26. WASTE MANAGEMENT

This chapter provides a summary of identified waste streams expected to be generated by project activities and an assessment of the potential for identified environmental values to be affected by impacts associated with waste generated in each phase of the project.

Environmental protection objectives have been developed and the mitigation and management measures to achieve these objectives identified. More specific details on waste stream generation and management measures are provided in the following chapters:

- Chapter 9, Air Quality
- Chapter 10, Greenhouse Gas Emissions
- Chapter 12, Geology, Landform and Soils
- Chapter 14, Groundwater
- Chapter 15, Surface Water
- Chapter 16, Aquatic Ecology
- Chapter 17, Terrestrial Ecology
- Chapter 18, Landscape and Visual Amenity
- Chapter 25, Preliminary Hazard and Risk

26.1 Legislative Context

The following legislation, policy and guidelines are relevant to waste management through all phases and activities of the project including construction, operation and eventual decommissioning.

Environmental Protection Act 1994 (Qld) **(EP Act)**. The objective of the EP Act is to protect Queensland's environment by promoting ecologically sustainable development. The act defines waste as anything that is left over, or an unwanted by-product from an industrial, commercial, domestic or other activity, or surplus to the industrial, commercial, domestic or other activity generating wastes.

Environmental Protection (Waste Management) Regulation 2000 (Qld). This regulation provides a mechanism to enforce the EP Act and aims to protect the environment by minimising the impact of waste on the environment including, in particular, the impact of waste so far as it directly affects human health. The regulation establishes an integrated framework for minimising and managing waste under the principles of ecologically sustainable development.

Environmental Protection Regulation 2008 (Qld)*.* This regulation defines regulated waste as waste that is commercial or industrial waste, whether or not it has been immobilised or treated, and is of a type, or contains a constituent of a type, mentioned in Schedule 7 of the Regulation. General wastes are all wastes not classified as regulated wastes.

Environmental Protection (Waste Management) Policy 2000 (Qld). This policy aims to achieve the objectives of the EP Act in relation to waste management by providing the framework for minimising waste generation, maximising the usage of waste, efficient use of resources and maintaining ecologically sustainable principles. The policy also provides the framework for waste management programs.

Queensland waste reduction and recycling strategy 2010-2020 (DERM, 2010h). This strategy aims to protect the environment by encouraging an increase in recovery and recycling of resources across all waste streams. The strategy emphasises reduction in waste generated and quantity sent to landfills, which aids in reducing greenhouse emission from waste. The strategy also aims to reduce environmental impacts from illegal waste disposal.

26.2 Assessment Methods

The waste assessment comprised of desktop study to identify potential waste streams generated from activities associated with the construction, operations and decommissioning of the project.

The assessment included the identification of the likely impacts associated with waste streams generated during each phase of the project as well as management options for waste minimisation and disposal. Waste types and quantities were based on information from Arrow's existing operations.

26.3 Existing Environment and Environmental Values

The existing environment that could be impacted by the generation of waste from project activities has been described in Chapters 9 to 25, and the proposed project activities expected to generate waste and types of waste generated is outlined in Chapter 5, Project Description.

The key environmental values to be protected from the waste streams are:

- **Soils and Land.** Land use capability, having regard to economic consideration, habitat for flora and fauna and quality of land to guarantee environmental sustainability. Further details on environmental values are provided in the existing environment description within Chapter 12, Geology, Soils and Landform.
- **Air Quality.** Air quality that is suitable for sustaining human health and local amenity. Further details on environmental values are provided in the existing environment description within Chapter 9, Air Quality.
- **Ecology.** The diversity of ecological processes and associated ecosystems and suitability of flora and fauna habitats. Further details on environmental values are provided in the existing environment descriptions within Chapter 16, Aquatic Ecology and Chapter 17, Terrestrial Ecology.
- **Water Resources.** Water quality that is suitable for sustaining human health, visual amenity and suitability of aquatic ecosystems. Further details on environmental values are provided in the existing environment descriptions within Chapter 14, Groundwater and Chapter 15, Surface Water.
- **Visual Amenity.** Features of the existing environment that are important for visual amenity. Further details on environmental values are provided in the existing environment description within Chapter 18, Landscape and Visual Amenity.
- **Health and Safety.** The life, health and wellbeing of people including the project workers. Further details on environmental values are provided in the existing environmental description within Chapter 25, Preliminary Hazard and Risk.

26.4 Issues and Potential Impacts

Waste management issues associated with project activities include:

- **Uncontrolled Releases of Waste.** Failure to properly manage waste storage and containment systems could potentially result in soil and water contamination and impacts on visual amenity.
- **Controlled Releases of Waste or Emissions.** Discharge of waste water and air emissions could potentially lead to adverse health and ecological impacts, e.g., discharge of sewage and generation of air pollutants such as nitrogen dioxide (NO_2).

Chemicals that can potentially bioaccumulate within the environment will not be present in any of the project discharges which include hydrotest water, sewage, coal seam gas water and runoff.

The potential impacts that are applicable to waste management are described in further detail in the relevant sections of the EIS impact assessment (Chapters 9 to 25).

26.5 Environmental Protection Objectives

The environmental protection objectives for waste management are to:

- Use a waste management hierarchy and principles based on waste avoidance, reuse, recycling and disposal.
- Minimise resource utilisation by reuse and recycling of waste.
- Minimise impacts to the environment from the management of waste.
- Reduce the quantity of waste that is sent to landfills by recycling and reuse of waste.

Regulatory air quality objectives are described in Chapter 9, Air Quality.

26.6 Avoidance, Mitigation and Management Measures

Avoidance, mitigation and management measures have been proposed to achieve the identified environmental protection objectives. Avoidance, mitigation and management of potential waste impacts will be achieved primarily through implementation of a waste hierarchy (Figure 26.1). Arrow will apply the following hierarchy of management options to all waste generated during the project activities:

- Source reduction: avoid, eliminate, change or reduce practices that result in the generation of wastes.
- Reuse: reuse waste materials that are in their original form.
- Recycling: where possible, send waste to appropriate facilities to convert waste into other usable materials.
- Treatment and disposal: render wastes safe by neutralisation or other treatment methods and dispose of waste products that can no longer be reused or recycled either through landfilling or incineration. [C058]

26.6.1 Source Reduction

Waste avoidance and source reduction is achieved primarily in the design phase of the project through cleaner production. Production technologies will be designed and production practices implemented to minimise resource consumption and increase production efficiency.

Specific mitigation measures involving cleaner production technologies and practices, e.g., efficiency-based selection of equipment and prevention of leakage of waste are outlined in further detail in Chapter 9, Air Quality and Chapter 25, Preliminary Hazard and Risk.

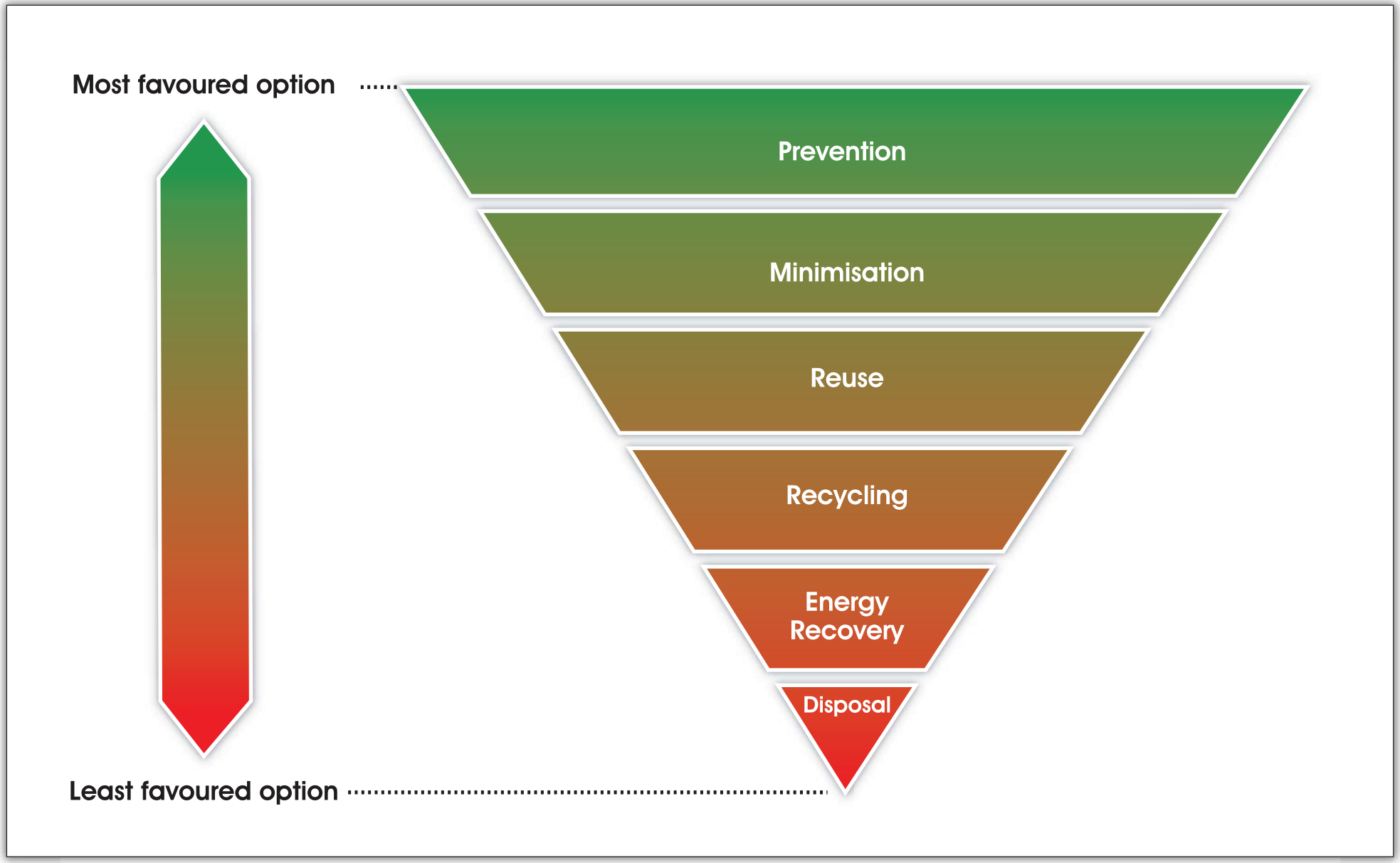
Arrow is implementing lean production to improve the efficiency and effectiveness of all business aspects. Lean production relates to reducing waste through improvements to how a business operates. The repetitious nature of coal seam gas activities lends Arrow to the lean production approach. Value delivered by this approach will increase as waste is removed from work processes and waste inventories are reduced across project phases and activities.

Materials will be procured in bulk, where practicable, to minimise containers and movement of material. [C491]

26.6.2 Waste Reuse

The reuse of waste will be determined largely by the salvage value of the material. Reuse requires onsite segregation and storage and will include the following measures:

- Reuse of cleared vegetation for mulch and soil erosion control.
- Reuse of brine for production of potentially saleable salt products and implementing salt crystallisation (see Chapter 5, Project Description, of the EIS for options relating to beneficial use of brine and coal seam gas water).
- Segregation of wastewater streams, i.e., contaminated stormwater, waste waters and coal seam gas water.
- Reuse of treated waste water for dust suppression, construction activities or irrigation.
- Reuse of treated coal seam gas water for town water supply, where of appropriate quality.
- Reuse of hydrotest water.
- Reuse of treated water for agricultural use, industrial use, potable water supply or injection into aquifers.
- Treatment and reuse of solid wastes, such as drilling muds and cuttings, where practicable. [C454]



	coffey environments	Job No: 7040	Arrow Energy	arrow energy go further	Waste hierarchy	Figure No: 26.1
		File Name: 7040_04_F26.01_GL	Surat Gas Project			

26.6.3 Waste Recycling

Recycling is a central element of waste management for the Surat Gas Project. The marketability of the waste is the primary driver for recycling. Arrow will maximise marketable volumes of recyclable waste to local and regional businesses. Highly marketable wastes include oil, metals, lead acid batteries and process vessels that have been decommissioned. Lower marketable waste includes aluminium cans, paper and box board and pipes.

26.6.4 Waste Disposal

General waste will be segregated, treated if necessary and stored onsite prior to disposal. Segregation will include the separation of liquid from solid waste, separation of regulated from non-regulated waste, and separation of reusable and recyclable from non-reusable and non-recyclable waste [C496].

Solid waste segregation will be achieved by the allocation of bins for different waste streams. Appropriate domestic waste disposal facilities will be provided at designated work sites to assist in segregation of waste [C051].

Contaminated soil or groundwater that cannot be avoided through physical investigation will be managed through quantification of the type, severity and extent of contamination, and remediated or managed in accordance with the Queensland Government's Draft Guidelines for the Assessment and Management of Contaminated Land (DE, 1998) [C065]. Further details on management of contaminated land are provided in Chapter 12, Geology, Landform and Soils.

Onsite waste treatment will be used for such purposes as sewage, coal seam gas water and other specified wastes. Sewage will be treated in packaged sewage treatment plants. Sewage treatment plants will be located at production facilities and include settlement, digestion, aeration, clarification and disinfection equipment [C469]. Coal seam gas water will be contained in dams for treatment through reverse osmosis [C202] as described in Chapter 5, Project Description.

The storage capacity of coal seam gas water and brine dams will be designed to be sufficient to manage waste liquids until such time that permanent disposal options are operational [C492]. Water dams will be designed in accordance with relevant legislation and Queensland standards and DERM guidelines [C154].

Onsite waste storage areas will be developed in accordance with industry practice and relevant waste management regulations [C490].

Waste that cannot be reused or recycled will be disposed of at appropriately licensed facilities [C257].

Potential waste facilities that may be used by the project and waste types accepted at each facility are provided in Table 26.1.

Table 26.1 Offsite waste disposal facilities

Facility Name	Location	Wastes Accepted
Cecil Plains	Cecil Plains Cemetery Road, Cecil Plains	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables.
Chinchilla	Clarks Road	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables.
Dalby	Dalby-Jandowae Road, Dalby	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables.
Goondiwindi Landfill	Refuse Tip Road (off Kildonan Road), Goondiwindi	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste.
Inglewood Landfill	Inglewood-Texas Road, Inglewood	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste.
Kogan	Condamine Highway, Kogan	General waste (commercial and industrial waste, hardfill and building waste, hot ambers or ash, chemical powders or liquids and hazardous waste not accepted).
Miles	Leichhardt Highway, Miles	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables.
Millmerran	Owens Scrub Road, Millmerran	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables, waste oil.
Roma	End Short St, Roma	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables, hazardous waste, waste oil.
Tara	Fry Street, Tara	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables.
Toowoomba	Hermitage Road, Toowoomba	Green waste, domestic, scrap metals, construction and demolition waste, commercial waste, recyclables, hazardous material.

Liquid waste generated (other than coal seam gas water and sewage) will be stored and periodically removed for disposal or recycling [C226]. All waste fluids and muds resulting from drilling activities will be contained in properly lined dams or storage tanks for in situ treatment or disposal [C411]. Putrescible solid waste will be stored in covered containers to prevent odours, public health hazards and access by fauna [C330].

Arrow will comply with Queensland Government waste tracking requirements [C495]. Regulated wastes will be handled, stored and disposed of in accordance with relevant standards and the Environmental Protection (Waste Management) Regulation 2000 [C494].

26.6.5 Waste Audits and Reporting

Arrow will carry out waste audits and reporting for waste generating activities to:

- Provide waste data to enable continuous improvement of waste avoidance, reduction and management measures throughout the project life.
- Assess whether action is required to fulfil set waste objectives and management.
- Assess the adequacy of proposed mitigation measures and identify where mitigation measures need revision or additional measures.

- Monitor potential environmental impacts that will enable positive action to be implemented in case of incidents or accidents related to waste activities.
- Provide actual waste management results by comparing predicted impacts and mitigation measures. [C222]

26.6.6 Spill Containment and Remediation

Regulated wastes will be handled, stored and disposed of in accordance with relevant standards and the Environmental Protection (Waste Management) Regulation 2000 [C494].

Appropriate international, Australian and industry standards and codes of practice will be applied for the design and installation of infrastructure associated with the storage of hazardous materials (such as chemicals, fuels and lubricants) [C048].

Emergency response and spill response procedures will be developed and implemented to minimise any impacts that could occur as a result of releases of hazardous materials or any loss of containment of storage equipment [C036].

More detailed information on management of spills and hazardous waste is provided in Chapter 12, Geology, Landform and Soils and Chapter 25, Preliminary Hazard and Risk.

26.6.7 Waste Stream Management Measures

Typical waste streams and projected quantities of waste to be generated by the project are shown in Table 26.2, with proposed methods of disposal and management. The type, quantity and management of wastes are indicative estimates only as the detailed design and execution plans have yet to be completed.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Construction of production wells	Acids and caustics	Regulated waste	Liquid waste	Residual	Collected and disposed of at offsite regulated waste facilities.
	Cleared vegetation	Organic waste	Solid waste	10 m^3 per well	• Used in progressive rehabilitation. Respread over disturbed land to minimise erosion. • Left onsite for habitat use.
	Soil	Inert waste	Solid waste	Not excessive	• Stockpiled and reused for site rehabilitation. • Stockpiles will be located away from water sources and in clear areas.
	Coal seam gas water contaminated soils Coal seam gas water filters and filter media	Regulated waste	Solid waste	30 m^3 per year	Buried onsite or disposed to an offsite landfill.
	Drill cuttings Drilling fluid additives: clay stabilisers (calcium chloride, calcium chloride anhydrous and potassium chloride), cement additive (bentonite and calcium sulphate), disinfectant (biocide), viscosifier (FS2000, XCD polymer and NIF 20 liquid), foaming agent (Tuff-Foam Ultra) and fluid loss prevention (Tuff-Loss) Residual muds	Regulated waste	Solid or liquid waste	10 m^3 to 75 m^3 per well	• Left onsite or disposed to a central site for remediation or an offsite landfill. • Reused or recycled. • Surface tank storage for drill cuttings in high quality agricultural areas. • Waste solids will be treated and reused where possible or disposed to landfill. • Drill fluids will be recycled where possible. • Water generated during drilling will be transported to drilling fluid pits for appropriate management.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Construction of production wells (cont'd)	Soil contaminated with chemicals or oil	Regulated waste	Solid waste	30 m^3 per year	Natural attenuation via bioremediation, landfarming or disposed to an offsite regulated waste facility.
	Used lubricating oil and filters Unused or spent chemicals	Regulated waste	Solid or liquid waste	25 drums per year	• Recycled where possible. • Transported by a licensed contractor to an offsite regulated waste facility for disposal.
	Empty drums and containers	Recyclable or regulated waste	Solid waste	25 drums per year	Recycled where possible or taken to an offsite licensed waste facility.
	Hard waste	Recyclable waste	Solid waste	0.5 m^3 per well including wood pallets, scrap metal, general waste	Recycled where possible or taken to an offsite licensed waste facility.
	Scale, may be contaminated by naturally occurring radioactive material X-ray film	Regulated waste	Solid waste	Residual	Transported to an offsite regulated waste facility.
	Spent and unused solvents, paints and paint wastes	Regulated waste	Liquid waste	Residual	Transported to an offsite regulated waste facility.
	Paper and cardboard	Recyclable waste	Solid waste	More than 1 t annually	Reused or recycled.
	General waste from workers' accommodation areas	General waste	Solid or liquid waste	More than 1 t annually	• Recycled and reused. • Transported to an offsite licensed waste facility.
	Greywater Stormwater	Regulated waste	Liquid waste	Dependent on workforce	Either collected and treated onsite or transported offsite to a municipal treatment facility or receive onsite treatment.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Construction of production wells (cont'd)	Air emissions	Nitrogen oxide, sulphur dioxide, carbon monoxide, particulate matter	Gaseous waste	See emission details in Chapter 9, Air Quality	Selection of equipment with consideration for low emissions to air, high energy efficiency and fuel efficiency. Dust suppression measures.
Construction of gas and water gathering systems	Cleared vegetation (for low-pressure gathering lines) Cleared vegetation (for medium-pressure pipelines)	Organic waste	Solid waste	• 150 m^3 per well • 50 m^3 per well	• Used in progressive rehabilitation. Respread over disturbed land to minimise erosion. • Left onsite for habitat use.
	Hydrostatic test water	Could potentially contain cleaning chemicals, silts, oxygen scavengers, biocide traces	Liquid waste	100 ML per gas field	Reused in other areas or disposed of through the coal seam gas water management system.
	Used chemicals and oils	Regulated wastes	Liquid waste	450 kg per day	Recycled where possible or taken to an offsite regulated waste facility.
	Scrap swarf (high-definition polyethylene filings)	Recyclable material	Solid waste	2.8 t per gathering network per year	Reused or recycled where possible or taken to an offsite licensed waste facility.
	Debris from blow out (cleaning) of pipes	Regulated waste	Solid waste	2 t per year	Stored in sealed container in a bunded area or will remain in drilling pit before being transported off site to a regulated waste facility.
	Unused composite pipe Unused high-definition polyethylene	Recyclable waste	Solid waste	80 m of various diameter (110 mm to 455 mm) per well	Recycled where possible or disposed of in an offsite licensed waste facility.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation	Emissions from engines and vehicles Dust	Nitrogen oxides, carbon monoxide, dust, hydrocarbons	Gaseous waste	See emission details in Chapter 9, Air Quality	Selection of equipment with consideration for low emissions to air, high energy efficiency and fuel efficiency. Dust suppression measures, management of odours.
	Activated carbon: spent activated carbon containing heavy organics, inorganic vanadium, boron compounds, elemental sulfur Filter cartridges: cellulose-based cartridges containing inorganic vanadium and boron compounds, elemental sulphur, potassium carbonate and iron oxides	Regulated waste	Solid waste	2 filters per year per production facility 38 filters per year per production facility	Collected and disposed of in an offsite regulated waste facility.
	Membrane modules: polyamide membranes containing heavy organics	Regulated waste	Solid waste	1 every 3 years per central gas processing facility.	Collected and disposed of in an offsite regulated waste facility.
	Lead acid batteries	Regulated waste	Solid waste	3 per field compression facility 8 per central gas processing facility 10 per integrated processing facility	Recycled or transported to an offsite regulated facility.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation (cont'd)	Concrete waste	Inert waste	Solid waste	100 t per field compression facility 325 t per central gas processing facility 375 t per integrated processing facility	Reused or recycled where possible, otherwise buried onsite.
	Cut and fill materials from dams	Inert waste	Solid waste	Nil (all to be used)	If contaminated, soils are excavated and will be treated and disposed of as described in Chapter 12, Geology, Landform and Soils.
	Domestic wastes such as general wastes (office consumables, paper, plastics, glass, etc.), kitchen refuse, garden waste, packing wastes (cardboard, wooden pallets, etc.)	General waste	Solid waste	Unknown (dependent on domestic activity)	Reused or recycled where possible; otherwise transported off site to a regulated waste disposal facility.
	Empty drums and containers	Recyclable or regulated waste	Solid waste	115 drums per year per facility	Reused or recycled where possible; otherwise transported off site to a regulated waste disposal facility.
	Wooden pallets, formwork timber	Organic waste	Solid waste	25 m^3 per field compression facility 90 m^3 per central gas processing facility 100 m^3 per integrated processing facility	Reused or recycled where possible; otherwise transported off site to a regulated waste disposal facility.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation (cont'd)	Glass, reinforced plastic pipe offcuts	Recyclable waste	Solid waste	5 t per field compression facility 5 t per central gas processing facility 5 t per integrated processing facility	Reused or recycled where possible; otherwise transported off site to a regulated waste disposal facility.
	Oily rags and sorbents	Regulated waste	Solid waste	Approximately 0.5 t per year	Transported off site to a regulated waste disposal facility.
	Packaging materials (cardboard, damaged styrofoam, plastic wrappers, bunting, lining, endcaps and containers)	Recyclable waste	Solid waste	150 m^3 per field compression facility 600 m^3 per central gas processing facility 675 m^3 per integrated processing facility	Reused or recycled where possible; otherwise transported off site to a regulated waste disposal facility.
	Plastic pipe offcuts/scrap, electric cable waste	Recyclable or regulated waste	Solid waste	8 t per field compression facility 15 t per central gas processing facility 20 t per integrated processing facility	Reused or recycled where possible; otherwise transported off site to a regulated waste disposal facility.
	Spent filter media bulk bags	General waste	Solid waste	Less than 1 t annually	Transported off site to a regulated waste disposal facility.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation (cont'd)	Steel offcuts and scrap metal	Recyclable waste	Solid waste	15 t per field compression facility 110 t per central gas processing facility 120 t per integrated processing facility	Reused or recycled.
	Crystallised salt	Regulated waste	Solid waste	110,670 t per year average	Transported off site to a regulated waste disposal facility unless an alternative use can be found.
	Rubber and tyres	Recyclable waste	Solid waste	5 pick-ups yearly for a 35 TJ/day facility	Reused and recycled.
	Anti-seize compounds	Regulated waste	Liquid waste	5 empty tins per field compression facility 15 per central gas processing facility 20 empty tins per integrated processing facility	Collected and disposed of in regulated waste facilities.
	Domestic cleaners	Regulated waste	Liquid waste	10 per field compression facility 30 per central gas processing facility 40 small empty containers per integrated processing facility	Collected and disposed of in regulated waste facilities.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation (cont'd)	Fuels	Regulated waste	Liquid waste	Residual	Reused or collected and disposed of in regulated waste facilities.
	Greases and oils	Regulated waste	Liquid waste	50 L per field compression facility 170 L per central gas processing facility 200 L per integrated processing facility	Reused, recycled or collected and disposed of in regulated waste facilities.
	Triethylene glycol	Regulated waste	Liquid waste	10 m^3 per integrated processing facility	Reused or collected and disposed of in regulated waste facilities.
	Salt precipitation waste product	Liquid with high salinity concentrate	Liquid waste	11,067 t per year average	See Section 5.6.4, Water Treatment and Storage Facilities.
	Cleaning acids	Regulated waste	Liquid waste	100 L per field compression facility 300 L per central gas processing facility 600 L per integrated processing facility	Disposed of onsite in sewage treatment plant or taken to an offsite regulated waste facility.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation (cont'd)	Contaminated stormwater runoff	Potentially containing high TSS or petroleum products	Liquid waste	Unknown (dependent on final design and rainfall)	Collected and treated within the wastewater treatment system.
	Lube oil	Regulated waste	Liquid waste	Engines: 750 L every 3,000 hours each. Lubrication oil from compressors 20 L/day.	Collected and disposed of in an offsite regulated waste facility.
	Oil entrained in the compression process	Regulated waste	Liquid waste	30 t per year maximum	Reused, recycled or collected and disposed of in regulated waste facilities.
	Paint waste	Regulated waste	Liquid waste	10 tins per field compression facility 30 tins per central gas processing facility 40 empty tins per integrated processing facility	Collected and stored onsite and reused where possible, otherwise transported offsite to a regulated waste facility.
	Pigging waste (water and sludge) Radioactive tracer wastes Scrap pipe Welding wastes Pesticides and herbicides	Regulated waste Recyclable waste	Liquid waste	Residual	Disposed of onsite in wastewater treatment system or taken to an offsite licensed waste facility. Scrap pipe can be reused or recycled in other Arrow operations.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Facility construction and operation (cont'd)	Reverse osmosis treatment chemicals	Regulated waste	Liquid waste	Less than 1000 L per integrated processing facility	Collected, piped and stored in suitable dam.
	Waste or wash out liquids	Regulated waste	Liquid waste	1 m^3 per field compression facility 2 m^3per central gas processing facility 3 m^3 per integrated processing facility	Reused or removed by licensed tanker or carrier to a licensed commercial waste facility.
	Wastewater (sewage)	Regulated waste	Liquid waste	4 ML per 8 month period for each field compression facility 12 ML per year for each central gas processing facility	Wastewater will be collected and transported off site to a municipal treatment facility or treated onsite.
	Sewage sludge	Regulated waste	Solid Waste	12 ML per year for each integrated processing facility	Sludge will be disposed of in an offsite regulated waste facility.
Decommissioning and rehabilitation	Debris and chemical or oil contaminated soil Sludge	Regulated waste	Solid waste	100 m^3	Natural attenuation onsite or disposed in an offsite regulated waste facility.
	Concrete	Inert waste	Solid waste	Less than 10 t annually.	Recycled or reused, or buried onsite.
	Electrical cables	Regulated or recyclable waste	Solid waste	Unknown (final design not available)	Recycled or reused, where possible, or taken to an offsite licensed waste facility.

Table 26.2 Projected quantities of waste to be generated and proposed disposal and management (cont'd)

Activity	Waste Material	Characteristics	Waste Stream	Quantities	Disposal and Management
Decommissioning and rehabilitation (cont'd)	Fencing	General or recyclable waste	Solid waste	Unknown (final design not available)	Either mothballed or abandoned (some excess pipe is maintained for future maintenance/repair requirements).
	Gas compressors	Recyclable waste	Solid waste	Up to 130 varying sized units	
	Gas pipelines	Recyclable or regulated waste	Solid waste	Unknown (final design not available)	
	High-pressure gas pipelines	Recyclable	Solid waste	These are part of a separate assessment process	
	Production wellheads	Recyclable waste	Solid waste	Unknown (final numbers not available)	Recycled or reused where possible or taken to an offsite licensed waste facility.
	Power generators	Recyclable or regulated waste	Solid waste	Up to 110 varying sized units, but could be considerably less	
	Pumps	Recyclable waste	Solid waste	Unknown (final numbers not available)	
	Sewerage treatment plant and tanks	Recyclable waste	Solid waste	Unknown (final design not available)	
	Storage tanks	Recyclable or regulated waste	Solid waste	Unknown (final design not available)	

26.7 Inspection and Monitoring

Inspection and monitoring of avoidance, mitigation and management measures will be implemented to ensure the residual impacts continue to be low throughout the lifetime of the project. Inspection will be undertaken regularly to ensure mitigation measures are effective and to intervene early, rather than monitor or inspect the effect of the impact. Monitoring will also be conducted, where necessary, to demonstrate achievement of objectives. Specific inspection and monitoring measures relating to waste management include:

- Maintain a waste stream inventory identifying the type, classification, storage, transport and disposal requirements for the waste. [C551]
- Inspect waste storage locations to ensure waste management measures are being adhered to. [C552]
- Maintain a waste tracking system. [C553]
- Maintain and update a water balance model that includes but is not limited to:
  - Monitoring of volume and quality of coal seam gas water produced and treated.
  - Monitoring of disposition volumes of treated and untreated coal seam gas water. [C539]

Training in the principles of the waste hierarchy will be provided to personnel handling wastes on a regular basis. [C554]