposed to be open-cut, whereby the Construction Working Width for the pipeline would be stripped of topsoil, a trench of suitable depth excavated, and the pipe installed to levels determined by design and subsequently backfilled, thus limiting excavated waste generated and increasing potential for topsoil to be recovered.

173. Topsoil would be stockpiled and stored for reuse on-site. Subsoils would be segregated and stored and used for backfilling of the trench. Due to diminishing landfill capacity, and therefore increasing costs, landfill disposal of clean soil and stone is becoming less prevalent. The appointed Contractor would be required to manage the surplus excavated material in a manner that follows the waste hierarchy as described in Section 19.2.6.

174. The Proposed Project would traverse large areas of peat bogs as well as peat deposits along parts of the proposed route. It is estimated that up to 153,200m^3 of peat would be displaced by the Proposed Project, equivalent to the volume of pipe placed within the trench, which would all be classified as a waste product under the pre-mitigation scenario as defined in Section 19.2.8. An approximate bulk density figure of 1.5 tonnes/m^3 (as per the Waste Management (Landfill Levy) Regulations 2008) for soils and stones is used instead, giving a total of 229,800 tonnes. The impact of transportation of any surplus excavated materials is addressed within Chapter 7 (Traffic & Transport) and Chapter 13 (Climate).

175. The estimated quantities of excavated material, as defined by construction methodologies set out in Chapter 5 (Construction & Commissioning), are summarised in Table 19.24.

Table 19.24: Estimated Quantity of Excavated and Surplus Material

	Raw Water Intake and Pumping Station	Raw Water Rising Mains	Water Treatment Plant	Treated Water Pipeline from the WTP to the BPT	Break Pressure Tank	Flow Control Valve	Treated Water Pipeline from the BPT to the TPR[3]	Booster Pumping Station[1]	Termination Point Reservoir	Proposed 38 kV Uprate Works	TOTAL
Approximate Total Excavated Material (m^3)	50,100	46,500	541,500	865,300	59,300	3,600	3,421,700	21,200	64,800	1,500	5,075,500
Expected Reused (m^3)	5,000	39,200	641,000	750,000	18,300	600	3,022,500	2,000	5,600	1,500	4,485,700
Expected Surplus Excavated Material (m^3)	45,100	7,300	(-99,500)[2]	115,300	41,000	3,000	399,200	19,200	59,200	0	589,800

[1] BPS includes the material for the associated power line from Birr.

[2] Material would have to be imported from other parts of the Proposed Project to complete the landscaping at the WTP:

- Surplus excavated material from the construction of the RWI&PS would be transported to the WTP for landscaping and fill or to licensed/permitted facilities
- Surplus excavated material would be imported to the WTP site from the RWI&PS site, from the Construction Working Width of the RWRMs, and from nearby sections of the Treated Water Pipeline from the WTP to the BPT between the WTP and the BPT.

[3] This section of the Treated Water Pipeline includes the FCV.

176. Table 19.24 provides estimates of the total amount of material to be excavated for each of the Proposed Project elements. It also estimates the amount of material which can be expected to be reused within each element, the majority being reused on-site directly during its excavation under Article 2 of the Waste Framework Directive (2008). Following these assumptions, the balance (cut and fill balance) provides an estimate of the expected surplus excavated material. Additionally imported rocks and stone would be required to be brought to the Proposed Project and used within the temporary works for Temporary Construction Roads to enable plant to travel along the Construction Working Width and this material would need to be imported to the construction sites and removed upon completion of the Proposed Project.

177. Table 19.24, summarising the approximate total excavated material quantities, identifies a surplus of approximately 589,800m^3 of excavated material, including soil and stone, rock and peat. It is assumed under the worst-case scenario that all the excavated material would require disposal to landfill as waste. To aid further understanding of potential for reuse or recovery of this material, and to inform the quantified assessment, this estimated surplus figure can be further broken down into material streams and converted to a tonnage figure as follows:

    - Soil and stone: 300,100m^3 (450,150 tonnes based on approximate density conversion of 1.5 tonnes/m^3)
    - Rock: 136,500m^3 (273,000 tonnes based on approximate density conversion of 2.0 tonnes/m^3).

178. It is assumed under the worst-case scenario that the peat would require disposal to suitably permitted landfill (including sites listed within Table 19.12) as waste, as follows:

    - Peat: 153,200m^3 (229,800 tonnes based on approximate density conversion of 1.5 tonnes/m^3).

179. It is likely that if the peat was to be disposed of to landfill then it would need to go through treatment including dewatering and stabilisation to meet the waste acceptance criteria for landfill disposal.

180. For the worst-case scenario, it is also assumed that the imported rocks and stone for use on Temporary Construction Roads would all require disposal to landfill as waste following completion of construction works, as follows:

    - Rocks and stone: 451,900m^3 (903,800 tonnes based on approximate density conversion of 2.0 tonnes/m^3).

181. It has been conservatively estimated for the assessment worst-case scenario that of the 1,626,950 tonnes of excavated soil and stone, excavated rock and imported rocks and stone likely to be generated, approximately 32,539 tonnes of this material would be contaminated (this equates to 2%, and is based on indicative benchmarks within the BRE SmartWaste tool), and potentially classified as hazardous. On this basis, this results in a worst-case scenario of a total of 1,594,411 tonnes of excavated soil and stone, excavated rock and imported rocks and stone requiring disposal within non-hazardous or inert landfill, assuming there is no recovery via reuse or recycling.

182. For the waste peat, working with the same worst-case scenario (that of the 229,800 tonnes of excavated peat likely to be generated), approximately 4,596 tonnes would be contaminated (this equates to 2%) and potentially classified as hazardous. On this basis, this results in a worst-case scenario of a total of 225,204 tonnes of excavated peat requiring disposal within a non-hazardous landfill.

183. As it is anticipated that construction would start in 2028, it is not yet possible to define the specific by-products and Regulation 27 registrations or notifications for off-site third-party end-uses with certainty. For the worst-case scenario it is assumed that all excavated waste is subject to disposal to landfill. Should the by-products use of the materials not be possible, the baseline assessment indicates that there is currently, and would likely be during the construction years, large capacity of the following, which (listed in line with the waste hierarchy) provide end-of-waste and waste recovery options and are likely to reduce the quantity of the excavated wastes requiring disposal:

    - Regulation 28 soil treatment facilities
    - Landfills requiring wastes for restoration (Section 19.3.2.4)
    - Soil treatment facilities (Section 19.3.2.5 and Section 19.3.2.6).

184. The adoption of the waste prevention and recovery options for the end-use of the excavated wastes would be implemented in the CWBPMP and CEMP, both to be adopted by the appointed Contractor, as discussed in Section 19.5.

185. Regarding the risk of excavated wastes being hazardous, the Ground Investigation Report (Irish Drilling Limited 2018) indicates that the majority of soils, subsoils and bedrock which would be excavated within the study area is natural material which is free from contamination (see Appendix A10.1 to Chapter 10: Soils, Geology & Hydrogeology). However, at this stage a risk of hazardous materials being excavated cannot be completely discounted. For the worst-case scenario and as some excavated wastes may be hazardous if there is past industrial use and made ground within any of the excavated areas, a conservative approach has been applied. This conservative approach assumes that treatment of contaminated soils is via existing recovery or recycling facilities and that existing facilities achieve existing levels of waste recovery in future years.

186. The definition of baseline conditions provides an indication of the available landfill capacity within Ireland. Table 19.13 outlines the remaining capacity for inert and non-hazardous waste in currently licensed landfills in Ireland. Landfill capacity is the known sensitive receptor and is also reducing in availability. Therefore, landfill is considered to have a ‘very high’ sensitivity as it can be expected to reduce by >10% per year. Section 19.3.2.9 states that there are no commercial hazardous waste landfills in Ireland and therefore hazardous waste landfill capacity is known to be unavailable or new infrastructure is required, meeting the criteria for ‘very high’ sensitivity.

187. The method for determining the magnitude of the impact from waste is to assess the percentage of the remaining landfill void capacity (Table 19.13) that would be depleted by the anticipated waste during the construction of the Proposed Project. The forecast for excavated wastes for the duration of the Proposed Project is approximately 1,819,615 tonnes, which if all was disposed of to landfill would reduce the availability of landfill from a baseline of 2,787,251 tonnes of capacity. However, the assessment must take into account the quantity of construction waste that will also be generated which is discussed below.

188. The magnitude of impacts for hazardous excavated waste is considered to be 'major' since any quantity of hazardous excavated waste generated by the Proposed Project would decrease the national landfill void capacity baseline by >1% as there is no capacity available within Ireland. The significance of effect for hazardous excavated waste generated with a 'very high' sensitivity and a 'major' magnitude of impact is Very Large which is Significant for the purposes of the EIAR prior to mitigation.

19.4.2.5 Construction Waste Generation and Management

189. As is typical of any construction activities, the generation of waste is inevitable. Surplus material goods and waste (excluding excess excavated materials) may occur where material supply exceeds material demand. While some surplus materials have reuse potential, other materials may be considered a waste and fall under relevant regulatory controls. Materials brought to site but not fully utilised for their original purpose could result in other waste such as damages, off-cuts and surplus products. Estimated quantities of these wastes would be provided by the appointed Contractor in the CWBPMP, which would form part of the CEMP.

190. Typically there are also hazardous wastes generated which are associated with maintenance of construction machinery or with chemicals and materials required as part of the construction processes. Table 19.25 summarises the types of waste which could be generated during the Construction Phase of the Proposed Project (with the associated LoW code), and some of the Proposed Project waste streams are discussed in more detail in Section 19.4.2.5.1 to Section 19.4.2.5.5.

Table 19.25: Likely Construction Waste from the Proposed Project (Including Hazardous and Non-Hazardous Waste Types)

Waste Type	LoW Code
Drilling muds and other drilling wastes	01 05 04 – 01 05 99
Waste hydraulic oils	13 01 01* – 13 01 13*
Waste engine, gear and lubricating oils	13 02 04* – 13 02 08*
Wastes of liquid fuels	13 07 01* – 13 07 03*
Packaging (including separately collected municipal packaging waste)	15 01 01 – 15 01 11*
Batteries and accumulators	16 06 01* – 16 06 05
Concrete, bricks, tiles and ceramics	17 01 01 – 17 01 03, 17 01 07
Wood, glass and plastic	17 02 01 – 17 02 04*
Bituminous mixtures, coal tar and tarred products	17 03 01* – 17 03 03*
Metals (including their alloys)	14 04 01 – 14 04 11
Soil (including excavated soil from contaminated sites), stones and dredging spoil	17 05 03* – 17 05 04
Gypsum-based construction material	17 08 01* – 17 08 02
Other C&D wastes	17 09 01* – 17 09 04
Municipal wastes arising from construction personnel, site office and canteen facilities	20 01 01 – 20 01 08, 20 01 39, 20 03 01

19.4.2.5.1 Construction Workforce Wastes

191. There would be quantities of mixed municipal (LoW 20 03 01), dry mixed recycling (LoW 20 03 01 or 15 01 06 where only mixed packaging) and food waste arising from the construction personnel, site office and kitchen/dining facilities at the site compounds (LoW 20 01 08). There would also be wastewater associated with welfare and sanitary facilities at the site compounds. Construction workforce wastes would be managed in accordance with the waste hierarchy.

19.4.2.5.2 Packaging Waste

192. Packaging waste would be generated on-site during construction. The packaging would be separated and segregated and placed in separate containers which would be covered. The wastes would then be transported to suitably licensed packaging recycling facilities. Many suppliers provide a facility where they remove and recycle their own waste packaging, and this would be checked prior to construction works.

19.4.2.5.3 Concrete Waste

193. All major elements of the Proposed Project would require concrete as part of their construction. Concrete batching plants may be required to be established at the WTP, BPT and BPS sites if suitable local concrete suppliers are unable to meet the requirements of the Proposed Project.

194. The proposed approach to the construction would limit the actual amount of waste concrete to arise as concrete would only be ordered or made as required, resulting in little to no surplus.

195. The potential for environmental effects due to concrete are primarily associated with its production and transport, which are considered within Chapter 6 (Noise & Vibration), Chapter 7 (Traffic & Transport), Chapter 12 (Air Quality) and Chapter 13 (Climate). Additionally, the recovery or disposal of any waste concrete which does arise at licensed/permitted facilities can also result in potential environmental effects. Waste concrete would be sent to appropriate recovery facilities.

19.4.2.5.4 Bentonite (Drilling) Waste

196. Trenchless construction methods would be used for parts of the Proposed Project, namely for tunnelling under major crossings such as roadways, railways, canals, watercourses and ESB networks. Bentonite is used as a lubricant in trenchless construction. The method by which soil would be extracted during micro-tunnelling would be either by an auger system or slurry system. Refer to Chapter 5 (Construction & Commissioning) for further detail on trenchless construction.

197. Where a slurry system is used to extract spoil during micro-tunnelling, a mix of bentonite and water is used to suspend the excavated spoil. The excavated material which is brought to the surface during tunnelling may therefore contain bentonite as well as the excavated soil and stone material. Where appropriate, the bentonite is reused within the tunnelling operations; however, any bentonite which is no longer required would require separate disposal as a non-hazardous waste. It is estimated that up to 17,000 tonnes of waste bentonite would be generated through the Construction Phase – see Table 19.26.

19.4.2.5.5 Pile Arisings

198. Piling is to take place at a number of locations as part of construction of the Proposed Project. Piling would be required as part of the construction of the RWI&PS, WTP, BPT and BPS. Piling may also be required to provide a support system to the pipeline in areas of poor ground conditions (for example, areas of peatland).

199. The quantity of the pile arisings (materials being removed from the ground in order to install the piles) would be dependent on the type of piles used by the appointed Contractor. The pile arisings could potentially be contaminated with cement and/or concrete and would require appropriate management of this waste stream on-site to avoid contaminated material entering the ground or nearby surface waters. Piling is a standard practice, and best practice operating procedures/construction methodologies would be used to manage such waste arisings.

19.4.2.6 Construction and Demolition (C&D) Waste Estimation

200. As mentioned in Section 19.2.3.1, the EU Waste Framework Directive set a target of preparing for reuse, recycling and other material recovery of 70% by weight of C&D non-hazardous waste by 2020 (note that this excludes naturally occurring soil and stone material falling within code 17 05 04 in the European Waste Catalogue). Ireland is achieving 89% material recovery rate for C&D waste (as of 2022); based on this evidence 70% recovery is assumed, in line with the current Waste Framework Directive target, for the reasonable assumption for worst-case assessment.

201. However, as discussed within Section 19.5 there is an ambition to send zero recoverable waste to landfill, and Uisce Éireann is currently drafting a sustainability strategy to this effect to align with the Government of Ireland's (Department of Communications, Climate Action and Environment 2020) Circular Economy Strategy. This would form the draft target within the outline CWBPMP and would be considered further during ongoing design development and during procurement of the appointed Contractor.

202. Table 19.26 provides an estimate of key construction waste anticipated to be generated from the Proposed Project based primarily on a 70% recycling/recovery rate. Table 19.26 does not include estimates for municipal solid waste from construction workers. As temporary welfare facilities would be installed at each of the six Infrastructure Sites, the additional Construction Compounds and nine Pipe Storage Depots it can be forecast that construction worker municipal solid wates would be generated for disposal in each location. At the peak of construction, up to 1,065 workers could be deployed on-site each producing 50 litres of waste per week (British Standards Institution 2005). It is estimated that the general waste quantities would be approximately 2,769,000 litres per annum. At a density conversion factor of 0.26 kilograms/litre, this equates to approximately 720 tonnes per annum.

203. It should be noted that it has been assumed that all of the drilling mud generated from the dewatering and grouting processes can be recycled in situ and that all the bentonite waste would be disposed of.

204. As has already been determined above, the sensitivity for landfill in Ireland is considered to be 'very high'. The magnitude of the impact for construction waste would be from the disposal of 36,696 tonnes of inert and non-hazardous waste to landfill which would reduce the availability of landfill by the same quantity from a baseline of 2,787,251 tonnes of capacity.

205. The magnitude of impacts for hazardous construction waste is considered to be 'major' since any quantity of hazardous waste generated by the Proposed Project would decrease the national landfill void capacity baseline by >1% as there is no capacity available within Ireland. The significance of effect for hazardous waste generated with a 'very high' sensitivity and a 'major' magnitude of impact is Very Large which is Significant for the purposes of the EIAR prior to mitigation.

Table 19.26: Summary of Estimated Key Construction Waste Generated from the Proposed Project

Waste Type	Indicative Waste Classification	Total Waste (Tonnes)	Worst-Case		Comments
			Quantity of Construction Waste Reused, Recycled, Recovered (Tonnes) [70%]	Quantity of Construction Waste Sent for Disposal (Tonnes) [30%]	
Blinding concrete (150-300mm)	Inert C&D waste	566	396	170	Consideration would be given to reusing/recycling fresh ready-mixed concrete, as well as any washout water, in the batching of new concrete (as appropriate).
Brick and blockwork	Inert C&D waste	198	139	59	Segregated and sent for off-site recycling or reuse.
Concrete	Inert C&D waste	25,193	17,635	7,558	See blinding concrete above.
Granular material	Inert C&D waste	8,740	6,118	2,622	The waste granular material would be segregated and sent for off-site recycling.
Glass	Inert C&D waste	1	0	1	Waste glass would predominantly be segregated and sent for off-site recycling.
Kerbing	Inert C&D waste	31	21	9	Segregated and sent for off-site recycling or reuse.
Mortar	Inert C&D waste	24	17	7	The mixed C&D wastes would be segregated and sent for off-site recycling.
Sub-total: Inert C&D waste		**34,753**	**24,326**	**10,426**	**-**
Geotextiles – ground stabilising matting	Non-hazardous C&D waste	-	-	-	Assume that it would be cut to fit – so no wastage.
Ground anchorage	Non-hazardous C&D waste	2,910	2,037	873	If permanent, then there would be no wastage as they would stay in the ground. Temporary use presumed requiring 30% disposal.
Grout (bentonite)	Non-hazardous C&D waste	16,406	0	16,406	Assume that all bentonite waste is disposed of as it would have been recirculated throughout the process and would at some point reach the end of its life.
Hot rolled asphalt	Non-hazardous C&D waste	297	208	89	Consideration would be given to reusing fully recovered aggregate as a non-waste in capping, subbase, basic running surfaces and use as a feedstock in the manufacture of new road surfacing materials either on or off-site.
Insulation	Non-hazardous C&D waste	2	0	2	Waste insulation assumed to be landfilled at non-hazardous landfill.
Iron	Non-hazardous C&D waste	3,378	2,365	1,013	Iron wastes would be segregated and sent (or indeed sold) for off-site recycling.
Reinforcing steel	Non-hazardous C&D waste	6,570	4,599	1,971	Steel wastes would be segregated and sent (or indeed sold) for off-site recycling.

Waste Type	Indicative Waste Classification	Total Waste (Tonnes)	Worst-Case		Comments
			Quantity of Construction Waste Reused, Recycled, Recovered (Tonnes) [70%]	Quantity of Construction Waste Sent for Disposal (Tonnes) [30%]	
Plastics	Non-hazardous C&D waste (unless contaminated hazardous containers)	29	20	9	Consideration would be given to crushing hardened concrete on-site for use as a fully recovered aggregate on or off-site where it is not possible to use it in its current form, or as a waste aggregate if not conforming to the relevant specification.
Portal frames	Non-hazardous C&D waste	4,061	2,843	1,218	Assumed to be steel and recycled at appropriate facilities.
Steel piles	Non-hazardous C&D waste	-	-	-	Steel wastes would be segregated and sent (or indeed sold) for off-site recycling.
Steel pipe	Non-hazardous C&D waste	3,042	2,129	912	Steel wastes would be segregated and sent (or indeed sold) for off-site recycling.
Aluminium	Non-hazardous	587	411	176	Aluminium wastes would be segregated and sent (or indeed sold) for off-site recycling.
Construction worker waste	Non-hazardous	3,600	0	3,600	Assumes all workforce waste requires disposal.
Sub-total: Non-hazardous C&D waste		**40,883**	**14,612**	**26,270**	-
Total Inert and Non-Hazardous C&D Waste		**75,635**	**38,938**	**36,696**	-
Hazardous C&D waste (see Section 19.4.2.1)	Hazardous	734	367	367	Hazardous forecast based on 2% (BRE SmartWaste tool) of the C&D wastes for disposal (36,696 tonnes) being hazardous. Professional judgement has been applied which assumes 50% of hazardous waste can be recovered/recycled in Ireland based on existing recovery rates. Therefore 50% of hazardous waste requires disposal.
Total Hazardous C&D Waste		734	367	367	-

19.4.2.7 Contaminated and Hazardous Waste

206. It is anticipated that the majority of the C&D and excavated wastes generated by the Proposed Project would be primarily inert and non-hazardous waste. However, the Proposed Project route would pass by features with potential for contamination such as an old petrol station, and intersect some roads, and the construction activities at these features may generate very small quantities of hazardous materials such as contaminated soils, demolition wastes (potentially containing asbestos) and bitumen road planings containing coal tar. Hazardous C&D wastes may include hazardous materials discovered during demolition such as asbestos. In the absence of further details of the quantity of asbestos present within the old petrol station, it is estimated that a maximum of 5 tonnes could be produced from this building. This is based on a building with an area of approximately 70m^2 with typical construction methods which contain asbestos containing materials. The quantity of bitumen road planings is accounted for within the overall C&D and excavated wastes discussed above.

207. It is expected that the majority of hazardous waste generated during the construction of the Proposed Project would be treated, recycled or otherwise recovered off-site. This would be required to comply with the legislative and policy framework for waste; and to minimise the attendant environmental impact and cost of waste transport and disposal in accordance with the proximity principle.

208. The absence of hazardous waste landfill within Ireland forms the basis for the quantified assessment prior to mitigation for this aspect of the assessment. However, given that a large quantity of hazardous waste generated in Ireland is currently exported in the absence of domestic capacity to dispose of it, export is also a likely option for any hazardous wastes generated by the Proposed Project.

209. The disturbance of contaminated land during construction can lead to the release of pollutants into the air, ground or water through mobilisation of contaminants. No land contamination has been identified through desk-based studies or ground investigations carried out for previous iterations of the project (refer to Chapter 10 (Soils, Geology & Hydrogeology) for further detail on the ground investigation works carried out to date). Given the undeveloped nature of the lands on which the Proposed Project is located, the likelihood of encountering such contaminated land is low over the majority of the Construction Working Width.

210. All potentially contaminated wastes would need to be assessed and tested to ensure contamination is accurately understood and the presence of contaminants would define the potential routes for reuse, recovery, treatment or disposal. There is potential for contaminated wastes to be defined as having hazardous status, therefore requiring management, treatment and disposal under the relevant legislation and restrictions associated with these wastes.

211. Currently identified sources of contaminated and hazardous wastes include:

- Where there is a requirement to cross roads by open trenching for tunnelling of the pipe and for the underground cable sections, waste road surfacing would be created (refer to Chapter 5: Construction & Commissioning and Chapter 18: Material Assets, for further information on crossings). This material contains bitumen which can be classified as hazardous waste if it contains coal tar (generally used in roads laid before the 1980s). It is currently unknown how many of these road crossings would contain such material, and testing would be required prior to disposal or reuse of any of this material to determine the quantities of hazardous waste
- Hazardous wastes potentially generated in the proposed Construction Compounds and Pipe Storage Depots where materials, plant and equipment would be stored during the Construction Phase
- Decommissioning of the former petrol station on the R445 and excavated wastes from this location to provide for an access road to the WTP. There is risk that some of the excavated waste would be contaminated with or would contain hazardous substances from the in situ disused pumps and an underground storage tank. Although no oil or oil staining was noted, as discussed in Chapter 10 (Soils, Geology & Hydrogeology), some of surrounding soils could potentially be contaminated with hydrocarbons and would require excavation and disposal via suitable facilities
- Landfilled wastes – during the Proposed Project options appraisal stage the existence of existing or retired landfills was considered, and none were identified. Ground investigation undertaken to inform previous iterations of the project and impacts on features such as soils and geology has also not identified any presence of landfilled wastes in the footprint of the Proposed Project. However, the presence of retired, historic (pre-landfilling records) or illegal landfill cannot be completely ruled out due to the size of the Proposed Project and extent of ground investigations to date. If such wastes are discovered during construction, these would require analysis and categorisation for appropriate management to be proposed according to the classification of the waste.

212. In addition to these sources, the general construction activities would also produce small quantities of hazardous waste. These tend to consist of waste from plant maintenance activities such as waste oils, oil-contaminated filters, brake fluids and other such materials. There may also be fuel or other chemical residues left in drums or containers utilised for certain construction processes which would result in the containers being designated as hazardous.

213. To represent a worst case for quantitative assessment, a reasonable assumption of 2% of total wastes arising is assumed to be classified for hazardous management. This is based on industry-standard benchmarking data as reported by BRE SmartWaste tool (2013), using an average of all sector infrastructure projects. The SmartWaste tool does provide a benchmark figure of 10% for 'Water and Utility' sector infrastructure projects; however, this is considered unreasonable given the limited amount of contaminated and hazardous wastes currently identified for the Proposed Project. Although not explicit within the literature associated with the SmartWaste tool, it is thought this figure is likely to represent water and utility projects with major decommissioning phases so not directly comparable to the Proposed Project which is predominantly new build on virgin land. Table 19.27 provides the assumed hazardous waste arising and the assumed management based on this worst-case assumption.

214. The total quantity of hazardous waste forecast to be generated by the Proposed Project is 37,874 tonnes of which 743 tonnes would require disposal to landfill. 37,131 tonnes of waste would be managed and recovered or recycled via existing waste management facilities in Ireland, which form part of a system that minimises the magnitude of adverse impacts by diverting waste away from the sensitive receptor, landfill capacity. As discussed above, the sensitivity for landfill in Ireland is considered to be 'very high' and the magnitude from hazardous waste disposal is classified as 'major'. This is because the impact of the disposal of 743 tonnes of waste would decrease the national landfill void capacity baseline by >1% as there is no capacity available within Ireland. The significance of effect for hazardous waste generated with a 'very high' sensitivity and a 'major' magnitude of impact is Very Large which is Significant for the purposes of the EIAR prior to mitigation.

Table 19.27: Summary of Estimated Hazardous Waste Generated from the Proposed Project

Indicative Waste Classification	Waste Type	Total Tonnage	Quantity of Hazardous Waste for Treatment (tonnes)	Quantity of Hazardous Waste for Disposal (tonnes)	Indicative Management Option(s)
Hazardous	Contaminated made ground (from excavated waste) and contaminated imported rocks and stone	32,539	32,214	325	In Ireland since 2022, approximately 99% of contaminated soils have been sent for treatment (Section 19.3.2.1).
Hazardous	Contaminated peat (from excavated waste)	4,596	4,550	46	In Ireland since 2022, approximately 99% of contaminated soils have been sent for treatment (Section 19.3.2.1).
Hazardous	C&D waste	734	367	367	Total tonnage derived from Table 19.26, based on 2% (BRE SmartWaste tool) of total C&D wastes for disposal (36,696 tonnes). Ireland currently treats approximately 50% of the hazardous waste (excluding soils) for recovery or recycling. Ireland's hazardous waste is treated either on-site at the industrial facility where the waste was generated (under conditions of EPA licence), off-site at hazardous waste treatment facilities in Ireland, or is exported for recovery or disposal at facilities in other countries.

Indicative Waste Classification	Waste Type	Total Tonnage	Quantity of Hazardous Waste for Treatment (tonnes)	Quantity of Hazardous Waste for Disposal (tonnes)	Indicative Management Option(s)
Hazardous	Asbestos	5	0	5	The presence of asbestos waste has been estimated at 5 tonnes as a result of the demolished petrol station. Specialist contractors would be appointed to remove asbestos from the sites where it is identified. There are two sites in Ireland that are able to accept asbestos. It is also likely that asbestos waste could be exported for disposal outside of Ireland.
Total		**37,874**	**37,131**	**743**	-

19.4.2.8 Summary of Construction and Excavation Phase Wastes

215. Table 19.28 provides a summary of the estimated quantity of C&D and excavated waste that is classified as inert, non-hazardous and hazardous for the IEMA-based assessment, and the waste types associated with each category. Based on this worst case, prior to mitigation scenario, the impacts of waste generation for the Proposed Project would be a reduction in landfill space for the disposal of 1,855,577 tonnes of inert and non-hazardous waste and a reduction in hazardous waste landfill space for the disposal of 743 tonnes of hazardous waste, over the five-year period of the Construction Phase.

216. The total quantity of inert and non-hazardous C&D and excavated waste forecast to be generated by the Proposed Project is 1,855,577 tonnes. This would deplete the remaining landfill void capacity by an equivalent quantity over the course of the Construction Phase of the Proposed Project, which is from 2028 to 2032. Assuming that these wastes are required to be disposed of at a rate similar to the estimate of the creation of the surplus excavated material for the pipelines, as per Table 5.26 of Chapter 5 (Construction & Commissioning), the waste would not be generated evenly over the five-year period of construction. Instead approximately 0% would be generated in Year 1, 40.9% in Year 2, 39.4% in Year 3, 19.7% in Year 4 and 0% in Year 5. Therefore, the greatest volume of waste is forecast to be generated in Year 2 when 760,202 would require disposal and this would reduce the available landfill volume of 1,470,921 tonnes by 51.68%. This would classify the magnitude of the impact as ‘very high’ because it would reduce the available landfill void capacity very considerably, by >10%. As discussed above, the sensitivity for landfill in Ireland is considered to be ‘very high’.

217. The significance of effect for inert and non-hazardous C&D and excavated waste with a ‘very high’ sensitivity and a ‘major’ magnitude of impact is Very Large which is Significant for the purposes of the EIAR prior to mitigation.

Table 19.28: Summary of Estimated Inert and Non-Hazardous Construction, Demolition and Excavation Wastes Generated from the Proposed Project

Indicative Waste Classification	Waste Types	Total Tonnage
Non-hazardous (excavated)	• Excavated peat.	225,204
Inert (C&D and excavated)	• Excavated soil and stone • Excavated rock • Imported rocks and stone from Temporary Construction Roads • Inert C&D waste (blinding concrete, brick and block work, concrete, granular material, glass, kerbing and mortar).	1,604,629
Non-hazardous (C&D)	Non-hazardous C&D waste (Ground anchorage, grout (bentonite) drilling waste, asphalt (unless testing hazardous), insulation, iron, reinforcing steel, plastics, portal frames, steel piles, steel pipes, and construction worker waste)	25,744
	Total	**1,855,577**

19.4.3 Operational Phase

19.4.3.1 Consumption of Materials During Operational Phase

218. The quantities of key materials likely to be consumed during the Operational Phase of the Proposed Project are estimated in Table 19.29. The consumption of materials is likely to be greatest within the WTP element of the Proposed Project.

Table 19.29: Summary of Estimated Materials Consumption from Representative Single Operational Year (2033) [8]

Material Type	Normal Average Year Annual Consumption (Tonnes)
Sulphuric acid	187
Coagulant	15,620
Polyelectrolyte	19
Caustic soda	1,993
Hydrofluorosilicic acid	57
On Site Electro Chlorination salt	1,139
Granular Activated Carbon (GAC)	1,544*
Flocculant for sludge treatment	18
Sodium hypochlorite (liquid)	163
Total	**20,720**

219. Operational Phase materials are all standard industry chemicals that are essential in controlling and maintaining operational process. The use of recycled materials or materials comprising sustainability features or benefits would be considered during the procurement of Operational Phase material supplies. Procurement will be subject to internal requirements and could be subject to future changes based on factors including economic, operational resiliency and external market forces to determine the exact material sourced. However, there are likely to be limited opportunities to substitute operational materials for other materials comprising waste products or recycled materials due to the specific requirements for specific applications and the quality standards that are required from the outputs.

[8] The Proposed Project is designed to abstract a maximum of 300Mld, however, this is the maximum that would be abstracted during periods of peak demand. The quantities of chemicals that would be used during operation, and water treatment residual sludge that would be generated, is based on 154Mld as this represents a normal average year of operation over the lifetime of the Proposed Project and is therefore appropriate to assess the likely significant effects. While quantities would be greater at 300Mld, this increase would not change to likely significant effects reported in this chapter.

220. The Operational Phase material consumption assessment is based on the IEMA guidance (IEMA 2020) and has been derived on the certainty of supply of the key primary materials. Table 19.29 indicates that the key material which would be required for the Operational Phase of the Proposed Project is coagulant, which is used to remove solids from the raw water during the treatment process at the WTP and accounts for approximately 75% of material consumption during the Operational Phase. Lesser amounts of salt from the On Site Electro Chlorination system, used in the disinfection process and caustic soda, used for pH correction would also be required. Fluorination (using hydrofluorosilicic acid) and chlorination (using chlorine generated from the On Site Electro Chlorination system) of the water would be required, although total consumption of both materials is expected to be modest given the low concentrations in the water supply network. GAC filter material used within the treatment process would require annual replacement and would not require constant sourcing but is the second greatest (by weight) of raw materials consumed.

221. Desk-based reviews of the market conditions do not identify any known supply or stock issues for Operational Phase resources (materials) and are classified to have a 'low' sensitivity. Materials are used by the water industry and other industrial sectors on a national basis and supplied on an international basis. In particular for the supply of coagulant, shortages in the supply chain are unlikely given the number of manufacturing sites known within Europe and their capacity to produce large volumes. Similarly, GAC is sourced from a wide range of different raw materials for supply to a number of end-markets and is generally free from known supply issues. Hydrofluorosilicic acid is a common fluoridation treatment chemical and supply of this raw material by international suppliers is generally free from known issues.

222. To treat the raw water, additional key water treatment chemicals already supplied to Uisce Éireann may be needed each year, from the current market supply to the whole country. As described in Section 19.3.3 the supplier markets of water treatment chemicals are assumed to have capacity to adjust to meet the new levels of demand, or alternatively, economic forces may result in new suppliers entering into the market to supply additional chemicals. Where the consumption of no individual material type is equal to or greater than 1% by volume of the national baseline availability, the magnitude of the change is considered to be 'negligible'.

223. The significance of effect for operational materials with a 'low' sensitivity and a 'negligible' magnitude of impact is 'Neutral or Slight' which is Not Significant for the purposes of the EIAR prior to mitigation.

19.4.3.2 Operational Phase Waste Generation and Management

224. Once construction of the Proposed Project has been completed, the majority of waste generated would be at the newly commissioned WTP. This would be in the form of residues resulting from the water treatment processes. There would also be small quantities of both hazardous and non-hazardous waste arising at the RWI&PS, BPT, BPS, FCV and the TPR, such as mixed municipal waste, recyclables and waste associated with maintenance activities on the Proposed Project elements.

19.4.3.2.1 Water Treatment Residuals

225. The largest operational waste stream identified resulting from the Proposed Project would be residual water sludge from the operation of the WTP. The water treatment process creates a residual water sludge, as the coagulant chemical binds up the organic material into insoluble form, which is then removed from the settlement tanks. Further information is provided in Chapter 4 (Proposed Project Description) on the water treatment process and residual management. The residues which would be produced would include:

- Coagulation sludges produced by the coagulation and settling of natural turbidity
- Chemical residues such as residual polyelectrolyte.

226. Residual water sludges produced by the treatment processes are non-hazardous and classified under LoW code 19 09 '*wastes from the preparation of water intended for human consumption or water for industrial use*'. These would be collected and dewatered on-site. The resulting material would be handled in adherence to the Waste Management Act 1996, as amended. It is estimated that under normal demand conditions (154Mld) the treatment plant would produce up to 18,560m^3 of dewatered sludge cake per annum (20,416 tonnes per annum at assumed 1.1 tonnes per m^3). The sludge cake would be stored in two covered sludge storage buildings designed to store up to six months' output.

227. As the residual water sludge is non-hazardous waste, if reuse or recovery of the residual water sludge is not possible, the sludges would be required to be disposed of within non-hazardous landfill, and this forms the basis for the worst-case assessment, following the IEMA guidance (IEMA 2020). Currently, Uisce Éireann is sending 90% of water sludge from water treatment to sustainable outlets with the remaining 10% being recovered and used for landfill capping material. Operational waste impact is based on the comparison of the estimated quantity arising for the operational year (20,416 tonnes) compared to non-hazardous landfill capacity. Table 19.13 provides an estimate of the inert and non-hazardous landfill capacity during the operational year (2033). However, it is anticipated the residual water sludge would be managed in accordance with Uisce Éireann's residual management strategy with a circular economy approach to be adopted in so far as is practicable to minimise the waste disposed of to landfill to a maximum of 10% of the total generated. As outlined in Section 19.2.3.7, Uisce Éireann is looking to progress a number of circular economy options for the recovery/reuse of WTP sludge. The operational residual water sludge from the Proposed Project would be recovered/reused through one of those options if available once the WTP commences operation. In the absence of these emerging recovery options being available at the time, the residual water sludge would be managed in accordance with the waste hierarchy and relevant legislation at one or more of the existing (or future regulated) facilities detailed in Section 19.3.4.

19.4.3.2.2 Filtrate from Microfiltration Process

228. There would be waste associated with the RWI&PS microfiltration process, which may contain invasive species debris that has been filtered out of the incoming raw water. The design of the filtration process is such to allow control of aquatic invasive species such as zebra mussel and Asian clam. After filtration, the washwater is conveyed to an invasive species debris retention tank; the debris would be allowed to settle out in this tank before being removed. It is estimated that the mass of solids settled in the invasive species debris retention tank would be approximately 7.3 tonnes per annum. The solids would require appropriate disposal within suitably licensed waste management facilities within Ireland. Please refer to Chapter 4 (Proposed Project Description) and Chapter 8 (Biodiversity) for further detail on invasive species control measures.

19.4.3.2.3 Washwater from the Treatment Process

229. Washwater would be generated as a result of a number of WTP processes. Please refer to Chapter 4 (Proposed Project Description) for further detail on the water treatment process and washwaters from the treatment process. Washwater would be generated from the following sources:

- Washwater from rapid gravity filters
- Filter 'run-to-waste' water
- Supernatant returned from sludge thickening
- Expressate from sludge dewatering process.

230. It is not proposed to discharge any washwater from the treatment process back to the Lower River Shannon Special Area of Conservation due to its environmental sensitivity. Instead, this washwater would be recirculated through the WTP, and therefore is not assessed as waste.

19.4.3.2.4 Hazardous Waste

231. Aside from the residuals generated by the proposed WTP processes, chemicals would be utilised for the different treatment processes. These processes include:

- Pre-conditioning of the water
- Coagulant dosing and mixing
- Disinfection using chlorination
- Post-treatment pH correction.

232. It is assumed that no chemical packaging wastes would be generated from the bulk delivery of the hazardous materials (sulphuric acid, coagulant, caustic soda and hydrofluorosilicic acid) that would be delivered into bulk storage tanks within the WTP. Waste associated with these chemicals (expired chemicals) may be classified as hazardous waste and would therefore require appropriate storage, handling, treatment or disposal. However, it is not anticipated that any expired chemicals would be generated within the first year of operation given that chemical storage tanks would typically hold approximately 40 days' storage and therefore require regular replenishment.

19.4.3.2.5 Other Waste

233. A number of general waste streams would be produced from day-to-day operations of different elements of the Proposed Project. Such waste would include mixed municipal waste (LoW 20 03 01), mixed dry recyclables (LoW 20 03 01 or 15 01 06 where only mixed packaging) and food waste from offices and canteen facilities (LoW 20 01 08). It is estimated that the general waste quantities to be produced per annum at the WTP would be approximately 20,000 litres of mixed municipal waste and 19,000 litres of mixed dry recyclables based on the quantities produced by Ballymore Eustace WTP. At a density conversion factor of 0.26 kilograms/litre, this equates to approximately 10,140 kilograms or 10.14 tonnes per annum. These wastes would be managed in accordance with the waste hierarchy and relevant legislation.

234. Small volumes of wastewater would be generated from welfare facilities located within parts of the Proposed Project. The welfare facilities at the BPS, BPT, the RWI&PS and the WTP would each have an associated wastewater tank on-site which would be regularly emptied via tanker to a licensed wastewater treatment plant. The TPR would utilise the welfare facilities at the existing Control Building on the site. The Construction Compounds and Pipe Storage Depots would utilise holding tanks which would be regularly emptied via tanker to a licensed wastewater treatment plant. Impacts of foul water are considered in Chapter 9 (Water).

235. Small quantities of waste would be generated from occasional maintenance and repair of the power line associated with the proposed 38 kV Uprate Works, but less than is likely to be expected from maintenance of the existing infrastructure.

19.4.3.3 Summary of Operational Phase Waste Impacts

236. Table 19.30 provides a summary of the estimated quantity of operational wastes that could be produced during a representative operational year that is classified as non-hazardous and hazardous for the IEMA-based assessment. Should the Proposed Project proceed as planned, it would have the potential to impact on available waste management capacities within the surrounding area. Based on this worst case, prior to mitigation scenario, the impacts of Operational Phase waste generation would be a reduction in landfill capacity for the disposal of 2,058 tonnes of non-hazardous waste. 2,058 tonnes of non-hazardous waste includes 10% of the WTP residual water sludge (2,041 tonnes), solid waste from the invasive species retention tank (7.30 tonnes) and all of the operational workforce wastes (10.14 tonnes). Small volumes of hazardous waste are also likely to be generated but have not been quantified.

237. As previously discussed, the sensitivity for landfill capacity in Ireland is considered to be 'very high'. The disposal to landfill of 2,058 tonnes of waste (which would include residual waste sludge, workforce waste and solid waste from the invasive species retention tank) would decrease the national landfill void capacity baseline by an equivalent quantity. The impact of 2,058 tonnes of waste on the forecast baseline in 2033 (882,105 tonnes) is a reduction 0.23%. This would be an impact of 'negligible' magnitude.

238. The significance of effect for non-hazardous operational wastes with a 'very high' sensitivity and a 'negligible' magnitude of impact is Slight which is Not Significant for the purposes of the EIAR prior to mitigation.

Table 19.30: Summary of Estimated Operational Wastes Generated from the Proposed Project for Representative Single Operational Year (2033)

Indicative Waste Classification	Waste Types	Annual Tonnage (2033 Operational Year)	Assessment Criteria
Non-hazardous	WTP residual water sludge Operational workforce wastes Solid waste from invasive species retention tank	20,416 tonnes 10.14 tonnes 7.30 tonnes	Options for recovery and/or recycling of WTP residual water sludge being investigated and promoted through Uisce Éireann's adoption of circular economy principles. Currently 90% of sludge from water treatment is recovered/reused within sustainable outlets with only 10% requiring disposal as non-hazardous waste. The worst-case scenario is that this performance remains the same and the current trend for 10% disposal of residual water sludge as waste to landfill continues, resulting in 2,041 tonnes for disposal. 10 tonnes of workforce wastes are assumed to require disposal for the worst case scenario. 7 tonnes of solid waste from the invasive species retention tank are assumed to require disposal for the worst case scenario.
Hazardous	Excess hazardous chemicals associated with operations, oils or lubricants associated with operations	0 tonnes	Recycled, or treated and recycled where possible.

19.4.4 Summary of Significant Effects

239. The significance of potential effects has been assessed and are summarised in Table 19.31, Table 19.32. In the absence of mitigation measures, construction materials, operational materials and operational waste effects are Slight and Not Significant for the purposes of the EIAR but the assessment for construction waste (non-hazardous and inert) results in a Very Large significance of effect that is Significant for the purposes of the EIAR and a Very Large significance of effect that is Significant for the purposes of the EIAR for construction waste (hazardous waste).

Table 19.31: Summary of Construction Materials Significant Effects Prior to Mitigation

Element	Description of Potential Sensitivity of Receptors/Magnitude of Impacts	Significance Criteria	Assessment Summary	Significance of Effect
Materials	The sensitivity of construction materials relates to markets, stocks and supplies of key materials required for the Proposed Project. The key materials are identified as aggregates, concrete and steel. The baseline assessment provides indication that the national supplies of aggregates (Table 19.9) and concrete (Table 19.10) have been generally increasing since 2013, to meet market demands, and are sustainable for the foreseeable future. However, aggregates such as sand (particularly from terrestrial sources) are known to be in short supply in the Eastern and Midlands Regions. On this basis aggregates and concrete markets have been determined to be medium sensitivity based on IEMA classifications. It is likely that the Proposed Project would rely (at least to some degree) on global markets for steel supply. Global steel supplies have recovered since the initial depression caused by the Coronavirus pandemic and are considered to be increasing over the short term. However, future trends for global markets hold large uncertainties and are characterised by constant changes as demand and production increase and decrease in response to each, as such a medium sensitivity is also determined for steel supply.	**Sensitivity of receptor**		**Significance of effect: Slight** **Significant for the purposes of EIAR: No**
		On balance, the key materials required for construction of the Proposed Project are forecast to suffer from some potential issues regarding supply and stock.	**Sensitivity of the receptor: Medium**	
	The method for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of materials consumption on the baseline market capacity. In accordance with IEMA classification guidance, aggregates have been used as the proxy indicator due to the complexities in assessment of global markets and availability of steel. As aggregates comprise as much as 60% to 80% of a typical concrete mix and 95% for asphalt, the quantity of aggregates used on the Proposed Project is estimated at approximately 1,016,810 tonnes. When these figures are compared to the aggregate production in Ireland (based on 2022 data), it equates to 2.75% of the national baseline availability (37Mt).	**Magnitude of impact**		
		The assessment is made by determining whether, through the Proposed Project, the consumption of one or more materials is between 1-5% by volume of the regional baseline availability.	**Magnitude of impact: Minor**	

Table 19.32: Summary of Construction Wastes Significant Effects Prior to Mitigation

<table>
<tr><th>Element</th><th>Description of Potential Sensitivity of Receptors/Magnitude of Impacts</th><th>Significance Criteria</th><th>Assessment Summary</th><th>Significance of Effect</th></tr>
<tr><td rowspan="4">Waste (inert and non-hazardous waste)</td><td rowspan="2">The sensitivity of waste relates to the availability of national landfill void capacity. The volume of waste anticipated to be generated nationally has been compared to the remaining inert and non-hazardous landfill void capacity. The future landfill capacity has been calculated and detailed in Section 19.3.2.3 analysing the available data from the EPA. Based on the anticipated construction years of 2028–2032 it has been estimated on average over the five-year Construction Phase that the inert and non-hazardous landfill void capacity is expected to reduce by >10% as a result of the waste forecast (without the Proposed Project).</td><td>Sensitivity of receptor</td><td></td><td rowspan="4">Significance of effect: Very Large

Significant for the purposes of EIAR: Yes</td></tr>
<tr><td>Across the Construction Phase the baseline/future baseline (without the Proposed Project) of national inert and non-hazardous waste landfill void capacity is expected to reduce very considerably by >10% as a result of wastes forecast.</td><td>Sensitivity of the receptor: Very High</td></tr>
<tr><td rowspan="2">The magnitude of impact from waste has been assessed by determining the percentage of the remaining landfill void capacity (Table 19.13) that would be depleted by the anticipated waste during the construction of the Proposed Project. Table 19.28 provides the estimates of C&D and excavated wastes anticipated to be generated by the Proposed Project for disposal. Under the worst-case scenario (assuming excavated materials, excavated peat and imported rocks and stone all become wastes and require disposal, and 30% of C&D waste disposal) the Proposed Project is predicted to generate 1,855,577 tonnes for disposal to inert and non-hazardous landfill. Assuming that these wastes are required to be disposed of at a rate of 0% in Year 1, 40.9% in Year 2, 39.4% in Year 3, 19.7% in Year 4 and 0% in Year 5 during the five-year Construction Phase, that equates to a reduction in national inert and non-hazardous landfill void capacity of between approximately 32.12% and 56.54% as per:
<table>
<tr><th>Project Year</th><th>Predicted Landfill Void Capacity</th><th>Waste disposal to landfill</th><th>% change</th></tr>
<tr><td>2028 (Year 1)</td><td>1,671,501</td><td>0</td><td>n/a</td></tr>
<tr><td>2029 (Year 2)</td><td>1,470,921</td><td>757,807</td><td>-51.52%</td></tr>
<tr><td>2030 (Year 3)</td><td>1,294,411</td><td>731,847</td><td>-56.54%</td></tr>
<tr><td>2031 (Year 4)</td><td>1,139,081</td><td>365,924</td><td>-32.12%</td></tr>
<tr><td>2032 (Year 5)</td><td>1,002,392</td><td>0</td><td>n/a</td></tr>
</table></td><td>Magnitude of impact</td><td></td></tr>
<tr><td>Waste generated by the Proposed Project would reduce national landfill void capacity baseline by >10% in three of the five construction years.</td><td>Magnitude of impact: Major</td></tr>
</table>

Element	Description of Potential Sensitivity of Receptors/Magnitude of Impacts	Significance Criteria	Assessment Summary	Significance of Effect
Waste (hazardous waste)	The sensitivity of waste relates to the availability of national hazardous landfill void capacity. There are no commercial hazardous waste landfills in Ireland. Thus, any hazardous waste generated in Ireland destined for landfill is exported. Historically, the majority of Ireland's hazardous waste was exported for disposal or treatment although this has reduced from 75% in 2019 to 50% in 2023. The main export market was the UK, although wastes are also exported to the Netherlands, Germany and Belgium and other European countries. This reflects the fact that Ireland does not have the range of facilities to deal with all of the hazardous waste generated. Striving for more self-sufficiency nationally in the management of Ireland's hazardous waste is a key action of the National Hazardous Waste Management Plan (EPA 2021b).	**Sensitivity of receptor**		**Significance of effect: Very Large** **Significant for the purposes of EIAR: Yes**
		Across the Construction Phase the baseline/future baseline (without the Proposed Project) national hazardous waste landfill void capacity is already known to be unavailable or would require new capacity to be put in place to meet the forecast demands.	**Sensitivity of the receptor: Very High**	
	The magnitude of impact from waste has been assessed by determining the percentage of the remaining landfill void capacity that would be depleted by the anticipated waste during the construction of the Proposed Project. However, there is no commercial hazardous waste landfill capacity in Ireland and any hazardous waste generated, including excavated waste, peat waste, imported rocks and stone and C&D waste, during the construction of the Proposed Project requiring disposal would require new national capacity to be put in place to meet demands as the projected 743 tonnes of hazardous waste would exceed the total available hazardous waste landfill availability. Based on this, the hazardous landfill void capacity in Ireland would be reduced by greater than 1% as a result of the hazardous waste forecast.	**Magnitude of impact**		
		Waste generated by the development would reduce national landfill void capacity baseline by >1% end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.	**Magnitude of impact: Major**	

Table 19.33: Summary of Operational Materials Significant Effects Prior to Mitigation

Element	Description of Potential Sensitivity of Receptors/Magnitude of Impacts	Significance Criteria	Assessment Summary	Significance of Effect
Materials	The sensitivity of materials relates to markets, stocks and supplies of key operational materials required for the Proposed Project, which are identified as coagulant, On Site Electro Chlorination salt and caustic soda amongst others. The baseline assessment provides an indication that there are national supplies of these materials currently being used by a number of users including water treatment, wastewater treatment, industry and agriculture, with capacity to meet market demands. Future trends are uncertain but international and national markets are likely to respond to changes in demand and increase supply to be generally free from supply issues. Supplies are therefore assessed to be of low sensitivity.	**Sensitivity of receptor**		**Significance of effect: Neutral or Slight** **Significant for the purposes of EIAR: No**
		On balance, the key materials required for operation of the Proposed Project are forecast to be generally free from known issues regarding supply and stock.	**Sensitivity of the receptor: Low**	
	The method for assessing the magnitude of impact from operational materials comprises a percentage-based approach that determines the influence of materials consumption on the baseline market capacity. As described in Section 19.3.3 the supplier markets of water treatment chemicals are assumed to have capacity to adjust to meet the new levels of demand, or alternatively, economic forces may result in new suppliers entering into the market to supply additional chemicals. This assessment does not take into account improvements in the efficiency of the new water treatment infrastructure nor that the existing national baseline would be supplying the same chemicals used in water treatment, to other industrial uses.	**Magnitude of impact**		
		The assessment is made by determining whether, through the Proposed Project, the consumption of no individual material type is equal to or greater than 1% by volume of the national baseline availability.	**Magnitude of Impact: Negligible**	

Table 19.34: Summary of Operational Waste Significant Effects Prior to Mitigation

<table>
<tr><th>Element</th><th>Description of Potential Sensitivity of Receptors/Magnitude of Impacts</th><th>Significance Criteria</th><th>Assessment Summary</th><th>Significance of Effect</th></tr>
<tr><td rowspan="4">Operational waste (non-hazardous waste)</td><td rowspan="2">The sensitivity of waste relates to the availability of national landfill void capacity. The volume of waste anticipated to be generated nationally has been compared to the remaining inert and non-hazardous landfill void capacity projected to 2033 (the assessed operational year). The future landfill capacity has been calculated and detailed in Section 19.3.2.3, analysing the available data from the EPA. Based on the selected operational year of 2033, it has been determined that non-hazardous landfill void capacity is expected to reduce by >10% as a result of the waste forecast (without the Proposed Project).</td><td colspan="2">Sensitivity of receptor</td><td rowspan="4">Significance of effect: Slight

Significant for the purposes of EIAR: No</td></tr>
<tr><td>During the assessed operational year (2033) the national inert and non-hazardous waste landfill void capacity is expected to reduce considerably by >10% as a result of wastes forecast.</td><td>Sensitivity of the receptor: Very High</td></tr>
<tr><td rowspan="2">The magnitude of impact from waste has been assessed by determining the percentage of the remaining non-hazardous landfill void capacity that would be depleted by the anticipated operational wastes in the selected operational year of 2033.
Table 19.30 provides the estimates of non-hazardous operational wastes anticipated to be generated by the Proposed Project in 2033, consisting of 10% of WTP residual water sludge that would require disposal to landfill and 100% of operational workforce wastes and solids from the invasive retention tank would require disposal to landfill. This is approximately 2,058 tonnes and 0.23% of the estimated remaining inert and non-hazardous landfill capacity in 2033 (882,105 tonnes).

<table><tr><th>Operational Year</th><th>Predicted Landfill Void Capacity</th><th>Waste disposal to landfill</th><th>% change</th></tr><tr><td>2033</td><td>882,105</td><td>2,058</td><td>-0.23%</td></tr></table></td><td colspan="2">Magnitude of impact</td></tr>
<tr><td>Waste generated by the development would reduce national landfill void capacity baseline by <1%.</td><td>Magnitude of impact: Negligible</td></tr>
</table>

19.5 Mitigation and Monitoring Measures

240. Mitigation measures, as set out in the following sections, aim to minimise the impact to the environment of the Proposed Project through good material resource efficiency practices. All materials consumed and waste generated by the Proposed Project will be managed in accordance with circular economy principles and the waste hierarchy, with prevention, reuse, recycling and other recovery methods favoured over disposal. The preferable outcome from an environmental, transportation and resource efficiency perspective is to prevent the generation of waste and maximise the reuse of material generated from the Proposed Project.

19.5.1 Embedded Mitigation

241. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the Proposed Project design. This is referred to as embedded (or design) mitigation. Embedded mitigation is inherent to the Proposed Project design, and forms part of the project description and construction methodology described in Chapters 4 (Proposed Project Description) and 5 (Construction & Commissioning) of the EIAR. As such, embedded mitigation is included in the assessment of pre-mitigation effects in Section 19.4. Chapter 3 (Consideration of Reasonable Alternatives) of the EIAR details the reasonable alternatives that have been included throughout the design development of the Proposed Project, and the environmental factors which have influenced the decision making.

242. Embedded mitigations within the design have included option selection and the refinement of detailed designs for the infrastructure and for the route of the pipeline to reduce the total volumes of excavated material generated and maximising the reuse within the Proposed Project to avoid the generation of surplus materials.

243. The choice of pipeline material and the diameter of the pipeline has reduced the volume of excavated material produced on the route of the RWRMs and Treated Water Pipelines. Changes to the route of the pipeline, in particular the Treated Water Pipeline from the BPT to the TPR, have reduced the volume of excavated materials and surplus materials generated from the current design (compared with previous versions of the design). The construction methods employed also allow for the re-use of topsoil and limit the amount of surplus material generated from excavations when employing open-cut methods.

244. Where surplus excavated material is generated during the construction of the Proposed Project, suitable materials will be re-used on-site or transferred for use on other elements of the Proposed Project, therefore both avoiding the generation of waste material and reducing the quantities of raw materials imported to construction sites.

245. Wastes generated from the Construction Phase of the Proposed Project will be managed in accordance with the requirements of the Waste Framework Directive and achieve the minimum targets specified. This requires that by 2020, a minimum of 70% (by weight) of the C&D waste generated is reused, recycled or subject to material recovery.

19.5.2 Specific Mitigation and Monitoring Measures

246. Specific mitigation measures are proposed to prevent or reduce significant adverse effects. Where appropriate, consideration has been given to the appropriateness of monitoring measures, the purpose of which is to check that the mitigation measures required to prevent or reduce significant adverse effects are delivered and perform as intended, in accordance with the requirements of the EIA Directive.

247. Mitigation and monitoring measures for resources and waste are described below and are included in the CEMP, which has been produced to support this EIAR (refer to Appendix A5.1), and the CWBPMP (Annex C of the CEMP).

19.5.2.1 Construction Phase

248. The appointed Contractor will be responsible for sourcing materials for the Construction Phase of the Proposed Project, and typically they will look to use local suppliers, but ultimately the choice of supplier is likely to be driven by availability of materials and cost and will not be confined on a regional basis. The appointed Contractor will seek to reuse materials on-site to minimise the attendant environmental impact and cost of waste transport and support the economic wellbeing of the local communities in line with the proximity principle.

249. The use of recycled materials in place of primary materials will be included during the Proposed Project design development and will become more prominent as Uisce Éireann transitions to a circular economy approach. The use of recycled materials will contribute towards attainment of Sustainable Development Goal 12 which is aimed at ensuring sustainable consumption and production patterns. This can be achieved by doing more and better with less and by increasing resource efficiency. One of the main areas will be the choice of whether to use primary or secondary or recycled aggregates, or a combinations of these materials. This decision will ultimately be made by the appointed Contractor after considering a combination of factors, such as sources, specification, production and transport of available materials.

250. Both secondary and recycled aggregates can be used as alternatives to primary aggregate and have a number of benefits, including the reuse of secondary and waste materials and reducing the impact of primary extraction. Secondary aggregates are typically by-products of industrial processes. These can be sub-divided into manufactured and natural aggregates, depending on their source and can include materials such as pulverised fuel ash, ground granulated blast furnace slag, incinerator bottom ash and recycled glass. Whereas, recycled aggregates are typically derived from reprocessing inert materials previously used in construction, e.g. road planings or crushed concrete.

19.5.2.1.1 Designing for Circular Economy

251. Uisce Éireann is moving towards a circular economy model and sustainable development aimed at doing more and better with less through responsible consumption and production patterns. The circular economy model is in direct contrast to the current linear model of ‘take, make, consume, dispose’, with landfill being the primary end point.

252. The Proposed Project will continue to be designed and constructed to be resource efficient, minimising the use of materials, energy and other resources in order to reduce environmental impacts and costs; and reflect a circular approach to the use of materials and Sustainable Development Goal 12. Throughout the construction of the Proposed Project the aim will be to construct solutions that seek to minimise the consumption of materials and the generation of waste throughout the lifecycle of the Proposed Project.

253. Five construction principles will be implemented throughout construction of the Proposed Project to minimise consumption of resources and generation of waste.

254. The five key principles are:

- Design for reuse and recovery: identifying, securing and using materials that already exist on-site, or can be sourced from other projects. The Proposed Project will use Regulation 27 (by-product) or Regulation 28 (end-of-waste) mechanisms where possible to reuse or recover materials off-site and has set a commitment of zero recoverable waste to landfill

- Design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content (e.g. using material from low-carbon or sustainable sources)
- Design for off-site construction: maximising the use of pre-fabricated structure and components, encouraging a process of assembly rather than construction
- Design for waste-efficient procurement: identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard (e.g. consider opportunities for materials to be returned to the supplier for future reuse (e.g. steel and concrete elements)
- Design for the future (deconstruction and flexibility): identifying how materials can be designed to be more easily adapted over an asset lifetime and how deconstruction and demounting of elements can be maximised at end of first life.

19.5.2.1.2 Applying the Waste Hierarchy as a Priority Order to the Management of Waste

255. All waste will be managed in accordance with the waste hierarchy (see Diagram 19.1), as set out in the Waste Framework Directive (2008/98/EC) in such a way as to prevent harm to human health, amenity and the environment.

256. The primary objective in the construction of the Proposed Project would, where practicable, be at the top of the waste hierarchy on zero avoidable waste, i.e. preventing waste and reusing waste wherever practicable. As such, the aim should be not to focus on lower value recycling and other recovery, and in any case most C&D waste is already 'recovered' in some form.

257. The waste hierarchy may be departed from for particular types of waste, where justified, to minimise environmental impact. It is important to understand any potential wider implications and thus any unintended consequences of managing waste. For example, there could be instances whereby avoiding waste in the first instance could create greater environmental impact. Consideration will therefore need to be given by the appointed Contractor to the relationship with other factors such as materials consumption, energy usage and carbon emissions.

19.5.2.1.3 Construction and Environmental Management Plan (CEMP)

258. A CEMP has been prepared for the Proposed Project, identifying construction methodologies and standard operating procedures that will be implemented to reduce the effect of the Proposed Project. It will be the responsibility of the appointed Contractor to ensure the waste management measures within the CEMP and CWBPMP are implemented. The CEMP is included as Appendix A5.1.

259. The appointed Contractor will be responsible for developing the Site Specific CEMP(s) as part of their contractual responsibilities. The Site Specific CEMP(s) will be based on the CEMP included in Appendix A5.1 and will include all mitigation measures as outlined in this EIAR and any potential additional mitigation measures which may be conditioned in any planning permission or environmental authorisation which may be granted.

19.5.2.1.4 Construction Waste and By-Product Management Plan (CWBPMP)

260. A CWBPMP has been prepared for the Proposed Project and forms part of the CEMP (Annex C of Appendix A5.1). Prior to commencement of construction the appointed Contractor will update the CWBPMP and refine this based on the latest information that is available regarding the likely waste and by-product arisings and the likely best practice management techniques for each waste and material (for specific information C&D wastes, and excavated materials, refer to EPA (2019a, 2023a and 2024d) guidance and decision documents). This CWBPMP identifies how waste arisings are to be controlled and managed during the course of the Proposed Project; in particular, how waste prevention principles will be applied and how on-site waste will be minimised, segregated and stored in order for the Proposed Project

to achieve the agreed targets. The plan has been written in accordance with the best practice guidance (EPA 2021a)).

261. The CWBPMP includes:

- Specific waste management objectives for the Proposed Project
- Identification of roles and responsibilities
- Methods proposed for recycling/reuse/prevention of waste
- Requirements for the storage of both hazardous and non-hazardous waste streams
- Procedures for keeping records of all waste and materials management for traceability, including quantities of material reused within the site and transported off-site in tonnes as well as records of the management of the material including permits of the collection vehicles and the licences/permits/certifications of the facilities to which the waste is brought if it leaves the site
- Requirements for training of the workforce.

262. A number of waste prevention and management practices will be implemented by the appointed Contractor at the Construction Compounds and Pipe Storage Depots across the Proposed Project in order to manage waste arisings in an orderly fashion to minimise the impact in so far as is possible. Such practices will include:

- A regular programme of site tidying will be established to ensure a safe and orderly site
- Debris netting will be erected to prevent materials being scattered by the wind
- Food waste will be strictly controlled on all parts of the site in order to minimise the attraction of vermin and other pests
- In the event of any litter or debris escaping the site, it will be collected immediately and removed to storage on-site, and subsequently recovered/disposed of in the normal manner
- Waste receptacles such as skips will be secured so as to minimise impact from fly-tipping
- Waste will be stored away from any sensitive receptors (e.g. surface waters) and in such a way as to prevent uncontrolled contaminated runoff through bunding or storage in non-permeable areas with adequately controlled drainage installed
- Foul water arising from welfare facilities provided during the Construction Phase will be collected and discharged to a storage tank which will be regularly emptied by a suction tanker to the nearest wastewater treatment plant. There will be no outlet from any of these storage tanks
- Waste will be collected in a timely fashion so as to prevent overly large volumes of waste accumulating.

19.5.2.1.5 General Excavation Phase Peat Resources and Topsoil

263. The Proposed Project would require the excavation of peat deposits which will be managed as a valuable resource for beneficial use rather than being disposed of. The large proportion of the peat deposits are on land owned and managed by Bord na Móna. Peat resources will be put to beneficial end-use such as peatland rehabilitation or peatland restoration and thereby would not become wastes.

264. When excavating topsoil, the appointed Contractor will, where practicable, segregate, manage and store topsoil in a manner that protects its properties and prevents it becoming a waste, thereby allowing its reuse. Reference will be made to the requirements of the EPA's Guidance on Soil and Stone By-products (EPA 2019a) and the Department for Environment, Food and Rural Affairs' (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

19.5.2.1.6 Excavated Materials/By-products/Wastes

265. The appointed Contractor will be required to manage the excavations in a manner that follows the waste hierarchy as described in Section 19.2.6. Based on geotechnical testing carried out to date, it is likely that the surplus soil and stones and rock would predominantly be clean materials and suitable for reuse as landscaping, non-structural fill and similar uses at other infrastructure development sites using the National By-Product Criteria for Greenfield Soil and Stone (BP-N002/2024) to achieve this. This will allow the subject materials to be used without becoming legally defined as a waste and will be pursued as a priority as waste 'prevention' is preferrable against the waste hierarchy, and also provides a circular economy approach. Uisce Éireann undertakes many infrastructure development projects and will explore options for Regulation 27 by-product use on other concurrent construction projects prior to the construction start.

266. The proposed pipeline would be constructed using predominantly open-cut, as well as trenchless methods. For crossings of certain features such as roads, railways, canals and rivers, trenchless methods will be employed in order to reduce impact to these features. Directional drilling and the use of pipe sleeves would reduce the amount of material excavated and therefore the amount of waste produced for the installation of the pipes.

267. The sequencing of pipe laying works will be planned to ensure seasonal restrictions on agricultural lands and availability of materials are accounted for. Such planning would mean that less waste is generated by the pipeline construction as excavated materials and materials brought to site would not need to sit for excessively long periods of time at the construction site and therefore are less likely to be damaged or spoiled and unusable.

268. Ground investigation undertaken to date indicates that the majority of soils, subsoils and bedrock which would be excavated within the study area is natural material which is free from contamination. On this basis, mechanisms may be explored which may redefine the excavated materials not as 'waste', preventing the need for waste disposal.

269. It is estimated that a large portion of excavated material (as detailed in Table 19.24) would be suitable for reuse within the Proposed Project for landscaping, non-structural fill and similar uses under exemption via the Waste Framework Directive Article 2(1)(c) (refer to Section 19.2.3.10). This will be subject to further geotechnical testing at detailed design stage. This uncontaminated excavated material would not be regulated as a waste as it is used in construction at the same project site where it was excavated.

270. Where material is not reusable within the Proposed Project, then further options for the reuse of the clean suitable material as a non-waste by-product under Regulation 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) allow for the declaration of a material generated through construction as a by-product rather than a waste where certain criteria can be demonstrated by the economic operator. This will be sought as a priority over recovery (in accordance with the waste hierarchy).

271. Suitable sites or construction projects requiring soil and stone to be imported will be sought out and agreements put in place with those sites, to confirm the future use of the material is certain and allow for the transport of by-product material from the Proposed Project. This may include other Uisce Éireann infrastructure projects under development at that time, but the viability of this will need to be confirmed nearer the construction start date.

272. Prior to works, the EPA will be notified of the by-product decision and intent for the use of Regulation 27 for any non-greenfield site material. Notifications must be submitted online using the Environmental Data Exchange Network (EDEN) online portal. This allows the EPA to maintain a register of by-product notifications which are available for public inspection online to include details of origin and destination sites for soil and stone by-product.

273. For by-product material that has originated from greenfield sites, the relevant Local Authority will be informed through registration using the EPA EDEN portal via the “By-product Module”.

274. If Uisce Éireann projects are not available then other major infrastructure projects being undertaken at that time will be researched and contacted to explore options. The excavated material must meet the set of criteria as set out in Section 19.2.3.10 and in the EPA’s Guidance on Soil and Stone By-products (EPA 2019a), in order to be classified as a by-product.

275. Where excavated material is not reusable within the Proposed Project and is not classified as a by-product in accordance with Regulation 27 or recoverable on-site, this material would then be classified as a ‘waste’. Only when all other options to prevent, reuse, or recover excess excavated material have been ruled out will recycling, recovery or disposal be considered. The waste will be sent to a suitably licensed or permitted waste facility for compliant handling and/or recycling, recovery or disposal. Any material to be removed from site will be transported in compliance with a valid Waste Collection Permit. In accordance with the proximity principle, the closest suitable facilities will be utilised, where practicable, to minimise the impacts associated with transporting the material.

276. Should Regulation 27 use of the materials (greenfield and non-greenfield) not be possible, the baseline indicates that there is currently, and would likely be during the construction years, a large capacity of the following end-of-waste and waste recovery options (listed in line with the waste hierarchy) which are used in the assessment to reduce the quantity of the excavated wastes requiring disposal:

- Regulation 28 soil treatment facilities (see below)
- Landfills requiring wastes for restoration (Section 19.3.2.4)
- Soil treatment facilities (Section 19.3.2.5 and Section 19.3.2.6).

277. Regulation 28 of the European Communities (Waste Directive) Regulations 2011 sets out the requirements under which a material, which is recovered or recycled from waste, can be deemed to be no longer a waste and complies with a set of end-of-waste criteria (i.e. common use for specific purposes, a market demand exists, fulfils technical requirements and no adverse impact to the environment). Use of Regulation 28 represents a mechanism for recovery of wastes that may be used to process and recover arisings prior to disposal, in accordance with the waste hierarchy. Details of the current Regulation 28 projects are provided in Table 19.35.

278. This sequence of mitigations, applied in accordance with the priorities of the waste hierarchy, would reduce the amount of waste generated by the Proposed Project that requires disposal to landfill and are aimed to achieve Uisce Éireann’s corporate target of sending zero recoverable waste to landfill by 2025.

Table 19.35: Recycled Aggregate Processing Sites Approved under Regulation 28

Facility Name	Decision Date for Article 28 Application	Authorised Waste Codes	End of Waste for Recycled Aggregates Uses
Integrated Materials Solutions Ltd	16 July 2019	17 01 01: concrete	Uses are restricted to roadway construction
Panda Greenstar	13 August 2019	17 01 01: concrete 17 01 02: brick 17 01 03: tiles and ceramics 17 01 07: mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 17 05 04: soil and stone 17 09 04: mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03 19 12 12: other wastes (including mixtures of materials) from mechanical treatment of waste other than those mentioned in 19 12 11. 19 12 12 wastes shall be restricted to those originating from the processing of 17 01 01, 17 01 02, 17 01 03, 17 01 07, 17 05 04 or 17 09 04.	Use is restricted to the construction of temporary haul roads at the Boliden Tara Mines Tailing Management Facility
Shannon Valley Plant Hire	11 October 2022	17 01 01: concrete (from construction and demolition waste) 17 05 04 Soil and Stone other than those mentioned in 17 05 03, (non-hazardous)	Use restricted to civil engineering and road construction works as unbound road sub-base and pipe bedding material. Use as lower risk bound applications could include temporary haulage roads or platforms at construction sites.
Enva Ireland Limited	11 October 2022	17 01 01: concrete (from construction and demolition waste)	Use in earthworks including road construction, general use as aggregate in surface dressing, general fill, and forestry road construction

19.5.2.1.7 Imported Temporary Construction Road Material

279. The Proposed Project would require the import of a large volume of material (rock and stones) for use within the temporary works for Temporary Construction Roads, to enable construction plant to travel along the Construction Working Width. Upon completion of the work, the imported material will require removal and will be re-used on the next section of construction within the Proposed Project. Alternatively if re-use within the Proposed Project is not required, imported materials would have a residual resale value and other users of the material will be sought. Therefore, this material would not meet the classification of a waste and would be used by other end-users for re-use and not require management via the waste management facilities and infrastructure.

280. If imported rock and stone is contaminated during use as a result of contact with the ground, soils and leaks from construction plant, from engine oils, lubrication oil or engine coolant materials, it will need to be assessed and managed as a waste material, as appropriate. Any contaminated material will need to be segregated and stored separately from other waste types, and will be subject to recovery or disposal, as appropriate.

19.5.2.1.8 General Construction Phase Waste

281. In order to minimise the generation of surplus construction material, the ordering of appropriate quantities using the 'just in time' philosophy will be implemented. The ordering of materials will be managed in line with construction requirements and schedules, and perishable materials will not be ordered far in advance of when needed. Materials will be stored in such a way as to ensure that they are protected from damage through rain, wind, crushing, vehicle impact or any other potential source of damage.

Concrete Waste

282. Concrete construction waste arising during the Construction Phase will be sent back to the supplier for reuse where possible.

283. There is also an end-of-waste decision document for demolition concrete to be used as a recycled aggregate under Regulation 28 procedures (EPA 2019b). Suitable non-hazardous demolition concrete waste will be removed from site by a licensed waste collection permit holder and transferred to the relevant facility for recovery if all of the end-of-waste criteria are met to avoid disposal to landfill. Should any excess concrete waste arise that cannot be sent back to the supplier or reused on-site, or that is not suitable for end-of-waste recovery, this concrete waste will be removed from site by a licensed waste collection permit holder and transferred to relevant authorised facilities for recovery. As shown in Table 19.11, waste concrete, brick, tile and gypsum from C&D has a very high recovery rate, 98% in 2022, demonstrating that it is a widely recovered waste material.

Bentonite (Drilling) Waste

284. Management of drilling waste during the Construction Phase of the Proposed Project will be the responsibility of the appointed Contractor. During trenchless construction, the bentonite slurry will be reused within the system until reaching the end of its useful life. The spoil is filtered and separated from the water and bentonite slurry, with the slurry then being recirculated and reused within the system. An amount of spent bentonite would be produced at the end of the tunnelling process. If an alternative use for this material is not identified, it will be disposed of in an appropriately licensed facility. Where bentonite slurry has reached the end of its useful life and is not recoverable, this waste stream will require disposal to landfill.

Pile Arisings

285. The appointed Contractor will be responsible for the appropriate storage, handling and transport of pile arisings in accordance with best practice guidelines. Arisings will be sampled, tested for contamination, and transported by a suitably permitted vehicle for disposal of to a suitably licensed waste management facility within Ireland.

Metal Waste

286. Metal waste arising during the Construction Phase will be segregated from other types of waste and where possible, segregated by ferrous metal and non-ferrous metal. This will allow for the waste to be removed from site by a licensed waste collection permit holder and transferred to a relevant authorised metal waste facility for recycling or recovery. As shown in Table 19.11, a metal recovery rate of 100% was achieved in 2022 demonstrating a very high level of recovery is achievable.

Other Waste

287. Construction worker municipal solid wates generated in temporary welfare facilities will be segregated on-site as far as reasonably practicable. Waste will be segregated into mixed municipal waste, mixed recyclables, glass (where generated) and compostable waste (food) to minimise the amount of waste requiring disposal and in compliance with the waste hierarchy. The Contractors responsible for each Infrastructure Site, Construction Compound and Pipe Storage Depot will be responsible for the management of day-to-day waste on-site. Mixed recyclables, glass and compostable waste would be expected to be diverted from landfill to waste recovery facilities. Residual wastes for disposal would be suitable for disposal at waste-to-energy facilities as mitigation. This would avoid the need to dispose of the waste to landfill and would meet Uisce Éireann's corporate objective to send zero tonnes of recoverable waste to landfill.

Hazardous Waste

288. All hazardous waste arising as a result of the construction of the Proposed Project will be managed as per the Waste Management (Hazardous Waste) Regulations 1998 (as amended) (S.I. No. 163 of 1998) and other applicable legislation. Any hazardous waste will be stored separately to non-hazardous waste, with individual hazardous waste streams segregated from each other. Appropriate signage will be put in place to denote any hazardous waste storage locations.

289. The disused petrol station at the WTP access road entrance has potential to be contaminated. Site investigation works will be required prior to any excavation within this area to determine the nature and extent of potential contamination. Contaminated land excavated will be treated on-site or removed to a suitably licensed facility.

290. Treatment options for hazardous wastes reuse and recovery will be explored depending on the nature of the waste and its hazardous properties. There are currently six licensed waste facilities in Ireland which can accept hazardous C&D waste. In total, they could accept just over 200,000 tonnes of hazardous wastes, including (but not limited to):

- Hydraulic oils, containing polychlorinated biphenyls (13 01 01*)
- Packaging containing residues of or contaminated by hazardous substances (15 01 10*)
- Metallic packaging containing a hazardous solid porous matrix (for example asbestos, including empty pressure containers (15 01 11*)
- Glass, plastic and wood containing or contaminated with hazardous substances (17 02 04*)
- Bituminous mixtures containing coal tar (17 03 01*)
- Coal tar and tarred products (17 03 03*)
- Metal waste contaminated with hazardous substances (17 04 09*)
- Soil and stones containing hazardous substances (17 05 03*)
- Construction and demolition wastes containing mercury (17 09 01*).

291. All hazardous waste which cannot be treated will be disposed of through a suitably licensed waste contractor for disposal or processing at a suitably licensed/permitted facility which can accept hazardous waste. National treatment and disposal options will be explored prior to resorting to exporting; however, it is accepted that the baseline assessment identified that there is no hazardous landfill capacity within Ireland and export may be required.

292. As identified within the baseline (Section 19.3.2.9), as there are no hazardous waste landfills located in Ireland, any hazardous waste sent for disposal would need to be exported. The main mitigation for the disposal of hazardous waste produced by the Proposed Project will be disposal to hazardous waste landfill in pre-existing export markets outside Ireland. It is anticipated that some of the hazardous waste generated by the Proposed Project could be treated via recovery or recycling facilities that achieve, as a minimum, existing levels of performances in future years. In 2023 in Ireland, approximately 50% of hazardous waste (excluding soils) and approximately 99% of contaminated soils generated in Ireland that were classified as hazardous, were sent for treatment within Ireland, and the same performance has been used as an assumption within this assessment. For the assessment of effects post-mitigation, landfill capacity in England and Scotland (as there are currently no hazardous waste landfills in Wales) is used as an indicator of a realistic scenario for the export of hazardous wastes for disposal.

293. As per legislative requirements, records of all hazardous waste generated and removed from site will be retained for a minimum period of three years by the appointed Contractor(s). This includes documentation such as Waste Transfer Forms, any applicable transfrontier shipment records and any records on the treatment or ultimate disposal of the hazardous waste.

Proposed Targets

294. Table 19.36 provides the proposed targets and mitigations to reduce environmental impacts, which will be adopted by the appointed Contractor and included within the CEMP to align with Uisce Éireann's corporate objective to send zero tonnes of recoverable waste to landfill.

Table 19.36: Targets for the Construction Waste and By-Product Management Plan

Waste	Material, By-Product or Waste Types	Target
All Proposed Project Construction Waste	Uncontaminated excavated peat	100% beneficial use
	Uncontaminated imported materials (from Temporary Construction Roads)	100% beneficial re-use
	Surplus, clean excavated soil and stone Surplus, clean excavated rock Non-hazardous and inert C&D wastes	Zero tonnes of recoverable waste disposed of to landfill

295. Ground investigations for previous iterations of the project indicate that the excavated material would be predominantly clean material which is suitable for end-of-waste mechanisms or waste recovery, and baseline analysis indicates that sufficient recovery and treatment infrastructure is currently available and forecast to be available during construction of the Proposed Project. As such, the target for surplus, clean excavated materials to be diverted from landfill disposal is considered realistic for adoption by the appointed Contractor. In reality, financial implications would also be a major driver as avoidance and recovery options would be more financially favourable than disposal.

296. Based on the draft target of zero tonnes of recoverable waste disposed of to landfill, the Proposed Project will be expected to achieve 70% avoidance of excavated materials through use as by-products via Regulation 27. Excavated materials that are not suitable for use as a by-product and recoverable C&D wastes will be expected to achieve 100% avoidance from landfill, in line with best practice for large infrastructure projects employing similar goals such as zero recoverable waste to landfill. This is considered realistic and achievable (provided that best practice protocols and guidelines are followed) and has been achieved in major projects and by other European countries. Final targets will be discussed further during the procurement of the appointed Contractor and refinement of the CEMP and CWBPMP. C&D wastes that are not recoverable would be suitable for disposal as per the waste hierarchy, which would include both energy recovery at a licensed energy-from-waste facility and disposal within a suitably licensed inert or non-hazardous landfill site.

297. The appointed Contractor will be required to monitor its performance against the targets, and to report its performance to Uisce Éireann on an annual basis.

19.5.2.2 Operational Phase

19.5.2.2.1 Consumption of Materials During Operational Phase

298. The majority of materials consumed during the Operational Phase of the Proposed Project would be consumed by water treatment within the RWI&PS and WTP processes using standard industrial chemicals. The Proposed Project would use new infrastructure and equipment that is likely to be able to treat water in a more efficient manner than the existing infrastructure to supply the additional water to the Uisce Éireann national water supply system.

299. As the chemicals used within water treatment are also supplied to other industries, including wastewater treatment, materials are likely to be available from multiple suppliers working with different economic sectors. The Operational Phase consumption of water treatment materials is likely to result in the consumption of one or more of the materials being less than 1% of the national baseline availability across all markets. For example, in one year the 57 tonnes of hydrofluorosilicic acid expected to be used to treat 154Mld (i.e. the volume abstracted under normal demand) represents less than 0.1% of the nearly 4 million litres of hydrofluorosilicic acid used in 2013 and the impacts related to consumption of materials during the Proposed Project's Operational Phase may be less than forecast.

19.5.2.2.2 Operational Phase Waste Generation

300. The majority of waste arising as a result of the operation of the Proposed Project would be solid and liquid from the treatment processes. There would also be small quantities of mixed municipal and very small quantities of hazardous waste associated with the day-to-day operations and maintenance activities of all parts of the Proposed Project. The following sections outline measures to mitigate impacts associated with these wastes.

19.5.2.2.3 Water Treatment Residuals

301. The invasive species debris filtered out of the raw water by microfiltration at the RWI&PS will be collected in an invasive species debris retention tank at the RWI&PS in line with existing processes. The material collected here will be disposed of via a suitably permitted waste collector to a suitably licensed waste management facility within Ireland, taking all necessary bio-security measures to protect all local waters. Please refer to Chapter 4 (Proposed Project Description) and Chapter 8 (Biodiversity) for further detail on the invasive species control measures that will be used to minimise generation of invasive species and therefore minimise any debris. Given the nature of this waste material and bio-security measures required, invasive species debris from the RWI&PS is not considered to be recoverable and small quantities of this waste could be disposed of to landfill or via incineration (subject to appropriate waste permits and licences).

302. All residual solids produced at the WTP would be thickened prior to being pumped to the sludge dewatering plant to bring the dry solids content of the sludge cake to 25%, thus reducing the quantity of this waste to be managed. It is estimated that, at full capacity (154Mld), the treatment plant would produce 20,416 tonnes of dewatered sludge cake per annum. Please refer to Chapter 4 (Proposed Project Description) for further detail on sludge management processes at the WTP.

303. As set out in the National Water Resources Plan, Technical Appendix K Residuals (Irish Water 2021b), Uisce Éireann is moving towards a circular economy model with respect to sludge management. To that end, it is intended that, where practicable, circular economy outlets for residual water sludge will be identified so that this could be put to a beneficial reuse via sustainable outlets ahead of disposal – an approach that aligns with the requirements of the waste management priority hierarchy. Examples of potential sustainable outlets and beneficial uses are outlined in Section 19.2.3.7.

304. It is anticipated that additional beneficial reuse facilities for the WTP residual water sludge are likely to be commissioned prior to the operation of the Proposed Project (2033) so that Uisce Éireann will be able to manage the WTP residual water sludge in accordance with best practices reflecting the waste priority hierarchy, and the residual water sludge will be sent to these facilities instead of to landfill.

305. Uisce Éireann has been reporting on how existing WTPs manage their operational residual water sludge since 2018 and reporting an upward trend in management via sustainable outlets (CRU 2022). Existing outlets have been identified to manage sludge arisings in a sustainable manner and further outlets are being developed to manage expected increases in sludge volumes, in a manner that considers the sludge within the context of circular economy principles. Uisce Éireann will manage operational residual water sludge arisings so that all residual sludges from the WTP will be managed via sustainable outlets as

further opportunities develop to move sludge treatment away from landfill capping. Therefore, with this mitigation, no recoverable wastes from the Operational Phase are likely to be disposed of to landfill from the WTP operational residual water sludge stream. Where possible, the closest suitably licensed facility will be chosen so as to minimise impacts associated with the ground transportation of waste. All transportation of operational residual water sludge waste from the site will be carried out by an operator with a valid Waste Collection Permit. It will be the responsibility of the WTP operator in conjunction with Uisce Éireann to ensure that the sludge is managed in a suitable and compliant manner.

19.5.2.2.4 Washwater from the Treatment Process

306. The WTP has been designed such that all washwater from the water treatment processes would be pumped back to the Raw Water Balancing Tank at the head of the treatment process. There will be no discharge of washwaters to the environmentally sensitive Lower River Shannon Special Area of Conservation, and therefore no additional mitigation measures are required for management of the washwater from the treatment process.

19.5.2.2.5 Hazardous Waste

307. Very small amounts of hazardous waste generated during the Operational Phase have not been quantified but are anticipated to be of low quantities, based on professional judgement. Small quantities of hazardous waste generated from routine maintenance activities may be generated, although can be expected to be minimal during the representative single year of the Operational Phase. Similarly, it is unlikely that time-expired chemicals would require disposal within the representative year if good procurement and operational management techniques are followed. Therefore, hazardous wastes would consist mainly of contaminated raw material packaging, waste batteries and accumulators. It will be the responsibility of the appointed Contractor to ensure that all hazardous waste generated through the Operational Phase of the Proposed Project are segregated from non-hazardous waste streams. Hazardous waste will be collected by suitably permitted waste contractor(s) and taken to facilities which are permitted to accept hazardous waste for treatment and/or disposal. In the absence of national landfill capacity this may include export for treatment and disposal.

19.5.2.2.6 Other Waste

308. Waste will be segregated on-site as far as reasonably practicable. Waste will be segregated into mixed municipal waste, mixed recyclables, glass (where generated) and compostable waste (food) to minimise the amount of waste requiring disposal and in compliance with the waste hierarchy. The operator of the proposed RWI&PS, WTP, BPT, BPS, FCV and TPR will be responsible for the management of day-to-day waste on-site and for the appointment of a waste contractor. Mixed recyclables, glass and compostable waste would be expected to be diverted from landfill to waste recovery facilities. Residual wastes for disposal would be suitable for disposal at waste-to-energy facilities as mitigation. This would avoid the need to dispose of the waste to landfill and would meet Uisce Éireann's corporate objective to send zero tonnes of recoverable waste to landfill.

19.6 Residual Effects

309. This section sets out the residual effects on waste and materials taking account of the mitigation measures described in Section 19.5.

310. The assessment of the effects on the environment of the use of construction materials (Table 19.31) prior to mitigation concluded that the effects would be Slight and would not be significant for the purposes of EIAR and this is the residual effect of the Proposed Project. However, further measures would be progressed through ongoing design development and procurement mechanisms such as choice of materials, specification of recycled materials and other measures such as modular design or design for reuse to reduce the impact from material consumption as a matter of good construction practice.

311. The assessment of the effects on the environment of the waste impacts from construction (Table 19.32) determined the significance of effect would be Very Large and would be significant for the purposes of EIAR because constructing the Proposed Project would be likely to generate potentially large quantities of waste including excavated material and C&D waste, leading to potential significant effects on the available waste management infrastructure (i.e. through the permanent use of landfill void space). The construction waste impacts were reassessed (in Table 19.39) to determine the residual effect following the identification of appropriate mitigation in Section 19.5. Mitigation has been identified that would achieve the proposed commitment of zero avoidable waste to landfill, which is a corporate target for Uisce Éireann. The assessment of the waste impacts from construction post mitigation concluded the residual effects would be Slight and would not be significant for the purposes of EIAR. For the quantified assessment of residual effects, assumptions were required on the outcomes of this approach. These are summarised within Table 19.37.

312. The assessment of the effects on the environment of the use of operational materials (Table 19.33) determined the effects would be Neutral or Slight and would not be significant for the purposes of EIAR and this is the residual effect of the Proposed Project. However, further measures would further reduce the impact from material consumption as the new infrastructure and associated equipment is likely to be able to treat water more efficiently than the existing infrastructure. Also, the market for the supply of water treatment chemicals is likely considerably larger than has been assessed, with water treatment chemicals also being supplied to other industries and to private water treatment facilities.

313. The assessment of the effects on the environment of operational waste impacts (Table 19.34) determined that the effects would be Slight and would not be significant for the purposes of EIAR and this is the residual effect of the Proposed Project. However, further measures, including the development of additional beneficial reuse facilities for the residual water sludge are likely to be commissioned prior to the operation of the Proposed Project, which would be likely to further reduce the amount of Operational Phase waste requiring disposal to landfill, compared with those reported in this chapter for the most recently reported years. Residual wastes from operation of the Proposed Project would also be diverted from landfill to other waste management facilities which could include waste-to-energy facilities.

314. The assessment of the effects on the environment from testing and commissioning were considered not to be relevant.

Table 19.37: Assumptions for Quantified Assessment of Residual Effects

Waste Types	Assumption for Residual Effect Assessment based on Mitigation
Peat	Mitigated through beneficial use of 98% of excavated peat. 2% assumed to be contaminated and hazardous for disposal.
Imported rocks and stone	Mitigated through beneficial re-use and 98% is re-used with other construction projects. 2% assumed to be contaminated and hazardous for disposal.
Surplus excavated soil and stone Surplus excavated rocks Materials which are not hazardous and are surplus to requirements of the Proposed Project.	70% waste avoidance through Regulation 27 (by-product criteria) or Regulation 28 (end-of-waste criteria).
Recoverable demolition wastes and C&D wastes which are not hazardous, and the 30% excavated wastes assumed to not be subject to Regulation 27 or Regulation 28.	100% waste recycled or recovered.
Non-recoverable demolition and C&D wastes	Disposal to landfill where no recovery operation exists.
Hazardous wastes: Hazardous contaminated peat Hazardous contaminated imported rocks and stone Hazardous contaminated soils and stones, and rocks Hazardous C&D waste	Hazardous waste is recovered within licensed facilities within Ireland and residual hazardous waste for disposal is exported to foreign markets.

315. Peat resources will be harvested, prior to construction, and be put to beneficial end-use therefore avoiding becoming a waste. This would avoid the disposal of 225,204 tonnes of peat to non-hazardous landfill.

316. Imported rock and stone used within Temporary Construction Roads is re-used within the next section of construction within the Proposed Project or is re-used by other construction projects in Ireland. This would avoid the disposal of 885,724 tonnes of rock and stone.

317. Based on the Proposed Project information including the ground investigations and baseline assessment, it is assumed that Regulation 27 by-products mechanisms could realistically divert over 70% of excavated soil and stone and excavated rock from landfill disposal, reducing the total amount of waste that requires disposal by avoiding 496,081 tonnes of waste. Where Regulation 27 by-product mechanisms are not available, excavated material would also be suitable for Regulation 28 mechanisms and is still suitable to be diverted from landfill. While use of Regulation 28 could be used as an effective mitigation, it is a more precautionary approach to waste avoidance but is included as a mitigation in the event that the Regulation 27 by-product registrations or notifications are unsuccessful.

318. Following implementation of the Regulation 27 (by-products) and Regulation 28 (end-of-waste) mechanisms the remaining 30% of excavated material, 212,606 tonnes of waste, is deemed to be included within the overall C&D wastes stream. Based on Uisce Éireann's commitment of zero recoverable waste to landfill, it is assumed that for quantified assessment of residual effects, 100% of this waste stream is recovered or recycled. This is also consistent with the performance achieved in major projects and by other European countries where C&D waste management protocols have been implemented, as per the EU Construction & Demolition Waste Management Protocol (EC 2024).

319. The construction of the Proposed Project would still generate 75,635 tonnes of C&D waste (Table 19.26) , however, with implementation of best practice construction waste management practices, and commitment of zero recoverable waste to landfill, all inert C&D waste generated and the majority of non-hazardous C&D waste is re-used, recycled or recovered and nothing is sent for disposal. A total of 59,227 tonnes of this waste would be recovered and recycled (all waste within Table 19.26 except for the waste bentonite and waste insulation). Some of the C&D waste is not considered to be recoverable and landfill disposal is required for 98% of the waste bentonite and waste insulation, totalling 16,080 tonnes of non-hazardous waste requiring disposal to landfill (with a further 2% of the waste bentonite and waste insulation classified as hazardous and considered below).

320. In total, there would be 286,728 tonnes of inert and non-hazardous waste generated (consisting of 212,606 tonnes of non-hazardous excavated soil and stone and excavated rock waste and 75,307 tonnes of non-hazardous C&D waste). 16,080 tonnes of this waste is not considered to be recoverable and would be disposed of to landfill. All of the other waste would be recovered or recycled through existing waste management facilities within Ireland. As a result of the mitigation, the residual impact would be 16,080 tonnes of non-hazardous waste that would require disposal to landfill during the Construction Phase.

321. The construction of the Proposed Project would still generate some hazardous waste that would require recovery or disposal. The assessment of potential effects identified a significant effect in relation to hazardous waste landfill capacity as there are no currently permitted hazardous landfills within Ireland. On the basis of 2% of the C&D waste sent for hazardous disposal (328 tonnes of waste bentonite and waste insulation), 2% of the total excavated soil and stone and excavated rock (14,463 tonnes), 2% of the total imported rocks and stone (18,076 tonnes) and 2% of the total excavated peat (4,596 tonnes), in total there would be 37,135 tonnes of hazardous waste, of which approximately 50% of the C&D waste and 99% of the excavated waste would be subject to treatment (recovery or recycling) within Ireland at existing treatment facilities. This leaves 535 tonnes of hazardous waste that would require disposal at hazardous waste management facilities. Therefore, mitigation is proposed as the export of hazardous waste for disposal to waste management facilities outside Ireland and the assessment of residual effects post-mitigation is based on landfill capacity in England and Scotland as an indicator for the export.

322. Table 19.38 provides a summary of the estimated excavated wastes and C&D that is classified as inert, non-hazardous and hazardous for the IEMA-based assessment and the waste types associated with each category. Post-mitigation, the impacts of waste generation for the Proposed Project would be a reduction in landfill space for the disposal of 16,080 tonnes of inert and non-hazardous waste and of 535 tonnes of hazardous waste, over the five-year period of the Construction Phase.

Table 19.38: Summary of Estimated C&D and Excavated Wastes Generated from the Proposed Project Post-Mitigation for Landfill Disposal

Indicative Waste Classification	Waste Types	Total Tonnage
Non-hazardous (excavated)	Excavated peat	0
Inert (excavated and C&D)	Excavated soil and stone waste, excavated rock waste, imported rocks and stone. Inert C&D waste (blinding concrete, brick and block work, concrete, granular material, glass, kerbing and mortar)	0
Non-hazardous (C&D)	Non-hazardous C&D waste (Ground anchorage, asphalt (unless testing hazardous), iron, reinforcing steel, plastics, portal frames, steel piles and steel pipes)	0
	Non-hazardous C&D waste (grout (bentonite) drilling waste and insulation)	16,080
Hazardous	Asbestos, hazardous C&D waste, contaminated excavated materials which test hazardous, contaminated peat which tests hazardous, contaminated imported rocks and stones which test hazardous, asphalt which tests hazardous	535
Total		**16,615**

323. The significance of each residual effect is assessed in Table 19.39 after the mitigation described within Section 19.5 has been applied. Following implementation of this mitigation, the potential impacts in relation to inert and non-hazardous and hazardous waste for the Proposed Project would be avoided or reduced where practicable.

19.6.1 Summary of Significant Effects

324. The significance of potential effects post mitigation has been assessed and is summarised in Table 19.39 and Table 19.40. The significance of effect for construction materials, operational material and operation wastes is Slight and are Not Significant for the purposes of the EIAR. The post-mitigation assessment for construction waste (non-hazardous and inert) results in a Slight significance of effect that is Not Significant for the purposes of the EIAR and the assessment for construction waste (hazardous waste) results in a Slight significance of effect that is Not Significant for the purposes of the EIAR.

Table 19.39: Summary of Construction Wastes Significant Effects Post-Mitigation

<table>
<tr><th rowspan="2">Element</th><th rowspan="2">Description of Potential Sensitivity of Receptors/Magnitude of Impacts</th><th colspan="3">Pre-Mitigation</th><th rowspan="2">Mitigation and Monitoring Measures</th><th colspan="2">Post-Mitigation</th></tr>
<tr><th>Sensitivity</th><th>Magnitude of Impact</th><th>Significance of Effect</th><th>Residual Magnitude</th><th>Residual Significance</th></tr>
<tr><td>Waste (inert and non-hazardous waste)</td><td>The sensitivity of waste relates to the availability of national landfill void capacity. The volume of waste anticipated to be generated nationally has been compared to the remaining inert and non-hazardous landfill void capacity. The future landfill capacity has been calculated and detailed in Section 19.3, analysing the available data from the EPA. Based on the anticipated construction years of 2028–2032 it has been estimated on average over the five-year Construction Phase that the inert and non-hazardous landfill void capacity is expected to reduce by >10% as a result of the waste forecast (without the Proposed Project).

The magnitude of impact from waste has been assessed by determining the percentage of the remaining landfill void capacity that would be depleted by the anticipated waste during the construction of the Proposed Project. Table 19.28 provides the estimates of C&D and excavated wastes anticipated to be generated by the Proposed Project. Under the worst-case scenario (assuming excavated materials and peat all become wastes and require disposal, and 70% of C&D waste avoidance/recovery) the Proposed Project is predicted to generate 1,855,577 tonnes for disposal to inert and non-hazardous landfill. Assuming that these wastes are required to be disposed of at a rate of 0% in Year 1, 40.9% in Year 2, 39.4% in Year 3, 19.7% in Year 4 and 0% in Year 5 during the five-year Construction Phase, then that equates to a reduction in national inert and non-hazardous landfill void capacity of between approximately 32.17% and 56.56% as per:

<table><tr><th>Project Year</th><th>Predicted Landfill Void Capacity</th><th>Waste Disposal to Landfill</th><th>% Change</th></tr><tr><td>2028 (Year 1)</td><td>1,671,501</td><td>0</td><td>0</td></tr><tr><td>2029 (Year 2)</td><td>1,470,921</td><td>757,807</td><td>-51.52%</td></tr><tr><td>2030 (Year 3)</td><td>1,294,411</td><td>731,847</td><td>-56.54%</td></tr><tr><td>2031 (Year 4)</td><td>1,139,081</td><td>365,924</td><td>-32.12%</td></tr><tr><td>2032 (Year 5)</td><td>1,002,392</td><td>0</td><td>0</td></tr></table></td><td>Very High</td><td>Major</td><td>Very Large (Significant)</td><td>The estimates of C&D and excavated wastes (Table 19.28) anticipated to be generated by the Proposed Project are reduced by the mitigation measures. Mitigation measures currently proposed as draft targets within the CWBPMP will require the appointed Contractor to send zero tonnes of avoidable waste to landfill. On this basis 16,080 tonnes of non-hazardous waste would be generated by the Proposed Project. Assuming that these wastes are required to be disposed of at a rate of 0% in Year 1, 40.9% in Year 2, 39.4% in Year 3, 19.7% in Year 4 and 0% in Year 5 during the five-year Construction Phase, that equates to a reduction in national inert and non-hazardous landfill void capacity of between approximately 0.28% and 0.49% during construction as per:

<table><tr><th>Project Year</th><th>Predicted Landfill Void Capacity</th><th>Waste Disposal to Landfill</th><th>% Change</th></tr><tr><td>2028 (Year 1)</td><td>1,671,501</td><td>0</td><td>0</td></tr><tr><td>2029 (Year 2)</td><td>1,470,921</td><td>6,567</td><td>-0.45%</td></tr><tr><td>2030 (Year 3)</td><td>1,294,411</td><td>6,342</td><td>-0.49%</td></tr><tr><td>2031 (Year 4)</td><td>1,139,081</td><td>3,171</td><td>-0.28%</td></tr><tr><td>2032 (Year 5)</td><td>1,002,392</td><td>0</td><td>0</td></tr></table></td><td>Negligible</td><td>Slight (Not significant)</td></tr>
</table>

<table>
<tr><th rowspan="2">Element</th><th rowspan="2">Description of Potential Sensitivity of Receptors/Magnitude of Impacts</th><th colspan="3">Pre-Mitigation</th><th rowspan="2">Mitigation and Monitoring Measures</th><th colspan="2">Post-Mitigation</th></tr>
<tr><th>Sensitivity</th><th>Magnitude of Impact</th><th>Significance of Effect</th><th>Residual Magnitude</th><th>Residual Significance</th></tr>
<tr><td>Waste (hazardous waste) including assessment against export capacity</td><td>The sensitivity of waste relates to the availability of national hazardous landfill void capacity. There are no commercial hazardous waste landfills in Ireland. Thus, any hazardous waste generated in Ireland destined for landfill is exported. Historically, the majority of Ireland's hazardous waste was exported for disposal or treatment although this has reduced from 75% in 2019 to 50% in 2023. The main export market was the UK, although wastes are also exported to the Netherlands, Germany and Belgium and other European countries. This reflects the fact that Ireland does not have the range of facilities to deal with all of the hazardous waste generated. Striving for more self-sufficiently nationally in the management of Ireland's hazardous waste is a key action of the National Hazardous Waste Management Plan (EPA 2021b).
The magnitude of impact from waste has been assessed by determining the percentage of the remaining landfill void capacity that would be depleted by the anticipated waste during the construction of the Proposed Project. However, there is no commercial hazardous waste landfill capacity in Ireland and any hazardous waste generated, including excavated waste, peat waste, imported rocks and stone and C&D waste, during the construction of the Proposed Project requiring disposal would require new national capacity to be put in place to meet demands as the projected 743 tonnes of hazardous waste would exceed the total available hazardous waste landfill availability. Based on this, the hazardous landfill void capacity in Ireland would be reduced by greater than 1% as a result of the hazardous waste forecast.</td><td>Very High</td><td>Major</td><td>Very Large (Significant)</td><td>The magnitude of impact from waste has been assessed by determining the percentage of the remaining landfill void capacity that would be depleted by the anticipated waste during the construction of the Proposed Project. However, there is no commercial hazardous waste landfill capacity in Ireland and it is unlikely that Ireland will gain new hazardous waste landfill capacity so any hazardous waste for disposal is exported to the UK as a mitigation. On this basis, the mitigation is export of hazardous waste and the magnitude has been assessed based on the hazardous landfill capacity in the UK. Currently (2023) there is approximately 15.6 million tonnes of hazardous landfill capacity in the UK which could have reduced to 4.9 million tonnes by 2033 (as per Table 19.19 and Table 19.20).
If approximately 2% of the excavated waste, peat waste, imported rocks and stone and C&D waste that is classified as hazardous is subject to national trends for treatment and recovery (which is approximately 50% for C&D waste and 99% for excavated waste), then 535 tonnes of hazardous waste is anticipated to be generated for disposal.
Assuming that these wastes are required to be disposed of at a rate of 0% in Year 1, 40.9% in Year 2, 39.4% in Year 3, 19.7% in Year 4 and 0% in Year 5 during the five-year Construction Phase, that equates to a reduction in hazardous landfill void capacity of less than 0.01% each year during construction.
<table>
<tr><th>Project Year</th><th>Predicted Landfill Void Capacity</th><th>Waste Disposal to Landfill</th><th>% Change</th></tr>
<tr><td>2028 (Year 1)</td><td>9,351,350</td><td>0</td><td>n/a</td></tr>
<tr><td>2029 (Year 2)</td><td>8,299,188</td><td>219</td><td>-0.003%</td></tr>
<tr><td>2030 (Year 3)</td><td>7,241,685</td><td>211</td><td>-0.003%</td></tr>
<tr><td>2031 (Year 4)</td><td>6,372,683</td><td>106</td><td>-0.002%</td></tr>
<tr><td>2032 (Year 5)</td><td>5,607,961</td><td>0</td><td>n/a</td></tr>
</table>
Based on these figures, hazardous landfill capacity in the UK is expected to reduce by <0.1% as a result of the hazardous waste forecast.</td><td>Negligible</td><td>Slight (Not significant)</td></tr>
</table>

Table 19.40: Summary of Operational Waste Significant Effects Post-Mitigation

Element	Description of Potential Sensitivity of Receptors/Magnitude of Impacts	Sensitivity	Pre-Mitigation		Mitigation Measures	Sensitivity	Post-Mitigation	
			Magnitude of Impact	Significance of Environmental Effect			Residual Magnitude	Residual Significance
Operational waste (non-hazardous)	The sensitivity of waste relates to the availability of national landfill void capacity. The volume of waste anticipated to be generated nationally has been compared to the remaining inert and non-hazardous landfill void capacity projected to 2033 (the assessed operational year). The future landfill capacity has been calculated and detailed in Table 19.13, analysing the available data from the EPA. Based on the selected operational year of 2033, that non-hazardous landfill void capacity is expected to reduce by >10% as a result of the waste forecast (without the Proposed Project). The magnitude of impact from waste has been assessed by determining the percentage of the remaining non-hazardous landfill void capacity that would be depleted by the anticipated operational wastes in the selected operational year of 2033. WTP operational residual water sludge would be recovered via sustainable outlets and 90% is diverted from landfill disposal. Section 19.5.2.2 provides the estimates of non-hazardous operational wastes anticipated to be generated by the Proposed Project in 2033 (2,058 tonnes), which is <1% compared to the estimated remaining landfill capacity (882,105 tonnes).	Very High	Negligible	Slight (Not significant)	As described in Section 19.5.2.2 it is anticipated that additional beneficial reuse facilities for the residual water sludge are likely to be commissioned prior to the operation of the Proposed Project (2033). Uisce Éireann is already managing water sludges through sustainable outlets and will manage residual water sludge from the Proposed Project via similar sustainable outlets. Therefore, zero tonnes of recoverable sludge waste will be sent to landfill for disposal. Water treatment washwater will be pumped back to the Raw Water Balancing Tanks at the head of the treatment process. Other operational wastes will be segregated into mixed municipal waste, mixed recyclables, glass (where generated) and compostable waste (food) and disposed of by licensed waste contractor(s) for recovery, recycling and energy recovery. Zero tonnes of operational waste will be sent to landfill for disposal.	Very High	Negligible	Slight (Not significant)

325. The mitigation measures applied reduces the quantity of inert and non-hazardous construction waste being disposed of in the available landfill void capacity. As a result, the magnitude of the impact of waste disposal changes from ‘major to ‘negligible’ and the overall significance of the effect changes from Very Large significance of effect, which would be a significant impact for the purposes of EIAR, to a Slight significance, which would not be significant for the purposes of EIAR. The mitigating impact of exporting hazardous waste from Ireland to hazardous waste landfill sites within the UK and other EU Member States reduces the magnitude of the impact from ‘major’ to ‘negligible’, and the overall significance of the effect from a Very Large significance of effect and significant for EIAR, to Slight significance of effect and not significant for the EIAR.

326. The mitigation measures proposed, based on the commitment of zero avoidable waste to landfill, which is a corporate target for Uisce Éireann, would result in a reduction in waste generated, thereby reducing the impact of the Proposed Project, by managing some arisings as non-wastes and some as by-products. Good waste management practices will be instilled by the appointed Contractor through the use of a CWBPMP for the Proposed Project, which forms part of the Proposed Project CEMP. The CWBPMP will encourage prevention, reuse and recycling over disposal for all waste generated by the Proposed Project. Resource efficiency will also be central to the CEMP, resulting in the generation of less waste.

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