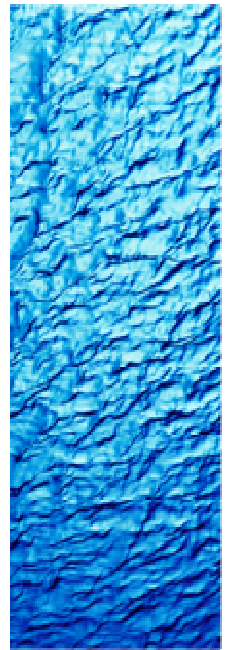
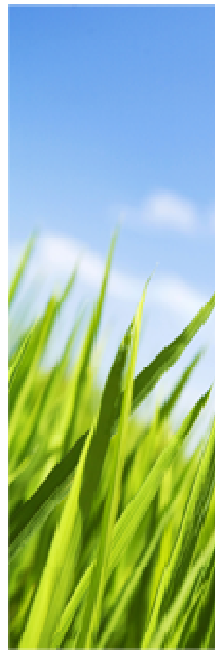
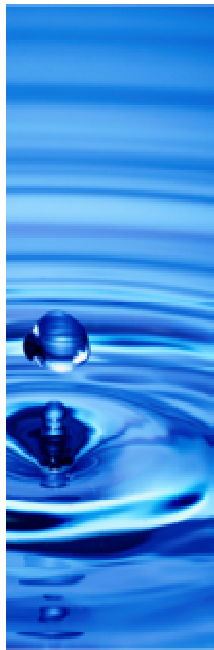
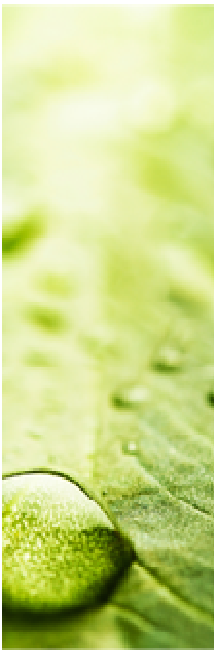


Victorian Desalination Project



D&C Plant and General Area Environmental Management Plan Attachment I6 – Resource Efficiency Sub Plan

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Definitions and Acronyms

The following Definitions and Acronyms are used in this document:

CWMS	Construction Work Method Statements
D&C	Design and Construct Phase of the VDP
DEWHA	Department of the Environment, Water, Heritage and the Arts
DSE	Department of Sustainability and Environment
DPI	Department of Primary Industries
EES	Environmental Effects Statement
EIRP	Environmental Incident Response Plan
EMP	Environmental Management Plan
EMR	Environmental Management Representative
EMS	Environmental Management System
EO	Environmental Officer
EPA	Victorian Environment Protection Authority
EP Act	<i>Environment Protection Act 1970</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
JHA	Job Hazard Analysis
JSEA	Job Safety and Environmental Analysis
NEPM	National Environment Protection Measure
PEM	Protocol for Environmental Management
O&M	Operation and Maintenance Phase of the VDP
OHS	Occupational Health and Safety
Performance Criteria	The Performance Criteria outline the overarching requirements based on the environmental objective for each Subject Area of Schedule A of Appendix S3 of the Project Scope and Project Requirements
Plant site	Victorian Desalination Project Wonthaggi Plant site
PR	Performance Requirement
PS&PR	Project Scope and Project Requirements
SEP	Site Environmental Plans
SEPP	State Environment Protection Policy
SEPP (AQM)	State Environment Protection Policy (Air Quality Management)
TDJV	Thiess Degrémont Joint Venture



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VDP	Victorian Desalination Project
WAP	Work Area Packages
WP	Work Packs



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1 Purpose and scope

This Resource Efficiency Sub Plan details the likely wastes to be produced, resources to be consumed and the management measures required to reduce resource consumption, waste and greenhouse gas emissions associated with design and construction (D&C) of the Victorian Desalination Project (VDP) Wonthaggi plant site.

This sub plan must be read in conjunction with the Environmental Management System (EMS) Manual, D&C Environmental Management Plan (D&C EMP) and the D&C Plant and General Area EMP. This sub plan forms an attachment to the D&C Plant and General Area EMP and addresses requirements listed in the Environmental Compliance Tracker (TDV-0-EV-RP-0001-01), including licence conditions, Performance Requirements (PRs), Performance Criteria (PC) and other obligations which may impact resource efficiency.

Specific management measures from this and other environmental sub plans have been incorporated into Work Area Packages (WAP) and Work Packs (WP) which include Construction Work Method Statements (CWMS), Site Environmental Plans (SEP) and Job Safety and Environmental Analysis (JSEA's) where applicable.

The management of spoil materials and contaminated soil are contained within the Soil Management Sub Plan and acid sulfate soil is covered by the Acid Sulfate Soil Sub Plan. The Hazardous Materials Sub Plan deals with materials on site (other than contaminated soil) that may also be deemed as waste, such as fuels, asbestos and solvents.

This sub plan forms the D&C Waste Management Plan, with waste-specific issues addressed further in Attachment I6.2 Waste Management.

2 Objectives and Targets

The objective of this sub plan is to minimise the use of resources, minimise the generation of waste and appropriately manage waste during construction to ensure project objectives, targets and obligations, including PRs and associated criteria, are met.

Table 1 outlines the relevant resource efficiency objectives and targets nominated to be achieved during the D&C phase of the VDP. Numbered entries are applicable performance requirements taken from Schedule A of Appendix S3 of the Project Deed. Non-numbered entries in Table 1 have been identified through earlier rounds of agency consultation.

Table 1: Environmental objectives, targets and performance requirements

Issue	Objective/Performance Criteria	Target/Performance Requirements
Resource efficiency	<p>Minimise resource use including energy and water during Project Activities.</p> <p>Comply with the Environment and Resource Efficiency Plans reporting and management requirements (PR#11085) D.</p> <p>Design to provide a holistic, best practice solution encompassing minimal resource usage and emissions to the receiving environment. D</p>	<p>Develop and implement construction and operation methods and management systems (including monitoring and reporting) to ensure the efficient use of water resources during Project Activities, including:</p> <ul style="list-style-type: none"> • Minimising water use. Designing offices and associated facilities to achieve a minimum water conservation target of 2A (i.e. less than, or equal to, 18 litres per day per person) • Reusing or recycling water, where possible. Where practical, harvesting rainwater and stormwater as a supplementary supply for various non-potable uses such as toilet flushing, cooling tower, irrigation and various in-plant uses where appropriate • Treating and/or returning surplus water for other non-Project uses or benefits • Using recycled water where practical, including during construction (PR#11087) D, C. <p>Develop and implement construction and operation methods and management systems (including monitoring and reporting) to ensure energy efficiency during Project Activities including:</p> <ul style="list-style-type: none"> • Achieving a specific energy consumption for the desalination process that is less than 4.6KWh/kL (calculated using a method agreed with EPA) on an annual average basis and as low as reasonably practicable and to the satisfaction of EPA • Installing variable speed (VSD) drives on pumps and motors, where practical • Ensuring all pumps are selected to run at their best efficiency point under normal operating conditions (PR#11088) D, C.

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Issue	Objective/Performance Criteria	Target/Performance Requirements
Greenhouse Gas	<p>Minimise greenhouse gas emissions.</p> <p>Adopt energy efficient design in accordance with Protocol for Environmental Management - Greenhouse Gas Emissions and Energy Efficiency in Industry (EPA Victoria), 2006 (PR#27179) D.</p> <p>Comply with the Environment and Resource Efficiency Plans reporting and management requirements (PR#27179) D.</p>	<p>Monitor and report in accordance with the National Greenhouse and Energy Reporting (Measurement) Systems and Technical Guidelines 2008 v1.0 (Department of Water Climate Change, 2008) (PR#27181) C.</p> <p>Demonstrate design, selection of project components and consumables minimises greenhouse gas emissions to the extent reasonably practicable (PR#27182) D.</p>
Waste - general	<p>Manage waste from the construction and operation phases of the Project consistent with the requirements of the Government/ EPA Waste Management Policies</p> <p>Minimise waste through the adoption of best practice waste reduction and disposal procedures consistent with the EPA waste hierarchy (PR#20130) D, C.</p>	<p>Develop and implement a long term waste minimisation and management plan for the construction¹ and operational phases of the Project, incorporating best practice measures to reduce the quantities of particular waste streams and minimise associated environmental impacts – including landfill requirements and greenhouse gas emissions – to the extent practicable, to the satisfaction of the EPA (PR#20132) C.</p> <p>In assessing waste management options, adopt the following order of preference:</p> <ul style="list-style-type: none"> - Waste avoidance and/or reduction - Waste reuse, recycling and reclamation - Waste treatment - Waste disposal (PR#20133) D, C. <p>Remove and otherwise handle any materials containing asbestos in accordance with the requirement of all Laws and Approvals, including the Occupational Health and Safety (Asbestos) Regulations 2003 (Victoria) (PR#20134) C.</p> <p>Promote the efficient use and conservation of resources as part of the training program for all Associates including contractors, subcontractors and operators (PR#20135) C.</p> <p>No unauthorised waste discharges C.</p>

D = Design phase requirement; C= Construct phase requirement

¹ This sub plan serves as the Waste Minimisation and Management Plan for the construction phase, as required by PR#20132. Attachment I6.2 provides further detail.



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All PRs from Project Deed Schedule A of Appendix S3 are contained within the D&C Plant and General Area EMP Attachment G – Environmental Obligations Register (TDV-0-EV-RP-0001-01). The Environmental Compliance Tracker is updated regularly by the TDJV Environmental Manager, Environmental Compliance Manager and Area Environmental Managers.

3 Legal, regulatory, licence, permits and approval requirements

This sub plan has been developed in accordance with the following legislation and standards:

- ~ *Environment Protection Act, (1970)*
 - o Environment Protection (Environment and Resource Efficiency Plans) Regulations 2007
 - o Environment Protection (Industrial Waste Resource) Regulations 2009
- ~ National Environment Protection Measure (Movement of Controlled Waste Between States and Territories) 2004
- ~ National Environment Protection Measure (Used Packaging Materials) 1998
- ~ Waste Management Policy (Used Packaging Materials)
- ~ EPA publication IWRG631 – Solid Industrial Waste Hazard Categorisation and Management, 2009
- ~ EPA Publication 996 – Guidelines for hazard classification of solid prescribed industrial wastes
- ~ EPA Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites (1996)
- ~ Protocol for Environmental Management - Greenhouse Gas Emissions and Energy Efficiency in Industry (EPA Victoria), 2006
- ~ National Greenhouse and Energy Reporting (Measurement) Systems and Technical Guidelines 2008 v1.0 (Department of Water Climate Change, 2008).

The legislative and contractual requirements for the D & C Plant and General Area are summarised in:

- ~ D&C Plant and General Area EMP – Attachment E – Environmental Legislation Register
- ~ D&C Plant and General Area EMP – Attachment F – Environmental License, Permit and Approval Register
- ~ D&C Plant and General Area EMP – Attachment G – Environmental Obligations Register.

The applicable Performance Requirements from Project Deed Schedule A of Appendix S3 are provided in Table1.

Under the Project Deed the D&C EMP, all sub plans and any changes to these must be endorsed by the State, who may refer aspects to relevant agencies.

EPA and any other relevant agencies and stakeholders will be consulted with regard to any specific approval requirements in relation to this sub plan. The requirements of any permits, licence and approval obtained will be placed in the Environmental Licence, Permit and Approval Register on receipt and updated in the Environmental Compliance Tracker.



4 Existing conditions and issues

The major resource-consuming issues for the VDP will be in the Operation and Maintenance (O&M) phase of the project, in particular through the extensive use of energy to operate the plant. These issues are dealt with through the control measures of Attachment I6.1 from a design perspective, to ensure design packages address water and energy usage and waste generation during construction.

There are also significant resource efficiency opportunities and waste issues during construction. These involve project office activities, transport and machinery, water harvesting, fit for purpose use and reuse practices and recycling activities.

Types of waste likely to be generated on site and their management requirements are detailed in Attachment I6.2. In Victoria, wastes are classified using EPA publication IWRG631 – *Solid Industrial Waste Hazard Categorisation and Management*, 2009,

5 Environmental Risk

An environmental risk assessment has been carried out for the D&C Plant and General Area works. This assessment is contained in the Environmental Risk Register, Attachment C of the D&C Plant and General Area EMP. Table 2 summarises the potential hazards from project activities, potential impacts of these hazards and the risk of occurrence as rated by the environmental risk assessment.

Table 2: Summary of plant and general area risk assessment for Resource Efficiency

Activity posing hazard	Risk/ Potential Impact	Inherent Risk (before controls)	Control Measure Reference (Att I06.1)
Excessive use of water and energy in site offices, generators, and other equipment	Use of resources, increase in greenhouse gas emissions	Moderate	#22-30
Incorrect waste disposal	Unforeseen contamination due to inappropriate or illegal disposal of waste	Extreme	#2-13, 31
Excavation during construction activities	Unexpected discovery of suspected contaminated soil, liquid or waste material during construction	High	Refer to Att. I07.1 Soil Management
Improper connection of wastewater	Negative impact on waterways, soil causing harm to local area	High	#14

Attachment C of the D&C Plant and General Area EMP should be consulted for a comprehensive assessment of these risks.



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The following environmental risks were not deemed as significant for resource efficiency in the environmental risk assessment, but are listed below for completeness:

- ~ Excessive use of construction materials and failure to manage the minimisation of losses (e.g. due to re-work and off-cuts)
- ~ Failure to identify and divert reusable/recyclable materials
- ~ Inadequate onsite waste management infrastructure resulting in waste becoming dispersed into the environment (windblown, lack of available receptacles)
- ~ Increased resource (particularly water and energy) use due to plant and process inefficiencies
- ~ Incorrect waste disposal
- ~ Higher project carbon emissions resulting from unnecessary transport to landfill (due to failure to implement waste hierarchy) and from combustion or decomposing of this waste during treatment/disposal
- ~ Failure to reuse stormwater runoff.

6 Control, management and mitigation measures

Attachment I6.1 describes a range of mitigation and control measures that will be used to minimise wastage and manage resource efficiency. Control measures implemented on site in response to potential and actual resource efficiency issues will be recorded in the Weekly Environmental Inspection Checklist (FM-TDV-EN-0-X-000-0006) and records retained on site.

The measures in Attachment I3.1 are designed to address potential impacts from the risks outlined in Section 5 as well as deliver on the objectives, targets and in particular the PRs listed in Section 2. They include requirements and responsibilities for design, construction, evaluating performance and reporting.

Attachment I6.1 references Design Packages (DPs) in design-related control measures. PRs that relate to design are incorporated into the project-wide Design Management Plan.

The scale of the project provides an opportunity to drive more efficient resource use through the supply chain. Major purchases of resources are managed during the D&C phase with resource efficiency aspects in mind. Supplier evaluations consider the best value offer to TDJV and take into account how the supplier manages its resources and cost to produce a product or supply a service. Contracts detail expectations and obligations regarding contract deliverables.

Bulk purchase agreements (e.g. concrete) are used to minimise cost and minimise resource, packaging and transport wastage. Procurement procedures have specific environmental requirements, as outlined in the Procurement Management Plan (TDV-0-PR-PL-0004-00).

Quality Systems and assurance processes adopted throughout the D&C phase of the project are aimed at avoiding rework and therefore minimising waste and using resources more efficiently.



7 Site environmental plans

A single Site Environmental Plan (SEP) has been developed for the whole plant site that details environmental management measures such as permanent controls, No Go zones, property boundaries and significant flora and fauna species. These measures are implemented to minimise potential impacts of construction activity on the environment and community.

The information contained in the SEP is presented in pictorial and tabular drawing format. This is to make them easy to use by all site personnel, consultants and subcontractors. SEPs are updated to reflect operating practices on a regular basis.

The resource efficiency related management controls set out in the SEP are drawn from this sub plan. Additional practical management measures are picked up and covered by the Weekly Environmental Checklist.

SEPs are held by Area Environment Managers.

8 Evaluating performance and reporting

Environmental audits and site environmental inspections (SEIs) are scheduled to detect where PRs are not being met with appropriate corrective actions developed to address these issues as they arise. Schedules, responsibilities and reporting procedures for waste management and resource efficiency are set out in the Monitoring, inspection, audit and reporting schedule - Attachment L of the D&C Plant and General Area EMP.

Monitoring will be undertaken by appropriately qualified personnel, in accordance with the appropriate standards and guidelines as specified in Attachment L of the D&C Plant and General Area EMP.

9 Contingency measures

Contingency measures have been developed and are summarised below. The control measures table (Attachment I6.1) focuses on preventative measures.

All environmental incidents will be responded to in accordance with the plant site Environmental Incident Response Plan (EIRP). The EIRP provides project specific details for the identification of and response to potential environmental related incidents at the plant site during the D&C phase of the VDP. It provides assistance in managing potential and actual incidents, as well as follow-up and reporting requirements.

The environmental risk assessment has identified the following circumstances that could occur outside normal operating conditions:

- ~ Unforeseen contamination due to the inappropriate or illegal disposal of waste
- ~ Unexpected discovery of contaminated soil, liquid or waste

In either of these cases contingency measures as described in section 9.1 of the Soil Management Sub Plan will be initiated. This will be undertaken in consultation with the Project Health and Safety Manager or their representative.



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Excessive use of water and energy in site offices, generators, and other equipment was also identified as a moderate risk. These are managed through the control measures and monitoring requirements outlined in sections 6 and 8 respectively.

10 References

10.1 VDP documents

- ~ Environment Effects Statement, Volume 3, Chapter 9

10.2 Technical / legislative documents

- ~ Sustainability Victoria, 2008, <http://www.sustainability.vic.gov.au>
- ~ Environment Protection (Industrial Waste Resource) Regulations 2009 Industrial Waste Management Policy (Prescribed Industrial Waste)
- ~ EPA publication IWRG631 – Solid Industrial Waste Hazard Categorisation and Management, 2009
- ~ Australian Code for the Transport of Dangerous Goods
- ~ Road Transport (Dangerous Goods) Act 1995
- ~ Road Transport Reform (Dangerous Goods) Regulations 1997
- ~ *Environment Protection Act 1970*
- ~ Environment Protection (Environment and Resource Efficiency Plans) Regulations 2007.



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ATTACHMENT I6.1 RESOURCE EFFICIENCY – CONTROL MEASURES TABLE

ATTACHMENT I6.1 RESOURCE EFFICIENCY – CONTROL MEASURES TABLE

#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
1	Induction	20135	Promote the efficient use and conservation of resources as part of the training program for all personnel including contractors, subcontractors and operators. Include the waste management hierarchy in the induction with an emphasis on avoidance and minimisation.	Area Environment manager All employees	Design, Construct	Training records	
2	Waste Management	11085, 20132	This sub plan forms part of a Project Waste Minimisation and Management Plan, with schedule(s) to be added as appropriate through the construction phase. The project plan will incorporate best practice measures to reduce the quantities of the waste streams identified and minimise the associated impacts for such things as; landfill requirements and greenhouse gas emissions, to the extent practicable. The Project plan will be developed in consultation with the EPA.	Area Environment manager	Construct	Sub plan & associated waste schedule(s)	
3	Waste Separation	20130, 20133	Prescribed wastes to be separated from non-prescribed waste at all times. If small amounts of prescribed waste are mixed with non-prescribed waste the entire quantity of waste becomes prescribed	Site Supervisors All employees	Construct	Inspection & monitoring records	
4	Waste Separation	20130, 20133	Recyclable waste to be kept separate in a designated area for future treatment at the appropriate recycling facility.	Site Supervisors All employees	Construct	Inspection records	
5	Waste Storage	20130, 20133	All general inert and solid waste generated shall be stored in waste containers	Site Supervisors	Construct	Inspection records	
6	Waste Storage	20130	All storage containers and locations for the various waste streams shall be clearly labelled to ensure that mixing of wastes is avoided	Site Supervisors	Construct	Inspection records	
7	Waste Storage	20130	The storage of prescribed waste shall be in accordance EPA Bunding Guidelines (Publication 347 or its most recent amendment) and the relevant Material Safety Data Sheet (MSDS) for the product. The storage of fuel, oil or chemicals on site will be undertaken in a designated area specifically designed to contain all chemical, fuel, and oil spills	Site Supervisors	Construct	Inspection records	

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#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
8	Waste Storage	20130	Waste will not be stored adjacent to potentially sensitive areas such as natural vegetation, stormwater drains, residences or waterways	Site Supervisors	Construct	SEP and SEIs	
9	Storage	-	Ensure spare waste storage receptacles on site for use as required	Site Supervisors	Construct	Inventory records	
10	Storage	-	All bins to have a securable lid	Site Supervisors	Construct	SEI	
11	Waste classification and transport	-	All waste to be classified and transported offsite in accordance with EPA Waste Management policies and a Waste Transport Certificate completed and retained where wastes are classified as Prescribed Waste. Consult the environmental manager on the nature or classification of a waste if it is unknown.	Site Supervisors	Construct	Waste transport certificate copies	
12	Waste transport	18125	Use appropriately licensed (EPA) waste transporters for the transportation of prescribed waste to off-site locations	Site Manager	Construct	Waste transport certificate copies	
13	Litter	-	Keep the site free of litter	Site Manager	Construct	Inspection records	
14	Sewage	-	Manage sewage in accordance with Water Authority requirements	Site Manager	Construct	Compliance records	
15	Construction spoil reuse	11085, 20133	Uncontaminated construction spoil shall be reused as general structural or non-structural fill, including general backfilling, rehabilitation works, general landscaping and construction of embankments and barriers. Particles with durable physical and mechanical properties may be used as a road base, drainage or concrete aggregate in line with regulatory requirements	Construction Manager	Construct	Spoil management records	
16	Construction spoil reuse	11085, 20133	Off site reuse of uncontaminated construction spoil shall be considered, including use in the civil sector, agricultural sector and landfill sector (eg material for new landfill cells). Industrial wastes (Schedule 1 of the Environment Protection (Industrial Waste Resource) Regulations 2009) should be recycled or disposed of at a suitably licensed premises.	Construction Manager	Construct	Spoil management records	

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#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
17	Vegetation recycling	11085, 20133	Suitable cleared trees shall be chipped or mulched and stockpiled for later use in landscaping as an organic base for revegetation works where appropriate	Site Supervisors	Construct	Waste management records	
18	Building material recycling	11085, 20133	Building materials and construction waste will be segregated and considered for recovery via dealers specialising in the sale of second hand building materials, or directly to waste processors	Site Supervisors	Construct	Waste management records	
19	Temporary roads	11085, 20133	Temporary haul roads during construction to be made using recycled concrete.	Site Supervisors	Construct	Haul Road Design Plans	
20	Waste recycling	11085, 20133	<p>Where practically possible, the following (but not limited to) waste types shall be separated on site and sent to a facility for either reuse or recycling:</p> <ul style="list-style-type: none"> - Asphalt - Bricks and pavers - Cable - Cardboard and paper - Concrete/brick/tile (accepted for reprocessing) - Drums - Landscape materials - Oil Pallets - Pallets - Plastic and polystyrene - Scrap metal - Soil and rubble - Virgin excavated natural material 	Site Supervisors	Construct	SEP, SEI's	

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#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
21	Purchasing	11085, 20130	<p>The procurement of products that have a recycled content (or have been purchased from a reprocessing facility) will take precedence for the following:</p> <ul style="list-style-type: none"> - Office-based supplies - Landscaping materials - Construction materials 	Area Environment Manager	Construct	Procurement records	
22	Purchasing	20130	<p>Major purchases of resources are managed during the D&C phase with resource efficiency aspects in mind. Supplier evaluations consider the best value offer to TDJV and take into account how the supplier manages its resources and cost to produce a product or supply a service. Contracts detail expectations and obligations regarding contract deliverables.</p>	Procurement Manager	Construct	Procurement records	

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#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
22	Embedded energy in consumables and project components	27182	<p>Ensure the following designs incorporate selection of project components and consumables that minimise greenhouse gas emissions to the extent reasonably practicable:</p> <p>DP 1-0030 Seawater Lift Pumpstation & Launder & Inlet / Outlet Shafts GA</p> <p>DP 1-0032 Seawater Lift Pumpstation - Electrical</p> <p>DP 2-0001 - Plant Process Design Concept -</p> <p>DP 2-0004 Site Wide Electrical</p> <p>DP 2-0009 Screening and Feed Pump Station - Electrical</p> <p>DP 2-0013 DMPF - Electrical</p> <p>DP 2-0034 Buiding 2E, 2F Electrical</p> <p>DP 2-0050 Lime Storage & Saturation - Electrical</p> <p>DP 2-0064 Building Services (Stage 1)</p> <p>DP 2-0064.01 Screening & Feed Pump Station - Building services</p> <p>DP 2-0203 Admin Complex - Electrical</p> <p>DP 2-0225 - Electrical after 22 kv Transformer</p> <p>DP 3-0100 - Pipeline Overview Report -</p> <p>DP 3-0116 - Pipesection 16</p> <p>DP 3-0117 - Pipesection 17 incl 3 crossings</p> <p>DP 3-0131 Pipe Section 01A</p> <p>DP 3-0132 Pipe Sections 1-10 Stage 1</p> <p>DP 3-0133 Pipe Section 15-13 incl crossings Stage 2</p> <p>DP 3-0134 Pipe Section 12 incl crossings Stage 2</p> <p>DP 3-0135 Pipe Section 11-09 incl crossings Stage 2</p> <p>DP 3-0136 Pipe Section 08-06 incl crossings Stage 2</p> <p>DP 3-0137 Pipe Section 05-04 incl crossings Stage 2</p> <p>DP 3-0138 Pipe Section 03-01 incl crossings Stage 2</p> <p>DP 3-0566 Surge Station kp10.3 and kp29.1 - Process, Mechanical, Electrical, I&C, HVAC</p> <p>DP 3-0559 Transfer Pump Station Electrical</p>	Design Package Manager	Design	Verified designs	

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#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
23	Water minimisation	11085, 11087	<p>Ensure the following designs provide minimal water usage (such as waterless urinals and rainwater tanks for toilet flushing) and maximum water reuse and recycling: Site office facilities will achieve a minimum water conservation target of less or equal to 18 litres per person per day</p> <p>DP 2-0001 Plant Process Design Concept</p> <p>DP 2-0047 - AR/STR Structure and Turbcirculators</p> <p>DP 2-0058 AR / STR - Tanks & Buildings</p> <p>DP 2-0120.01 - Screening and Feedpump Station - AR Envelope and Superstructure</p> <p>DP 2-0137.01 - RO - AR - Envelope [Grid G-Z] Stage 2 Design</p> <p>DP 2-0142 - Administration Complex Architecture</p> <p>DP 2-0200 - Plant Architectural Design Concept -</p> <p>DP 3-0506 Delivery Points 2-7</p> <p>DP 3-0551 Transfer Pump Station STR - Superstructure</p> <p>DP 3-0572 - Transfer Pump Station Envelope - Architecture -</p> <p>DP 3-0579 - Booster Pump Station Envelope - Architecture -</p>	Design Package Manager	Design	Verified designs	
24	Water minimisation	11085, 11087	Recycled water will be used for dust suppression spraying over potable water where possible.	Site Manager	Construct	SEP and SEIs	
25	Water minimisation	11085, 11087	<p>Minimise the use of potable water. This will include use of recycled water from</p> <ul style="list-style-type: none"> - on-site sedimentation basins and - collected stormwater runoff. 	Site Manager	Construct	SEP and SEIs	
26	Water minimisation	11085, 11087	Apply water during periods of least evaporation (early morning and late evening) where practical.	Site Manager	Construct	Site inspection records	
27	Water minimisation	11085, 11087	Monitor water usage as per and assess obligation report to EPA's EREP program. Thresholds for reporting are 120ML/year water usage or 100TJ/year energy usage.	Area Environmental Manager	Construct	Monitoring records	

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#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
28	Energy efficiency	11088	<p>Ensure designs incorporate less than 4.6KWh/kL energy consumption for the desalination process, variable speed (VSD) drives on pumps and motors are installed where practical and all pumps are selected to run at their best efficiency point under normal operating conditions. The following designs will address this:</p> <p>DP 1-0001 Area 1 Design Brief</p> <p>DP 2-0001 - Plant Process Design Concept -</p> <p>DP 2-0007 Process, Mechanical, Piping</p> <p>DP 3-0553 - Transfer Pump Station - Process & Hydraulics & Mechanical -</p> <p>DP 3-0557 - Booster Pump Station - Process & Hydraulics & Mechanical</p> <p>DP 3-0559 - Transfer Pump Station Electrical -</p> <p>DP 3-0561 - Booster Pump Station Electrical -</p> <p>DP 3-0566 Surge Station kp10.3 and kp29.1 - Process, Mechanical, Electrical, I&C, HVAC</p> <p>DP 3-0557 Booster Pump Station - Process & Hydraulics & Mechanical</p> <p>DP 3-0567 - Surge Station Electrical -</p>	Design Package Managers	Design	Verified designs	

Att I6 D&C Plant and General Area – Resource Efficiency Sub Plan

#	Issue	PR # addressed	Measure	Responsibility *	Project Phase	Evidence	Audit Check
29	Energy efficiency in construction	27179	Ensure the following designs adopt energy efficient design during construction: DP 1-0005 Seawater Lift Pumpstation - Pumps DP 1-0030 Seawater Lift Pumpstation & Launder & Inlet / Outlet Shafts GA DP 1-0032 Seawater Lift Pumpstation - Electrical DP 2-0001 Plant Process Design Concept DP 2-0004 Site Wide Electrical DP 2-0009 Screening and Feed Pump Station - Electrical DP 2-0013 DMPF - Electrical DP 2-0034 Buiding 2E, 2F Electrical DP 2-0050 Lime Storage & Saturation - Electrical DP 2-0064 Building Services (Stage 1) DP 2-0064.01 Screening & Feed Pump Station - Building services DP 2-0203 Admin Complex - Electrical DP 2-0225 - Electrical after 22 kv Transformer DP 3-0566 Surge Station kp10.3 and kp29.1 - Process, Mechanical, Electrical, I&C, HVAC DP 3-0559 Transfer Pump Station Electrical	Design Package Managers	Design	Verified designs	
30	Energy	11088, 27181	Monitor energy usage and assess obligation report to EPA's EREP program (see #24 above) and the Commonwealth Government's NGERS program. NGERS facility threshold is 100TJ/year energy use – identical to EREP.	Area Environment Manager	Construct	Monitoring records	
31	Asbestos	20134	Ensure that removal or handling of any material containing asbestos is done in accordance with the requirement of all Laws and Approvals, including the Occupational Health and Safety (Asbestos) Regulations 2003 (Victoria)	Area Environment Manager / Health and Safety Officer	Construct	Daily logs	

* The *Responsibilities* column refers in many cases to senior positions within the project organisation, due to the changing nature of project teams. In practice some responsibilities may be delegated by the person nominated.



D&C PGA EMP Attachment I6 – Resource Efficiency Sub Plan

ATTACHMENT 16.2 RESOURCE EFFICIENCY – WASTE MANAGEMENT

ATTACHMENT I6.2 WASTE MANAGEMENT

1. Introduction

This attachment describes waste aspects of the Resource Efficiency Sub Plan in further detail. Control measures for the minimisation and management of wastes are described in Attachment I6.1 Control Measures Table. Contingency measures relating to waste are described in the Resource Efficiency Sub Plan, section 9.

2. Waste Hierarchy

The objectives and targets detailed in the Resource Efficiency Sub Plan Table 1 will be achieved through the implementation of the Victorian EPA waste management hierarchy displayed graphically in Figure 1.

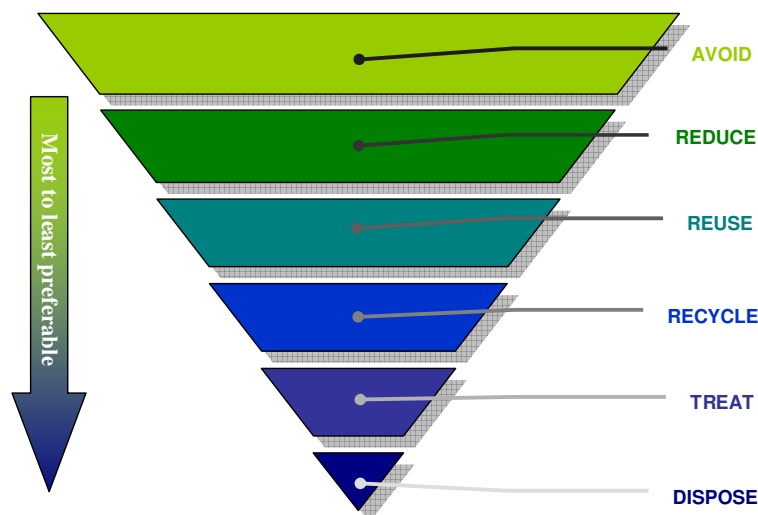


Figure 1: Waste Hierarchy

This waste hierarchy aims to achieve the following:

- AVOID:** Do not produce the waste in the first place.
- REDUCE:** Reduce the amount of pollution or waste by changing the way the activity is carried out.
- REUSE:** Some products and materials can be reused with minimal processing, for example, use durable alternatives to disposables, or use waste materials from one process as the raw material for another.
- RECYCLE:** Break down products into their constituent materials and reprocess this into new articles.
- TREAT:** Treat products to make them less harmful to the environment.

DISPOSE: Transfer waste to another location under controlled conditions for long-term storage (no further use).

3. Type of wastes

3.1 Waste generation

The major waste-generating aspects of the works include but are not restricted to:

- Materials resulting from the construction of the desalination plant
- Other ancillary works related to the desalination plant, such as intake and outlet pipe tunnelling works
- Site preparation and development, including demolition and removal of existing buried services, clearing and grubbing of the site and vegetation removal
- Pavement and road works

Potential waste types generated from the above work activities are detailed in Table 1. In Victoria wastes are classified utilising the *EPA publication IWRG631 – Solid Industrial Waste Hazard Categorisation and Management, 2009*.

Table 1: Potential waste products generated during construction

Waste types*	State**	Classification
Project office activities		
Glass	S	Solid Inert ***
Aluminium cans	S	Solid Inert***
Paper and cardboard*	S	Solid Inert *** (if separated from other waste streams)
PET plastic bottles	S	Solid Inert***
Toner cartridges	S	Solid Inert
Putrescible wastes (non recyclables)*	S	Putrescible
Paint wastes and sludges	L	Prescribed
Office fit-out wastes*	S	Solid Inert
Sanitary waste	S	Not Applicable
Batteries	S	Prescribed
Sewage	L	Prescribed
Site Preparation and Development		
Metals*	S	Inert***
Cables	S	Inert***
Bitumen seal	S	Inert***
Vegetation removal*	S	Putrescible
Topsoil*	S	Inert

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Waste types*	State**	Classification
Fill material	S	Inert
Masonry materials (e.g. concrete rubble)	S	Inert***
Construction Works		
Bitumen seal	S	Inert***
Sub base and base course materials	S	Inert
Desalination Plant Works Construction		
Concrete Slurries*	L	Inert when allowed to cure***
Timber (formwork, off-cuts, packaging, packing crates)*	S	Inert *** (provided separated from other waste streams)
Ferrous materials (e.g. steel frame, drums, piping, cables, sheeting, strapping)*	S	Inert***
Non-ferrous materials (e.g. electrical cable off-cuts, aluminium profile off-cuts)	S	Inert***
Rigid and film plastics (e.g. PVC piping off-cuts, drums, packaging film)	S	Inert***
Oils	L	Prescribed
Oily waste water	L	Prescribed
Batteries	S	Prescribed
Fuels	L	Prescribed
Engine coolant	L	Prescribed
Paint wastes and sludges	L	Prescribed
Sewage	L	Prescribed
Topsoil	S	Inert
Any other waste material that meets the criteria for dangerous goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail (chemical waste from painting, maintenance, spill cleanup).	S and L	Prescribed
Ancillary works		
Concrete slurries*	L	Inert***
Ferrous materials (e.g. steel frame, drums, piping, cables, sheeting, strapping)*	S	Inert***
Non-ferrous materials (e.g. electrical cable off-cuts, aluminium profile off-cuts)	S	Inert***
Rigid and film plastics (e.g. PVC piping off-cuts, drums, packaging film)	S	Inert***

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Waste types*	State**	Classification
Oils	L	Prescribed
Batteries	S	Prescribed
Fuels	L	Prescribed
Used tyres	S	Inert
Engine coolant	L	Prescribed
Paint wastes and sludges	L	Prescribed
Any other waste material that meets the criteria for dangerous goods under the Australian Code for the Transport of Dangerous Goods by Road and Rail	S and L	Prescribed

* Waste type anticipated to be generated in large quantities (in relation to other waste types and construction activity).

** L= liquid; S= non-liquid (solid)

*** Schedule 1 of the *Environment Protection (Industrial Waste Resource) Regulations 2009* also classifies these wastes as “industrial waste”

3.2 Management requirements for waste disposal

Table 2 details the waste categories, description and management requirements that apply in Victoria for off site disposal of waste in accordance with EPA publication IWRG631 – Solid Industrial Waste Hazard Categorisation and Management, 2009. Categories in Table 3 can be matched to the classification of potential wastes listed above in Table 2 to assist in the selection of appropriate management options.

Table 2: Management requirements by category

Category	Description	Management option	EPA requirements for offsite disposal
Solid Inert***	Building/demolition material, e.g. concrete, bricks, dry timber, plastic, glass, metals, bitumen; and shredded tyres	Reuse Recycling Landfill	Receiving facility must be licensed (Non-municipal landfills) and when disposing to municipal landfill serving >5000 persons the receiving facility must be licensed. ¹ .
Putrescible	Food or garden wastes from commercial or industrial sources, e.g. vegetable processing, butchers and domestic garbage	Composting Stockfood ² Recovery of energy Landfill	As above

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Category	Description	Management option	EPA requirements for offsite disposal
Prescribed waste	<p>Prescribed industrial waste means any industrial waste or mixture containing industrial waste other than industrial waste or a mixture containing industrial waste that—</p> <p>(a) is a Schedule 1 industrial waste; or</p> <p>(b) has a direct beneficial reuse and has been consigned for use; or</p> <p>(c) is exempt material; or</p> <p>(d) is not category A waste, category B waste or category C waste;</p> <p>As defined as:</p> <p>Environment Protection (Industrial Waste Resource) Regulations 2009</p>	Various treatment and disposal methods depending on waste type and hazard category	<p>No disposal of Category A waste to landfill.</p> <p>Disposal of hazard category B or C waste to a licensed site.¹</p> <p>EPA transport certificates must be used (Attachment I6.1).</p> <p>Vehicles must hold EPA permit (unless exemption issued).</p>
SOIL – dealt with directly in Soil Management Sub Plan			
Fill Material	<p>Soil where:</p> <p>the site assessment demonstrates the soil is not contaminated or contamination concentrations do not exceed those specified in Table 2* and without potential amenity effects, e.g. highly odorous or any elevated levels of metals or other constituents can be demonstrated to be of natural origin</p>	Use as fill material, e.g. site filling/levelling	<p>No licence required.</p> <p>However, reuse must not give rise to environmental or health impacts.</p>
Category A Contaminated soil	<p>Contaminated soil with any contaminant concentration or leachable concentration greater than those specified in Table 4* or soil that displays any hazard characteristic listed in Table 6*</p>	<p>On-site remediation</p> <p>Off-site remediation</p> <p>Storage pending availability of treatment</p>	<p>No disposal to landfill.</p> <p>EPA transport certificates must be used (Attachment I6.1).</p> <p>Vehicles must hold EPA permit (unless exemption issued).</p>
Category B Contaminated soil	<p>Contaminated soil with any contaminant concentration or leachable concentration greater than those specified in Table 3*, but not exceeding both the contaminant and leachable concentrations specified in Table 4*</p>	<p>On-site remediation</p> <p>Off-site remediation</p> <p>Licensed facility</p>	<p>Disposal to licensed facility.¹</p> <p>EPA Transport certificate system must be used (Attachment I6.1).</p> <p>Vehicles must hold EPA permit (unless exemption issued)</p>

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Category	Description	Management option	EPA requirements for offsite disposal
Category C Contaminated soil	Contaminated soil with any contaminant concentration greater than those specified in Table 2*, but not exceeding both the contaminant and leachable concentrations specified in Table 3*	On-site remediation Off-site remediation Licensed landfill	Disposal to licensed landfill. ¹ EPA Transport certificate system must be used (Attachment I6.1). Vehicles must hold EPA permit (unless exemption issued).

* EPA Publication 448.3 – Classification of Wastes

*** Schedule 1 of the *Environment Protection (Industrial Waste Resource) Regulations 2009* also classifies these wastes as “industrial waste”

1 Receiving facility must be licensed to receive the specific waste type, and for prescribed industrial waste, the specific hazard category

2 The Victorian Department of Primary Industries can provide advice on the suitability of commercial waste as stockfeed

1.1 Waste recycle and reuse

Table 3 details the waste categories and reuse/recycle targets for the Plant and General Area.

Table 3: Waste recycle and reuse targets

Waste Stream	Target
Recyclable Waste	60% recycling of comingled waste
	80% recycling of waste metal
	80% recycling of waste concrete
	80% recycling of waste timber
Prescribed waste	100% separation of prescribed wastes from general waste streams
Spoil	100% beneficial reuse (clean) fill material
	100% of contaminated soil (if encountered) disposed of to landfill and with EPA transport certificate, or remediated on site
	100% disposal of contaminated soil in accordance with EPA Guidelines
ASS	0% disposal waste ASS to non-licensed landfill
	>90% reuse of waste ASS on site
	Identification and disposal of all contaminated soil in accordance with EPA Soil Hazard Categorisation and Management Guidelines