APPENDIX B7

Waste and Resource Management Plan

The Northern Road Upgrade - Stage 3 North Project

MARCH 2017

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Glossary / Abbreviations

CEMP	Construction Environmental Management Plan
CT	Contaminant Thresholds
EEC	Endangered Ecological Community
ENM	Excavated Natural Material
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPI	Environmental Planning Instrument
EPL	Environmental Protection Licence
EWMS	Environmental Work Method Statements
FM Act	*Fisheries Management Act 1994*
NOW	NSW Office of Water
OEH	Office of Environment and Heritage
PESCP	Progressive Erosion and Sediment Control Plan
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
SCC	Specific Contaminant Concentrations
TCLP	Toxicity Characteristics Leaching Procedure
VENM	Virgin Excavated Natural Material
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*
WRMP	Waste and Resource Management Plan
WRAPP	Waste Reduction and Purchasing Policy

1 Introduction

1.1 Context

This Waste and Resource Management Plan (WRMP or Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Northern Road Upgrade - Stage 3 North Project (the Project).

This WRMP has been prepared to address the requirements of the Review of Environmental Factors (REF) and all applicable legislation.

1.2 Background

The REF assessed the impacts of construction in terms of waste generation/management and energy use, within chapter *6.14.*

The REF identified the various waste streams that would be generated during the construction of the Project, including construction and demolition waste, vegetation waste, packaging materials and liquid wastes. It also identified opportunities to avoid, reduce and recycle waste using the Waste Hierarchy.

The REF identified the main sources of energy consumption for the project and estimated the consumption of electricity and fuel to indicatively quantify greenhouse gas emissions. Measures to reduce energy consumption during construction were identified.

1.3 Environmental management systems overview

The overall Environmental Management System for the Project is described in the Construction Environmental Management Plan (CEMP).

The WRMP is part of the Lendlease environmental management framework for the Project, as described in *Section 4.1 of the CEMP*. Management measures identified in this Plan will be incorporated into site or activity specific Environmental Work Method Statements (EWMS) where applicable.

EWMS will be developed and signed off by environment and management representatives prior to associated works and construction personnel will be required to undertake works in accordance with the identified mitigation and management measures.

Used together, the CEMP, strategies, procedures and EWMS form management guides that clearly identify required environmental management actions for reference by Lendlease personnel and contractors.

The review and document control processes for this Plan are described in *Sections 9 and 10 of the CEMP*.

2 Purpose and objectives

2.1 Purpose

The purpose of this Plan is to describe how Lendlease proposes to minimise the amount of waste for disposal, manage waste and reduce energy consumption during construction of the Project.

2.2 Objectives

The key objective of the WRMP is to ensure that waste for disposal and energy use are minimised. To achieve this objective, Lendlease will undertake the following:

- Ensure measures are identified and implemented to minimise waste, manage waste and conserve energy throughout the construction of the Project;
- Ensure the preferred waste management hierarchy of avoidance, minimisation, reuse, recycling and finally disposal is followed;
- Provide staff with an increased level of understanding and awareness of waste and resource use management issues;
- Ensure appropriate measures are implemented to address the relevant REF Environmental Safeguards; and
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in *Section 3.1* of this Plan.

2.3 Targets

The following targets have been established for the management of waste and energy consumption during the Project:

- Avoid the unnecessary production of waste where practical to do so;
- Dispose of waste materials in accordance with legislative requirements;
- Minimise / reduce the quantities of resources to be used; and
- Achieve the waste re-use / recycling targets nominated in Table 2-1.

Table 2-1 Construction waste streams and targets

Construction Activity	Waste Type	Waste Classification	Disposal methods	Reuse / Recycle Target
Earthworks	Surplus spoil	VENM/ENM	Re-use on site Offsite re-use	100%
	Contaminated Soil	Special Hazardous	Onsite remediation Offsite disposal to licensed Landfill	0%
Clearing and grubbing	Vegetation	General solid waste (non-putrescible)	Use on site in erosion and sediment control and landscaping	100%

Construction Activity	Waste Type	Waste Classification	Disposal methods	Reuse / Recycle Target
			Offsite use of merchantable timber.	
			Offsite disposal in accordance with the Raw Mulch Exemption/Order 2016	
Demolition	Concrete, Steel etc	General solid waste (non-putrescible)	Crushed for use in access tracks on site	60%
			Disposal to steel recycler	
			Disposal to concrete recycler	
Dewatering	Waste Water	Liquid waste	Use on site as dust suppressant	20%
			Discharge offsite in accordance with Environment Protection License	
Maintenance	Liquid Waste, Oils, lubes etc	Liquid	Disposal off site to licensed facility.	0%
Administration	Office Waste	General solid waste (non-putrescible)	Recycle paper/cardboard etc	60%
			Other general waste to landfill	
	Sewage	General solid waste (putrescible)	Pump out to licensed facility	0%

3 Environmental requirements

3.1 Relevant legislation and guidelines

3.1.1 Legislation

Legislation and regulations relevant to waste and energy management includes:

- *Protection of the Environment Operations Act 1997;*
- *Protection of the Environment Operations (General) Regulation 2009;*
- *Protection of the Environment Operations (Waste) Regulation 2014;*
- *Waste Avoidance and Resource Recovery Act 2001 (WARR Act);*
- *Contaminated Land Management Act 1997;*
- *National Greenhouse and Energy Reporting Act 2007;*
- *Noxious Weeds Act 1993; and*
- *Environmentally Hazardous Chemicals Act 1985*.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix A1 of the CEMP.

3.1.2 Guidelines and standards

The main guidelines, specifications and policy documents relevant to this Plan include:

- Waste Classification Guidelines 2014 (EPA Publication);
- NSW Waste Avoidance and Resource Recovery Strategy 2014;
- NSW Waste Reduction and Purchasing Policy; and
- Best Practice Waste Reduction Guidelines for the Construction and Demolition Industry (tools for Practice), Natural Heritage Trust, 2000.

3.2 REF Environmental Safeguards

The REF environmental safeguards (ES) relevant to this Plan are listed Table 3-1 below. A cross-reference is also included to indicate where the condition is addressed in this Plan or other Project management documents.

Table 3-1 Environmental Safeguards relevant to the WRMP

ES.	Condition Requirements	Document Reference
W1	*A Waste and resource Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:* • *measures to avoid and minimise waste associated with the project;* • *classification of wastes and management options (re-use, recycle, stockpile, disposal);* • *statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions;*	*This document*

ES.	Condition Requirements	Document Reference
	• *procedures for storage, transport and disposal;* • *monitoring, record keeping and reporting; and* • *A resource management strategy detailing beneficial reuse options for surplus and/or unsuitable material.* *The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets, as well as the adopting the Resources Management Hierarchy principles of the WARR Act.*	
W2	*Prior to land being used for ancillary construction purposes (compounds, storage, parking, etc) a pre-construction land assessment will be undertaken to identify the presence of any pre-existing wastes. The assessment will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land. Where the land is privately owned, a copy of the assessment will be provided to the landowner.*	*Table 6-1*
W3	*A Spoil Management Strategy would be developed prior to the commencement of construction and implemented during construction. The strategy would identify spoil disposal site(s) and describe the management of spoil on-site and during off-site transport.*	*Table 6-1* *SWMP Appendix B*
W4	*Waste materials (such as soils and aggregates) obtained from the project and to be exported for use on another construction site or project will be sampled and managed in accordance with relevant resource recovery orders and exemptions as issued by the NSW EPA.*	*Table 6-1*
W5	*Any trees to be removed will be reused as millable timber wherever practicable. Other vegetated material from native species will be mulched and re-used on-site for landscaping or rehabilitation purposes if consistent with the approved Flora and Fauna Management Plan for the project. Weed species, or vegetation not considered appropriate for re-use on-site, will be removed and disposed of to an appropriately licenced facility.*	*Table 6-1*
W6	*Effluent produced from on-site amenities, including toilets, bathrooms and kitchens will either be discharged to the local sewerage system, or where septic or portable facilities are provided they will be of sufficient capacity, located away from environmentally sensitive areas, and material will be regularly collected and disposed of to an appropriately licenced facility. Pit toilets are not permitted.*	*Table 6-1*
W7	*All wastes, including contaminated wastes and liquid waste, will be identified and classified in accordance with Waste Classification Guidelines (NSW EPA, 2014)*	*Table 6-1*
W8	*Disposal of waste will be undertaken in accordance with the POEO Act.*	*Table 6-1*
W9	*Asbestos waste will be removed from the site and disposed of to an appropriately licenced facility and in accordance with the Asbestos Management Plan for the project and will be carried out in accordance with:*	*Table 6-1* *Appendix A to the CLMP*

ES.	Condition Requirements	Document Reference
	• *Work Health and Safety Act 2011;* • *Code of Practice for the Safe Removal of Asbestos 2nd edition (NOHSC, 2005);* • *Code of Practice for the Management and Control of Asbestos in Workplaces (NOHSC, 2005); and* • *Protection of the Environment Operations (Waste) Regulation 2005 – section 42 special requirements relating to asbestos waste.*	
W10	*Demolition work would be carried out in accordance with AS2601:1991 Demolition of Structures.*	*Table 6-1*
W11	*Any dewatering activities will be undertaken in accordance with the RTA Technical Guideline:* *Environmental management of construction site dewatering in a manner that prevents pollution of waters, including appropriate reuse or disposal in accordance with the management options outlined in the approved WMP.*	*Table 6-1* *SWMP*
W12	*A post-construction land assessment will be undertaken of land that was used for ancillary construction purposes (compounds, storage, parking, etc) to determine the suitability for hand-back to the landowner.* *The assessment will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land. Where the land is privately owned, a copy of the assessment will be provided to the landowner.*	*Table 6-1*
CC1	*Detailed design will take into consideration the potential effect of climate change on the proposal, including drainage requirements.*	*Table 6-1*
CC2	*A Greenhouse Gas (GHG) Assessment will be carried out for the proposal to determine the likely source of GHG emissions and associated reduction strategies to be investigated.*	*Table 6-1*
CC3	*The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.*	*Table 6-1*
CC4	*Energy efficiency and related carbon emissions will be considered in the selection of vehicle and plant equipment.*	*Table 6-1*
CC5	*Materials will be delivered as full loads and local suppliers would be used, where possible.*	*Table 6-1*
CC6	*Construction equipment, plant and vehicles will be appropriately sized for the task.*	*Table 6-1*
CC7	*Equipment will be serviced frequently to ensure they are operating efficiently*	*Table 6-1*
CC8	*The following measures will be considered during detailed design and construction, and implemented as appropriate:* • *Use of LED and low energy equipment for traffic lights and signage;* • *Use of modern diesel engine equipment, to ensure highest fuel efficiency ratings;* • *Review of cut and fill balances for earthworks to ensure material is transported the least possible distances ;*	*Table 6-1*

ES.	Condition Requirements	Document Reference

	• *Review of local options for import and export of materials asneeded to reduce excess fuel used during transport;*
	• *Specification of the use of biofuels, or biofuel blends in construction plant and equipment;*
	• *Specification and certification of steel from recycled sources where suitable for offsetting virgin steel; and*
	• *Specification of materials with low embodied energy / embodied greenhouse gas content, such as:*
	  ○ *Replacement of Portland cement in concrete mixes with low carbon alternatives such as fly-ash;*
	  ○ *Use of warm mix asphalt versus hot mix; and*
	  ○ *Avoid excess clearance of vegetation where feasible by reducing buffer zones and replanting once construction is finished.*	

4 Environmental aspects and impacts

4.1 Construction waste streams and energy use

The following construction related waste streams have been identified:

- Demolition wastes from existing structures that require demolition, M4 bridge, pipe work, pavements and concrete pathways;
- Excavation wastes including ENM, VENM and contaminated soils;
- Vegetation from removal of shrubs and trees;
- Waste from illegal dumping which may occur during the Project;
- Packaging materials associated with items delivered to site such as pallets, crates, cartons, plastics and wrapping materials;
- Wastes produced from the maintenance of various heavy construction equipment including liquid hazardous wastes from cleaning, repairing and maintenance;
- Non-hazardous wastes would be generated through the use of worker's facilities such as toilets;
- Used spill kit materials and small quantities of contaminated soil from spillage and clean up works during construction; and
- General wastes including office wastes, scrap materials and biodegradable wastes.

The following sources of construction related energy consumption (fuel and power) have been identified:

- Procurement and delivery of materials to site;
- Vegetation removal;
- Site establishment, including compound set up;
- Relocation and protection of services;
- Earthworks including earth and rock cuttings and retaining walls;
- Removal, relocation and compaction of excavated material in fill embankments;
- Construction of pavements, bridges and culverts;
- Demolition of structures and pavements;
- Operation of site compounds and lighting;
- Construction plant including cranes, rollers, excavators, bulldozers, graders and water trucks;
- Importation of material to site; and
- Removal of waste from the site.

4.2 Impacts

The potential environmental impacts associated with construction waste generation and energy use include:

- Inappropriate handling and disposal of hazardous waste;

- Generation or spread of contaminated waste/soils, e.g. groundwater, used or expired chemicals, or construction materials;
- Water pollution due to sediment runoff from soil excavation and excess spoil storage;
- Weed infestation from dispersion of seeds and so forth during clearing and access upgrading activities;
- Consumption of non-renewable resources such as energy, diesel and other chemicals; and
- Greenhouse gas emissions due to consumption of energy from non-renewable resources.

5 Waste and energy management

5.1 Classification of waste streams

Where waste cannot be avoided, reused or recycled it will be classified and appropriate disposal will then occur. The classification of waste is undertaken in accordance with the OEH *Waste Classification Guidelines Part 1: Classifying Waste* (2014). This document identifies six classes of waste: Special, Liquid, Hazardous, Restricted Solid, General Solid (putrescible) and General Solid (non-putrescible), and describes a six step process to classifying waste.

5.2 Waste orders and exemptions

Clause 92 *Protection of the Environment Operations (Waste) Regulation 2014* enables the EPA to grant exemptions to the licensing and payment of levies for the land application or use of waste. The EPA has issued general resource recovery orders and exemptions for a range of commonly recovered, high volume and well characterised waste materials that allow their use as fill or fertiliser at unlicensed, off-site facilities. The general 'Resource Recovery Orders/Exemptions' may be applicable to this Project are defined in Table 5-1 below. These are general gazette exemptions that do not require approval. A specific exemption may be granted where an application is made to the EPA.

Table 5-1 Resource recovery orders/exemptions

Order/Exemption	General Conditions
Effluent Exemption 2014	The effluent can only be applied to land for the purposes of irrigation or as a soil amendment material. The consumer must land apply the effluent within a reasonable period of time.
Excavated Natural Material Exemption 2014	The chemical concentration or other attributes of the excavated natural material listed in the Excavated Natural Material Exemption must not be exceeded. The excavated natural material can only be applied to land as engineering fill or used in earthworks. ENM handling, processing and testing requirements are outlined in detail in the exemption
Excavated Public Road Material 2014	The excavated public road material can only be stored within the road corridor at the site where it is to be applied to land. The excavated public road material can only be applied to land within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities. This exemption does not apply to the land application of excavated public road material on any land outside the road corridor. The excavated public road material cannot be applied on private land. The consumer must land apply the relevant waste within a reasonable period of time.
Raw Mulch Exemption 2016	The raw mulch can only be applied to land with a risk management protocol in place. The consumer must ensure that they do not cause or permit the migration of leachate from the land application site. The consumer must land apply the raw mulch within a reasonable period of time.
Recovered Aggregate Exemption 2014	The chemical concentration or other attribute of the recovered aggregate listed in Recovered aggregate Exemption must be met. The recovered aggregate can only be applied to land for road making activities, building, landscaping and construction works. This approval does not apply to any of the following applications: - Construction of dams or related water storage infrastructure; - Mine site rehabilitation; - Quarry rehabilitation; - Sand dredge pond rehabilitation;

Order/Exemption	General Conditions
	- Back-filling of quarry voids; - Raising or reshaping of land used for agricultural purposes; and - Construction of roads on private land unless: a. the relevant waste is applied to land to the minimum extent necessary for the construction of a road, and b. a development consent for the development has been granted under the relevant Environmental Planning Instrument (EPI), or c. it is to provide access (temporary or permanent) to a development approved by a Council, or d. the works undertaken are either exempt or complying e. development.
Reclaimed asphalt pavement exemption 2014	Reclaimed asphalt must not contain a detectable quantity of coal tar or asbestos. Reclaimed asphalt may be applied to land for road related activities including: - Use as a road base and sub base; - Applied as a surface layer or road shoulders and unsealed roads; and - Use aa an engineering fill material Or used as an alternative input into thermal processes for non-energy recovery purposes in the manufacture of asphalt.

5.3 Classification of potential waste streams

The construction aspects and types of wastes, which may be generated during construction, are outlined with classifications in Table 5-2.

Table 5-2 Classification of potential waste streams

Aspect	Waste Types	Classification	Proposed reuse / Recycling / Disposal
Demolition / Site Clearing	Vegetation (logs, mulched timber, weeds)	General solid waste (non-putrescible)	*Beneficial reuse onsite for erosion and sediment control and landscaping mulch* *Offsite re-use as millable timber* *Weeds buried on site in accordance with FFMP.*
	Concrete, asphalt and gravel	General solid waste (non-putrescible)	Recycling of concrete for use in access tracks, landscape mounds and other applications where suitable and approved by RMS. Recycling of asphalt pavement in new asphalt pavement.
	Scrap metal	General solid waste (non-putrescible)	Recycling
Bulk Earthworks	ENM (Excavated Natural Material) Potentially Contaminated Soils VENM (Virgin Excavated Natural Material)	If material is taken off site classification will be carried out, based on soil tests carried out pre-construction and in accordance with the EPA *Waste Classification Guidelines: Parts 1 and 2* (DECC 2014)	*Beneficial reuse onsite (such as noise mounds). Balance cut and fill earthworks, where possible, to optimise reuse.* *Off site disposal at an approved facility*

Aspect	Waste Types	Classification	Proposed reuse / Recycling / Disposal
Road Construction	Steel Reinforcing	General solid waste (non-putrescible)	Recycling
	Conduits and pipes	General solid waste (non-putrescible)	Disposal
	Concrete (solids and washouts) and asphalt	General solid waste (non-putrescible)	Disposal
	Timber formwork	General solid waste (non-putrescible)	Disposal/recycled where applicable
	Packaging Materials, including wood, plastic, cardboard and metals	General solid waste (non-putrescible)	Disposal
	Empty oil and other drums	General solid waste (non-putrescible)	Disposal
	Pesticides, herbicides, spill clean ups, paints and other chemicals	Hazardous waste	Disposal
	Metals and electrical cabling	General solid waste (non-putrescible)	Recycling
Compounds and Workshop Operation	Tyres	Special Waste	Disposal
	Waste generated by the maintenance of equipment including air and oil filters and rags	General solid waste (non-putrescible)	Disposal
	Oils, grease, fuel, chemicals and other fluids	Liquid	Recycling/Disposal where applicable
	Batteries	Hazardous waste	Recycling
	Radiator Fluid	Hazardous waste	Disposal
	Hydraulic Fluid	Hazardous waste	Disposal
	Domestic waste generated by workers	General solid waste (putrescible)	Disposal
	Sewage	General solid waste (putrescible)	Disposal
Office Operation	Paper, cardboard and plastic	General solid waste (non-putrescible)	Recycling
	Glass bottles and aluminium cans	General solid waste (non-putrescible)	Recycling
	Ink cartridges	General solid waste (non-putrescible)	Recycling
	Food Waste	General solid waste (non-putrescible)	Disposal
	Effluent (eg STP)	Liquid	Disposal

5.4 Reuse and recycling

Waste separation and segregation will be promoted on-site to facilitate reuse and recycling as a priority of the waste management program as follows:

Waste segregation onsite – Waste materials, including spoil and demolition waste, will be separated onsite into dedicated bins/areas for either reuse onsite or collection by a waste contractor and transport to offsite facilities.

Waste separation offsite – Wastes to be deposited into one bin where space is not available for placement of multiple bins, and the waste is to be sorted offsite by a waste contractor.

5.5 Waste Handling and Storage

Where waste is required to be handled and stored onsite prior to onsite reuse or offsite recycling/disposal, the following measures apply:

- Spoil, topsoil and mulch are to be stockpiled onsite in allocated areas in accordance with the Stockpile Management Protocol (Appendix E to the Soil and Water Management Plan), where appropriate, and mitigation measures for dust control and surface water management will be implemented as per the Air Quality Management Plan and the Soil and Water Management Plan;
- Liquid wastes are to be stored in appropriate containers in bunded areas until transported offsite. Bunded areas will have the capacity to hold 110 per cent of the liquid waste volume for bulk storage or 120 per cent of the volume of the largest container for smaller packaged storage;
- Hazardous waste will be managed by appropriately qualified and licensed contractors, in accordance with the requirements of the Environmentally Hazardous Chemicals Act 1985 and the EPA waste disposal guidelines;
- All other recyclable or non-recyclable wastes are to be stored in appropriate receptacles (e.g. bins or skips) in appropriate locations onsite and contractors commissioned to regularly remove/empty the bins to approved disposal or recycling facilities; and
- Waste materials are to be stored in appropriate areas that prevent degradation or damage from weathering or moisture.

5.6 Waste Disposal

Waste (and spoil) disposal is to be in accordance with the *Protection of the Environment Operations Act 1997* and the *Waste Avoidance and Resource Recovery Act 2001*. Wastes that are unable to be reused or recycled will be disposed of offsite to an EPA approved waste management facility following classification (*refer to Section 5.1*). The location of waste management / disposal facilities are included in *Appendix A*. Details of waste types, volumes and destinations are to be recorded in the project Waste Management Register (an example is included in Appendix B).

Wastes that can be re-used at un-licensed facilities under current general or specific resource recovery orders/exemptions will be managed in accordance with the relevant exemption/order and tracked through the completion of s143 certificates.

5.7 Waste Tracking

Consistent with the Protection of the Environment Operations (Waste) Regulation 2014 the following wastes potentially encountered/generated are required to be tracked within NSW:

- Hazardous Wastes as defined by Table 3 in the NSW EPA 'Waste that must be tracked' guideline;
- Liquid Waste (Category 1 trackable waste);

- More than 100 kilograms of asbestos waste or more than 10 square meters of asbestos sheeting in any single load;
- More than 200kg of waste tyres, or 20 tyres (whichever is heavier);
- Waste oil/water, hydrocarbon/water mixtures or emulsions; and
- Wastes listed in Table 1 of the NSW EPA 'Waste that must be tracked' Guideline.

It is noted that there is an exemption in place (*Notice of Exemption from Clause 79: Reporting on transportation of asbestos waste solely within NSW*) for the transport of Asbestos contaminated soil and this does not need to be tracked.

The NSW EPA WasteLocate system is to be used to track asbestos waste and waste tyres, whilst the online waste tracking system developed by EPA will be utilised to track all other trackable waste.

5.8 Energy Conservation

The Project Team is dedicated to implementing energy conservation best practice and the reduction of greenhouse gases by adopting energy efficient work practices including:

- Developing and implementing procedures to minimise energy use; and
- Conducting awareness programs for all site personnel regarding energy conservation methods.

6 Environmental mitigation and management measures

A range of environmental requirements are identified in the various environmental documents, including the REF and RMS documents, and from recent experience on similar road projects. Specific measures and requirements to address waste management and energy use issues are outlined in Table 6-1.

Table 6-1 Management and mitigation measures

ID	Measure / Requirement	When to implement	Responsibility	Reference
GENERAL				
W1	*A Waste and resource Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:* • *measures to avoid and minimise waste associated with the project;* • *classification of wastes and management options (re-use, recycle, stockpile, disposal);* • *statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions;* • *procedures for storage, transport and disposal;* • *monitoring, record keeping and reporting; and* • *A resource management strategy detailing beneficial reuse options for surplus and/or unsuitable material.* *The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets, as well as the adopting the Resources Management Hierarchy principles of the WARR Act.*	*Pre-construction* *Construction*	*Environment Manager*	*REF W1*
W2	*Prior to land being used for ancillary construction purposes (compounds, storage, parking, etc) a pre- construction land assessment will be undertaken to identify the presence of any pre-existing wastes. The assessment will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land. Where the land is privately owned, a copy of the assessment will be provided to the landowner.*	*Pre-construction*	*Site Engineer / Environment Officer*	*REF W2*
W3	*A Spoil and Fill Management Protocol has been developed prior to the commencement of construction and implemented during construction.*	*Pre-Construction*	*Construction Manager*	*REF W3* *SWMP Appendix E*
W4	*Waste materials (such as soils and aggregates) obtained from the project and to be exported for use on another construction site or*	*Construction*	*Site Engineer*	*REF W4* *Lendlease Global Minimum Requirements*

ID	Measure / Requirement	When to implement	Responsibility	Reference
	project will be sampled and managed in accordance with relevant resource recovery orders and exemptions as issued by the NSW EPA.			
W5	*Any trees to be removed will be reused as millable timber wherever practicable. Other vegetated material from native species will be mulched and re-use on-site for erosion and sediment control measures, landscaping or rehabilitation purposes. Weed species, or vegetation not considered appropriate for re-use on-site, will be removed and either buried onsite in accordance with the FFMP or disposed of to an appropriately licenced facility.*	*Pre-construction / Construction*	*Construction Manager / Environment Manager*	*REF W5* *FFMP*
W6	*Effluent produced from on-site amenities, including toilets, bathrooms and kitchens will either be discharged to the local sewerage system, or where septic or portable facilities are provided they will be of sufficient capacity, located away from environmentally sensitive areas, and material will be regularly collected and disposed of to an appropriately licenced facility.*	*Construction*	*Construction Manager / foreman*	*REF W6*
W7	*All wastes, including contaminated wastes and liquid waste, will be identified and classified in accordance with Waste Classification Guidelines (NSW EPA, 2014)*	*Construction*	*Environment Manager*	*REF W7*
W8	*Disposal of waste will be undertaken in accordance with the POEO Act.*	*Construction*	*Foreman*	*REF W8*
W9	*Asbestos waste will be removed from the site and disposed of to an appropriately licenced facility and in accordance with the Asbestos Management Plan for the project and will be carried out in accordance with:* • *Work Health and Safety Act 2011;* • *Code of Practice for the Safe Removal of Asbestos 2nd edition (NOHSC, 2005);* • *Code of Practice for the Management and Control of Asbestos in Workplaces (NOHSC, 2005); and* • *Protection of the Environment Operations (Waste) Regulation 2005 – section 42 special requirements relating to asbestos waste.*	*Construction*	*Safety Manager / foreman*	*REF W9* *CLMP*
W10	*Demolition work would be carried out in accordance with AS2601:1991 Demolition of Structures.*	*Construction*	*Foreman*	*REF W10*

ID	Measure / Requirement	When to implement	Responsibility	Reference
W11	*Any dewatering activities will be undertaken in accordance with the RTA Technical Guideline:* *Environmental management of construction site dewatering in a manner that prevents pollution of waters, including appropriate reuse or disposal in accordance with the management options outlined in the approved WMP.*	Construction	Foreman	REF W11 SWMP
W12	*A post-construction land assessment will be undertaken of land that was used for ancillary construction purposes (compounds, storage, parking, etc) to determine the suitability for hand-back to the landowner.* *The assessment will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land. Where the land is privately owned, a copy of the assessment will be provided to the landowner.*	*Construction*	*Construction Manager*	*REF W12*
W13	*The relevant licences of waste facilities utilised for the disposal of project waste shall be obtained (on a regular basis if necessary) to ensure they are legally able to accept that waste. Waste facilities will also be reviewed regularly to ensure ongoing compliance with waste disposal regulations.*	*Construction*	*Environment Manager*	*G36* *LLE712*
W14	*The disposal of chemical, fuel and lubricant containers, solid and liquid wastes must be in accordance with the requirements of the local Council or the EPA.*	*Construction*	*Foreman*	*G36*
W15	*All trucks transporting wastes off site will be appropriately licensed to carry the materials to appropriately licensed waste facilities.*	*Construction*	*Site Engineer*	*G36*
W16	*Stockpiles including mulch and other combustible waste will be managed to prevent the risk of fire, by regular removal and safe disposal.*	*Construction*	*Foreman*	*LLE712*
W17	*Suppliers will be requested to reduce unnecessary packing and seek to arrange a packaging return agreement. Suppliers will also be requested to deliver materials when needed to reduce error wastage.*	*Construction*	*Environment Manager/ Site Engineer/ Foreman*	*LLE712*
W18	*Any waste or spoil proposed to be disposed at an unlicensed facility will be approved by the Project Environment Representative prior to disposal. The Environment Manager will ensure that all appropriate approvals and documentation will be obtained prior to issuing approval. The offsite disposal of waste in this manner must be undertaken in*	*Construction*	*Environment Manager*	*LLE712* *POEO Act (Waste Regulation, 2014)*

ID	Measure / Requirement	When to implement	Responsibility	Reference
	accordance with the POEO Act Waste Regulation (2014), which includes the completion of a signed s143 certificate (Appendix E) for the waste to be disposed of. *Waste that may be required to be disposed of in this manner must be covered by a General Resource recovery exemption (refer Table 5-1) or a Specific Resource recovery exemption issued by EPA.*			
W19	*Any servicing of plant and equipment will occur off-site where possible. Any minor maintenance of plant or equipment on-site will be performed in accordance with a risk assessment and within an appropriate servicing area supported by immediately accessible spill controls and waste storage. Maintenance records will be readily available for inspection.*	*Construction*	*Foreman*	*LLE712*
W20	*Each Project site will have an informed, delegated officer authorised to sign off any Waste Transport Certificates when waste is picked up from site.* *The following limits of authority apply to different waste streams:* *Foreman: general waste, recyclable materials and effluent pump out activities.* *Environment Manager/Superintendent: special waste, hazardous waste, and waste covered by General and/or Specific exemptions.*	*Construction*	*Environment Manager/ Foreman/ Superintendent*	*LLE712*
CC1	*Detailed design will take into consideration the potential effect of climate change on the proposal, including drainage requirements.*	*Design*	*Design Manager*	*REF CC1*
CC2	*A Greenhouse Gas (GHG) Assessment will be carried out for the proposal to determine the likely source of GHG emissions and associated reduction strategies to be investigated.*	*Pre Construction*	*Environment Manager*	*REF CC2* *REF Section 6.15*
CC3	*The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.*	*Construction*	*Construction Manager / Environment Manager*	*REF CC3*
CC4	*Energy efficiency and related carbon emissions will be considered in the selection of vehicle and plant equipment.*	*Pre Construction*	*Construction Manager / Environment Manager*	*REF CC4*
CC5	*Materials will be delivered as full loads and local suppliers would be used, where possible.*	*Construction*	*Site Engineer / Foreman*	*REF CC5*

ID	Measure / Requirement	When to implement	Responsibility	Reference
CC6	*Construction equipment, plant and vehicles will be appropriately sized for the task.*	*Construction*	*Foreman*	*REF CC6*
CC7	*Equipment will be serviced frequently to ensure they are operating efficiently*	*Construction*	*Foreman*	*REF CC7*
CC8	*The following measures will be considered during detailed design and construction, and implemented as appropriate:* • *Use of LED and low energy equipment for traffic lights and signage;* • *Use of modern diesel engine equipment, to ensure highest fuel efficiency ratings;* • *Review of cut and fill balances for earthworks to ensure material is transported the least possible distances;* • *Review of local options for import and export of materials as needed to reduce excess fuel used during transport;* • *Consideration of the use of biofuels, or biofuel blends in construction plant and equipment where deemed applicable and not to the detriment of the machinery in question;* • *Specification and certification of steel from recycled sources where suitable for offsetting virgin steel; and* • *Specification of materials with low embodied energy / embodied greenhouse gas content where applicable, such as:* o *Replacement of Portland cement in concrete mixes with low carbon alternatives such as fly-ash;* o *Use of warm mix asphalt versus hot mix; and* o *Avoid excess clearance of vegetation where feasible by reducing buffer zones and replanting once construction is finished.*	*Design/Construction*	*Design Manager / Construction Manager*	*REF CC8*
CC9	*Turn of plant and equipment when not in use to minimise GHG emissions.*	*Construction*	*Foreman*	*This plan*
WR1	*Waste segregation and energy use will be monitored informally by site staff throughout construction and recorded on weekly inspection checklist. Waste reporting will be undertaken in accordance with RMS WARR reporting requirement.*	*Construction*	*Environment Officer/Environment Manager*	*Weekly Inspection Checklist* *Waste Avoidance and Resource Recovery Reporting*

7 Compliance management

7.1 Roles and responsibilities

The Lendlease Project Team's organisational structure and overall roles and responsibilities are outlined in *Section 4.2 of the CEMP*. Specific responsibilities for the implementation of environmental controls are detailed in *Section 6 of this Plan*.

7.2 Training

All employees, contractors and utility staff working on site will undergo site induction training relating to waste and energy management issues. The induction training will address elements including:

- Existence and requirements of this sub-plan;
- Relevant legislation;
- Incident response, management and reporting;
- Waste reporting requirements;
- Requirements of the waste hierarchy;
- Waste/ recycle storage requirements;
- Potential for contaminated material (including asbestos containing material) to be present on site and management requirements for such material if identified;
- Energy efficient best practices; and
- Other specific responsibilities for waste and reuse management.

Further details regarding staff induction and training are outlined in Section 5 of the CEMP.

7.3 Monitoring and inspection

Regular monitoring and inspections will be undertaken during construction.

Additional requirements and responsibilities in relation to inspections, in addition to those in Table 6-1, are documented in *Section 8 of the CEMP*.

7.4 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental mitigation and management measures, compliance with this sub plan, and other relevant approvals, licenses and guidelines.

Audit requirements are detailed in *Section 8.3 of the CEMP*.

7.5 Reporting

Waste Avoidance and Resource Recovery (WARR) reporting will be undertaken in accordance with RMS G36, which includes the submission of the WARR report to RMS by 31st July each year, for the preceding year.

All other reporting requirements and responsibilities are documented in the *Sections 8.4 and 8.5 of the CEMP*.

8 Review and improvement

8.1 Continuous improvement

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance;
- Determine the cause or causes of non-conformances and deficiencies;
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies;
- Verify the effectiveness of the corrective and preventative actions;
- Document any changes in procedures resulting from process improvement; and
- Make comparisons with objectives and targets.

8.2 WRMP update and amendment

The processes described in *Section 8 and Section 9* of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

Any revisions to the WRMP will be in accordance with the process outlined in *Section 1.6 of the CEMP*.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to *Section 10 of the CEMP*.

Appendix A
Waste Facilities

Landfill and Recycling Centre Details				
Facility	**Type**	**Contact Details**	**Waste Accepted**	**Waste Recycled**
Eastern Creek Resource Recovery Park	Recycler	Wallgrove Road, Eastern Creek NSW 2766 1300651116 EPL # 12517	ENM VENM Wood Waste Garden Waste	ENM VENM Wood Waste Garden Waste
Penrith Landfill	Landfill	842 Mulgoa Road, Mulgoa 2745 (02) 4773 8778 EPL# 3438	Garden Waste General Solid Waste (non-putrescible) Waste Tyres	
Blaxland Waste Management Facility	Landfill	28-30 Attunga Road, Blaxland NSW 2774 EPL# 10039	General Solid Waste (putrescible) General Solid Waste (Non-putrescible) Asbestos Waste Tyres (over 1.2m diameter)	
Blacktown Waste Services	Landfill	920 Marsden Park Landfill, Richmond Road, Marsden Park NSW 2765 EPL#11497	General Solid Waste (non-putescible) Asbestos Waste Tyres (over 1.2m diameter)	
Concrete Recyclers	Recycler	14 Thackeray street, Camellia NSW 2142 EPL# 6664		General or specific exempted waste Building and Demolition waste VENM Drilling mud Muddy water from construction sites Industrial wash down waters

Appendix B
Example waste management register

Sheet 1: Summary

2017

All Volumes in Tonnes

	Waste Stream	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD
HAZARDOUS - RECYCLED	Batteries													0
	Coolant													0
	Degreaser													0
	Effluent													0
	Grease													0
	Oil Drum - 205L													0
	Oil Drum - 20L													0
	Oil Filters													0
	Oily Water													0
	Used Oil													0
	Contaminated Soils													0
	Total Recycled Haz	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	%	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
NON-HAZARDOUS - RE	Scrap Metal													0

	Paper & Cardboard													0
	Security Destruction-													0
	Co-mingled													0
	Fill/VENM													0
	Mulch/Vegetation													0
	Aggregates													0
	Asphalt													0
	Concrete													0
	Total Recycled/Reused NonHaz	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	%	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
HAZARDOUS - LANDFILL	Oily Rags / Absorbents													0
	Medical													0
	Contaminated Soils													0
	Total Disposed Haz	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	%	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
NON-HAZARDOUS - LANDFILL	Mixed Solid Waste (MSW)													0
	Fill/VENM													0

Mulch/Vegetation													0
Aggregates													0
Asphalt													0
Concrete													0
Metal													0
Total Disposed NonHaz	0	0	0	0	0	0	0	0	0	0	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

2014	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD
Total to Landfill	0	0	0	0	0	0	0	0	0	0	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Total Recycled/Reused	0	0	0	0	0	0	0	0	0	0	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total Weight/tonnes	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
total check	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Recycle Reuse %

Sheet 2: Breakdown of Individual Waste Stream

Waste Stream							
Classification	Date	Source	Transporter	Destination	Docket #	Landfill Quantity	
						m^3	ton

Appendix C
s143 Certificates