

CHAPTER 21

Waste management



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21. Waste management

This chapter describes potential waste generation associated with the construction and operation of Brisbane Metro and outlines a framework for ongoing waste management.

21.1 Assessment methodology

This assessment identifies and describes the potential waste streams that are likely to be encountered during construction and operation of Brisbane Metro. It involved:

- defining waste management objectives in relation to legislation and standards protecting environmental values and the waste management hierarchy
- describing the expected waste streams from likely Brisbane Metro construction and operational activities
- identifying secondary impacts that may warrant further assessment.

Waste materials associated with Brisbane Metro will generally include:

- construction phase wastes
- operational and maintenance phase wastes.

Construction wastes associated with acid sulfate soils, contaminated land or hydrological wastes (e.g. treated water discharge) are addressed separately in Chapter 7 and Chapter 8. Spoil that is generated through the excavation of material and which is not affected by contamination is not considered a waste.

21.2 Legislative framework

Waste management in Queensland is regulated by:

- EP Act
- *Waste Reduction and Recycling Act 2011* (Waste Reduction Act).

Subordinate legislation includes:

- Queensland Waste Avoidance and Resource Productivity Strategy (2014–2024)
- Waste Reduction and Recycling Regulation 2011
- Environmental Protection Regulation 2008.

These instruments provide the legal and strategic framework for managing waste in Queensland.

Section 13 (1) of the EP Act defines 'waste' as anything, other than a resource approved under the Waste Reduction Act, that is:

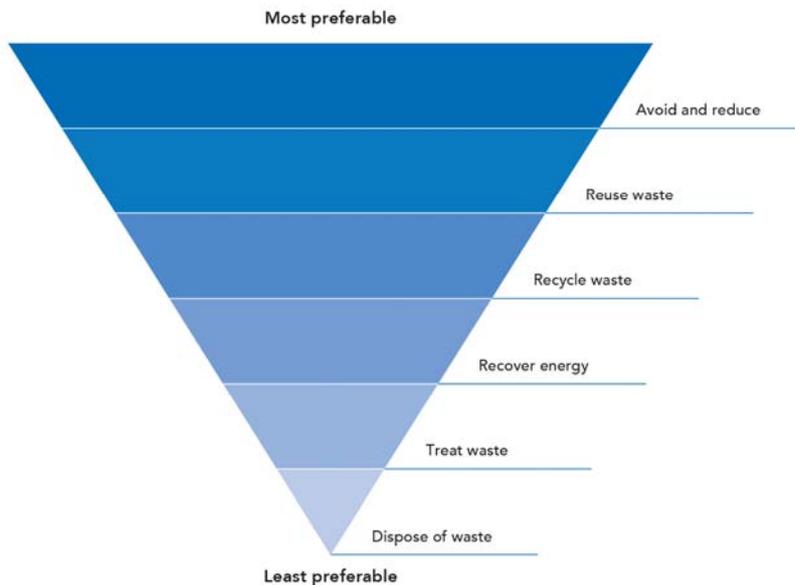
- a) "left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or
- b) surplus to the industrial, commercial, domestic, or other activity generating the waste."

General waste, limited regulated waste and regulated waste is further defined under the Environmental Protection Regulation. Schedule 7 prescribes what materials constitute regulated waste and waste that is not regulated waste. Certain waste management activities, including the disposal and transport of waste, are considered to be ERAs and require approval under the EP Act. The Environmental Protection Regulation also contains particular requirements for the handling of specific waste streams.

The *Queensland Waste Avoidance and Resource Productivity Strategy (2014–2024)* provides a strategic view of resource recovery and sets targets for commercial, industrial and construction reuse within Queensland. These targets will form the basis for resource recovery from Brisbane Metro.

The Waste Reduction Act provides a framework for managing wastes through a waste management hierarchy as described in Figure 21.1. This hierarchy describes an overall approach to waste with avoidance the most preferred option.

Figure 21.1: Waste and resource management hierarchy



21.2.1 Recycling Policy for Building and Civil Infrastructure

The Queensland Government Department of Public Works (now Department of Housing and Public Works) developed a whole-of-government recycling policy for Buildings and Civil Infrastructure for Queensland called the *Recycling Policy for Building and Civil Infrastructure 2009* (Recycling Policy). The Recycling Policy states:

“The Queensland Government is committed to maximising the resource recovery of materials used in building and civil infrastructure projects in order to help conserve natural resources and contribute to ecologically sustainable development”¹.

While the Recycling Policy is not applicable to Brisbane Metro, this is considered as a reference to best practice in Queensland.

21.3 Waste generation

Solid and liquid wastes generated by Brisbane Metro are likely to be variable both in type and quantity across construction and operation. Waste generated can be categorised as construction and demolition waste; and operational and maintenance waste.

The waste streams are further categorised as:

- general solid waste
- inert waste (construction)
- green waste
- recyclable waste
- regulated waste.

Significantly less waste is expected to be generated by operation and maintenance activities relative to demolition and construction activities.

¹ Department of Public Works (2009) Recycling Policy for Building and Civil Infrastructure, Queensland Government

21.3.1 Demolition and construction waste

Solid waste materials will be generated during demolition, construction, or alteration of existing busway stations or platforms, buildings and infrastructure such as roads, bridges and tunnels. The main areas for demolition are listed in Table 21.1.

Table 21.1: Major demolition activities

Location	Likely demolition
Rochedale to Upper Mt Gravatt	
Mt Gravatt to Greenslopes	
Woolloongabba to St Lucia	
South Brisbane	
Brisbane CBD	

The quantity and type of demolition and construction waste is site-specific and dependent on the location, land uses, design features and construction methodologies. A summary of the major waste streams expected to be generated from construction and demolition activities are provided in Table 21.2.

Specific consideration will need to be given to hazardous materials that may be encountered during demolition activities, e.g. asbestos in service pipes and older buildings. Asbestos materials have the potential to be present in construction and demolition areas in the form of building materials. Asbestos surveys of all structures requiring demolition should be undertaken prior to demolition.

Table 21.2: Major waste streams – construction

Location	Expected waste streams
General	
Eight Mile Plains station	
Upper Mt Gravatt station	
Griffith University station (including bus turnaround and layover)	

Location	Expected waste streams
Buranda station	<ul style="list-style-type: none"> Platform shelter roof flashing, soffit lining and guttering. Miscellaneous plaza fixtures (e.g. shelters, shrub/tree planter boxes, seating). Reinforced concrete panels, rubble, piles and pavement. Subsoil drainage/piping and pits. Roadway guard railing. Tunnel linings (i.e. fibre cement sheeting and alpoloc (aluminium composite) cladding). Pre-stressed concrete deck units. O'Keefe Street roadway asphaltic concrete pavement.
Woolloongabba station	<ul style="list-style-type: none"> Concrete kerbing and road pavement.
Mater Hill station	<ul style="list-style-type: none"> Platform shelter roof flashing, soffit lining and guttering (small amounts). Miscellaneous plaza fixtures (planter boxes, seating, etc). Reinforced concrete rubble. Ramp hand railing and glass balustrade.
Cultural Centre station	<ul style="list-style-type: none"> Reinforced concrete panels, rubble and piles. Busway and roadway asphaltic concrete pavement. Tunnel linings (i.e. fibre cement sheeting and alpoloc cladding). Piles supporting the BCEC loading dock. Railway overhead masts. Traffic signals, pedestrian access and railing at the existing Melbourne Street busway portal. Drainage piping and pits and services conduits and pits. Existing bus stops (e.g. roof sheeting, soffit panelling, flashing, gutters and down piping, steelwork, glass panelling and seating), lifts (carriage, steel framing and glass panelling) and stairway (steel framework, treads and landings, and glass railing). Electrical cabinets, traffic signals.
North Quay and Victoria Bridge	<ul style="list-style-type: none"> Steel bridge hand railing, pedestrian railing, walkway tubular railing and grid mesh flooring from bridge maintenance access. Reinforced concrete rubble. Roadway asphaltic concrete pavement. Drainage piping and pits and services conduits and pits.
Adelaide Street (including Albert Street bus tunnel break-in)	<ul style="list-style-type: none"> Building awnings, street trees and street furniture (e.g. rubbish bins, seating, signage, bus shelters). Footpath and roadway asphaltic concrete pavement. Road drainage pipework and pits, and services conduits and pits. Reinforced concrete rubble and piling.
King George Square station	<ul style="list-style-type: none"> Blockwork walls. Reinforced concrete rubble. Glass screening and doors.
Roma Street station	<ul style="list-style-type: none"> Blockwork walls. Reinforced concrete rubble. Fire doors.

The actual waste streams and quantities of materials will be confirmed through the detailed design phase. Concrete, bricks, asphalt, soil, rubble and ferrous metals are the most common materials recycled from the construction waste streams in Australia².

² Environment Protection and Heritage Council (2010) National Waste Report, Commonwealth of Australia

Based on current observed trends for construction and demolition wastes in Queensland³, it is estimated that 50% of construction and demolition waste will be recovered from Brisbane Metro without specific adoption of waste management provisions. An aspirational recovery target of 80% waste recovery is proposed to form the recovery goal for Brisbane Metro, in line with the Queensland Waste Avoidance and Resource Productivity Strategy.

21.3.2 Operational waste

The volumes of waste generated from the operation and maintenance of Brisbane Metro are expected to be significantly less than those generated during the construction phase and will depend on such things as operational frequencies of metro vehicles, customer numbers and maintenance regimes. The wastes produced at stations during operation will generally be consistent with waste currently produced at existing stations.

Table 21.3 provides a summary of the major waste streams likely to be generated from operation and maintenance, although the actual types and quantities of waste likely to be generated from operation and maintenance activities will be determined during the detailed design phase.

Table 21.3: Major waste streams – operation and maintenance

Project activity	Waste category	Major waste materials
Vehicle maintenance	Regulated waste	<ul style="list-style-type: none"> Waste oils, greases and lubricants. Brake pads. Tyres. Hazardous wastes (e.g. hydrocarbons, waste oils, greases, paint, solvents and lubricants). Batteries. Fire retardants. Adhesives. Cleaning agents. Coolants. Absorbent materials and spent spill.
	General solid waste (some potentially recyclable)	<ul style="list-style-type: none"> Metals (ferrous and non-ferrous). Glass. Plastic. General domestic and food wastes (vehicle cleaning). Packaging material – pallets, plastic, wrapping, polystyrene products and cardboard.
Station maintenance	Green waste (organic)	<ul style="list-style-type: none"> Green waste (e.g. landscaping).
	General solid waste (some potentially recyclable)	<ul style="list-style-type: none"> Metals (ferrous and non-ferrous). Concrete. Plastics. General domestic and food wastes. Station furnishings (e.g. furniture, doors and windows). Packaging material – pallets, plastic, wrapping, polystyrene products and cardboard.
	Regulated waste	<ul style="list-style-type: none"> Hazardous waste (e.g. hydrocarbons, chemicals, refrigerant/air conditioning gases). Cleaning agents. Absorbent materials and spent spill. Fire retardants.

³ DEHP (2016) Recycling and waste in Queensland 2016, at <https://www.ehp.qld.gov.au/waste/pdf/recycling-waste-qld-report2016.pdf>

Project activity	Waste category	Major waste materials
Maintenance of infrastructure and buildings	Regulated waste	<ul style="list-style-type: none"> Hazardous waste (e.g. hydrocarbons, chemicals, refrigerant/air conditioning gases). Cleaning agents. Glass. Fire retardants.
	General solid waste (some potentially recyclable)	<ul style="list-style-type: none"> General domestic and food wastes. Station furnishings (e.g. furniture, doors and windows). Packaging material – pallets, plastic, wrapping, polystyrene products and cardboard.

21.3.3 Secondary impacts

Waste generated during construction and operation has the potential to cause secondary impacts if not appropriately managed. Potential secondary impacts include such things as:

- dust resulting from the inappropriate storage, handling and disposal of excavated material
- soil and water contamination including surface water and groundwater contamination, from material spills during handling and haulage, or from the inappropriate storage, handling and disposal of solid and liquid waste and materials separated for recycling, reuse or recovery
- impact on social amenity during construction as a result of poor housekeeping in construction areas
- inefficient use of resources.

Waste and resource recovery activities associated with Brisbane Metro are not expected to pose a significant risk to the environment or public health with the implementation of effective waste management and resource recovery control measures.

21.4 Mitigation and management measures

The waste management strategy for Brisbane Metro will follow the waste management hierarchy shown in Figure 21.1. While these principles lead towards best practice in waste management, it is recognised that they are not always achievable and/or practicable due to the:

- nature of the waste product
- availability of capable receiving facilities
- health and safety implications
- associated costs that may be involved.

With respect to these issues, the following sections outline the principles within the waste hierarchy proposed to be adopted for Brisbane Metro.

Existing waste management strategy and operation procedures for the operation of the busway will be updated, as required, to include Brisbane Metro.

21.4.1 Avoid or reduce

Opportunities for avoiding and reducing (where avoidance is not possible) waste generation onsite will be identified during the detailed design phase. A Waste and Resource Recovery Management Plan (WRRMP) will be prepared that outlines appropriate strategies for reducing waste.

21.4.2 Reuse

Reuse strategies (e.g. the identification of waste materials that would otherwise be destined for landfill disposal) will be identified during the detailed design phase.

Potential strategies include:

- develop demolition procedures which facilitate recovery of materials for reuse, segregate different types of materials for recycling in preference to demolish and dispose
- provide salvaging contractors with the opportunity to salvage (remove) building materials prior to demolition so that items can retain their value and be reused
- stockpile clean topsoil that is free of weeds for reuse where practicable
- reuse excavated soils wherever practicable to do so
- reuse waste concrete wherever practicable in the design
- chip and mulch vegetation cleared during construction and reuse mulched material for landscaping purposes.

21.4.3 Recycle

Recycling opportunities will be identified through the detailed design and development of the WRRMP. This will consider the Guidelines to the Recycling Policy.

Strategies for reuse of materials and recycling during the demolition and construction activities may include:

- educate and train workforce (e.g. implementation of easily recognisable signage of recycling streams)
- provide recycling facilities for general rubbish (e.g. glass, plastic, waste paper and metals)
- collection of kerb and pavement materials and transport to crushing and recycling plants
- segregate demolition materials by type to facilitate recycling and resource recovery efforts where reuse onsite is not practicable
- collect demolition materials for transportation to a nominated resource recovery and recycling depot.

21.4.4 Waste and Resource Recovery Management Plan

A WRRMP will be developed that outlines and describes waste management measures to be implemented during various phases of Brisbane Metro's delivery (i.e. demolition, construction and operation). The WRRMP will outline:

- waste stream assessment per project stage – prior to commencement of waste producing activities, specific waste management strategies will be developed for each waste stream including:
 - developing and implementing systems to identify, quantify and monitor waste generation
 - identifying opportunities for resource recovery including the proposed destination for recovered materials
 - management of waste storage areas to prevent pollution of unused product and off cuts
- training and awareness of waste management procedures for segregation of recyclable materials, storage of waste and identification opportunities to avoid waste generation and reuse material during construction
- supply chain management actions to minimise generation of solid waste and encourage recycling, for example:
 - utilising materials and products that have a recycled content wherever they are cost- and performance-competitive, and where environmentally preferable to the non-recycled alternative
 - ordering goods in bulk to minimise packaging waste and develop contract conditions/arrangements with suppliers to reduce the quantity of packaging materials supplied with building materials and return of packaging materials to the supplier
 - identification of recycling/reuse facilities used to segregate and recover demolition and waste construction materials for reuse and/or recycling prequalification requirements for waste/recyclables receiving facilities

- roles and responsibilities relating to waste management and resource recovery for each stage of Brisbane Metro
- monitoring, auditing and reporting requirements
- procedure for review and update of the WRRMP.

The WRRMP will outline the mechanism for implementing the strategies required for Brisbane Metro's construction and operational activities and the resulting waste stream management.