

Upper South Creek Advanced Water Recycling Centre and Pipelines

Waste and Resource Use CEMP Sub-plan

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Revision: B

Recommend Documents to be Read in Conjunction

This management plan is to be read in conjunction with the Construction Environmental Management Plan (USCP-JHG-MPL-G-0008), Soils & Contamination CEMP Sub-plan (USCP-JHG-MPL-ENV-0003), Surface Water & Groundwater CEMP Sub-plan (USCP-JHG-MPL-ENV-0001) and the Sustainability Management Plan (USCP-JHG-MPL-PMT-0009).

Distribution

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Date:	28.08.2023

Revisions

Draft issues of this document shall be identified as Revision 01, 02, 03 etc. Upon initial issue (generally Contract Award) this shall be changed to a sequential lettering commencing at Revision A. Revision numbers shall commence at Rev. A, B etc.

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Glossary & Abbreviations

Abbreviations	Meaning
AWRC	Advanced Water Recycling Centre
CEMP	Construction Environmental Management Plan
CoA	Minister's Conditions of Approval
DPI	Department of Primary Industries
DPE	NSW Department of Planning and Environment
EIS	Environment Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EWMS	Environmental Work Method Statements
ISC	Infrastructure Sustainability Council
JH	John Holland (the Principal Contractor)
NPW Act	<i>National Parks and Wildlife Act 1974</i>
OEH	NSW Office of Environment and Heritage
POEO Act	Protection of the Environment Operations Act 1997
PPW	Project Pack Web
REAP	Resource Efficiency Action Plan
RES	Resource Efficiency Strategy
SCCSP	Soils & Contamination CEMP Sub-plan
SMP	Sustainability Management Plan
SWC	Sydney Water Corporation (the client and Proponent)
SWGCSPP	Surface Water & Groundwater CEMP Sub-plan
TW	Treated Water
UMM	Updated Management Measures
USC	Upper South Creek
WRUCSP	Waste and Resource Use CEMP Sub-plan (this Plan)

1 Introduction

1.1 Context

This Waste and Resource Use CEMP Sub-plan (WRUCSP) forms part of the Construction Environmental Management Plan (CEMP) for Upper South Creek Advanced Water Recycling Centre (AWRC) and Pipelines project (refer to herein as the project).

This WRUCSP has been prepared to address the requirements of:

- Minister's Conditions of Approval (CoA);
- *Upper South Creek Advanced Water Recycling Centre Environmental Impact Statement (EIS)* (September 2021);
- *Upper South Creek Advanced Water Recycling Centre Submission Report* (March 2022);
- *Upper South Creek Advanced Water Recycling Centre Amendment Report* (March 2022);
- *Upper South Creek Advanced Water Recycling Centre Submissions Report – Project Amendments* (April 2022);
- Response to DPE RFI 1, regarding responses to advice received on the Response to Submissions Report (dated 01 June 2022, 01 July 2022 and 11 July 2022);
- Response to DPE RFI 2, regarding additional information on Flood Impact Assessment (dated 11 July 2022);
- Commonwealth Controlled Activity Approval (EPBC 2020/8816);
- Modification of Infrastructure Approval CSSI 8609189, 26 May 2023 (herein referred to as Mod 1)
- Infrastructure Sustainability Council Technical Manual version 2.1 (ISC 2.1) requirements; and
- All applicable legislation.

The USC project will be built in stages, consisting of:

Stage 1

- building and operating the AWRC to treat a daily wastewater flow, known as the average dry weather flow (ADWF), of up to 50 megalitres per day (ML/day); and
- building the treated water and brine pipelines to cater for up to 100 ML/day flow coming through the AWRC (but only operating them to transport and release volumes produced by Stage 1).

Future Stages

It is expected that the AWRC will ultimately require expansion to treat wastewater flows up to 100 ML/day. Sydney Water will remain flexible on the size and timing of these future upgrades to accommodate changes in population projections over time. Future stages will be subject to further environmental assessment.

Further detail on project staging is provided in the EIS and the Staging Report. This WRUCSP applies to Stage_1 detailed design, construction and commissioning only. John Holland has been appointed by Sydney Water to deliver the USC project works, including detailed design and construction for treating an operational daily wastewater flow of up to 35ML/day. Greater flow capacities (including up to 50ML/day and 100ML/day), as explored in the EIS, are not covered in this WRUCSP.

1.2 Project Description and Background

A comprehensive project description, including staging of the project, is outlined in Sections 1.1 to 1.3 of the CEMP. Figure 1-1 includes an overview of the AWRC site and associated pipelines. Figure 1-2 includes an overview of the AWRC site.

As part of the EIS development, a detailed assessment identified the potential impacts of the project's waste on the surrounding and overarching environment and provided recommendations for the reduction of impacts in accordance with relevant environmental assessment requirements. The assessment was included in the EIS, within Volume 3, Impact Assessment (Section 12.2) and Appendix Z.

This WRUCSP does not include the operational component of the project. The issue of waste management and resource use during construction of all infrastructure, is the key issue addressed in this plan.

1.3 Purpose

This WRUCSP outlines the project's approach to implement measures to reduce, recycle and reuse waste during construction phases in accordance with the project's legal, planning, and contractual requirements. These specific requirements must be met to enhance the project's sustainability performance and reduce the construction impact on the existing and surrounding environment.

This will be managed through **SMART** principles:

- **Specific** – Impacts from construction waste and the associated management measures explored in Section 6
- **Measurable** – Inspection and monitoring requirements detailed in Section 8 of this Plan
- **Achievable** – Ongoing compliance with CoAs, UMMs and Commonwealth approval requirements (Tables 3-1 and 3-2, respectively), as discussed in Section 3 of this Plan, is achievable throughout the delivery of the USC construction work and represents the minimum requirements to be implemented by JH.
- **Relevant** - The management measures outlined in Section 6 of this Plan represent JH's approach to monitoring and tracking against the objectives, targets and environmental performance outcomes aimed at waste and resource use (which are identified in Section 2 of this Plan).
- **Time-bound** – On a broader scale, the management measures set out within Section 6 of this Plan are required to be implemented for the duration of construction, setting a clear and defined time frame.

1.4 WRUCSP Development and Approval

This WRUCSP has been prepared for the purpose of addressing the waste management requirements of the project. Unlike the CEMP sub-plans nominated in CoA C4, this WRUCSP does not require approval and endorsement by the project Environmental Representative (ER), nor does it require consultation with external government agencies. This WRUCSP does however, take into account compliance of the project with the following:

- CoA related to waste management (CoA E110 – E113)
- Documents listed in CoA A1 (listed in Section 1.1 of this WRUCSP), including the EIS Updated Management Measure (UMM) W01 which requires the development and implementation of a Waste Management Plan as part of the project's CEMP.

This WRUCSP will be reviewed by the project's ER in accordance with CoA A28(d) to ensure it is consistent with the requirements in or under the approval, and a written statement prepared summarising this consistency. The review and accompanying written statement will take place / be prepared prior to submission to the Planning Secretary. In accordance with CoA 11, construction will not commence until the CEMP and all CEMP Sub-plans have been approved by the Planning Secretary.

1.5 Relationship to Other Plans

This WRUCSP details measures and requirements to manage waste and resource use during the construction phase of the project. In addition to the WRUCSP, strategies to waste and resources and potential impacts of the project, including contaminated waste, are documented within the CEMP, the Soils and Contamination CEMP Sub-plan (SCCSP) and the Sustainability Management Plan.

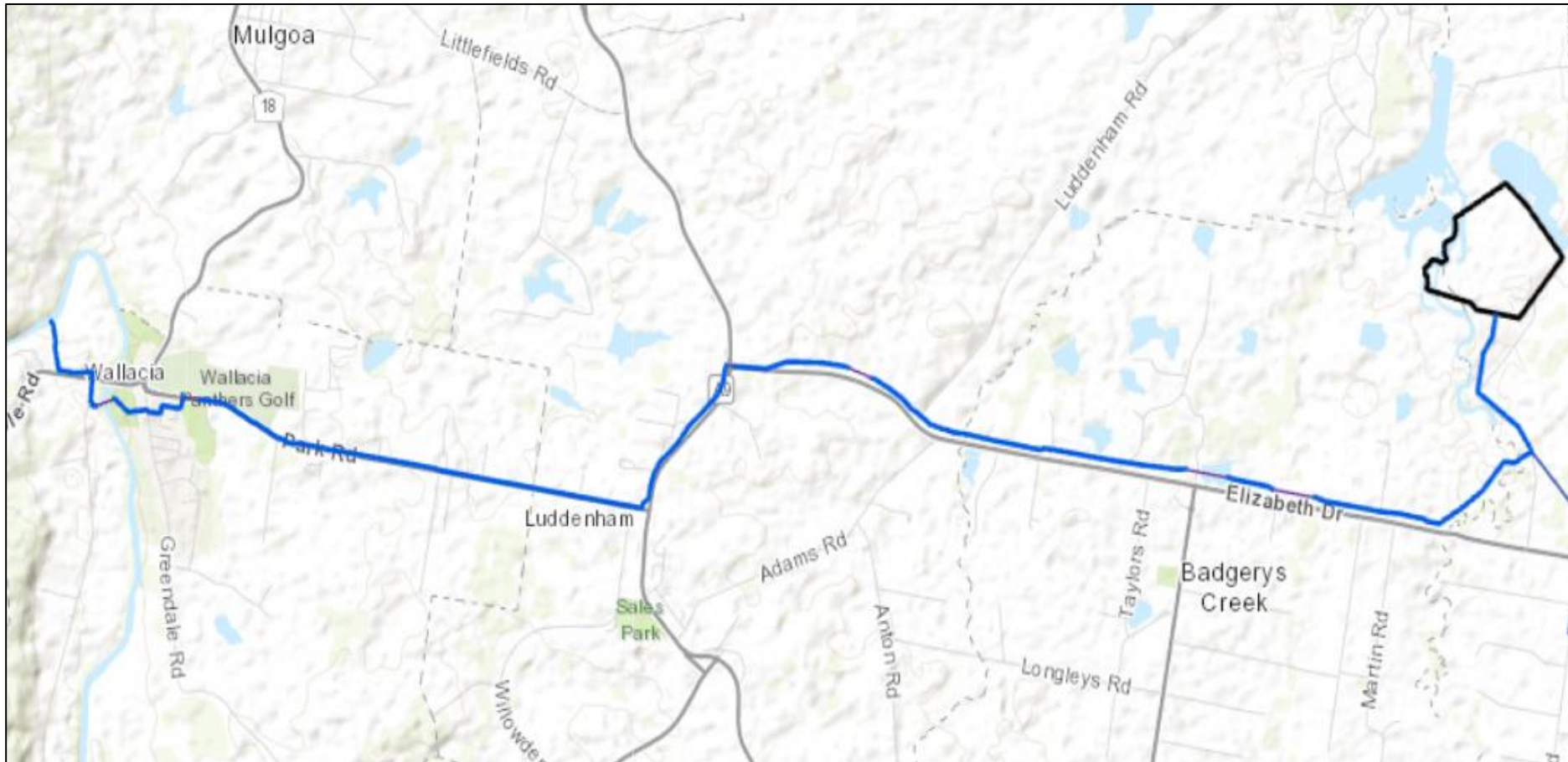


Figure 1-1a Indicative overview of the project site (AWRC) and treated water pipeline

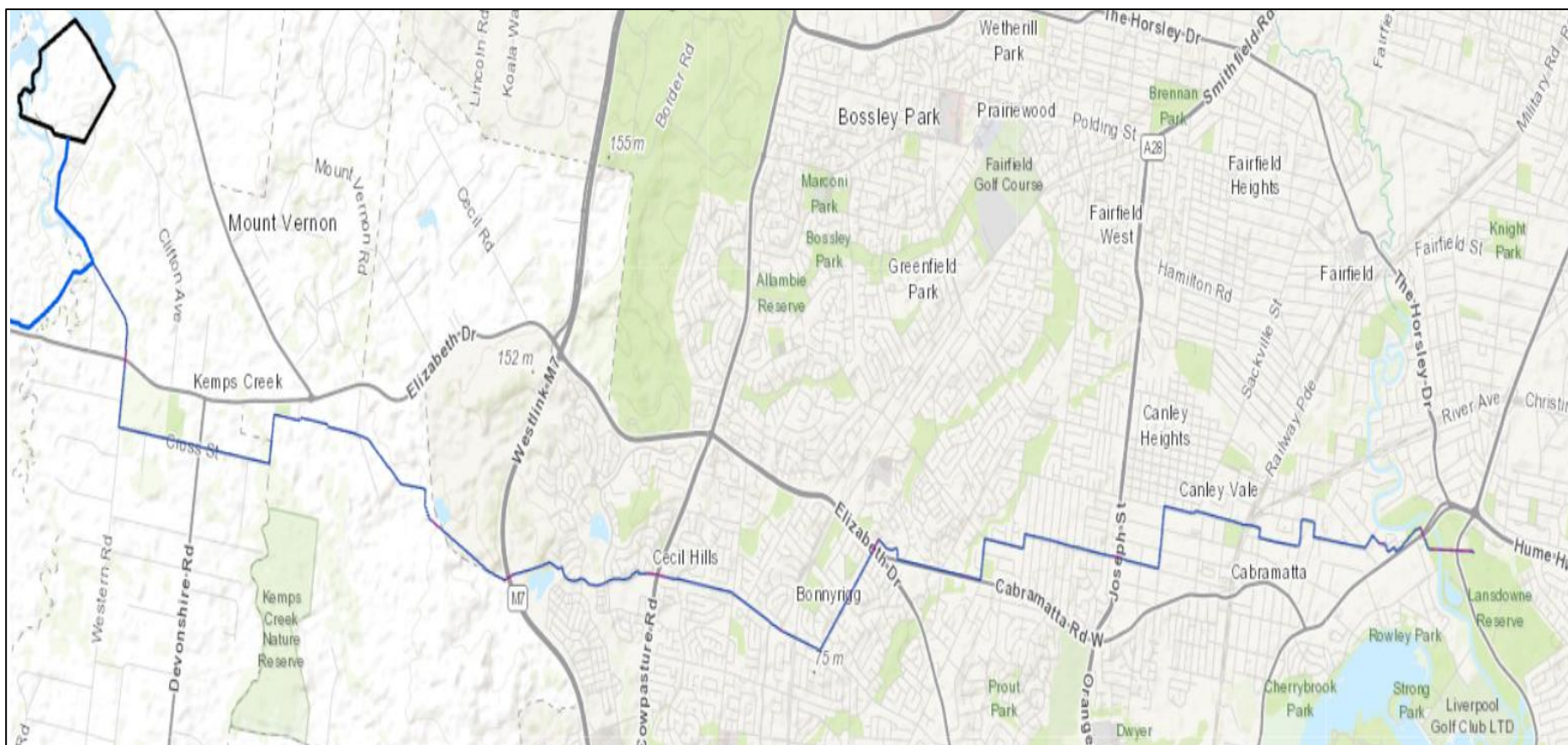


Figure 1-1b Indicative overview of the project site (AWRC) and brine pipeline



1	AWRC SITE ENTRY	6	BRINE TANKS
2	ADMINISTRATION CENTRE AND CAR PARKING	7	DIGESTORS
3	PARKLAND ACCESS ROAD	8	MBR
4	OVERLAND DISCHARGE ALIGNMENT	9	INLET WORKS
5	ONSITE BIO DETENTION AND RETENTION BASIN	10	OXIDATION DITCH

Figure 1-2 Indicative AWRC site arrangement (indicative and pending detailed design)

2 Objectives and Performance Criteria

The objectives and performance criteria identified in this WRUCSP are applicable to all construction works associated with the USC project undertaken by both John Holland and its subcontractors.

This WRUCSP forms part of the Construction Environmental Management Plan (CEMP) and must be implemented for the duration of construction.

2.1 Objectives

The key objective of this Plan is to ensure the following items, where they include items applicable to waste and resource use management, are described, scheduled and assigned responsibility:

- The Environmental Impact Statement (EIS);
- The Amendment Report;
- Updated Management Measures (UMMs);
- Minister's Conditions of Approval (CoA);
- Commonwealth Controlled Activity Approval;
- Infrastructure Sustainability Council Technical Manual version 2.1 (ISC 2.1) requirements; and
- Relevant legislation and other requirements described in Section 4 of this Plan.

2.2 Targets

The following targets have been established for the management of potential waste and resource use impacts during the design and construction phases of the project:

- Ensure full compliance with the relevant legislative requirements and/or guidelines, CoA, UMMs, Commonwealth and EPL approval;
- Ensure full compliance with USC Project Sustainability Leadership Objectives and Targets, including those listed in *Note*, the USC project sustainability objectives and targets were workshopped and agreed upon by the Project Senior Management Team and reported under Lea-1.
- *Table 2-1 and Table 2-2;*
Note, the USC project sustainability objectives and targets were workshopped and agreed upon by the Project Senior Management Team and reported under Lea-1.
- Diverting 75% of spoil from landfill (UMMs, EIS)*.

Note, the USC project sustainability objectives and targets were workshopped and agreed upon by the Project Senior Management Team and reported under Lea-1.

Table 2-1 Waste and resource use targets related to Rso-DL2.1 (ISC v2.1)

Resource output category	Phase	Level 3 Target
Clean / inert excavation spoil	Design and As Built	95% diverted from landfill (including > 75% onsite reuse)
Office resource outputs (office and kitchen based)	Design and As Built	70% diverted from landfill
Other inert resource outputs (i.e., construction and demolition waste, stormwater reuse via rainwater harvesting tanks^)	Design and As Built	80% diverted from landfill

*Note, the ISC targets exceed those required under the UMMs and EIS.

^Note, rainwater harvesting from roof runoff as per Sustainability Supply Chain Specification USCP-JHG-SPC-GEN-0004 Rev B

Table 2-2 Waste and resource use project specific targets for Lea-1 DL1.1 (ISC v2.1)

ID	Primary Theme	SMART Target
Design Targets		
T-10	Circular Economy	100% re-use of biosolids
Construction Targets		
T-23	Circular Economy	95% diversion of clean/inert excavation spoil from entering landfill

ID	Primary Theme	SMART Target
T24	Circular Economy	70% diversion of office waste from entering landfill
T-25	Circular Economy	80% diversion of other inert resource outputs from entering landfill
T-31	Environmental Health - contamination	100% of contaminated material is effectively managed

2.3 Performance Criteria

The environmental performance outcomes related to waste and resource use matters are included in *Table 2-3*.

Table 2-3 Performance outcomes related to waste and resource use

Desired Performance Outcome	How Performance Outcomes Would Be Achieved	Measurement Tool
All wastes generated during the construction of the project are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.	Recycle or reuse uncontaminated spoil either on site or off-site Manage off-site waste re-use in accordance with relevant NSW Environment Protection Authority resource recovery exemptions and requirements Dispose of waste at appropriately licensed facilities.	Construction activities will be managed in accordance with this WRUCSP to ensure project objectives, targets and performance outcomes are met.

3 Legislative and Guidance Requirements

3.1 Relevant Legislation, Standards, and Guidelines

3.1.1 Legislation

All legislation relevant to this WRUCSP is included in Appendix A3 of the CEMP. Additionally, the following legislation applies:

- Work Health and Safety Act 2011 (NSW).

3.1.2 Standards and guidelines

The primary guidelines and other reference documents relevant to this plan include:

- Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, November 2014)
- Waste Classification Guidelines, Part 4: Acid Sulfate Soils (NSW EPA, November 2014)
- NSW Government's Waste Reduction and Purchasing Policy
- NSW Waste Avoidance and Resource Recovery Strategy (NSW EPA, December 2014)
- Section 143 Notice (Protection of the Environment Operations Act 1997)
- Asbestos and waste tyre guidelines (NSW EPA)
- Code of Practice for the Safe Removal of Asbestos 2nd Edition (National Occupational Health and Safety Commission (NOHSC) 2005a)
- Code of Practice for the Management and Control of Asbestos in Workplaces (NOHSC 2005b)
- Protection of the Environment Operations (Waste) Regulation 2014 (NSW) – clause 42 special requirements relating to asbestos waste
- Local government guidelines for waste/recycling as applicable
- Australian National Waste Report 2016 (Department of the Environment and Energy and Blue Environment Pty Ltd, 2016)
- AS/NZS 4361.1:2017 Guide to hazardous paint management Lead and other hazardous metallic pigments in industrial applications
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures. Retrieved from <https://www.iso.org/standard/38131.html>
- ISO 18504:2017 Soil Quality – Sustainable Remediation. Retrieved from <https://www.iso.org/standard/62688.html>
- Sydney Water Management Specification (1041412)
- Sydney Water Guidance Standard: waste generation and management (9.8 – ENVS-GS-008).

3.2 Minister's Conditions of Approval

Table 3-1 below provides a summary of the CoA relevant to Waste Management and how and where these items are addressed in this Plan.

Table 3-1 Relevant CoA related to waste and resource use.

CoA Reference	Condition Requirement	WRUCSP Reference
E110	Waste generated during construction and operation must be dealt with in accordance with the following priorities: (a) waste generation must be avoided and where avoidance is not reasonably practicable, waste generation must be reduced; (b) where avoiding or reducing waste is not possible, waste must be re-used, recycled, or recovered; and (c) where re-using, recycling or recovering waste is not reasonably practicable, waste must be treated or disposed of.	Section 4
E111	The importation of waste and the storage, treatment, processing, reprocessing or disposal of such waste must comply with the EPL in force for Stage 1 of the CSSI, or be done in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, as the case may be.	Section 6
E112	Waste must only be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, or to any other place that can lawfully accept such waste.	Section 6
E113	All waste must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.	Section 6

3.3 Updated Management Measures

Table 3-2 below provides a summary of the UMMs relevant to waste and resource use and how these items are addressed in this plan.

Table 3-2 Relevant UMMs related to waste and resource use.

UMMs Reference	Management Measure Requirement	WRUCSP Reference
W01	Develop and implement a Waste Management Plan as part of the project's CEMP. This plan will include: - opportunities to minimise the generation of spoil including suitability for re-use within the project - targets for different waste streams with disposal being the least preferred approach (consistent with the NSW Waste Avoidance Strategy (NSW EPA, 2014), including diverting 75% of spoil from landfill (e.g. through offsite reuse), recycling rates of 80% for construction and demolition waste and reuse of stormwater for construction activities.	Opportunities are explored in the Resource Efficiency Strategy (RES) - developed as part of ISC v2.1 (Rso-1 DL1.1) requirements. Section 3.2 of this plan discusses targets specific to waste and resource use.
	- classification of all waste generated by the project in accordance with the EPA waste classification guidelines - site specific measures (in accordance with the compound locations) for waste segregation, storage, handling, collection and transport according to their waste classification, including for liquid wastes - instructions on clear signage to be provided at construction compounds to encourage correct recycling and reduce contamination. - measures to ensure safe storage and transport of waste materials and avoid or minimise any risk of waste or contaminated materials creating dust or other impacts to the community or surrounding sensitive environments	Section 6
	- regular monitoring and auditing to assess the performance of waste management activities against the determined targets - training and awareness for all construction personnel - a record keeping system on site so that waste tracking systems can be maintained. This should include the use of the NSW EPA's online waste tracking system where required. Keep records of receipts to prove that waste diversion and recycling targets have been met.	Section 8 Section 7 Section 8
W02	Develop and implement a procedure for managing special waste in accordance with legislative and policy requirements. This should include as a minimum: - review contaminated spoil volumes identified in the Waste Impact Assessment (Aurecon Arup 2021k). Confirm volumes of soils contaminated with ACM as detailed design develops. - identify lawful offsite storage and disposal options (including those listed in the Waste Impact Assessment (Aurecon Arup 2021k)) - if asbestos waste is transported off site, ensure appropriate containment methods are in place including, as a minimum, wrapping asbestos sheets and wetting down soil contaminated with ACM. - ensure transportation of asbestos waste by appropriately qualified personnel.	Soils and Contamination CEMP Sub-plan (SCCSP) Section 4.2 Appendix A Section 6.3 Section 6.3
W03	Store, manage and dispose of hazardous wastes in accordance with legislative and policy requirements, including disposal by a licensed contractor and at a lawful disposal facility.	Section 6.3
W04	Investigate opportunities to divert food waste from landfill. This could include the provision of site waste facilities such as bins to separate food waste at source.	Resource Efficiency Strategy (RES) - developed as part of ISC v2.1 (Rso-1 DL1.1) requirements Section 6.3

3.4 Infrastructure Sustainability Council Benchmarks

The project is aiming to achieve the Level 3 benchmarks for Resource Recovery and Management (Rso-4) in Infrastructure Sustainability (IS) v2.1 Technical Manual Design and As Built Rating (ISC Benchmarks) (herein referred to as ISC v2.1). The relevant benchmarks are listed in Table 3-3 and includes references to the benchmarks, the requirements for achieving the benchmark, the necessary evidence and references to documents and/or sections of this WRUCSP where the evidence is presented.

The Resource Efficiency Strategy (RES) is a strategy that identifies and conveys specific high-quality baseline information and a clear set of resource efficiency performance expectations and goals for each phase of the infrastructure life cycle. Specifically, it details resource consumption and disposal expectation of the design, construction and operation of the project. This is supplemented by the Resource Efficiency Action Plan (REAP) which describes the implementation of these expectations and goals, including resource efficiency opportunities with the potential to be implemented on the project. The RES and REAP will be developed during the design phase of the project and will outline requirements for the project design, construction and operational phases.

Table 3-3 Relevant ISC requirements related to waste and resource use.

Level	Benchmark	Management Measure	WRUCSP Reference
Design			
1	DL1.1 Risks and opportunities associated with resources outputs have been assessed and measures to minimise resource outputs during design, construction and operation have been identified.	MS1.1a: A desktop risk assessment for resource outputs (see Definitions) must be undertaken to identify risks and opportunities associated with resource outputs and assess the likelihood and consequence of risks.	Resource Efficiency Strategy (RES)
		MS1.1b: Resource output characterisation including predictions of quantities of resource outputs generated during design, construction and operation must be undertaken to inform the risk assessment (could use Rso-1 information if completed).	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP), included as a sub-section within the RES
		MS1.1c: Measures to minimise resource outputs during design, construction and operation must be identified across the resource outputs streams generated by the project.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
		MS1.1d: Within the framework of complying with laws and regulations, it must be demonstrated that the waste hierarchy is applied to the resource output streams and if the top (or other upper) level of the hierarchy is not selected for an output stream, then justification provided.	Section 4.2
		MS1.1e: If a desktop risk assessment for resource outputs has been undertaken and verified as part of a Planning rating, it must be reviewed and updated, considering any new information or changes to the project.	N/A
1	DL1.2 Project performance targets for resource outputs have been developed for the delivery phase.	MS1.2a: SMART resource output targets for Design & As Built must be developed for achievement at Levels 2 and 3 (according to location, type, and volume).	Section 2.2 Table 2-1 and Table 2-2
		MS1.2b: If the default targets are not used, the project-specific targets developed for Level 2 and 3 must be submitted to ISC for approval via the CIR process to assess their appropriateness and ambition in driving best practice resource recovery outcomes.	Section 2.3 Table 2-1 and Table 2-2
1	DL1.3 Opportunities to beneficially reuse resource outputs have been identified	MS1.3a: Opportunities to beneficially reuse resource outputs (see Definitions) either onsite or offsite must be identified and included in the resource outputs management plan (DL1.4).	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)

Level	Benchmark	Management Measure	WRUCSP Reference
		MS1.3b: If opportunities to beneficially reuse resource outputs have been provided as part of a Planning rating, then those opportunities must be reviewed and updated to reflect any new information or changes to the project.	N/A
1	DL1.4 A management plan (or equivalent) for resource outputs has been developed and design phase actions implemented.	MS1.4a: A management plan (or equivalent) must be developed to outline how the project-specific targets will be implemented and operations resource outputs addressed, including the following: - Resource output characterisation including predictions of quantities of resource outputs generated (DL1.1) - Risk assessment (DL1.1) - Project-specific performance targets (DL1.2) and actions for the design and construction phases - Measures to minimise potential resource outputs (waste) generated during operations. e.g. recycling infrastructure, smart design - Responsibilities and timing for actions - A monitoring plan for resource output targets and actions, including how data will be collected during design and construction.	Sustainability Management Plan (SMP) Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
		MS1.4b: All actions in the management plan identified for the design phase must be implemented, including consideration of resource outputs in the final design and in construction management plans.	Sustainability Management Plan (SMP)
2	DL2.1 Opportunities to beneficially reuse resource outputs have been formally assessed and embedded.	MS2.1a: The identification of opportunities to beneficially reuse (see Definitions) resource outputs onsite or offsite (DL1.3) must be substantiated by either: - The outcomes of a Resource Efficiency Workshop (as per Rso-1 DL1.1 or separate) - A market sounding process (as per Rso-1 DL2.2 and ABL2.1 or separate).	Detailed in the RES
		MS2.1b: A multi-criteria options assessment that considers material environmental, social and economic aspects and whole of life costing must be undertaken to quantify beneficial reuse opportunities	Project Significant Decisions Register developed as part of ISC v2.1- Ecn-1. Feasible options subsequently included in the REAP
		MS2.1c: Feasible opportunities (at least two) to beneficially reuse identified resource output must be incorporated in the final design or management plans.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
2	DL2.2 Achievement of Level 2 resource output targets has been demonstrated.	MS2.2a: Modelling (see Definitions) of predicted resource outputs must demonstrate that the Level 2 project targets for Design & As Built are on track to be achieved.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
3	DL3.1 Significant beneficial reuse of resource outputs has been embedded.	MS3.1a: Feasible beneficial reuse (see Definitions) opportunities must represent at least 20% of the resource output footprint (by volume) and be incorporated in the final design or construction management plans.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
3	DL3.2 Achievement of Level 3 resource output targets has been demonstrated.	MS3.2a: Modelling of predicted resource outputs must demonstrate that the Level 3 project targets for Design & As Built are on track to be achieved.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)

Level	Benchmark	Management Measure	WRUCSP Reference
As Built			
1	ABL1.1 The resource outputs management plan has been reviewed annually and construction phase actions implemented.	MS1.1a: The resource outputs management plan developed in the design phase (DL1.4) must be reviewed and updated annually during construction by a suitably qualified professional, taking into account any new information or changes to design or construction methodology.	Section 8.2 Section 8.5
		MS1.1b: If any changes are made to the project targets (default or project developed as per DL1.2), then the new targets and their justification must be approved by ISC via the CIR process. Justification must show the reasoning for the updated targets, and how the new targets will result in the same or improved sustainability outcomes.	Section 2.2
		MS1.1c: All actions outlined in the management plan to be completed during the construction phase must be implemented, including measures to minimise potential resource outputs (waste) generated during operations e.g. recycling infrastructure, smart design.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
1	ABL1.2 Project resource output performance has been monitored and reported.	MS1.2a: Project performance data for resource outputs must be monitored and reported at least quarterly during construction (as per management plan).	Section 8.1 Section 8.2
2	ABL2.1 Resource output data has been audited.	MS2.1a: Reported resource output data (ABL1.2) must be audited annually by a suitably qualified professional.	Section 8.2 Section 8.4
		MS2.1b: The audit must cover both systems and data and include an objective assessment of the accuracy and completeness of reported resource output information and management practices and performance, and include an audit report covering: - A description of the scope, objectives and criteria of the audit - Evidence of the sampled data and sampling methods used, including examples of raw data used for crosschecking, and error checking methodologies - A statement that the resource output data has been checked to ensure accuracy - The reviewer's or auditor's conclusions on the resource output data, including any qualifications expressed or limitations identified.	Section 8.4
		MS2.1c: Remedial actions to address issues or concerns raised in the audit report must be implemented.	Section 8.4
2	ABL2.2 Resource outputs have been tracked all the way to final destination.	MS2.2a: An audit of the movement of resource outputs to their final destination must be undertaken at least once every six months for the full As Built phase	Section 8.4
		MS2.2b: Each audit must cover at least 10% (by volume) of the project's resource output footprint over the six-month period.	Section 8.4
		MS2.2c: Over the life of the project a minimum of 80% of all resource output streams (i.e. all relevant waste streams for the project) must be audited at least once.	Section 8.4
2	ABL2.3 Opportunities to beneficially reuse resource	MS2.3a: At least two feasible opportunities (DL2.1) to beneficially reuse identified resource outputs must have been implemented in the final project	Resource Efficiency Strategy (RES)

Level	Benchmark	Management Measure	WRUCSP Reference
	outputs have been implemented.	asset or externally (on infrastructure projects or other).	Resource Efficiency Action Plan (REAP)
2	ABL2.4 Level 2 resource output targets have been achieved	MS2.4a: Regular monitoring and final reporting of resource outputs must demonstrate that the Level 2 project targets for Design & As Built (default or project developed as per DL1.2) have been achieved.	Sections 8.1 and 8.2
3	ABL3.1 Significant opportunities to beneficially reuse resource outputs have been implemented.	MS3.1a: Opportunities to beneficially reuse resource outputs either onsite or offsite representing at least 20% of the resource output footprint as outlined in the design phase must be implemented.	Resource Efficiency Strategy (RES) Resource Efficiency Action Plan (REAP)
3	ABL3.2 Level 3 resource output targets have been achieved.	MS3.2a: Regular monitoring and final reporting of resource outputs must demonstrate that the Level 3 project targets for Design & As Built (default or project developed as per DL1.2) have been achieved.	Sections 8.1 and 8.2

4 Waste And Resource Planning

4.1 Risks and Opportunities

The project team have determined the sustainability and environmental risks and opportunities, related to waste and resource use. They are associated with the activities, products and services that it can control and those that it can influence, and the associated impacts, considering a lifecycle perspective. Specifically, the Resource Efficiency Strategy (RES) and associated Resource Efficiency Action Plan (REAP) as addressed in Section 3.4, have been developed to identify the risks and opportunities associated with resource outputs and assess the likelihood and consequences of these risks. Specific measures to minimise resource outputs during design, construction and operation have been assessed, including opportunities to beneficially re-use resource outputs both on and off site.

Lifecycle assessments will also be used ahead of detailed design to determine quantities of resource outputs in order to identify issues that have or can have a significant impact, with a view to identifying and prioritising opportunities, which maximise efficiency, avoid unnecessary consumption of resources and achieve positive circular economy outcomes.

Waste and resource use opportunities and actions to mitigate risk will be documented in the Project Risk and Opportunities Register, appended to the RES. Effectively managing waste minimisation and resource efficiency opportunities is key to achieving sustainable outcomes for the project. It is typically the management of opportunities, rather than risks, that allow compliance benchmarks to be surpassed and best practice to be achieved.

4.2 Waste Management Approach

The project has planned to take action to address waste management and recycling risks and opportunities, its compliance obligations, and its objectives. The project has determined what will be done, what resources will be required, who will be responsible, when it will be completed and how the results will be evaluated as introduced in Section 4 (RES).

The project has and shall apply the waste hierarchy detailed below, focusing on the waste streams with the most significant lifecycle impacts first, by prioritising (in order of preference):



Figure 4-1 Waste hierarchy (NSW EPA, 2017)

Where the project is unable to minimise or avoid resource outputs through design, procurement or other processes, options will be explored to re-use the resource outputs on or off site. Justification will be provided in the REAP where this is not achievable. A summary of the project's proposed resource outputs is provided in more detail in Table 8-1.

Prior to reuse on site or disposal off site, materials will be classified in accordance with the *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, November 2014). Further details on the classification of waste stream process is provided in Section 6.1. No waste shall be permitted to be received on site, unless permitted by the EPL and assessed by the Site Auditor .

The project team will review contaminated spoil volumes identified in the Waste Impact Assessment (Aurecon Arup 2021k) to further rationalise the application of the waste hierarchy as detailed design develops. Volumes of soils contaminated with ACM will also be included in this review as detailed design develops.

Actions to attend to objectives and compliance obligations are being planned and documented within multiple trackers including:

- IS Rating Tracker
- USC Environmental Compliance Tracker
- Resource Efficiency Action Plan (REAP).
- Material (VENM/ENM) Importation Plan

These are excel-based documents for the management of obligations and deliverables associated with the IS Rating, the CoA, UMM's, EPL conditions and contract requirements. These trackers have been designed to assist in the management of the large number of deliverables for the environmental legislative and compliance requirements, sustainability ratings and contract requirements. Review of these trackers will be undertaken weekly and have been tailored to prompt actions from the relevant members of the project team or where deliverables are requested from multiple parties, and allows what, when, who and how to be defined for each deliverable.

These trackers are key items which will be reviewed within regular sustainability and environmental leadership committee meetings and are also shared with the client monthly or when requested.

Note, all registers / trackers detailed within this section will be live documents and will be regularly reviewed and adapted as new information comes to hand. Where possible, registers / trackers centralise information from multiple management plans, removing duplication and providing improved flexibility, increasing efficiency, performance, and outcomes.

5 Potential Impacts

Waste generated due to construction of the project has the potential to affect the local environment if not managed correctly, with potential impacts including:

- Runoff from accidental spillages, waste transfer and poor waste storage;
- Ground contamination from accidental spills and poor waste and stockpile management;
- Release of dust contaminated with asbestos;
- Amenity impacts through littering of the site;
- Potential waste misclassification; and
- Excessive waste being diverted to landfill.

The measures detailed in Sections 6 and 8 of this plan would be implemented to manage any potential impact related to waste generated due to construction activities.

6 Management of waste and resources

6.1 Classification of Waste Streams

The classification of waste is undertaken in accordance with the EPA's Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA, 2014). Where waste cannot be avoided, reused, or recycled, it will be classified and appropriate disposal will then occur.

This document identifies six classes of waste as defined in clause 49 of Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act):

- Special Waste
- Liquid waste
- Hazardous waste
- Restricted solid waste
- General solid waste (putrescible)
- General solid waste (non-putrescible).
- Virgin Excavated Natural Material (VENM)
- Excavated Natural Material (ENM)

The steps below will be implemented to determine which of the above classifications applies to Project waste. Once a classification has been established under a particular step, the waste will be tested if required and will be managed accordingly.

Step 1: Is it 'special waste'?

Establish if the waste should be classified as special waste. Special wastes are: clinical and related, asbestos, waste tyres. Definitions are provided in the guidelines.

Note: Asbestos and clinical wastes must be managed in accordance with the requirements of Clauses 42 and 43 of the *Protection of the Environment Operations (Waste) Regulation 2005*.

Step 2: If not special, is it 'liquid waste'?

If it is established that the waste is not special waste, it must be decided whether it is 'liquid waste'. Liquid waste means any waste that: has an angle of repose of less than 5° above horizontal becomes free-flowing at or below 60° Celsius or when it is transported is generally not capable of being picked up by a spade or shovel. Liquid wastes are sub-classified into:

- Sewer and stormwater effluent.
- Trackable liquid waste according to *Protection of the Environment Operations (Waste) Regulation 2005 Schedule 1* Waste to which waste tracking requirements apply.
- Non-trackable liquid waste.

Step 3: Has the waste already been pre-classified by the NSW EPA?

The EPA has pre-classified several commonly generated wastes in the categories of hazardous, general solid waste (putrescibles) and general solid waste (non-putrescibles). If a waste is listed as 'pre-classified', no further assessment is required. Details are provided in the guidelines.

Step 4: If not pre-classified, is the waste hazardous?

If the waste is not special waste, liquid waste, or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous under the classes or divisions of the *Transport of Dangerous Goods Code* which include explosives, flammable solids, substances liable to spontaneous combustion, oxidizing agents, toxic substances, and corrosive substances.

Step 5: Chemical assessment to determine classification?

If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible and non-putrescible). If the waste is not chemically assessed, it must be classified and treated as hazardous. Waste is assessed by comparing Specific Contaminant Concentrations (SCC) of each chemical contaminant, and where required, the leachable concentration using the Toxicity Characteristics Leaching Procedure (TCLP), against Contaminant Thresholds (CT).

Step 6: Is the general solid waste putrescible or non-putrescible?

If the waste is chemically assessed as general solid waste, a further assessment is available to determine whether the waste is putrescible or non-putrescible. The assessment determines whether the waste is capable of significant biological transformation. If this assessment is not undertaken, the waste must be managed as general solid waste (putrescible).

For each waste stream to be generated onsite (e.g. VENM, ENM, General Solid Waste, Concrete, asphalt etc.), a waste disposal location has been nominated (refer to Appendix A). The John Holland Environmental Manager, EPA accredited Site Auditor and Sydney Water Environmental Lead will review and approve supporting information regarding the nominated disposal location, prior to commencing works, including reviewing:

- Environment Protection Licence (EPL) number - for NSW EPA licenced premises (e.g. landfills, recycling centres)
- Development Approval and/or written confirmation from landowners (via a POEO Act Section 143 Notice) confirming that the disposal site is approved to receive the type and volume of fill to be disposed (i.e. VENM, ENM) - for non-licenced premises.

Where a new disposal location is proposed during works, correspondence along with the appropriate EPL number, Development Approval and/or Section 143 Notice, will be submitted to the John Holland Environmental Manager, Sydney Water Project Manager and Environmental Lead for approval of the new location prior to any offsite disposal commencing.

John Holland will carry out resource recovery (for example, ENM, recovered aggregates, treated drilling mud, etc.) in accordance with the requirements of the EPA Resource Recovery Orders and Exemptions.

6.2 Waste Exemptions

Clause 51 Protection of the Environment Operations (Waste) Regulation 2005 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 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. A specific exemption may be granted where an application is made to the EPA. A summary of relevant exemptions the project team will consider during the construction period is provided in Table 6-1.

Table 6-1 Relevant waste exemptions

Exemption	General Conditions
Excavated Natural Material (ENM) Exemption 2014	This exemption applies to excavated natural material that is, or is intended to be, applied to land as engineering fill or for use in earthworks. Excavated natural material is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has: a) been excavated from the ground, and b) contains at least 98% (by weight) natural material, and c) does not meet the definition of Virgin Excavated Natural Material in the Act. Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.
Treated Drilling Mud Exemption 2014	This exemption applies to treated drilling mud that is, or is intended to be, applied to land as engineering fill or for use in earthworks Treated drilling mud means drilling mud that has undergone dewatering such that the resultant solid: • does not have an angle of repose of less than 5 degrees above horizontal; or • does not become free flowing at or below 60 degrees Celsius or when it is transported; or • is generally capable of being picked up by a spade or shovel
Recovered Glass Sand Exemption 2014	This exemption applies to recovered glass sand that is, or is intended to be, applied to land for the purpose of pipe bedding, drainage or for road making activities. Recovered glass sand means recovered glass that has been processed to produce a 'sand-like' glass material with a particle size diameter generally less than 5 mm, and that contains at least 98% recovered glass.
Recovered Aggregate Exemption 2008	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, • Back-filling of quarry voids, • Raising or reshaping of land used for agricultural purposes, and • Construction of roads on private land unless: ○ the relevant waste is applied to land to the minimum extent necessary for the construction of a road, and ○ a development consent for the development has been granted under the relevant Environmental Planning Instrument (EPI), or ○ it is to provide access (temporary or permanent) to a development approved by a Council, or ○ the works undertaken are either exempt or complying development.

6.3 Waste Storage, Disposal, Recycling and Reuse Locations

Waste disposal and potential offsite recycling (Appendix A) or spoil reuse locations have been identified by the project, and written confirmation will be received from each place of disposal confirming that they can lawfully receive the types of waste proposed. Waste will only be exported to a site with a waste consignment authority or, in accordance with the Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation 2014), to any other place that can lawfully accept the waste.

The importation, storage, treatment, processing, reprocessing or disposal of waste during construction will comply with the EPL in force and is to be verified by the site auditor as detailed in the SCCSP. Under appropriate circumstances, the above may be done in accordance with a Resource Recovery Exemption or Order issued under the POEO Regulation 2014 (including but not limited to VENM, ENM, recycled aggregates, treated drilling mud, etc).

Refer to the SCCSP for further details on spoil management.

6.3.1 Handling Waste On-site

Materials segregation and recycling facilities will be provided on site, including:

- Reusable materials will be stored separately, in secure facilities
- Recyclable waste will be stored separately from other waste in clearly labelled bins
- Sufficient and secured storage areas will be provided for material stockpiling
- Stockpiles and waste in general will be collected on a regular basis
- Work sites will be kept free of litter and good housekeeping will be maintained
- Concrete washout and residues from vehicles will be managed at approved locations only
- Clearly delineate temporary stockpiles located onsite and in compound areas (e.g. use material storage bays) to prevent cross-contamination between stockpiles
- Storage of special waste (including asbestos) will be undertaken to ensure the material remains damp with dust suppression or covered where water cannot be accessed.
- Provision of specialist bins for specialist waste streams (including electrical and electronic waste, and equipment waste)
- Waste oil, other liquid wastes and spillages will be collected and stored in bunded areas.
- Recyclable wastes, including paper at site offices, and other wastes, will be stored separately from other wastes
- Opportunities to divert food waste from landfill will be investigated, subject to appropriate site office waste and hygiene requirements, this may include the provision of site waste facilities such as bins to separate food waste at source.
- The storage and handling of hazardous and restricted wastes will be segregated from other waste streams and managed in accordance with legislative and policy requirements, including disposal by a licensed contractor and at a lawful disposal facility.
- Any unexpected special waste will be managed in accordance with the Unexpected Finds Procedure for Contamination (Appendix D of the SCCSP).
- Relevant requirements regarding waste management on site will be detailed in the Site Environmental Plan and Site Layout Plans

6.3.2 Transport Waste Offsite

If waste cannot be reused on site, it will be transported off site using an appropriately licensed waste contractor in accordance with the waste classification. All vehicles transporting waste will be covered, and tailgates secured prior to leaving the work location. Waste types requiring specific transportation requirements must also be implemented for all waste types, including liquid waste. For example, asbestos waste transported off site must have appropriate containment methods in place including, as a minimum, wrapping asbestos sheets and wetting down soil contaminated with ACM.

For transportation of high-risk waste (including special waste such as asbestos, hazardous and/or restricted), all transporters will hold an environmental protection license and will be tracked using either the Project's waste tracking or EPA's online waste tracking system.

6.3.3 Waste Receiving Facilities

See Appendix A for a preliminary register of licenced facilities that waste can be transported to by the project.

6.3.4 Worm Farm Septic System

John Holland will construct and operate a “worm farm” septic system to treat human sewage generated by the construction workforce. This alternate sewage system provides a circular economy solution to the traditional “pump-out” methodology, reducing the amount of liquid waste required to be processed off site, whilst also providing a beneficial natural liquid fertilizer to the site. The septic system is expected to operate throughout the AWRC plant construction phase until permanent Sydney Water sewage connections are established at the AWRC plant site. The septic system is to be designed to accommodate sewage for up to 300 workers (peak capacity), and will include the following key components:

Subsurface septic poly tanks (seven total), to support a daily hydraulic load of 4500 L, holding live earthworms;

- A vertical vent from the septic tanks;
- A line from the septic tanks carrying treated liquid effluent to the land application trenches (fed via gravity or pump); and
- Trenches (500 m) for application of treated liquid effluent to land.

The worms consume organic matter within the sewage, resulting in production of worm castings. Whilst the septic system can accept and treat food waste, human sewage, green waste (landscaping waste, etc.), only human sewage from the construction workforce during the AWRC construction program and grey water from sinks and showers are planned to be treated within the proposed septic system. This will include sewage from the AWRC plant site only. No sewage from other construction programs and no other sources of grey water or other liquid or solid waste will be treated by this system. No chemicals, amendments such as fertilisers, or other additives are required during the operation of the septic system. This treated liquid effluent is transferred to land via the application trenches and has been designed and located to avoid potential interaction with groundwater.

Any material imported to the AWRC plant site, or excavated from the AWRC plant site, for construction of the septic system will be managed in accordance with the Construction Environmental Management Plan (CEMP) for the project, and the Soils and Contamination CEMP Sub-plan.

The installation, operation and decommission of the septic system will be undertaken in accordance “Upper South Creek Advanced Water Recycling Centre – Proposes Worm Farm Septic System, ERM 2023” which has been reviewed by the Project Independent EPA Site Auditor (Refer to Appendix C for further details). The treated effluent is classified as “low strength” in regard to “*The Environmental Guidelines: Use of Effluent by Irrigation (NSW Department of Environment and Conservation, 2004)*” in relation to constituents such as total nitrogen, total phosphorus, biological oxygen demand (BOD), total dissolved solids (TDS), other pollutants (e.g. metals and pesticides) and grease and oil. The effluent from this septic system is also expected to be similarly low risk.

Ongoing discussion with Penrith City Council regarding the operation and installation of the septic system are being undertaken by the Project at the time of updating this plan. Representatives from JHG and Worm Farm Waste Systems (the subcontractor) meet with Penrith Council (Environmental Health and Compliance Officer- Penrith City Council) to discuss the proposed septic system on the 03/07/23. Any queries raised by the Council will be addressed prior to the construction of the septic system.

7 Resources and Training

7.1 Roles and Responsibilities

The project has determined and made provision for the resources needed for the establishment, implementation, maintenance and continual improvement of the waste and resource use management system on the project. The USC Project Team's organisational structure and overall roles and responsibilities are outlined in Section 3.3 of the CEMP.

7.2 Competence, Training and Awareness

The Project shall:

- Use Training Needs Analysis to determine the necessary competence of persons doing work under its control that affects its materials performance and its ability to fulfil its compliance obligations;
- Obtain records of suitable education, training, experience and verification of competency to ensure that these persons are competent on the basis of appropriate education, training or experience;
- Determine any further training needs associated with waste and resource use;
- Where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken.

The Project shall also ensure, via the Project Induction, Toolbox Talks and Pre-Start Meetings (or similar) that persons doing work under the project's control are aware of the:

- Sustainability policy;
- The significant waste issues and related actual or potential impacts associated with their work, including in relation to waste management;
- Their contribution to the effectiveness of waste management, including the benefits of enhanced waste performance;
- The implications of not conforming with the waste management requirements, including not fulfilling the organisation's compliance obligations and sustainability goals.

Internal and external workshops with multidisciplinary teams (e.g designers, engineers, construction supervisors, environment, and sustainability personnel) will also be undertaken in the development of the REAP to ensure all possible opportunities for waste avoidance and re-use are discussed and assessed. These workshops will further assist in educating the wider team on the waste and resource goals and targets outlined in Section 2 of this plan and, provide plausible pathways to ensure they can be achieved.

8 Performance Evaluation

8.1 Monitoring Measurement and Analysis

The project team shall monitor, measure, analyse and evaluate its waste, reuse and recycling performance. The project shall undertake weekly environmental (including waste) inspections during construction. Monitoring in relation to waste, reuse and recycling will also be undertaken in accordance with the applicable compliance requirements. Monitoring shall include:

- Segregation and labelling of waste on-site
- Types and quantity of waste generated
- Types and quantity of waste reused or recycled
- Types and quantity of waste disposed to landfill
- Percentage of waste reused or recycled
- Quantity of spoil generated.

Waste (including spoil) removed from the site will be tracked using a Waste Tracking Register (Appendix B). This register will be completed by foreman/site engineer at the site, and will capture the following information:

- Date transported
- Haulage contractor
- Material type
- Waste classification
- Quantity
- Waste receival location
- Truck registration
- Docket numbers.

Receipts for waste transfer and disposal will be retained and checked to ensure waste is taken to the correct, licenced facility. These appropriate records and disposal dockets will be retained for audit purposes. A copy of the waste facility's EPL will also be retained to verify that the waste facility can lawfully accept the waste being disposed. These details will be obtained prior to the commencement of construction and the details added into PPW accordingly.

Preliminary waste estimates for design and construction are included in Table 8.1. These estimates have been extracted from Section 12.2 and Appendix Z of the EIS. Each waste type represents an opportunity to apply the waste hierarchy (eliminate, reduce, reuse, recycle, waste to energy, landfill). Waste outcomes and the associated justification is indicative and subject to change upon regular review of the opportunities and risks for each waste stream.

Table 8-1 Estimated Design and Construction Quantities of Waste generated and their classification and outcomes at the AWRC and Pipelines site.

Waste Classification	Waste Stream	Estimate of Quantities		Waste Outcome	Relevant SMART Target	Justification* (if cannot be re-used, treated or recycled)
		AWRC	Pipelines			
Special	Asbestos waste	4,690m ³	20 – 75m ³	Off-site disposal at approval facility	T-31	
	Tyres	6t	55t	Off-site disposal at approval facility	T-31	
Liquid	Waste Oils	1,050 litres	9,690 litres	Recycled where possible or Disposal	T-25	
	Wastewater	13,, 950 m ³	16,000m ³	Off-site disposal at an approved facility	T-25	
	Sewage from main construction temporary compound	4050 m ³	N/A	Treated and re-used on site	T-25	
	Saline groundwater	50 million litres (ML)	4ML	Off-site disposal at an approved facility	T-25	
	Untreated drilling muds	-	860m ³	Off-site disposal at an approved facility	T-25	
Hazardous	Unwashed containers that previously held Class 1, 3, 4, 5 or 8	360m ³	320m ³	Off-site disposal at approval facility	T-31	
	Used batteries	65kg	380kg	Off-site disposal at approval facility	T-31	
General Solid Waste (non-putrescible) Excludes excavated soil waste	Green waste	14,400m ³	30,500m ³	Off-site disposal at approval facility	T-25	
	Wood waste	78t	41t	Recycled where possible or Disposal	T-25	
	Electrical infrastructure waste	720kg	-	Recycled where possible or Disposal	T-25	

Waste Classification	Waste Stream	Estimate of Quantities		Waste Outcome	Relevant SMART Target	Justification* (if cannot be re-used, treated or recycled)
		AWRC	Pipelines			
	Piping materials	480t	850t	Recycled where possible or Disposal	T-25	
	Metal wastes	1,850t	-	Recycled	T-25	
	Demolition waste	1,000m ³	-	Recycled where possible or Disposal	T-25	80% of demolition waste recycled
	Other construction waste	6,530m ³	2,560m ³	Recycled where possible or Disposal	T-25	
	Paper and Cardboard	20t	23t	Recycled	T-24/T-25	
	Construction plant waste	90m ³	80m ³	Recycled where possible or Disposal	T-25	
	Synthetic fibres and membranes	5t	5t	Recycled where possible or Disposal	T-25	
	Dewatered grit, sediment, litter and gross pollutants	180m ³	-	Recycled where possible or Disposal	T-25	
	Treated drilling muds	-	1,540m ³	Recycled where possible or Disposal	T-25	
	Pipe blanket backfill material	-	4,450m ³	Recycled where possible or Disposal	T-23/T-25	
	Excavated pavement	-	10,222m ³	Recycled where possible or Disposal	T-25	
General Solid Waste (putrescible)	Food Waste	40t	47t	Off-site disposal at approval facility	T-25	
Excavated Spoil	Spoil and Rock (ENM/VENM)	93,814m ³	87, 419m ³	Recycled where possible or Disposal	T-23	

*To be confirmed and updated pending the outcome of the development of the Resource Efficiency Strategy and the accompanying Resource Efficiency Action Plan.

8.2 Reporting

Reporting requirements are documented in Section 3.9.4 of the CEMP. Project-specific waste and resource use reporting requirements are detailed below. Details of field observations shall be reported via the weekly environmental inspection checklist, and communicated to all staff during pre-starts, toolbox and team meetings, as required. Records will be maintained detailing the beneficial re-use or recycling of material either within the project or at off-site locations, including waste tracking forms and dockets for any material disposed of to landfill sites. A waste register, detailing the date, types and quantities of waste disposed and the receiving facility, will be maintained.

Any environmental incidents related to waste management will be reported in accordance with the project's environmental incident management plan (IMP), provided in Section 3.7 of the CEMP. The IMP is consistent with Sydney Water's Incident Management Procedure (DC0000506). Any incident that has caused or is likely to cause material harm to the environment will be reported to Sydney Water within 30 minutes after the incident was first notified, as required by the Sydney Water Environment Incident Reporting Process (REF0866). The John Holland Regional HSEQ team is to be immediately informed of any incident that has caused or has the potential to cause material harm to the environment and will advise on the notification of relevant regulators and stakeholders.

A summary of project-specific waste management, including incident management, will be provided in the project monthly report issued to Sydney Water.

The project will regularly evaluate performance and tracking towards targets relating to waste and resource use. The project will communicate relevant waste and resource use performance information both internally and externally, as identified in its communication processes and as required by its compliance obligations. Waste and resource use management will be detailed in the following reports:

- Monthly Project Reports
- Quarterly Environmental Report
- Monthly Sustainability Data Report
- Quarterly Sustainability Report
- Annual Sustainability Report.

8.3 Non-conformance and Corrective Action

Table 8-2 lists potential risks that may be encountered during the construction of the project and identifies suggested corrective actions.

Table 8-2 Suggested corrective actions

Potential Risk	Suggested Corrective Action
Wastes incorrectly separated / segregated	- Inspect facilities for appropriate signage and physical separation of waste bins - Notify and train personnel
No / inadequate collection	- Arrange for collection by approved / licensed waste contractor - Segregate and reuse or recycle wastes wherever practicable
Reuse or recycling opportunities not recognised / loss of opportunities	- Train / Re-train personnel - Arrange for recycling collection by approved / licensed waste contractor - Clearly communicate waste and resource use targets to personnel/contractors - Provide adequate avenues/channels for personnel to communicate and realise opportunities/ideas
Unlicensed operator	Confirm operator license/s are appropriate for the required service
Incorrect disposal	- Confirm suitability of waste removal contractor - Confirm / Inspect disposal facilities for suitability - Record as an incident - Notify / Train personnel
Contamination of the Site	- Notify client, assess degree and real extent of contamination - Prevent access to the area. - Cover contamination to prevent exposure to rain - Remove contaminated material and remediate in accordance with Regulator / Client requirements
Inaccurate records management	- Update records - Improve reporting system - Train personnel
Additional costs / time / resources to implement waste management and reuse opportunities	- Identify risks and opportunities early to ensure that solutions can be embedded into planning and implementation of works. - Present value of benefits and contribution to waste and resource efficiency targets - Ensure that risks and opportunities register captures resource needs and requirements for implementation.

8.4 Auditing

Auditing of the WRUCSP will be undertaken in accordance with Section 3.9.3 of the CEMP. The Project shall be audited at planned intervals to provide information on whether the project is meeting its compliance obligations; conforms to the WRUCSP; and determine if the WRUCSP is effectively implemented and maintained. The project shall establish, implement and maintain an audit programme for the project, including the frequency, methods, responsibilities, planning requirements and reporting of its audits.

Sustainability audits will be conducted at least quarterly with at least one per year being 'independent'. Over the life of the project, a minimum of 80% of all resource outputs streams (i.e. all relevant waste streams for the project) must be audited at least once. The scope of the audits may vary but it is important that the most material issues are audited regularly during the rating period. Sustainability audits should cover the most material environmental, social and economic issues. The audit reports must demonstrate that these requirements have been fulfilled. Specifically, they should cover:

- A description of the scope, objectives and criteria of the audit.
- Evidence of the sampled data and sampling methods used, including examples of raw data used for crosschecking, and error checking methodologies.
- The reviewers or auditor's conclusions on the resource output data, including any qualifications expressed or limitation identified.
- Each audit must cover at least 10% (by volume) of the projects resource output footprint over the six-month period.

In addition, waste specific audits shall include:

- Annual review covering systems used to manage waste and the data recording and reporting. Must be an objective assessment of the accuracy and completeness of reported waste information with the aim to provide confidence that the reported information represents a faithful, true, and fair account of waste management practices and performance. Must be undertaken by a suitably qualified person (someone with at least five years' waste management experience, or a NABERS Assessor, or equivalent)
- Auditing to final destination must be undertaken at least 6 monthly for construction. Final destination means at least to a waste facility where the waste is transformed into another product or material or into landfill. Physical sorting of waste is not considered a final destination. The audit should include a physical/visual verification of waste destinations.

8.5 Continuous Improvement

The project shall continually review and improve the suitability, adequacy and effectiveness of this plan against environmental objectives, performance criteria and relevant legislative and other associated guidance documentation, for the purpose of identifying opportunities for improvement. Continuous improvement processes will be undertaken consistent with Section 3.11 of the CEMP, where appropriate.

The continuous improvement process will:

- 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 or this WRUCSP resulting from the process improvement.
- Make comparisons with objectives and targets.

8.6 WRUCSP Update and Change Management

The environmental risk analysis processes described in Section 3.2 of the CEMP may result in the need to update or revise this Plan. This plan will be reviewed annually as a minimum but may be updated more regularly depending on process changes and refinements. Any revisions to the WRUCSP will be in accordance with the process outlined in Section 3.12 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 3.12 of the CEMP.

Appendix A: Waste Receiving Facilities

Facility Name	Address	Distance from AWRC (km via road)	Facility Type	Description
SUEZ Kems Creek Resource Recovery Park	1725 Elizabeth Drive, Kems Creek	1.3	Resource recovery and landfill	Accepts biosolids, contaminated waste, mixed putrescibles and non-putrescibles
Hi-Quality Group - Kems Central	1503 – 1509 Elizabeth Drive, Kems Creek	3.8	Landfill	Accepts asphalt and VENM
Wanless Sydney Recycling Park	16-23 Clifton Avenue, Kems Creek	4.2	Resource recovery and landfill	Accepts commercial/industrial waste, ENM/VENM and C&D waste.
Brandown Quarries	Lot 90, Elizabeth Drive, Kems Creek	7.5	Resource recovery and landfill	Private resource recovery, GSW landfill and quarry facility
Cleanaway Erskine Park Landfill	85-87 Quarry Road, Erskine Park	14.3	Landfill	Accepts commercial/industrial waste, GSW, ENM/VENM and C&D waste
Veolia Horsley Park Facility	752/716 Wallgrove Rd, Horsley Park	16.9	Resource recovery and landfill	Accepts GSW (nonputrescible) wastes.
SUEZ Eastern Creek Waste Management	Wallgrove Road, Eastern Creek	16.9	Centre Resource recovery and landfill	Accepts GSW, ENM/VENM, organic wastes.
Penrith Landfill Depot	842 Mulgoa Rd, Mulgoa	17.0	Landfill	Accepts domestic and commercial wastes.
SUEZ Wetherill Resource Recovery Facility	20 Davis Rd, Wetherill Park	19.9	Resource recovery and transfer station	Accepts special, hazardous and commercial/industrial waste, GSW, ENM/VENM and C&D waste.
Bingo Eastern Creek Recycling Ecology Park (& Landfill)	1 Kangaroo Ave, Eastern Creek	20.0	Resource recovery and landfill	Accepts GSW, ENM/VENM, organic wastes.
Cleanaway St Marys Liquid	40 Christie St, St Marys	23.2	Waste management/treatment	Waste Services Accepts hazardous liquid wastes.
Solveco Waste Management and Treatment Facility	38 Links Rd, St Marys	24.0	Waste management/treatment	Accepts hazardous, liquid, chemical and industrial wastes in liquid, sludge and solid states.
Doyle Bros Resource Recovery Facility	87/91 Lisbon St, Fairfield East	24.1	Resource recovery and transfer station	Accepts recyclable domestic and commercial wastes.
Glenfield Waste	Services 2 Cambridge Ave, Glenfield	25.1	Landfill	Accepts commercial/industrial waste, GSW, ENM/VENM and C&D waste.
Blacktown Waste Services	25 Harris Ave, Marsden Park	29.9	Landfill	Accepts domestic and commercial wastes.
SUEZ Seven Hills Resource Recovery Centre	29 Powers Rd, Seven Hills	31.8	Resource recovery and transfer station	Accepts GSW, ENM/VENM, organic wastes.
Canterbury Bankstown Council Waste Management Centre	Panania NSW 2213	33.2	Landfill	Accepts domestic and commercial wastes.
Blaxland Waste Management Facility	28-30 Attunga Rd, Blaxland	33.4	Resource recovery and landfill	Accepts domestic and commercial wastes.

Appendix B: WASTE TRACKING REGISTER – Project Pack Web (PPW)

PRJ-05398-01 Upper South Creek Advanced Water Recycling Centre (AWRC) and Pipelines

Create

New

Date Raised 18/04/2023

* Exact Location

* Location Select...

* Activity Select...

* Produced By Select...

Subcontractor Select...

* Collection Period

Project Source Reference (e.g. Stockpile#, Docket#)

* Transport Company Select...

Licence of Transport Company

Vehicle/Truck Rego

Receiving Facility Licence/DA

* Receiving Facility Name

Receiving Facility Address

Waste Classification Evidence
Received and Attached? ☐

Created from PCR ☐

Type of Waste	Waste outcome	Amount produced	Unit	Cost	Activity conducted	Destination reference (e.g. Stockpile# or External destination)
No items to display						

Add

Comments

Add a description

Related Asbestos Item

Search for Asbestos items

Attachments

Upload photo...

Upload multiple files...

Maximum individual attachment size is 100Mb

Title	Description
No items to display	

Related Asbestos Items

Record No	Date of Inspection	Exact Location	Asbestos Type	Detailed Actions for Asbestos Management
No items to display				

Save

Save and create new

Cancel Changes

Appendix C: ERM Memo “Upper South Creek Advanced Water Recycling Centre – Proposed Worm Farm Septic System” and Site Auditor Review.



Andrew Lau
NSW EPA Accredited Site Auditor
JBS&G
Level 1, 50 Margaret Street
Sydney, NSW 2000, Australia

10 May 2023

Reference: 0677828L03

Dear Andrew

Subject: Upper South Creek Advanced Water Recycling Centre – Proposed Worm Farm
Septic System

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by the John Holland Group (John Holland) to assist with management of potential contamination that may be encountered during construction of the Upper South Creek Advanced Water Recycling Centre (AWRC).

This project comprises both the AWRC plant site located at Kemps Creek, NSW ('the AWRC plant site') and approximately 20 km of associated brine and recycled water pipelines.

As discussed on the 12th April 2023, John Holland is proposing to construct and operate a "worm farm" septic system to treat human sewage generated by the construction workforce during the AWRC construction program.

This letter has been prepared to provide further information on the proposed septic system in relation to potential contamination that may require consideration during the contamination audit.

ERM notes that the associated statutory planning requirements are currently being considered by ERM and John Holland and are outside of the scope of the contamination audit.

2. SEPTIC SYSTEM DESIGN

The proposed septic system would be designed and installed by A&A Worm Farm Waste Systems¹, who have installed over 3000 similar systems across Australia since 1996. Relevant examples installed by A&A Worm Farm Waste Systems in New South Wales include:

- Shoalhaven City Council Animal Shelter & staff amenities – Nowra, NSW;
- Rouse Hill House & Farm – Museum & Education Centre – Rouse Hill, NSW;
- George & Annie Cork Memorial Medical Centre – Dorrigo, NSW;
- Tabulam Backpackers Hostels – Tenterfield, NSW;
- Peninsula Firearm Academy – Terrey Hills, NSW;
- Alpine Habitat Cabins Accommodation – Jindabyne, NSW;
- Wakehurst Golf Club –Seaforth, NSW; and
- Northbridge Golf Club – Northbridge, NSW.

The septic system is expected to be designed to accommodate sewage from up to 300 workers, with a typical flow rate of approximately 8000L to 12,000L per day, and is likely to include the following key components:

- A subsurface septic tank (poly or concrete), typically 3200L or larger, holding live earthworms;
- A vertical vent from the septic tank;
- A line from the septic tank carrying treated liquid effluent to the land application trenches (fed via gravity or pump); and
- Trenches for application of treated liquid effluent to land.

The final design of the system, including capacities, dimensions and layout of the various components, was not yet available at the time of preparation of this letter.

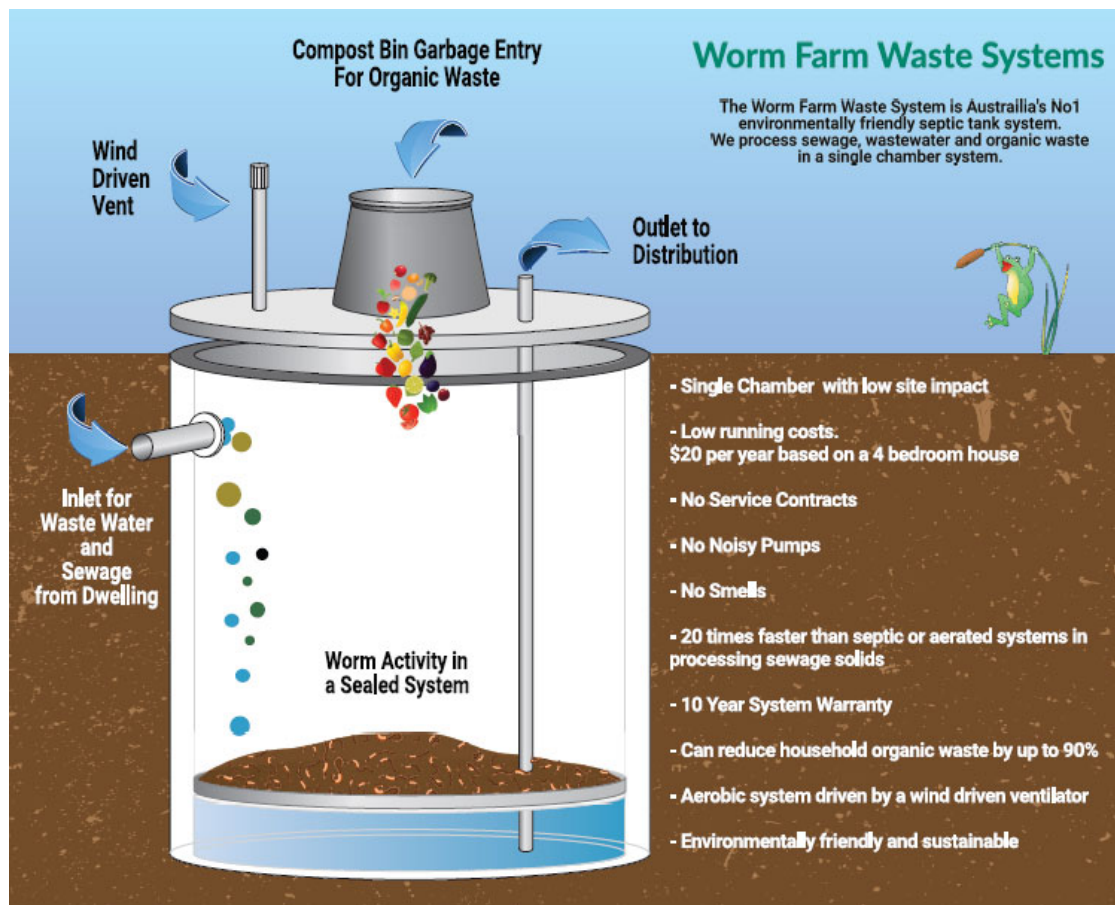
Any material imported to the AWRC plant site, or excavated from the AWRC plant site, for construction of the septic system will be managed in accordance with the Construction Environmental Management Plan (CEMP) for the project, incorporating the Soils and Contamination CEMP Sub-Plan, and future spoil/materials management plans that are developed for the project (if any).

The outcomes of the AWRC plant site Detailed Site Investigation (yet to be commenced) will also be taken into account when managing excavated material.

A typical septic system configuration is shown in **Figure 1**.

¹ <https://www.wormfarm.com.au>

Figure 1: Typical Worm Farm Septic System Configuration



Information provided to ERM indicates that the worms will live on a raised platform within the septic tank which is located above the treated liquid in the lower portion of the tank (refer to **Figure 1**).

The worms consume organic matter within the sewage, resulting in production of worm castings. Whilst the septic system can accept and treat food waste, human sewage, green waste (landscaping waste, etc.), ERM understands that human sewage from the construction workforce during the AWRC construction program and grey water from sinks and showers are the only waste streams planned to be treated by John Holland within the proposed septic system. This will include sewage from the AWRC plant site only. No sewage from other construction programs and no other sources of grey water or other liquid or solid waste will be treated by this system.

Based on information provided by John Holland and A&A Worm Farm Waste Systems, ERM understands that no chemicals, amendments such as fertilisers, or other additives are required during the operation of the septic system.

Representative site diagrams showing typical worm farm septic system layouts are presented in **Attachment A**. Representative photographs of typical worm farm septic system tanks and liquid application trenches are presented in **Attachment B**.

3. SEPTIC SYSTEM WASTE

The septic system is expected to be operated throughout the AWRC plant construction phase until permanent Sydney Water sewage connections are established at the AWRC plant site. The operation of the septic system is expected to be undertaken in general accordance with *Environmental Guidelines: Use of Effluent by Irrigation* (NSW Department of Environment and Conservation, 2004); although this document is not a regulatory requirement, it sets out best management practices which will be implemented to the extent practicable at the AWRC plant site.

The only waste stream to be produced during operation of the septic system is the treated liquid effluent which is transferred to land via the application trenches (refer to **Attachment A** and **Attachment B** for typical layouts and photographs). We understand that the septic system will be designed and located to avoid potential interaction with groundwater.

Based on information provided by A&A Worm Farm Waste Systems, this liquid waste consists of predominantly water, with a minor component of worm castings (solids) and other organics generated during the treatment process and acts as a beneficial natural liquid fertiliser.

ERM considers there to be a low risk of the system generating contamination that may impact the AWRC plant site. The *Environmental Guidelines: Use of Effluent by Irrigation* (NSW Department of Environment and Conservation, 2004) states that treated effluent from municipal sewage treatment plants is likely to be “low strength” in relation to constituents such as total nitrogen, total phosphorus, biological oxygen demand (BOD), total dissolved solids (TDS), other pollutants (e.g. metals and pesticides) and grease and oil. The effluent from this septic system is also expected to be similarly low risk.

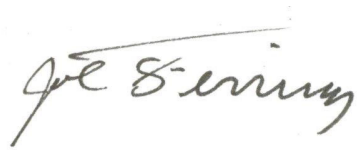
Once the AWRC plant site construction program is complete, the septic system (septic tank, pipework and land application trenches) will be decommissioned and removed from the AWRC plant site. It is expected that there will be a small volume of residual solids within the septic tank which will require classification and off-site disposal to a suitably licensed waste facility.

This residual solid waste is proposed to be sampled and classified in accordance with *Environmental Guidelines: Use and Disposal of Biosolids Products* (NSW EPA, 2000), with the results and final classification presented within a waste classification letter which will be provided to the Auditor.

4. CLOSING

This letter is intended to provide additional information on the septic system proposed to be constructed and operated by John Holland at the AWRC plant site. Please contact the undersigned should you wish to discuss anything further.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Joe Ferring'.

Joe Ferring
Principal Environmental Scientist

A handwritten signature in blue ink, appearing to be a stylized 'I' followed by a large 'B'.

Ian Batterley
Partner

ATTACHMENT A REPRESENTATIVE SITE DIAGRAMS

A&A Worm Farm Waste Systems
03-5979 1887
AS CONSTRUCTED LAYOUT FOR:



CLIENT:

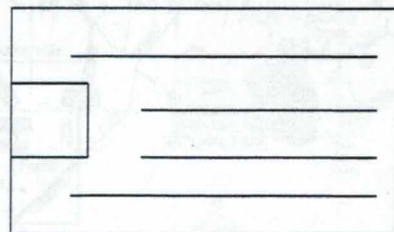
ADDRESS:

COUNCIL:

DATE:



Worm Farm Waste System

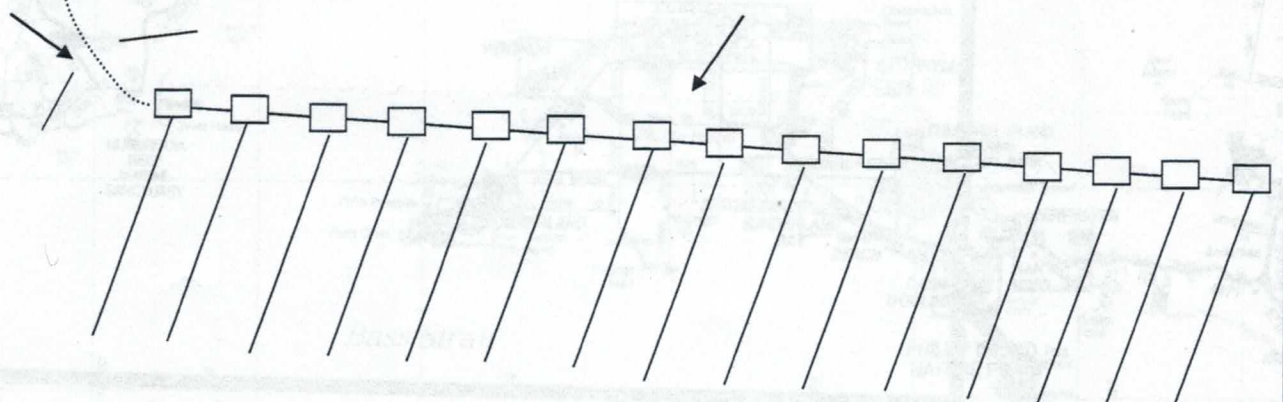


500m Pump Line



Gate

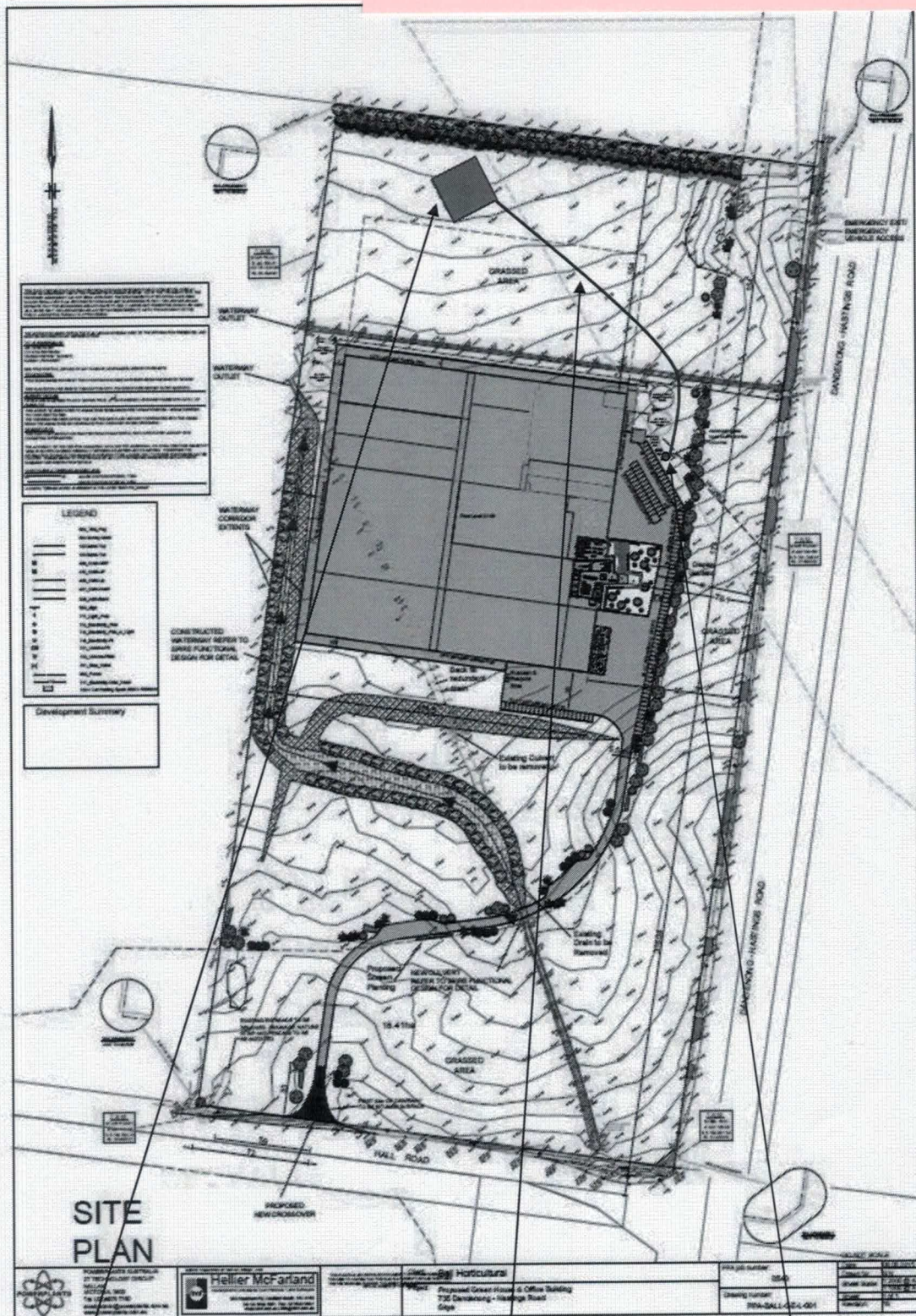
432m ReIn





Effluent dispersal area
350m² subsurface drip
irrigation.
Installed on contour.

A&A Worm Farm Waste System
Poly pipe - 32mm poly pipe



ect to this
age application.

Proposed Cyclone Mesh Fence

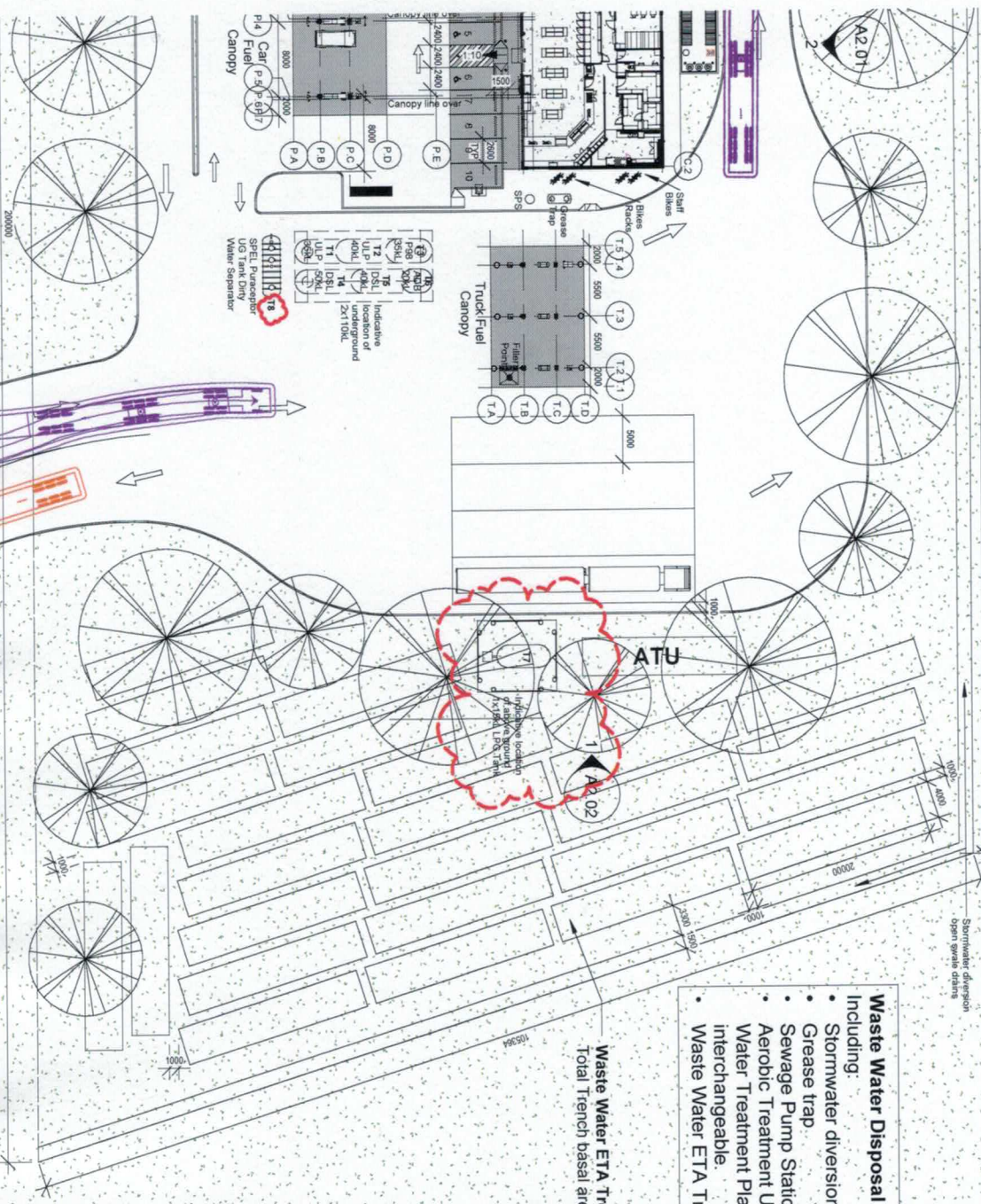
111235

Stormwater diversion
open swale drains

Waste Water Disposal System (WWDS)
Including:

- Stormwater diversion drains
- Grease trap
- Sewage Pump Station (SPS)
- Aerobic Treatment Unit (ATU) / WWTP (Waste Water Treatment Plant). These descriptions are interchangeable.
- Waste Water ETA Trenches

Waste Water ETA Trenches
Total Trench basal area: 2080m²



ATTACHMENT B REPRESENTATIVE PHOTOGRAPHS











From: Sara Arthur <sarthur@jbsg.com.au>

Sent: Monday, May 15, 2023 11:34 AM

To: Alyce Harrington-JHG <Alyce.Harrington@jhg.com.au>; Andrew Lau <ALau@jbsg.com.au>; Sara Arthur

<sarthur@jbsg.com.au>

Cc: CAHILL, CHERYL <CHERYL.CAHILL@sydneywater.com.au>; Cameron Varricchio

<CAMERON.VARRICCHIO@sydneywater.com.au>; Mark Trethewy-JHG

<Mark.Trethewy@jhg.com.au>; Jeremy

Cadzow-JHG <Jeremy.Cadzow@jhg.com.au>; Brad Johnstone-JHG <Brad.Johnstone@jhg.com.au>;

Darragh O'Brien-

JHG <Darragh.O'Brien@jhg.com.au>; Joseph Ferring <Joseph.Ferring@erm.com>; Ian Batterley

<Ian.Batterley@erm.com>

Subject: RE: USC AWRC - additional information re proposed septic system

Hi Alyce,

Thank you for the letter regarding the proposed Worm Farm Septic System at USC AWRC from ERM, dated 10 May 2023.

Andrew has considered the information and considers that the use of the Worm Farm Septic System appears to be an initiative worth pursuing provided that it is for human waste only and doesn't process other material such as vehicle washdown or materials arising from industrial processes. The area where the biosolids are received will need to be assessed in accordance with the requirements of the *Environmental Guidelines: Use and Disposal of Biosolids Products*, NSW EPA, 2000.

If you have any queries, please contact myself on 0425 287 451 or Andrew on 0412 512 614.

Kind Regards,

Sara

Dr Sara Arthur | Principal | JBS&G

Gadigal Country | Level 1, 50 Margaret St, Sydney, NSW

T: 02 8245 0300 | M: 0425 287 451 | E: sarthur@jbsg.com.au | W: jbsg.com.au | L: [Conditions and Limitations](#)

From: Alyce Harrington-JHG <Alyce.Harrington@jhg.com.au>
Sent: Wednesday, 10 May 2023 5:46 PM
To: Andrew Lau <ALau@jbsg.com.au>; Sara Arthur <sarthur@jbsg.com.au>
Cc: CAHILL, CHERYL <CHERYL.CAHILL@sydneywater.com.au>; Cameron Varricchio <CAMERON.VARRICCHIO@sydneywater.com.au>; Mark Trethewy-JHG <Mark.Trethewy@jhg.com.au>; Jeremy Cadzow-JHG <Jeremy.Cadzow@jhg.com.au>; Brad Johnstone-JHG <Brad.Johnstone@jhg.com.au>; Darragh O'Brien-JHG <Darragh.O'Brien@jhg.com.au>; Joseph Ferring <Joseph.Ferring@erm.com>; Ian Batterley <Ian.Batterley@erm.com>
Subject: USC AWRC - additional information re proposed septic system

*****[EXTERNAL EMAIL]** Stop and think before opening attachments, clicking or responding.***

Good evening Andrew and Sara,

For your information and review, please see attached letter prepared by ERM on behalf of John Holland for the Upper South Creek project. The purpose of the letter is to provide additional information on the septic system proposed to be constructed and operated by John Holland at the AWRC plant site in Kemps Creek, NSW.

John Holland would welcome any further discussion on the matter during this Friday's project meeting to be held over Microsoft Teams at 2pm.

Kind Regards,

Alyce Harrington
Planning, Environment & Approvals Director
Upper South Creek

Level 3, 65 Pirrama Road, Pyrmont NSW

M. +61 409 633 908

E. Alyce.Harrington@jhg.com.au

Make flexibility work – if you receive an email from me outside of normal business hours, it's because I'm sending it at a time that suits me. I'm not expecting you to read it or reply until normal business hours.