CHAPTER

22

Waste and Resource Management

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND RAIL

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22. Waste and Resource Management

22.1 Scope and objectives of chapter

This chapter addresses the 'Waste Management' section of the Terms of Reference for the Inland Rail—Border to Gowrie (B2G) project (the Project), inclusive of Terms of Reference items 11.158 to 11.165, as included in Appendix A2: Terms of Reference Cross-reference Table. This chapter has been developed with reference to the *Waste—EIS information guideline* (Department of Environment and Science (DES), 2022i). This chapter also addresses the additional information requested by the Coordinator-General following the public notification of the draft Environmental Impact Statement (EIS).

The purpose of this chapter is to provide a description of baseline conditions and waste management requirements for the Project, an assessment of potential waste/resource impacts, and identification of measures to mitigate and manage waste impacts during the delivery of the Project.

The management strategy for earthworks and potentially contaminated material encountered throughout the Project is further addressed in Appendix AB: Earthworks Strategy and Draft Soil Management Plan. Wastewater generated by the Project is assessed separately in Chapter 13: Surface Water.

This chapter provides an assessment of the applicable regulatory framework, waste and resource management strategies (including treatment and disposal) and estimates of the waste stream composition and volumes for the Project, excluding air emissions assessed in Chapter 12: Air Quality and liquid wastes assessed in Chapter 13: Surface Water. The assessment focuses on the additional waste impacts that may arise due to the Project in the context of the existing waste and resource management conditions of the impact assessment area.

22.2 Regulatory environment

Waste and resource management is primarily administered by the State Government, with the Australian Government providing broad policy guidance based on national-level outcomes and international obligations. Local governments, and commercial and industrial generators of waste, are responsible for managing waste within their local areas and/or from their activities.

The legislation, regulation, policy and guidelines relevant to waste and resource management for the Project are summarised in Table 22-1. Further guidance on legislation and potential approvals associated with the Project is provided in Chapter 3: Legislation and Project Approvals Process.

TABLE 22-1 REGULATORY CONTEXT

Regulatory context	Relevance to the Project
Commonwealth	
2018 National Waste Policy: less waste, more resources (2018 National Waste Policy) (Australian Government, 2018a)	The 2018 National Waste Policy provides a framework for collective action by businesses, governments, communities and individuals. The policy identifies five overarching principles underpinning waste management in a circular economy. These include: ▸ Avoid waste ▸ Improve resource recovery ▸ Increase use of recycled material, and build demand and markets for recycled products ▸ Better manage material flows to benefit human health, the environment and the economy ▸ Improve information to support innovation, guide investment and enable informed consumer decisions. The policy embodies shifting away from 'take, make, use and dispose' to a more circular approach where the value of resources is maintained for as long as possible. It sets a national framework for action by governments, the business sector, waste and resource recovery industries, and communities to achieve sustainable waste management. The policy also facilitates annual reporting of waste emissions to air, land and water through the National Pollutant Inventory.
National Greenhouse and Energy Reporting Act 2007 (Cth)	Waste generated by the Project will likely be disposed at facilities required to report energy consumption and greenhouse gas emissions under the *National Greenhouse and Energy Reporting Act 2007*.
National Environment Protection Measures (NEPM), made under the *National Environment Protection Measures (Implementation) Act 1998* (Cth)	NEPM related to the Project include: ▸ The *National Environment Protection (Used Packaging Materials) Measure 2011* supports the Australian Packaging Covenant, which is the principal national instrument to reduce the environmental impacts of consumer packaging in Australia. It outlines sustainable packaging design, recycling of used packaging and reduction of litter from packaging. Where possible, the packaging from materials used in the Project will be recycled or managed to reduce litter.

Regulatory context	Relevance to the Project
	▸ The *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM) establishes a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices. Chapter 9: Land Resources details the potential for contamination in the vicinity of the Project. Where required, contaminated land within the Project will be assessed in accordance with principles of this NEPM. ▸ The *National Environment Protection (National Pollutant Inventory) Measure 1998* provides the framework for the development and establishment of the National Pollutant Inventory, which is an internet database designed to provide publicly available information on the types and amounts of certain substances being emitted to air, land and water. ▸ The *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998* provides a basis for ensuring that controlled wastes that are to be moved between States and Territories are appropriately identified, transported and handled. This NEPM is not considered to be relevant as there is not expected to be any movement of controlled wastes between Queensland and New South Wales (NSW) during the construction works or operations stages of the Project.
Australian Code for the Transport of Dangerous Goods by Road & Rail (National Transport Commission, 2024)	The transportation of waste, where constituting a dangerous good, will be undertaken in accordance with the specific requirements set out in the *Australian Code for the Transport of Dangerous Goods by Road & Rail.* Dangerous goods anticipated to be used by the Project are further described in Chapter 21: Hazard and Risk.
Construction and Demolition Waste Guide—Recycling and reuse across the supply chain (Department of Sustainability, Environment, Water, Population and Communities, 2011c)	This guide outlines opportunities for business and industry to invest in activities that will create profit and improve environmental outcomes, by extracting valuable resources from the construction and demolition waste stream.
State	
Environmental Protection Act 1994 (Qld) (EP Act) Environmental Protection Regulation 2019 (Qld) (EP Regulation)	Under the EP Act, the Australia Rail Track Corporation (ARTC) has a general environmental duty and must report potential environmental harm, including as a result of waste management activities. When dealing with land that is, or may be contaminated, the person undertaking the activity must meet the general environmental duty and obtain required permits to remove contaminated soil. The movement of certain regulated wastes must be tracked. The EP Regulation provides risk-based regulated waste classifications, including Category 1 regulated waste (highest risk), Category 2 regulated waste (moderate risk) and not-regulated waste/general waste (lowest risk). Waste that is commercial or industrial and is of a type, or contains a constituent of a type, mentioned in Schedule 9, Part 1, Column 1 of the EP Regulation. Regulated wastes require specific controls or actions, including handling, disposal and waste tracking requirements, to manage specific hazards associated with them. Under Schedule 8 of the EP Regulation, the environmental objective for waste is prescribed as managing any waste generated, transported, or received as part of carrying out the activity in a way that protects all environmental values. Both performance outcomes apply: ▸ Waste generated, transported or received in managed in accordance with the waste and resource management hierarchy under the *Waste Reduction and Recycling Act 2011* (Qld) (WRR Act) ▸ If waste is disposed of, it is disposed of in a way that prevents or minimises adverse effects on environmental values. Prescribed environmental relevant activities (ERAs) are defined in Schedule 2 of the EP Regulation. The requirements for ERAs will be confirmed during detailed design. Subsequent applications for ERAs will consider relevant guidelines including but not limited to: *Guideline: Approval processes for environmental authorities* (Department of Environment, Science and Innovation (DESI), 2024) and the relevant guidelines regarding application requirements for activities with impacts to land, water, air and waste.

Regulatory context	Relevance to the Project
	Construction of the Project may involve a reliance on the undertaking of ERAs, as defined in Schedule 2 of the EP Regulation (Chapter 3: Legislation and Project Approvals Process). Rather than obtain approval to transport regulated waste, ARTC will engage a licenced waste transportation contractor to transport regulated waste from the Project footprint to appropriately licensed disposal facilities. No other ERAs for the collection, transportation or disposal of solid wastes are expected to be required in support of construction of the Project.
Waste Reduction and Recycling Act 2011 (Qld) (WRR Act) Waste Reduction and Recycling Regulation 2011 (Qld)	The WRR Act provides a strategic framework containing measures to reduce waste generation and landfill disposal, and encourage recycling through a waste and resource management hierarchy. The Act provides for a waste strategy, waste levy and other measures such as local government waste management planning, and littering and illegal dumping offences. The end of waste (EOW) framework under the Act also promotes resource recovery opportunities and aims to transform the perception of waste from being seen as waste to being valued as a resource. The Waste Reduction and Recycling Regulation 2011 details the types of wastes these levies apply to and the associated fees for disposal. The Project is located within a levy zone and the disposal of waste will be subject to a fee unless an exemption applies. Section 26 of the WRR Act details exempt waste, which no longer includes clean earth from 1 July 2023.
Waste Management and Resource Recovery Strategy (Queensland Government, 2019c)	Queensland's *Waste Management and Resource Recovery Strategy* is supported by the introduction of a waste disposal levy and provides the strategic framework for Queensland to become a zero-waste society through avoidance, reduction and reuse/recycling. The *Waste Management and Resource Recovery Strategy* is underpinned by the waste levy. The strategy focuses on transitioning to the principles of a circular economy. It provides the framework to help deliver coordinated, long-term and sustained growth for the recycling and resource recovery sector, while reducing the amount of waste produced and ultimately disposed of, by promoting more sustainable waste-management practices for business, industry and households. The waste levy aims to provide a source of funding to enable better resource recovery practices, provide certainty and security of feedstocks for advanced technology, and facilitate industry investment in resource recovery infrastructure (Queensland Government, 2019b). The waste levy is paid to the Queensland Government by landfill operators (local councils and private businesses) based on the amount of waste disposed to landfill. The levy can then be passed through to landfill operator customers.
End of waste framework (Chapter 8 and Chapter 8A of the WRR Act)	The EOW framework promotes resource recovery opportunities and aims to transform the perception of waste from being seen as waste to being valued as a resource. The EOW framework consists of: ▸ EOW codes: related to registered resource producers and resource users ▸ EOW approvals: considered on a trial basis for reusing waste as resources for which an EOW code has not been developed for the waste. A waste can be approved as a resource if DESI considers it meets specified quality criteria for its specific use. It is the registered resource producer's responsibility to ensure the resource meets the specified criteria and quality characteristics prior to supplying the resource to the user for approved use. If a waste is approved as a resource under the EOW framework, it is no longer considered a waste under Section 13 of the EP Act; however, if the resource is not used in accordance with the EOW code or approval, it is deemed to be a waste. Operating under an EOW code can have the following benefits: ▸ Less regulation for the reuse of waste (e.g. approvals relating to regulated waste are not required) ▸ Volumes of waste disposed to landfill are reduced, reducing the cost associated with disposal.
Public Health Act 2005 (Qld)	The objective of this Act is to protect and promote the health of the Queensland public, which it seeks to achieve by, among other things, preventing, controlling and reducing risks to public health. The act identifies waste as a public health risk where it is or is likely to be hazardous to human health or where it contributes to, or is likely to contribute to, disease in humans or the transmission of an infection condition to humans. This waste management chapter aims to minimise this risk during the delivery of the Project.
Recycling and waste in Queensland 2021 (Queensland Government, 2021b)	The report presents data and trends in waste recovery and disposal in Queensland which will be used to provide a benchmark for the assessment of the generated waste from this Project.
Waste – EIS information guideline (DES, 2022i)	This guideline advises on the information and assessment requirements for the preparation of an environmental impact statement in relation to waste management.

22.3 Methodology

22.3.1 Defining impact assessment area

The impact assessment area for waste and resource management is primarily focused on conditions and activities within the Project footprint; however, consideration is also given to impacts on environmental values and sensitive receptors beyond this area, as a result of waste generation and management (e.g. offsite disposal at existing waste and resource management facilities). Combined, these areas comprise the impact assessment area for waste.

22.3.2 Project design philosophy

The design of the Project has been developed with priority given to efficient use of resources over waste management in line with the waste and resource management hierarchy presented in the 2018 National Waste Policy (Australian Government, 2018a), WRR Act and the DES *Waste – EIS information guideline* (DES, 2022i) (Figure 22-1). In alignment with the waste and resource management hierarchy, waste management has linkages with sustainability initiatives for the Project. This includes the sustainable procurement of construction materials and efficient use of resources to reduce the carbon footprint. A discussion of the sustainability principles and initiatives for the Project is presented in Chapter 7: Sustainability.

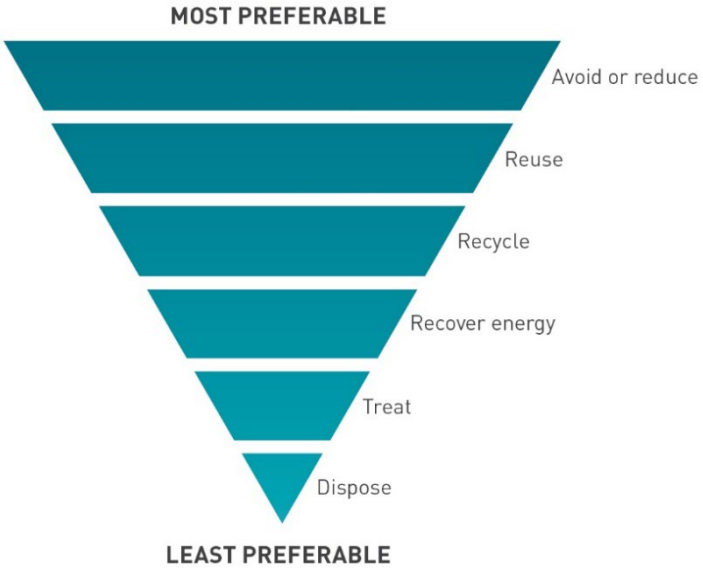


FIGURE 22-1 WASTE AND RESOURCE MANAGEMENT HIERARCHY

Source: WRR Act

Along with the resource management hierarchy, principles guiding waste and resource management processes for the Project are derived from the DES *Waste – EIS information guideline* (DES, 2022i). The main principles are defined under the WRR Act as follows:

- The polluter (user) pays principle: The polluter pays principle is the principle that all costs associated with the management of waste should be borne by the persons who generated the waste.
- The proximity principle: the principle that waste and recovered resources should be managed as close to the source of generation as possible.
- The product stewardship principle: the principle that there is a shared responsibility between all persons who are involved in the life cycle of a product for managing the environmental, social and economic impact of the product.

Opportunities for further refinement will continue to be sought including through consultation with operators and other stakeholders.

22.3.3 Waste assessment approach

The following tasks have been undertaken for assessing potential waste impacts, as a result of the Project, and give rise to assumptions that have been used as the basis of the assessment:

1. Identifying potential waste generation during the construction works and operations stages

Waste streams and volumes were derived from a review of the draft construction methodologies, design documentation, bill of quantities and the constructability assessment. The potential waste streams have been identified as:

- Earthworks material classified as 'inherently unsuitable', or excess material generated from the Project for offsite disposal that cannot be reused for environmental or land restoration purposes
- General waste, including domestic construction and demolition, recyclables, green waste
- Regulated wastes and contaminated land requiring special management requirements and/or may be challenging to treat or dispose, if required.

2. Earthworks management limitations and assumptions

Of the total excavated earthwork volume, spoil is defined as surplus material to the Project requirements and requires management of offsite disposal, either through beneficial reuse or waste. Specific assumptions and limitations for the assessment of spoil are summarised as follows and presented further in Appendix AB: Earthworks Strategy and Draft Soil Management Plan:

- Results from geotechnical investigations conducted to-date are reflective of ground conditions to be encountered during construction
- The use of suitable excavated material by the Project is based upon the relevant specification for rail and road requirements that define suitable material (outlined in Appendix AB: Earthworks Strategy and Draft Soil Management Plan)
- The identified reuse opportunities for non-conforming materials have been split into railway applications and environmental or land restoration works. A total of 95 per cent of all Project excavated materials have been nominated to be used directly by the Project, with the remaining 5 per cent of spoil to be reused offsite beneficially for environmental purposes
- Based on a review of the geotechnical investigation data within the B2G alignment, as presented in Appendix G1: Geotechnical Reports—Investigation Results and G2: Macquarie Geotechnical—Laboratory Results, approximately 1 per cent of subsurface strata encountered are of soil classifications that are considered to be 'inherently unsuitable' and not fit for use, either directly or through treatment, within the Project extent. To account for the level of uncertainty that remains with respect to geotechnical investigation spacing, design development and the detailed mass haul strategy, up to 5 per cent of total cut volume has been classified as spoil for offsite reuse, within the Project Earthworks Strategy. This value is assumed to factor in losses of material due to inefficiencies of construction arising from work sequencing, ground conditions at the time of works, weather, access, timing and availability of material, as well as an allowance for contaminated material that may be encountered during execution of the works
- Based on the proposed Earthworks Strategy, approximately 5 per cent of total cut volume is designated as offsite spoil, due to the presence of materials expected to be classified as 'inherently unsuitable' or lost due to construction inefficiencies, as nominated above. All other site-won materials have been nominated as suitable, with or without additional treatment, for re-use within the rail or road corridors in accordance with the relevant material specifications
- Based on the geological conditions encountered from geotechnical boreholes within the impact assessment area, the likelihood of encountering acid sulfate soils is considered to be low, as described in Appendix J: Soil Assessment Report
- Preliminary contaminated land investigation found contaminant concentrations below threshold values (e.g. those published in the ASC NEPM) for the most sensitive (residential) land use setting. Should contaminated soils be encountered during execution of the works, it is assumed they will be managed in accordance with the spoil management hierarchy and the relevant contaminated land guidelines and legislative requirements.
- For use within the rail corridor, treatment methods such as moisture conditioning or lime stabilisation are available options to reuse non-conforming material types within embankment construction, rail maintenance access road and other temporary construction elements
- Assumed mass hauls/routes along the Project alignment have been used based on a source-to-end-node analysis, using an approximate 50 kilometre (km) haul distance. Increases in fuel costs may well drive a change in this haul distance that may affect the availability of material and opportunities for reuse
- The estimates detailed within Appendix AB: Earthworks Strategy and the Draft Soil Management Plan have not reused materials between other Inland Rail projects; however, this is a potential option available to the Project.

- Locations identified for the acceptance of offsite spoil are indicative only and are subject to commercial negotiation by the party appointed to execute the works.

3. Identifying and consulting with existing waste facilities

The location of existing waste-management facilities, their current capacity and waste acceptance criteria have been investigated, including consultation with current operators, to assess the appropriateness of resource recovery and waste disposal options (Section 22.4.1).

4. Identifying potential impacts

The potential impacts to environmental receptors during the construction works and operations stages are described in Section 22.5. The potential impacts have been derived from an appreciation of waste generation and management issues identified from the actual design and construction information from the Project, and from an understanding of potential impacts that typically arise during the development of large-scale linear transport infrastructure.

5. Assessing risk and likelihood of identified impacts

This assessment identifies risks to environmental receptors, which are assessed in other chapters of this revised draft Environmental Impact Statement (EIS), and provides mitigation measures to demonstrate that the Project will achieve performance outcomes for waste listed under Schedule 8 of the EP Regulation:

- Waste generated, transported or received in managed in accordance with the waste and resource management hierarchy under the WRR Act
- If waste is disposed of, it is disposed of in a way that prevents or minimises adverse effects on environmental values.

22.4 Regional waste context

Existing environment and environmental receptors are assessed in other chapters of this revised draft EIS. Waste will be managed appropriately to prevent or minimise adverse effects on environmental values. This section describes waste and resource management operations in proximity to the Project.

22.4.1 Existing regional waste generation

An estimate of regional waste generation (without the Project) for Darling Downs–Maranoa has been established to inform the impact assessment presented in Section 22.6. An estimate of regional waste generation characteristics by waste stream, on an annual basis, as sourced from *Recycling and waste in Queensland 2021* (Queensland Government, 2021b) is presented in Table 22-2.

TABLE 22-2 REGIONAL WASTE DISPOSAL CHARACTERISTICS FOR DARLING DOWNS–MARANOA

Waste stream	Darling Downs–Maranoa per annum
Commercial and industrial waste (C&I)	40,086 tonnes (t)
Construction and demolition waste (C&D)	11,086 t
General waste (municipal waste)	103,499 t
Green waste1	39,312 t
Regulated waste (including asbestos)	Not reported regionally

Table note:
Denoted amount managed by local authorities and accounts for approximately 90 per cent of total green waste collected and managed within the region.

22.4.2 Licensed waste contractors and waste facilities

Waste collection, recycling and disposal facilities and services for domestic uses are provided by local governments within the impact assessment area. Commercial and industrial land uses primarily rely on private waste transportation contractors for the collection and offsite transportation of wastes. The identified waste management facilities in Table 22-3 represent facilities expected to accept waste types generated by the Project and not necessarily proposed for use by the Project. The locations of existing waste management facilities in relation to the Project are shown on Figure 22-2.

ARTC has engaged local governments on their waste management facilities and services with capacity to take Project waste during construction (summary of consultation with waste management facilities is detailed in Appendix E: Consultation Report). Discussions with waste management facilities covered waste services and capacity offered in the Toowoomba Regional Council (TRC) and Goondiwindi Regional Council (GRC) regions (further detail regarding Project consultation is in Appendix E: Consultation Report).

In the Toowoomba local government area, 14 waste management facilities have been consulted and expressed interest in entering into a commercial arrangement to deliver waste management services. These discussions will be ongoing as the Project progresses to detailed design and construction.

The GRC has prepared a waste strategy in response to the reinstatement of the Queensland waste levy. The GRC operates two designated landfill sites, located in Goondiwindi and Inglewood, with weighbridges and a transfer station at Yelarbon. In the Goondiwindi local government area, three waste facilities have been consulted and expressed interest in taking waste from the Project.

Additional commercial businesses and private landowners have expressed interest in taking or providing materials during construction, and while negotiations are at an early stage, ARTC will provide ongoing engagement to ensure these suppliers are actively informed at every stage of the Project.

Many of the waste management facilities listed in Table 22-3 accept clean spoil material; however, due to the anticipated material deficit for the Project, it is a core principle of the Project that the offsite disposal of spoil be avoided, unless material is encountered that cannot be treated for reuse within the Project footprint (Section 22.1); therefore, none of the facilities listed in Table 22-3 have been specifically identified as potential spoil disposal sites for the Project. This objective of retaining material onsite is reflected in Appendix AB: Earthworks Strategy and Draft Soil Management Plan.

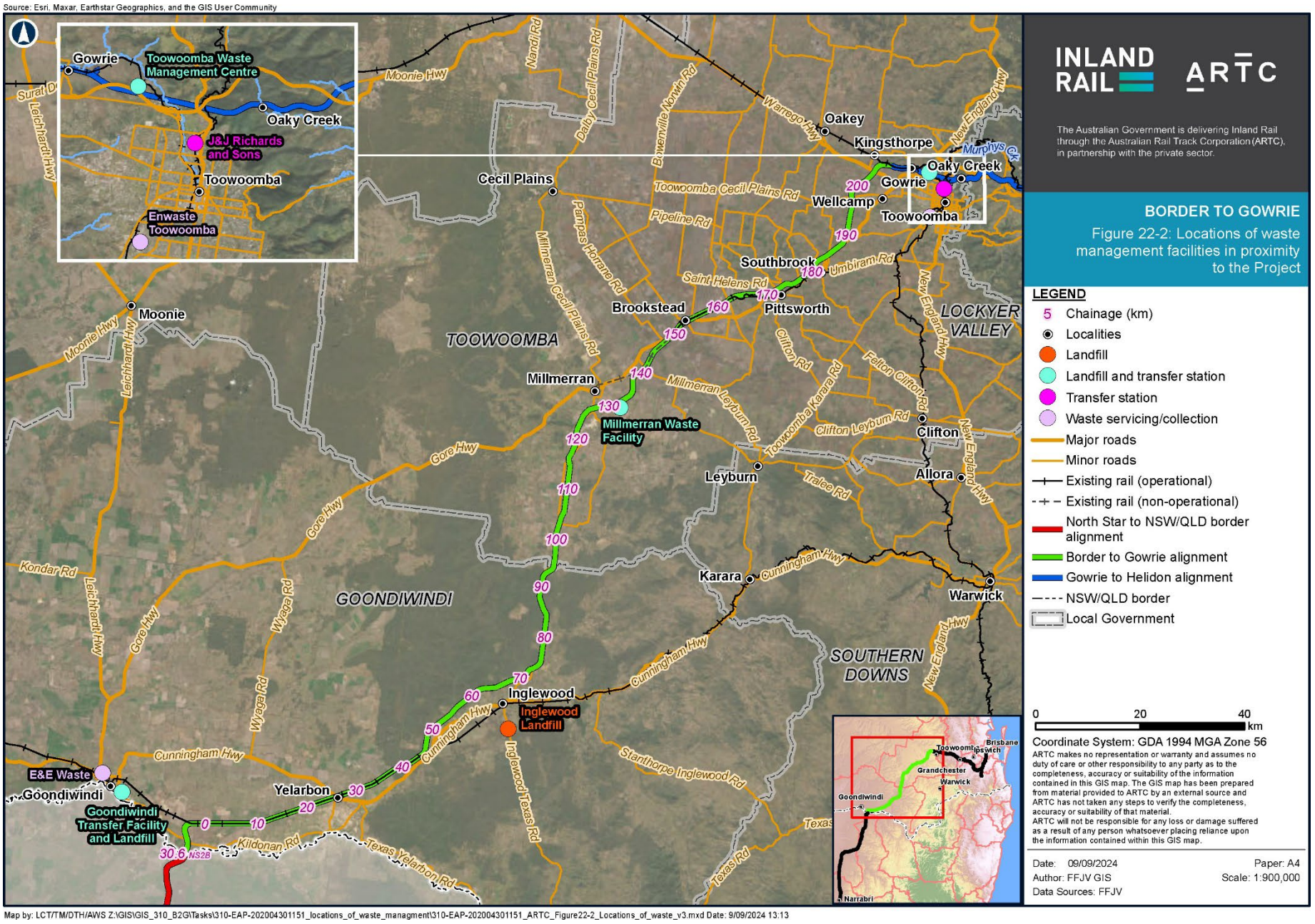
ARTC will continue to consult with relevant local governments and waste facility operators prior to the commencement of construction to confirm the Project's approach to waste disposal and spoil management.

TABLE 22-3 WASTE MANAGEMENT FACILITIES IN PROXIMITY TO THE PROJECT

Facility	Type	Operator	Contact details and opening hours	Services performed	Waste accepted	Environmental Authority and EA threshold (facility capacity)
Toowoomba Waste Management Centre	Landfill and transfer station	TRC	155–175 Hermitage Road, Cranley QLD (07) 13 18 72 ▸ Monday to Friday 7.00 am to 5.00 pm ▸ Saturday and Sunday 8.00 am to 5.00 pm	▸ Green waste stockpiling and shredding ▸ C&D waste recycling ▸ Limited regulated waste disposal ▸ Municipal solid waste disposal	▸ C&I waste ▸ C&D waste ▸ Green waste ▸ General (putrescible and non-putrescible) ▸ Regulated waste	EPPR00625013 100,000 to 200,000 t/year
Millmerran Waste Facility	Landfill and transfer station	TRC	Owens Scrub Road, Millmerran QLD (07) 13 18 72 ▸ Monday 1.00 pm to 5.00 pm ▸ Wednesday 8.00 am to 12 noon ▸ Friday 1.00 pm to 5.00 pm ▸ Saturday and Sunday–10.00 am to 3.00 pm	▸ Green waste stockpiling and shredding ▸ Limited C&D waste recycling ▸ Limited regulated waste disposal ▸ Municipal solid waste disposal	▸ C&I waste ▸ C&D waste ▸ Green waste ▸ General (putrescible and non-putrescible) ▸ Regulated waste (no solid regulated waste)	EPPR00625013 2,000 to 5,000 t/year
Goondiwindi Transfer Facility and Landfill	Landfill and transfer station	GRC (Proterra Group)	Rubbish Tip Road, Goondiwindi QLD (07) 4671 7400 ▸ Monday to Friday 8:00 am to 5:00 pm ▸ Saturday and Sunday 9.30 am to 5.00 pm	▸ Green waste stockpiling and shredding ▸ C&D waste recycling ▸ Limited regulated waste disposal ▸ Municipal solid waste disposal	▸ C&I waste ▸ C&D waste ▸ Green waste ▸ General (putrescible and non-putrescible) ▸ Regulated waste	EPPR00809313 5,000 to 10,000 t/year
Inglewood Landfill	Landfill	GRC (Proterra Group)	Inglewood-Texas Road, Inglewood QLD (07) 4671 7440 ▸ Open 24/7 ▸ Only Wednesday: Commercial/Industrial and Construction Demolition waste	▸ Green waste stockpiling and shredding ▸ Limited C&D waste recycling ▸ Limited regulated waste disposal ▸ Municipal solid waste disposal	▸ C&I waste ▸ C&D waste ▸ Waste oils ▸ Green waste ▸ General (putrescible and non-putrescible) ▸ Scrap metal ▸ Regulated waste	EPPR00809313 5,000 to 10,000 t/year
E&E Waste	Waste servicing/ collection	E&E	81 Hungerford Street, Goondiwindi QLD (07) 4671 2403 ▸ Monday to Friday–8.00 am to 4.00 pm ▸ Saturday 8.00 am to 12.00 pm	▸ Collection service only	▸ C&I waste ▸ C&D waste ▸ Green waste ▸ General (putrescible and non-putrescible) ▸ Regulated waste	Not applicable

Facility	Type	Operator	Contact details and opening hours	Services performed	Waste accepted	Environmental Authority and EA threshold (facility capacity)
Enwaste Toowoomba	Waste servicing/ collection	Enwaste	18 Spalding Street, Toowoomba City QLD (07) 4638 2245 Open 24/7	▸ Skip bin hire ▸ Waste recycling ▸ C&D waste recycling	▸ C&I waste ▸ Green waste ▸ Regulated waste (only liquid regulated waste)	Not applicable
Zilch Waste Recyclers (previously known as Beutel Oughtred Sons)	Recycling services	Beutel Oughtred Sons	42-72 Griffiths Street, Toowoomba QLD (07) 4638 4438 ▸ Monday to Friday 7.00 am to 4:30pm	▸ C&D waste recycling	▸ C&I waste ▸ C&D waste ▸ Green waste	EPPR00230213 5,000 to 10,000 t/year
J&J Richards and Sons	Transfer station	J&J Richards and Sons	51 Wilkinson Street, Harlaxton QLD (07) 4634 1062 ▸ Monday to Friday 8.00 am to 5.00 pm	▸ Acceptance and transfer of C&I waste, C&D waste, municipal solid waste and limited regulated waste ▸ Operates adjacent to Orgro, where green waste can be re-purposed into organic mulches and conditioned soils	▸ C&I waste ▸ C&D waste ▸ Green waste ▸ General (putrescible and non-putrescible) ▸ Regulated waste	EPPR00875913 1 to 100 t/year

Table notes:
C&I = Commercial and industrial, C&D = Construction and demolition


Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Gowrie
Toowoomba Waste Management Centre
Oaky Creek
J&J Richards and Sons
Toowoomba
Enwaste Toowoomba
Moonie
Cecil Plains
Oakey
Kingsthorpe
Wellcamp
Gowrie
Oaky Creek
Toowoomba
Southbrook
Pittsworth
Brookstead
Millmerran
Millmerran Waste Facility
Leyburn
Clifton
Allora
Karara
Warwick
Inglewood
Inglewood Landfill
Yelarbon
E&E Waste
Goondiwindi
Goondiwindi Transfer Facility and Landfill
TOOWOOMBA
GOONDIWINDI
LOCKYER VALLEY
SOUTHERN DOWNS
Moonie Hwy
Leichhardt Hwy
Gore Hwy
Cunningham Hwy
Warrego Hwy
New England Hwy
Toowoomba Cecil Plains Rd
Pipeline Rd
Millmerran Cecil Plains Rd
Pampas Horrane Rd
Saint Helens Rd
Jumbiram Rd
Clifton Rd
Millmerran Leyburn Rd
Toowoomba Karara Rd
Felton Clifton Rd
Clifton Leyburn Rd
Tralee Rd
Kondar Rd
Wyaga Rd
Inglewood Texas Rd
Stanthorpe Inglewood Rd
Kildonan Rd
Texas Yelarbon Rd
Texas Rd
Murphys Ck
Brisbane
Ipswich
Grandchester
Narrabri
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
30.6
NS2B
INLAND RAIL
ARTC
The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.
BORDER TO GOWRIE
Figure 22-2: Locations of waste management facilities in proximity to the Project
LEGEND
5 Chainage (km)
Localities
Landfill
Landfill and transfer station
Transfer station
Waste servicing/collection
Major roads
Minor roads
Existing rail (operational)
Existing rail (non-operational)
North Star to NSW/QLD border alignment
Border to Gowrie alignment
Gowrie to Helidon alignment
NSW/QLD border
Local Government
0 20 40 km
Coordinate System: GDA 1994 MGA Zone 56
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Author: FFJV GIS
Scale: 1:900,000
Data Sources: FFJV
Map by: LCT/TM/DTH/AWS Z:\GIS\GIS_310_B2G\Tasks\310-EAP-202004301151_locations_of_waste_managment\310-EAP-202004301151_ARTC_Figure22-2_Locations_of_waste_v3.mxd Date: 9/09/2024 13:13

22.5 Potential impacts

Waste generation during the construction works and operations stages of the Project may result in the following potential impacts on the environmental values:

- Waste disposal, additional to current levels, resulting in increased consumption of existing landfill capacity and reduction of community access to waste facilities within the waste and resource management study area
- Uncontrolled release of waste from the improper storage, or failure of management systems resulting in contamination of receiving environments (i.e. land, surface water and air)
- Increase in the incidence of vermin, insects and pests from the inappropriate storage and handling of putrescible wastes
- Reduced visual amenity of land uses adjacent to the Project
- Increased transportation of waste materials onsite and offsite, resulting in:
  - the increase of greenhouse gas emissions due to the combustion of hydrocarbons from the operation of vehicles/plant used to transport and manage waste
  - decreased amenity of land uses adjacent to the Project from the generation of dust and road deterioration
  - traffic issues related to heavy vehicle usage of the road network
- Risks to human health and safety of site personnel, through the release of pollutants from the poor management of regulated wastes.

The proposed management approach and relationship to the waste management hierarchy for each waste stream is presented in Table 22-10.

The construction of the Project will generate several waste streams that will be managed by maximising opportunities to avoid or reduce, reuse and recycle; however, there will be waste streams for which this cannot be achieved (e.g. municipal solid waste arising from non-resident workforce accommodation). In these instances, wastes will be disposed of at appropriately licensed facilities (Table 22-3).

The ability of waste-receiving facilities listed in Table 22-3 to receive wastes generated by the Project has been determined based on initial consultation with operators, a review of environmental authority licensing under the EP Act. Feedback from consultation with TRC and GRC has indicated that the facilities listed in Table 22-3, which are owned and/or managed by these councils, are expected to have sufficient combined capacity to accept waste materials generated by the Project (Appendix E: Consultation Report). As requested by landfill operators, waste-acceptance criteria and ability to receive Project wastes will be re-confirmed with local landfill facilities prior to the commencement of construction.

The volume of vehicles for waste transport from construction areas to established waste facilities is not expected to significantly impact the functioning of the existing road network. Localised latent conditions will dictate requirements for material disposal during construction; as such, the origin location of material to be disposed of is not known at this time. Therefore, traffic impacts associated with the offsite disposal of waste have assumed mass hauls/routes based on a source-to-end-node analysis using a 50 km haul distance. Increases in fuel costs may drive a change in this haul distance that may affect the availability of material and opportunities for reuse. ARTC will ensure access to waste facilities will be maintained for commercial waste contractors, domestic self-haul customers and construction traffic. The traffic impact assessment for the Project is discussed in Chapter 20: Traffic, Transport and Access.

The generation of waste will occur throughout the construction works and operations stages of the Project. The waste streams and quantities for the Project identified in this assessment are indicative and have been estimated for the purpose of determining potential impacts, and waste and resource management options. Waste types and volumes that are expected to be generated by the Project will be confirmed following further design development and construction methodology planning during detailed design to seek to further minimise waste generation and maximise re-use opportunities available to the project. These confirmed details will be incorporated into the Waste Management Plan, as a component of the Construction Environmental Management Plan.

Table 22-4 identifies corresponding chapters of the revised draft EIS where the potential impacts that may arise from waste on environmental values are discussed.

TABLE 22-4 ENVIRONMENTAL VALUES POTENTIALLY IMPACTED BY THE PROJECT

Environmental value	Potential impacts	EIS chapter
Adjacent land uses and productive capacity of land (i.e. its potential for use for cropping activities and animal husbandry)	▸ Release of contaminants including litter/debris, fuels, hydrocarbons and chemicals ▸ Spread of pests and disease ▸ Reduced visual amenity ▸ Waste disposal additional to current levels	Chapter 8: Land Use and Tenure Chapter 9: Land Resources Chapter 10: Landscape and Visual Impact Assessment
Receiving environments surrounding the Project (i.e. land, surface water and air quality) and areas of recognised ecological significance, including Whetstone State Forest and Bringalily State Forest	▸ Release of contaminants including litter/debris, fuels, hydrocarbons and chemicals ▸ Reduced visual amenity	Chapter 9: Land Resources Chapter 10: Landscape and Visual Impact Assessment Chapter 11: Flora and Fauna Chapter 12: Air Quality
Health and safety of site personnel, adjacent landowners and communities	▸ Release of contaminants including litter/debris, fuels, hydrocarbons and chemicals ▸ Spread of pests and disease	Chapter 17: Social

22.5.1 Waste types

Construction and maintenance activities for the Project are expected to result in the production of various waste streams (Table 22-5). The waste stream classifications are consistent with those established under the EP Regulation Schedule 9 and used by the State Government for policy and planning purposes. The waste streams and quantities for the Project identified in this assessment are indicative. They will be re-estimated once the construction methodology is finalised during detailed design. These confirmed details will be incorporated into the Waste Management Plan, as a component of the Construction Environmental Management Plan.

TABLE 22-5 WASTE STREAMS, DEFINITION AND POTENTIAL PROJECT SOURCES

Waste stream	Definition	Potential Project source
C&I waste	Waste that is produced by business and commerce and includes waste from schools, restaurants, offices, retail and wholesale businesses, and manufacturing industries. In the case of green waste, it includes material delivered by commercial operations.	▸ Non-resident workforce accommodation ▸ Site offices
C&D waste	Non-putrescible waste arising from the construction or demolition activities. C&D waste includes materials such as brick, timber, concrete and steel.	▸ Demolition/removal of existing structures ▸ Work fronts ▸ Demobilisation of construction facilities (e.g. site offices)
General waste	Wastes not defined as regulated waste under legislation. General wastes comprise putrescible wastes (easily decomposed, treated by composting) and non-putrescible wastes (not easily decomposed, may be recyclable).	▸ Kitchen and general waste from non-resident workforce accommodation ▸ Site offices ▸ Work fronts ▸ Laydown areas
Green waste	Includes grass clippings, tree, bush and shrub trimmings, branches and other similar material resulting from landscaping or maintenance activities.	▸ Clear and grubbing activities ▸ Site preparation works
Recyclable waste	Waste types that can be reconditioned, reprocessed or reused. What constitutes recyclable waste may change between local government areas, as it depends on what the local government has declared to be recyclable waste for the area.	▸ Non-resident workforce accommodation ▸ Site offices ▸ Work fronts ▸ Laydown areas

Waste stream	Definition	Potential Project source
Regulated waste	Waste that is commercial or industrial and is of a type or contains a constituent of a type mentioned in Schedule 9, Part 1, Column 1 of the EP Regulation. Regulated wastes require specific controls or actions as defined by legislation. Listed hazardous, regulated, controlled or trackable wastes typically have unique handling and disposal requirements in order to manage specific hazards associated with them. Regulated waste includes asbestos, pesticides, a range of chemicals and other industrial wastes (i.e. grease trap waste).	▸ Used containers and residues of hazardous chemicals and dangerous goods ▸ Kitchen waste from non-resident workforce accommodation (e.g. food processing waste, grease trap waste, etc.) ▸ Vehicle, plant and equipment maintenance (e.g. tyres, lead acid batteries, etc.) ▸ Demolition/removal of existing structures (e.g. asbestos, lead-based paint, etc.)

22.5.2 Construction wastes

Key stages and activities with the potential to generate waste streams during the construction works stage of the Project include:

- Site preparation
  - vegetation clearing and grubbing
  - topsoil stripping
  - demolition of existing infrastructure
  - establishment of laydown areas and work fronts
  - establishment of construction compounds
  - establishment of site offices
  - installation of temporary and permanent fencing
  - installation of drainage and water management controls
  - construction of site access roads.
- Civil works:
  - bulk earthworks
  - construction of cuts and embankments
  - installation of permanent drainage controls
  - construction of bridges and watercourse crossings
  - road and rail corridor works.
- Track works:
  - installation of ballast, sleepers and rails
  - rail systems infrastructure and wayside equipment
  - signals
  - turnouts
  - asset monitoring infrastructure.
- Commissioning and integration testing
- Construction demobilisation/decommissioning:
  - removal of construction site facilities (e.g. site offices, amenities and associated infrastructure)
  - removal of temporary access/haul roads
  - removal of laydown areas and hardstands.

A detailed discussion of construction activities required to establish the Project is presented in Chapter 5: Project Description.

The waste types and volumes that are expected to be generated during the construction works stage of the Project are presented in Table 22-6. It is assumed that site office and non-resident workforce accommodation infrastructure will be demountable in nature and returned to suppliers for reuse upon demobilisation. In this assessment, spoil is characterised as part of the C&D waste stream to demonstrate the benefit of having this material appropriately dealt with during the Project and subsequently reduce impacts to the waste management system. Where uncertainty exists regarding waste quantities, estimates have been rationalised through reference to *Integrated Solid Waste Management: Engineering Principles and Management Issues Report* (Tchobanoglous et al.,1993). These details will be subject to further refinement during progression of detailed design as the construction approach is confirmed.

All procured material (i.e. concrete, steel, timber and ballast) will be required to meet material specifications and quality assurance criteria adopted by ARTC for Inland Rail, as set out in Figure 22-3. A portion of this material is expected to be non-compliant with quality requirements and if no alternative use is identified, this material would contribute to a construction waste stream.

The waste streams expected to be produced by the Project have been categorised at a broad level only, as they will be managed by the Project which will be required to comply with industry standards and all statutory requirements pertaining to waste and resource management.

TABLE 22-6 ESTIMATED CONSTRUCTION WORKS STAGE WASTE QUANTITIES

Waste/resource description	Waste type	Quantity of waste estimated to be produced during the construction stage	Potential reuse
Vegetation	Green waste	14,640,000 square metres (m^2)	Yes Cleared vegetation will be mulched and reused for site stabilisation and rehabilitation or, where vegetation has a commercial value (e.g. trees within State forest), salvaged by the landowner for on-site/use
Spoil	C&D Waste	572,500 cubic metres (m^3) (143,125 m^3 annually)	Yes Spoil resulting from excess cutting excavations of borrow pits, rail and road corridor elements are proposed to be reused for the backfill of borrow pits
Steel (existing rail)	C&D waste	5,800 t	Yes Where practical, opportunities for reuse will be explored
Timber sleepers	Regulated waste (regarded as contaminated)	361,700 count	Yes Opportunities for reuse will be considered consistent with the intent of *EOW Code: Chemically Treated Solid Timber (ENEW07503218)*
Ballast	Regulated waste (regarded as contaminated)	400,100 m^3	Yes Opportunities for reuse will be considered consistent with the intent of *Draft EOW Code: Recycled Aggregates (ENEW07604819)*
Occupation of non-resident workforce accommodation	General waste/ C&I waste	115 t	No Materials will be recycled where possible
Occupation of site offices	General waste/ C&I waste	26 t	No Materials will be recycled where possible
Concrete culverts	C&D waste	447 m^3	Yes Opportunities for reuse will be considered consistent with the intent of *EOW Code: Returned Concrete (ENEW07278517)*
Concrete (in situ)	C&D waste	1,850 m^3	Yes Opportunities for reuse will be considered consistent with the intent of *EOW Code: Solid Concrete Washout (ENEW07602819)* and *EOW Code: Liquid Concrete Washout (ENEW07602719)*
Concrete (pre-cast)	C&D waste	490 m^3	Yes Opportunities for reuse will be considered consistent with the intent of *EOW Code: Returned Concrete (ENEW07278517)*
Oils, lubricants and greases	Regulated waste	Cannot be determined at present. Waste quantity is dependent on confirmed construction method and the numbers and types of plant and vehicular fleet	No
Packaging	General waste	Cannot be determined at present. Waste quantity is dependent on confirmed construction method, material requirements and packaging of received goods	Yes Opportunities for reuse will be considered consistent with the intent of the *National Environment Protection (Used Packaging Materials) Measure 2011*

Of the wastes identified in Table 22-6, mitigations guided by the Waste and Resource Management Hierarchy are detailed in Section 22.6.3 and Table 22-10.

As outlined in Appendix AB: Earthworks Strategy and Draft Soil Management Plan, a selective combination of reuse opportunities has been adopted to minimise the volume of material that is designated as excess spoil for offsite reuse. Reuse methodology for earthworks material management is show in Figure 22-3. For example, preliminary calculations based on the revised reference design indicate that the reuse of non-conforming general fill (Type E) within zoned embankments and other railway elements will result in an estimated reduction of spoil from 20 per cent of cut material to 5 per cent. The reuse options that are adopted during construction will be dependent on the detailed mass haul at the conclusion of detailed design. If the total volume of spoil produced by the Project was disposed to landfill, it is deemed to present a significant impact for existing waste management infrastructure based on comparison to construction and demolition waste; noting construction and demolition waste does not typically include clean earth fill.

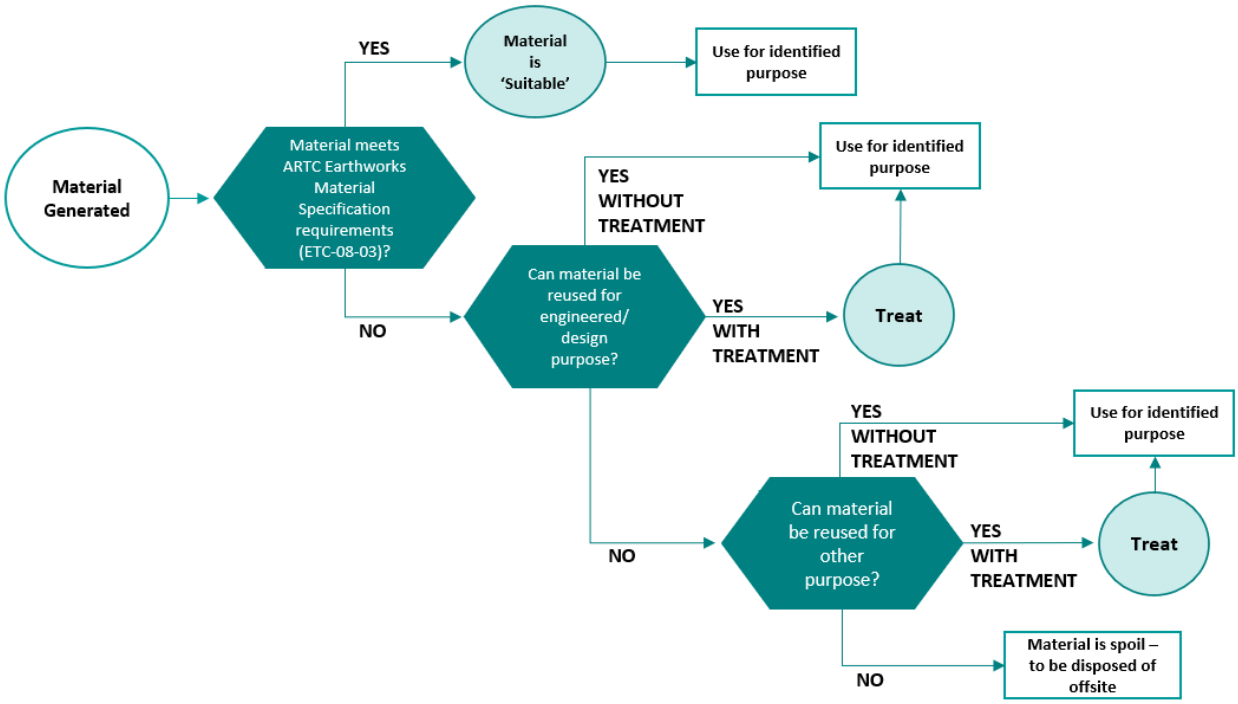

FIGURE 22-3 EARTHWORKS MATERIALS MANAGEMENT FRAMEWORK

22.5.2.1 Generation of waste materials

The revised reference design for the Project has, where possible, endeavoured to achieve a net balance of cut and fill, to avoid the need for offsite disposal of material. Where possible, materials won from excavation, such as cuttings, will be reused as fill; however, materials may be encountered that are deemed to be unsuitable without treatment, for various reasons, including:

- Organic content: Materials with organic content are typically considered unsuitable due to being highly compressible, degradable and susceptible to collapse
- Contamination: Contaminants may be present in the material due to several factors, including agricultural activity, waste disposal, brownfield Queensland Rail corridor and acid sulfates
- Oversize materials: Blasted or ripped rock with particles larger than 150 millimetres (mm) are typically excluded from earthworks, as they cannot be adequately compacted. The oversize material can be considered for use as rock fill or rip-rap.
- Materials subject to soil piping: such as fine single-sized sand, windblown sand and non-cohesive silt.

Estimated bulk earthworks volumes are presented in Table 22-7. Balancing of the cut-and-fill volumes may result in surplus or deficit of bulk earthworks material, depending on further geotechnical investigations and adjustments made during detailed design, which supports the technical and economic feasibility of material treatment options. The current fill deficit for the Project will be met through the importation of appropriate material types from existing operational, licensed quarries or from the six borrow pit locations proposed to be established for the Project.

TABLE 22-7 ESTIMATED CUT AND FILL REQUIREMENTS FOR THE PROJECT

Earthworks	Volume (m^3)	Breakdown		
Cut		**Spoil %**	**Spoil volume (m^3)**	**Usable / reuse cut volume (m^3)**
Cut (rail)	11,368,000	5	568,000	10,800,000
Cut (road)	90,700	5	4,500	86,200
Total cut	**11,458,700**		**572,500**	**10,886,200**
Fill		**Usable/reuse cut volume (m^3)**	**Borrow volume (m^3)**	**Quarry volume (m^3)**
General (rail elements)	10,975,000	10,725,740	26,830	222,430
Structural (rail formation)	551,000	-	271,150	279,850
Capping (rail formation)	350,000	-	-	350,000
Fill requirement (rail corridor requirements)	11,876,000	-	-	-
Fill requirement (road elements)	802,300	160,460	-	641,840
Total Project fill requirements	**12,678,300**	**10,886,200**	**297,980**	**1,494,120**

Table note:
The ARTC Earthworks Material Specification (outlined in Appendix AB: Earthworks Strategy and Draft Soil Management Plan) describes material types, associated compliance criteria and classification/suitability for use within earthworks for the Inland Rail Program. The material classes specified in ARTC Earthworks Material Specification are unique to ARTC.

The majority of the cut material produced by the Project will be reused as Project fill components. Approximately 572,500 m^3 of spoil will be generated during construction. Where practicable, unsuitable material will be beneficially reused within the Project footprint through treatment, amelioration or drying or for offsite reuse subject to compliance with relevant legislation and policy framework, demonstration of the material as clean and written agreement with the receiver. Material that is not suitable for reuse, such as due to geotechnical, contamination or biosecurity constraints, will be disposed at an offsite licenced facility.

22.5.2.2 Spoil storage areas

In the first instance, spoil will be directly transported to a point of immediate reuse within the Project footprint. In the event this is not possible; the material will be temporarily stockpiled along the Project right of way established or within designated laydown areas. Where practicable, stockpiles will not be maintained for more than 12 months to avoid impacts to nutrients available and organic composition of soils. Stockpile areas have been nominated based on current earthwork and project planning in locations within the rail corridor and outside of flood-prone areas. Stockpiles will be located as close as possible to the source of the excavated material or its intended destination. Stockpiles will be separated by material type and held at minimum 20 m apart, where practicable to allow discrete soils types to be separated and located to minimise disruption to overland flow paths.

Laydown areas that may be used for the temporary stockpiling of material have been allocated in Appendix AB: Earthworks Strategy and Draft Soil Management Plan. Stockpiles will be located as close as possible to the source of the excavated material or its intended destination and will be isolated by material type.

The identification of spoil haulage disposal routes and potential impacts on construction routes and local government traffic networks and road infrastructure is discussed in Chapter 20: Traffic, Transport and Access. Mitigation measures associated with spoil haulage disposal routes are also discussed in Chapter 20: Traffic, Transport and Access. Chapter 5: Project Description summarises the mass haul material movement breakdown along the alignment.

22.5.3 Operational wastes

Site-maintenance activities will be undertaken during the operations stage of the Project and will typically include inspections of rail track and structures, vegetation management, rail track replacement/upgrade and general asset upkeep.

The waste types anticipated to be generated during the operations stage of the Project are shown in Table 22-8. These waste types have been identified based on what is typically generated during the undertaking of maintenance activities on ARTC's existing freight railway networks. Wastes generated will typically include materials that are no longer suitable for their intended purpose, such as ballast, rail or sleepers, and therefore require replacement.

TABLE 22-8 OPERATIONS STAGE WASTE TYPES AND WASTE STREAMS

Activity	Waste type	Waste stream
Vegetation management	Green waste	General waste (non-putrescible)
Re-profiling of landforms (e.g. embankments)	Potentially contaminated solid waste	Regulated waste
General upkeep	Debris, litter/rubbish	General waste (non-putrescible)
Rail track replacement/upgrade	Scrap metal—rail	General waste (non-putrescible)
	Potentially contaminated solid waste—ballast and sleepers	Regulated waste
Infrastructure maintenance	Waste paints and solvents	Regulated waste
General maintenance of rail corridor	Empty chemical containers	Regulated waste
Maintenance of erosion and control devices and culverts	Silt and sediment	General waste (non-putrescible)
	Vegetative debris	General waste (non-putrescible)

22.6 Mitigation measures

This section describes the measures that either have been, or will be adopted by the Project to avoid, minimise or mitigate potential impacts attributed to waste. The mitigation measures have been developed to consider best practice management measures as outlined in:

- The 2018 National Waste Policy (Australian Government, 2018a)
- WRR Act
- EP Regulation.

Cross-references to these guidelines are provided within the mitigation measures in Sections 22.6.1 and 22.6.3, where applicable.

A hierarchical approach to waste management will be implemented for the Project from the most preferable, avoidance, to the least preferable, disposal (Figure 22-1). Waste management strategies that avoid the generation of waste materials in the first instance will be prioritised. Where waste cannot be avoided, waste materials will be segregated by type for collection and removal by licensed contractors.

Resource-use efficiency and by-product reuse is a core Project priority underling the waste management and mitigation measures that are proposed for the Project. There are both environmental and economic benefits to investigating and maximising opportunities for resource use efficiency and by-product reuse, while also unlocking potential for innovation.

The approach to resource efficiency that will be adopted for the Inland Rail Program, and this Project, is summarised in Figure 22-4.

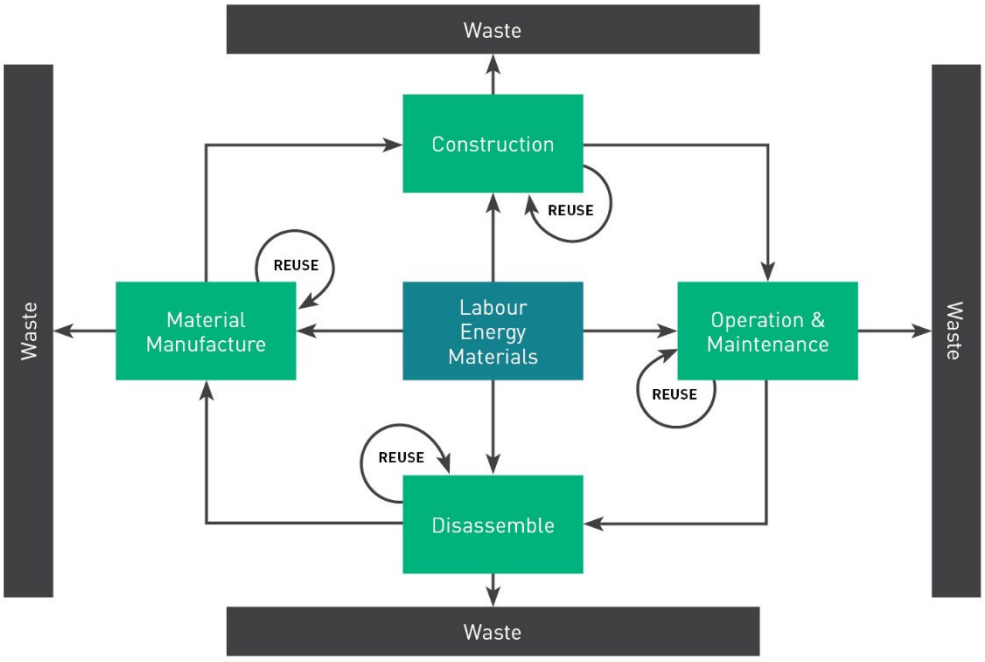

FIGURE 22-4 APPROACH TO RESOURCE USE EFFICIENCY AND BY-PRODUCT REUSE

22.6.1 Mitigation through the revised reference design stage

Development of the revised reference design has progressed in parallel with the impact assessment process. As a result, design solutions for avoiding, minimising or mitigating impacts have been incorporated into the revised reference design as appropriate and where possible.

Included mitigation measures and controls are as follows:

- The quantity of spoil to be generated by the Project has been reduced through development of the revised reference design to achieve as close to a net balance in earthworks as is practicable. For the most part, this is achieved through:
  - aligning the Project to avoid, where possible, steep terrain and topographical constraints
  - considering the shape and size of batters to encourage cut-and-fill balancing
  - optimising the number, width and depth of cuts
- The purpose of the Earthworks Strategy (Appendix AB: Earthworks Strategy and Draft Soil Management Plan) is to provide overarching principles to guide the storage, treatment, reuse or disposal of material generated during construction of the Project
- A value-management process has been implemented that focuses on identifying potential opportunities for defining, maximising and achieving efficiencies through the design, construction and operation of the Project
- Consideration of the following:
  - reuse of local sources of aggregate and treatment of dispersive and reactive materials to improve mass haul
  - reuse of material excavated below the rail embankment for less critical parts of infrastructure
  - reuse of excavated material as a stabilised structural fill
  - viability of the reuse of ballast as high-quality general fill or structural fill to minimise the import of rock amour.
- Initial discussions have been had with the Department of Agriculture and Fisheries to identify opportunities for State forest timber salvage to supply local timber mills prior to commencement of rail construction.

Consultation has commenced with the owners and operators of existing waste management facilities in proximity to the Project (i.e. Toowoomba Waste Management Centre) to determine the wastes accepted, waste acceptance criteria and capacity to receive wastes from the Project during detailed design, prior to construction. ARTC commits to continuing this consultation (Table 22-3).

22.6.2 Waste storage areas

Waste storage areas will be located within the Project footprint and managed to ensure that risks to the environment are avoided or minimised, by considering:

- Waste characteristics and leachability
- Potential for nuisance and pollution generation (odour, dust and litter)
- Proximity to, and the sensitivity of, the surrounding environments and receptors
- Potential for impacts to human health
- Site conditions, duration of storage and climatic conditions.

As required, designated areas will be made available for the storage of general waste and contaminated material. The siting and management of waste storage areas will be contingent on confirmation of the finalised construction methodology, workforce planning and earthworks sequencing.

22.6.2.1 General waste storage areas

Designated areas with sufficient space for waste storage, handling and collection activities will be provided at each construction work front. These waste storage areas will enable the sorting and segregation of waste prior to collection by appropriately licensed contractors. Each storage area will be provided on hardstand or within suitable receptables or bunding for the waste stream being stored.

Good housekeeping and regular removal of residual waste would be practiced at waste storage areas to maintain safety, facilitate identification of reusable items and minimise opportunities for pests to proliferate in the area.

22.6.2.2 Contaminated material storage areas

If required, appropriate storage areas for contaminated soil will be identified subject to findings of site contamination investigations. The potential for contaminated soil to be encountered within the Project footprint is discussed in Chapter 9: Land Resources.

Contaminated soil that is identified in advance and will be excavated will be subject to a site management plan that is prepared in accordance with the requirements of the EP Act. Depending on the type and levels of contamination encountered, contaminated material may be reused for construction activities within the rail corridor, such as through encapsulation within zoned embankment. In some instances, contaminated material may require treatment prior to being suitable for reuse. The onsite management and remediation of contaminated soil would be further informed by a review of sampling results, exposure risks, onsite treatment or encapsulation opportunities, and requirements for ongoing management.

A disposal permit from DESI would be required for the transportation of contaminated soil by a licensed service provider to an appropriately licensed facility.

22.6.3 Proposed mitigation measures

In order to manage and mitigate Project risks, several mitigation measures have been developed for implementation in future stages of Project delivery. These mitigation measures have been identified to address Project-specific issues and opportunities, including legislative requirements and accepted government plans, policy and practices.

Table 22-9 identifies the relevant Project stage, the aspect to be managed and the proposed mitigation measure. The mitigation measures presented in Table 22-9 have then been factored into the assessment of residual risk, as documented in Table 22-11.

Further context and the framework for implementation of these proposed mitigation and management measures is provided in Chapter 24: Draft Outline Environmental Management Plan.

TABLE 22-9 MITIGATION MEASURES FOR WASTE MANAGEMENT

Stage	Aspect	Proposed mitigation measures
Detailed design	Generation of waste	▸ Develop a Waste Management Plan, as a component of the Construction Environmental Management Plan (CEMP), in consultation with relevant stakeholders (e.g. GRC, TRC, operators of waste facilities). As a minimum, the plan will establish: ▸ waste targets (or waste reduction targets) to be achieved for the Project, in accordance with the WRR Act ▸ general protocols and performance objectives for keeping the work site clean and tidy ▸ processes for documenting waste volumes, types and how these will be compared to waste targets in accordance with the EP Regulation ▸ confirmation of waste streams and estimated volumes ▸ temporary waste storage areas and disposal locations on and offsite (Table 22-3) ▸ requirements for secure temporary storage, collection frequency and disposal/recycling requirements, in accordance with the EP Regulation ▸ requirements for regulated waste disposal including how waste will be isolated, storied, and transported to pre-determined destinations agreed in consultation with relevant stakeholders ▸ requirements for the provision of regulated waste disposal receptacles, storage bins and coverage (if required) ▸ waste disposal and NEPM criteria for disposal sites, in accordance with the environmental authority conditions for operational facilities (Table 22-3) ▸ requirement for the Project to engage a licensed waste transportation contractor to transport regulated waste from the Project footprint to appropriately licensed disposal facilities ▸ methods for survey of infrastructure that will be removed or disturbed by the Project prior to the commencement of construction, to identify asbestos-containing materials and other hazardous materials ▸ requirements for waste isolation, for example green waste, C&I waste, C&D waste, general waste, regulated waste and recyclables, in accordance with the EP Regulation ▸ procedures and reporting/documentation requirements for ensuring waste transporters and receivers are appropriately licensed according to the type of waste, in accordance with the EP Regulation

Stage	Aspect	Proposed mitigation measures
		▸ requirements for training, inspections, audits, corrective actions, notification and classification of environmental incidents ▸ requirements for workers to have relevant skills and qualifications for removal and handling of asbestos-containing materials, including Workplace Health and Safety Queensland licence requirements ▸ requirements for record keeping, notification processes, monitoring and performance objectives for handover on completion of construction. ▸ Maximise the reuse of local sources of aggregate and treatment of dispersive and reactive materials to improve mass haul ▸ Maximise the reuse of material excavated below the rail embankment for less critical parts of infrastructure ▸ Maximise the reuse of excavated material as a stabilised structural fill ▸ Optimise the number, width and depth of cuts to avoid the generation of material that would be considered surplus to Project requirements ▸ Continue to investigate the viability of the reuse of ballast as high-quality general fill or structural fill to minimise the import of rock amour ▸ Refine the horizontal and vertical design and alignments to minimise the quantity of offsite fill required ▸ Review the cut-and-fill balance for the Project during detailed design, to minimise reliance on the external sourcing of fill ▸ Review and update the Earthworks Strategy (Appendix AB: Earthworks Strategy and Draft Soil Management Plan). The Earthworks Strategy will be finalised prior to the commencement of pre-construction activities and early works and construction stages in consultation with GRC and TRC ▸ ARTC consult with relevant local governments and waste facility operators prior to the commencement of construction, to confirm the Project's approach to waste disposal and spoil management ▸ Assess and confirm opportunities for the beneficial use of materials under the EOW framework. If appropriate to do so, ARTC will register as a resource producer to operate under an EOW code.
Pre-construction and early works and construction works	Hazardous waste	▸ Regulated wastes and contaminated soils or other waste hazardous materials must be transported and disposed of in accordance with the EP Act and procedures within the Waste Management Plan. ▸ For management and handling of hazardous materials, workers will have and/or complete training to gain appropriate skills and qualifications and in accordance with the Hazardous Materials Management Plan. ▸ Where identified, asbestos-containing materials will be removed prior to the commencement of construction. Asbestos removal and handling will be conducted in accordance with relevant legislation, standards and guidelines. ▸ Asbestos-containing materials will be transported by a licensed service provider and disposed of at an appropriately licensed facility, in accordance with the requirements of the EP Act, WRR Act and WHS Act.
	Waste generation	▸ Monitor waste generation to ensure adherence to waste reduction targets established in construction contract documentation ▸ Project to adhere to the practices of the WRR Act waste and resource management hierarchy (detailed in Appendix AB: Earthworks Strategy and Draft Soil Management Plan), which sets out options for managing waste, from avoiding, to reusing, recovering, treating and disposing of waste ▸ All cut material will be stockpiled and isolated based on material type (as per the Earthworks Material Specification (outlined in Appendix AB: Earthworks Strategy and Draft Soil Management Plan)) and reused onsite, where possible, with or without treatment ▸ Portable toilets and amenities to be serviced and maintained to ensure efficient operation and minimise environmental risks associated with their operation and decommissioning ▸ Appropriate waste bins will be located in general waste storage areas to facilitate segregation and appropriate containment of waste materials ▸ Each storage area will be provided on hardstand or within suitable receptables or bunding for the waste stream being stored ▸ Recorded waste generation and disposal data to be reported as a component of monthly construction environmental reporting.

Stage	Aspect	Proposed mitigation measures
	Disposal of waste	▸ Waste generated by the Project will be disposed of at licensed waste-management facilities ▸ Sewage sludges and residues (regulated waste) are to be removed by a licensed regulated waste transporter, for disposal at a municipal treatment facility to be identified in consultation with the relevant councils and utility providers. Grease trap and interceptor wastes will be pumped out and removed by a licensed regulated waste transporter. ▸ Waste tracking documentation is to be retained by all waste handlers for materials removed from site for disposal in accordance with of the EP Regulation. Waste tracking information must be submitted to DESI for the Queensland Waste Disposal Levy to be applied. Accurate waste tracking information provides means for waste facilities to apply or transfer the levy at that facility's discretion, according to the type of material being disposed. ▸ Loose and/or dispersible loads are to be secured and covered during transportation to minimise and avoid loss of loaded materials, rock debris and dust ▸ Waste disposal is to be conducted in accordance with the Waste Management Plan as a component of the CEMP.
Operations	Waste generation	▸ Operators and maintenance crews to adhere to the practices of the WRR Act waste and resource management hierarchy, which sets out options for managing waste, from avoiding, to reusing, recovering, treating and disposing of waste
	Disposal of waste	▸ Wastes to be disposed of at appropriately licensed facilities where disposal to landfill is unavoidable ▸ Waste tracking documentation to be retained by the maintenance supervisor for materials removed from site for disposal.
	Hazardous waste	▸ The transportation of regulated wastes and contaminated soil or other materials will be conducted by appropriately licensed contractors for disposal at licensed facilities in accordance with the EP Act.

All managers of waste facilities in proximity to the Project have been consulted in the preparation of the revised draft EIS (Appendix E: Consultation Report). Waste-acceptance criteria and ability to receive Project wastes will be re-confirmed with local landfill facilities prior to the commencement of construction. This information will be used to develop the Waste Management Plan, as a component of the CEMP for the Project.

Management of specific waste types that are expected to be generated by the Project are further detailed in Table 22-10, as per the waste management hierarchy shown in Figure 22-1 and the approach to resource use efficiency shown in Figure 22-4.

TABLE 22-10 MANAGEMENT OF WASTE TYPES GENERATED BY THE PROJECT

Waste type	Waste stream	Avoid/reduce	Reuse/recycle/recover	Treat/dispose
Cleared vegetation	Green waste	Where practical, minimise the extent of disturbance and clearing required to enable construction of the Project	Reuse cleared vegetation, logs, stumps and mulch in rehabilitation Where vegetation has a commercial value (e.g. trees within State forest), salvaged for on-sale/use Identify opportunities for beneficial reuse of material or reprocess at a licensed facility for reuse.	Excess cleared vegetation unable to be reused on site will be isolated and disposed from the Project in accordance with the EP Regulation

Waste type	Waste stream	Avoid/reduce	Reuse/recycle/recover	Treat/dispose
Concrete	C&D waste	Detailed design is to specify material requirements to avoid overestimation during procurement. Construction specifications to be established to maximise life expectancy of concrete structures. Minimise offcuts by 'ordering to size', (e.g. ordering pre-cast concrete where possible).	Crushed concrete may be used as aggregate for fill, drainage aggregate, construction fill or road base. Opportunities for reuse will be considered consistent with the intent of *EOW Code: Returned Concrete (ENEW07278517)*, *EOW Code: Solid Concrete Washout (ENEW07602819)* and *Liquid Concrete Washout (ENEW07602719).*	Transportation of waste by appropriately licenced operator to a licensed facility
Topsoil stripping	C&D waste	Where practical, minimise the extent of disturbance and clearing required to enable construction of the Project.	Topsoil to be temporarily stockpiled for reuse on batters/used for revegetation. Immediate reuse of topsoil is preferred to long-term stockpiling.	No treatment or disposal proposed (topsoil is to be reinstated)
Debris and litter	General waste (non-putrescible)	Buy consumable products in bulk to minimise packaging waste. Procurement protocols to be established to include waste minimisation principles.	Reduce, reuse or recycle wastes where possible. Provision of separate waste disposal receptacles, storage bins and coverage (if required) onsite to enable the segregation of wastes.	Disposal of all waste that cannot be reused or recycled through: ▸ Appropriate provision of waste-disposal receptacles onsite ▸ Collection in covered bins/containers with appropriate signage ▸ Service regularly to avoid vermin and pests ▸ Transportation of waste by appropriately qualified personnel to licensed facility with appropriate controls including covering loads when traversing roads to minimise and avoid loss of loaded materials, rock debris and dust
Recyclable materials (e.g. aluminium, cardboard and glass)	Recyclable	Buy consumable products in bulk to minimise packaging waste. Procurement protocols to be established to include waste minimisation principles.	Provide for segregation of recyclable materials.	Transportation to appropriate offsite recycling facility
Metal	C&D waste	Detailed design is to specify material requirements to avoid overestimation during procurement. Construction specifications to be established to maximise life expectancy of structures.	Where possible, salvage reusable metal for reuse or recycling, including stakes, drums and wire, and disused railway track. Segregate and store onsite in designated areas for removal to licensed facility for recycling.	Waste metals that are surplus to requirements will be disposed of via a licensed metal recycling/recovery contractor

Waste type	Waste stream	Avoid/reduce	Reuse/recycle/recover	Treat/dispose
Timber	C&D waste	Detailed design is to specify material requirements to avoid overestimation during procurement. Construction specifications to be established to maximise life expectancy of structures.	Reuse or repurpose for applications onsite. Opportunities for reuse will be considered consistent with the intent of *EOW Code: Chemically Treated Solid Timber (ENEW07503218).* Segregate and store onsite in designated areas for removal by appropriately qualified personnel to licensed facility for recycling.	Waste timber that is surplus to requirements will be disposed of via a licensed recycling/recovery contractor
Ballast	Regulated waste	The Project uses approximately 68 km of existing rail corridor, in which the existing rail formation will need to be modified; therefore, the disturbance of existing ballast cannot be avoided.	Reuse or repurpose for applications onsite. Opportunities for reuse will be considered consistent with the intent of *Draft EOW Code: Recycled Aggregates (ENEW07604819)*.	No treatment or disposal proposed

22.7 Residual impact

Potential construction works and operations stage impacts on environmental values associated with the generation and management of waste are outlined in Table 22-4. These impacts have been subject to a risk assessment as per the methodology in Section 22.3.2 and Chapter 4: Assessment Methodology.

The initial risk assessment is undertaken on the assumption that the design considerations (or initial mitigation measures) factored into the revised reference design stage (Section 22.6.1) have been implemented.

Additional mitigation and management measures are then applied as appropriate to the stage of the Project to reduce the level of potential impact (Table 22-9). The residual risk level of the potential impacts was then reassessed.

The pre-mitigated risk levels are presented next to the residual risk levels in Table 22-11 to demonstrate the effectiveness of the mitigation and management measures.

TABLE 22-11 WASTE RISK ASSESSMENT

Aspect	Potential Impact	Stage	Initial risk			Residual risk		
			Likelihood	Consequence	Risk	Likelihood	Consequence	Risk
Disposal of wastes	Municipal waste disposed to landfill (additional to current levels)	Pre-construction activities and early works and construction works	Likely	Not significant	Low	Unlikely	Not significant	Low
		Operations	Likely	Not significant	Low	Unlikely	Not significant	Low
	C&D waste disposed to landfill (additional to current levels)	Pre-construction activities and early works and construction works	Likely	Moderate	High	Unlikely	Moderate	Low
		Operations	Unlikely	Moderate	Low	Unlikely	Moderate	Low
Waste generation	Uncontrolled release of waste (may cause contamination)	Pre-construction activities and early works and construction works	Possible	Moderate	Medium	Unlikely	Moderate	Low
		Operations	Possible	Minor	Low	Unlikely	Minor	Low
	Increase in greenhouse gas emissions arising from waste transportation activities	Pre-construction activities and early works and construction works	Likely	Not significant	Low	Likely	Not significant	Low
		Operations	Likely	Not significant	Low	Likely	Not significant	Low
	Decrease in air quality due to waste traffic increases	Pre-construction activities and early works and construction works	Possible	Minor	Low	Unlikely	Minor	Low
		Operations	Unlikely	Minor	Low	Rare	Minor	Low
	Release of pollutants and risks to human health and safety	Pre-construction activities and early works and construction works	Possible	Moderate	Medium	Unlikely	Moderate	Low
		Operations	Possible	Moderate	Medium	Unlikely	Moderate	Low
Hazardous wastes	Loss of containment of dangerous goods during handling and transportation	Pre-construction activities and early works and construction works	Possible	Moderate	Medium	Unlikely	Moderate	Low
		Operations	Possible	Moderate	Medium	Unlikely	Moderate	Low

22.8 Conclusion

Construction and maintenance activities for the Project are expected to result in the production of commercial and industrial, construction and demolition, general, green, recyclable and regulated wastes.

Project impacts that relate to waste and resource management include:

- Additional demand for waste disposal beyond current levels, resulting in increased consumption of airspace and reduction of community access to waste facilities surrounding the Project footprint
- Possible uncontrolled release of waste from inappropriate storage or failure of management systems resulting in contamination of receiving environments (i.e. land, surface water and air)
- Possible increase in the incidence of vermin, insects and pests from inappropriate storage and handling of putrescible wastes
- Reduced visual amenity of land uses adjacent to the Project
- Increased transportation of waste materials onsite and offsite, resulting in:
  - the increase of greenhouse gas emissions due to the combustion of hydrocarbons from the operation of vehicles/plant
  - decreased amenity of land uses adjacent to the Project from the generation of dust and road deterioration.
- Risks to human health and safety of site personnel, through the release of pollutants from ineffective management of regulated wastes.

Where potential waste management impacts have not been fully avoided or mitigated through the revised reference design and construction planning, additional mitigation measures to maximise the reuse and treatment of fill have been proposed for implementation in future stages. The general intent of these proposed mitigation measures is to:

- Minimise double handling during resource recovery activities and promote segregation of materials, by providing sufficient area for storage and segregation of materials
- Separate and segregate the different material types onsite, where practicable
- Manage movement of excavated material within the Project footprint and external to the Project
- Develop procedures to record, monitor and report the offsite destination of each load of excavated material, recovered materials and residual waste.

A risk assessment of potential impacts has found that waste management impacts associated with the Project are expected to have a low residual risk rating with the application of proposed mitigation measures. Waste and resource recovery activities associated with the Project are not anticipated to pose a significant risk to the environment or public health with the implementation of mitigation measures as proposed.