West Nowra Recycling and Waste Facility

Proposed Stage 4 Landfill Extension
Landfill Master Plan

Prepared for:

Shoalhaven City Council
36 Bridge Street
Nowra NSW 2541

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PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street
Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
T: +61 2 9427 8100
E: sydney@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Shoalhaven City Council (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.15781.00000-R03-v1.1	15 January 2019	I-Hui Wuang	Sarah Kill	John Postlethwaite
610.15781.00000-R03-v1.0	13 December 2018	Danielle O'Toole	Sarah Kill	John Postlethwaite

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1 Introduction

The West Nowra Recycling and Waste Facility (the Facility) is the primary solid waste landfill that services the Shoalhaven Local Government Area (LGA), and it is located at 120 Flatrock Road, Mundamia, approximately 4.5km west of Nowra.

The Facility is operated by Shoalhaven City Council (Council) and currently receives waste from nine waste transfer stations and a domestic waste collections service, as well as public and commercial drop-off direct to the Facility. The Facility is the only one licensed to accept both general solid waste (putrescible and non-putrescible) in the Shoalhaven LGA, and its location is shown in **Figure 1.**

The existing Stage 3 of the landfill cells is anticipated to be nearing capacity in the next 10 years.

Review of options by Council indicated that it is preferable to extend the landfill at the existing site, rather than develop a new landfill site (Locale Consulting, July 2015).

This Landfill Master Plan has been prepared by SLR Consulting Australia Pty Ltd (SLR) for the development and operation of the landfill extension (Stage 4) works. This Master Plan document describes the proposed development and provides a basis for ongoing consultation within Council and with other Government Agencies, the community and any potential industry partners.

The Master Plan references earlier planning work and current technical assessments and recent consultation activities. All relevant technical studies, previous and current, are listed in Section 11 of this document.

The remainder of the Master Plan is structured as follows:

- Section 2: Context for Project
- Section 3: Site Description and Location
- Section 4: Site constraints
- Section 5: Consultation
- Section 6: Facility Definition
- Section 7: Conceptual Master Plan Layout
- Section 8: Operations
- Section 9: Closure and Rehabilitation

The following Master Plan drawings are provided:

- Site layout plan (no aerial photo)
- Site layout plan

2 Context for Project

The Facility is the primary solid waste landfill that services the Shoalhaven LGA and currently receives waste from nine waste transfer stations and a domestic waste collections service, as well as public and commercial drop-off direct to the Facility. The Facility is the only one licensed to accept both general solid waste (putrescible and non-putrescible) in the Shoalhaven LGA.

At present, the existing landfill areas (Stages 2 and 3) have a projected capacity of approximately 10 years, necessitating the development of additional landfill space at the existing site or a new landfill site.

Council commissioned a study to identify a long-term waste management strategy to service the needs of the Shoalhaven LGA into the future. The study, conducted by Locale Consulting, identified that Council should consider two options for future waste management:

- Development of a new landfill at a new site, which would likely be constrained by long lead times to commission (due to studies and environmental approvals required to complete site selection, approval and construction); and
- Identifying a strategy to extend the operational life of the existing West Nowra Facility to significantly extend the landfill life expectancy.

Council adopted a strategy to establish the existing West Nowra Facility as the core waste management facility for the Shoalhaven LGA. The strategy involves extending the projected landfill life expectancy of the Facility, comprising the development of a Resource Recovery Plant (RRP) (to reduce the volume of waste requiring disposal to landfill), and an extension to the existing landfill (identified as Stage 4 Extension). The landfill extension, in isolation from the proposed RRP, is anticipated to extend the operational life of the landfill by approximately six years, to 2030. Combined with the RRP, the waste management strategy is anticipated to cater for waste management in the LGA to approximately 2040.

The key drivers for the Stage 4 landfill extension and overall strategy adopted by Council are outlined as follows:

- Minimise the potential social and environmental impacts that may arise from waste management activities in the Shoalhaven LGA by centralising all facilities at a single location;
- Reduce waste transportation and associated heavy vehicle transport movements by centralisation of waste management activities at a single location;
- Maximise the use of existing infrastructure and value of land already zoned for waste management;
- Reduce as far as practicable, Council's environmental liability on lands associated with landfill / resource recovery, by centralising operations on a single site.

The principal environmental planning instrument applying to properties in the Shoalhaven LGA is the SCC *Shoalhaven Local Environmental Plan 2014 (SLEP 2014).* The land on which the Facility is situated is currently zoned Special Purpose 2 Infrastructure (SP2), annotated for "Waste / Resource Management Facilities".

However, despite the subject land being appropriately zoned for Waste Management (SP2) under the Shoalhaven LEP 2014, the *State Environmental Planning Policy (State and Regional Development) 2011*, also applies.

Both the Stage 4 Landfill Extension and the RRP projects were designated as State Significant Development by the *State Environmental Planning Policy (State and Regional Development) 2011,* because they triggered development of a type listed in Schedule 1, item 23 of the State and Regional Development SEPP, specifically being consistent with item 23 – *"Waste and resource management facilities*, *where by the project is consistent with the following definition:*

> *(1) Development for the purpose of regional putrescible landfills or an extension to a regional putrescible landfill that:*
>
> *(a) has a capacity to receive more than 75,000 tonnes per year of putrescible waste, or*
>
> *(b) has a capacity to receive more than 650,000 tonnes of putrescible waste over the life*
>
> *of the site…"*

The Stage 4 Landfill Extension and RRP projects were referred separately for Secretary's Environmental Assessment Requirements (SEARs) to support EIS development and were assigned separated State Significant Development references as follows:

- Stage 4 Landfill Extension – State Significant Development (SSD) Reference SSD 15_7187; and
- Resource Recovery Park – State Significant Development (SSD) Reference SSD 15_7015.

This Landfill Master Plan relates only to the Stage 4 Landfill Extension project for the Facility, and excludes the RRP.

Additional works completed by SLR for the Stage 4 Landfill Extension project, under separate cover include:

- Landfill Environmental Management Plan; and
- Concept Design for the Stage 4 Landfill Extension.

In addition, an Environmental Impact Statement (EIS) for the Stage 4 Landfill Extension for the Facility is under preparation by Arcadis, again under separate cover.

3 Site Location and Description

The Facility is located at the northern end of Flatrock Road, Mundamia (**Figure 1**), approximately 4.5 km to the west of the main township of Nowra. The Facility covers an area of approximately 65 ha, owned by Council, who also operate and manage the Facility, whilst the area proposed for the Stage 4 Extension comprises approximately 14.5 ha of undeveloped land (including land set aside for environmental offsets and buffers).

The Facility is bordered to the south and south-east by rural residential properties, with the closest legal resident being approximately 100m from the sites southern boundary. Other surrounding land is predominantly undeveloped bushland, including the Bamarang Nature Reserve, and other land zoned for conservation / environmental purposes.

The Shoalhaven Campus of the University of Wollongong is located approximately 1.3 km to the southeast. The Office of Environment and Heritage (OEH) Nowra Area Office and Depot is located immediately to the east of the site, along with the former (now closed) Council operated animal shelter site which is now proposed for a Resource Recovery Park (SSD 15_7015).

Operationally, the Facility is divided into several stages (**Figure 2**):

- Stage 1: “Old” unlined landfill, stockpile and irrigation areas, and landfill gas extraction comprising the northern portion of the Facility;
- Stage 2: Completed lined landfill areas, now used for stockpiling and landfill gas extraction;
- Stage 3: Active lined landfilling of solid waste and wet weather tipping areas, and future landfill gas extraction area; and
- Stage 4: Proposed lined landfilling areas for solid waste, and future landfill gas extraction.

Figure 1 Site Location Plan

Stages 1, 2 and 3 of the Facility are located on the western side of a ridge line with Stage 4 on the eastern side of the ridge. The Facility is drained by two tributary creeks: Sandy Creek, to the west of the Facility, and Cabbage Tree Creek, to the east of the Facility.

Details of land parcels, zoning and zoned land use applicable to the Facility are summarised in **Table 1**.

Table 1 Property Details and Land Use

Lot No.	DP No.	Area (ha)	Zone and zoned land use	Tenure Status	Address
436	808415	8.29	SP2 Waste / Resource Management Facilities	Freehold	Flatrock Road, Mundania, NSW
1	1018193	13.04	SP2 Waste / Resource Management Facilities	Freehold	Flatrock Road, Mundania, NSW
1	847203	8.96	SP2 Waste / Resource Management Facilities	Freehold	Flatrock Road, Mundania, NSW
1	870268	20.33	SP2 Waste / Resource Management Facilities	Freehold	Flatrock Road, Mundania, NSW
1	1104402	14.52	SP2 Waste / Resource Management Facilities	Freehold	Flatrock Road, Mundania, NSW

Source: Areas: https://maps.six.nsw.gov.au/; Zone and zoned land use: Shoalhaven Local Environmental Plan 2014 Land Zoning Map – Sheet LZN_013B (Map identification number 6950_COM_LZN_013B_020_20140129.

The proposed Stage 4 landfill extension area is located on Lot 1 DP 1104402, east of the Stage 2 (Lot 1 DP 847203) and Stage 3 (Lot 1 DP 870268) footprints, as can be seen in Figure 2.

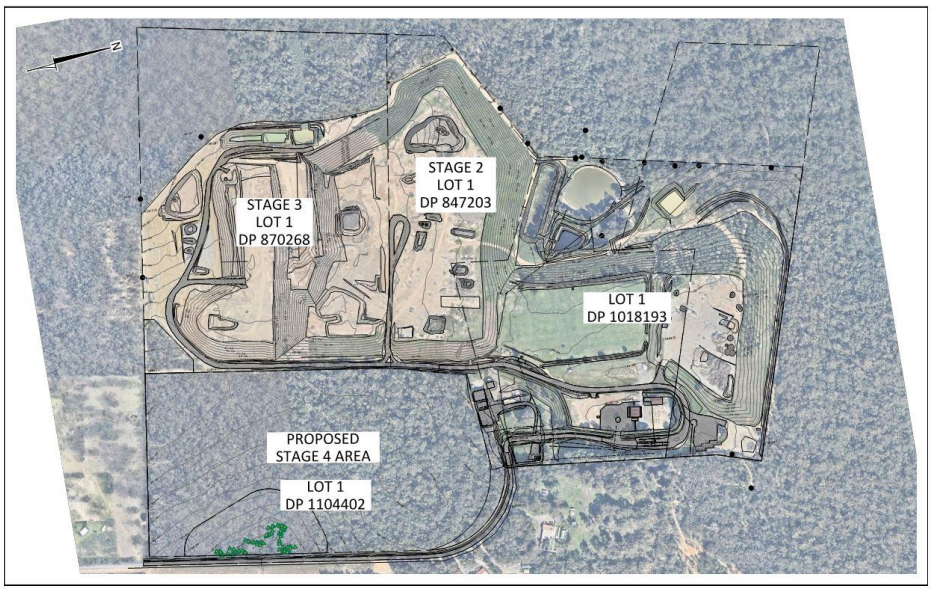

Figure 2 Current Site Layout

As part of the EIS for the Stage 4 Landfill Extension, SCC is applying for a variation to the conditions of existing EPL Number 5877 to support the operational management of the landfill extension area.

The footprint of the proposed Stage 4 Landfill Extension (the Proposal) is limited by a number of existing features, including existing Facility infrastructure, environmental conservation areas and a residential buffer zone.

Key characteristics of the Facility site and surrounds include the following:

- Land use - Rural residential land use to the south and south east.
- Vegetation -
    - Surrounded to the north, east, south and west by bushland;
    - Local drainage depression positioned in the south-east of the site contains vegetation community of conservation significance (*Nowra Heath Myrtle*) which requires poorly drained or periodically waterlogged soils.
- Drainage - 1.5 km south and 2.5 km east of the Shoalhaven River, catchment drained primarily by Cabbage Tree Creek, which flows northward to the Shoalhaven River, and secondly by Sandy Creek, also flowing north to the Shoalhaven River.
- Topography - Stage 4 located on the eastern side of a ridge line, and is predominantly flat.
- Transport - Serviced by close proximity to the Princes Highway.
- Existing site infrastructure, which can be utilised by the Stage 4 landfill extension, includes leachate management facilities, landfill gas extraction and management infrastructure.

4 Site Constraints

A number of technical studies and reports have been reviewed to inform the Landfill Master Plan, and these include

- Threatened Biodiversity Survey & Assessment, (Hyder Consulting, June, 2007)
- Geotechnical & Hydrogeological Investigation, (Coffey Geotechnics Pty Ltd, July 2016)
- Consultation Plan, (Shoalhaven City Council, 2015)
- State Significant Development Application Supporting Document, Proposed extension to existing landfill, West Nowra Recycling & Waste Facility, (Locale Consulting, July 2015)
- Pollution Incident Response Management Plan (PIRMP) – West Nowra Waste & Recycling Facility (Shoalhaven City Council, February 2015)
- Leachate Potential & Water Balance Analysis, West Nowra Recycling & Waste Facility, (Environment & Natural Resource Solutions (ENRS), February 2012)
- Landscape Management Plan, Review of Landscape Maintenance, (Shoalhaven City Council, Roslyn Holmes, 2008)
- Heritage Assessment – will be addressed under the EIS for the project.
- Bushfire – will be addressed under the EIS for the project. Based on existing knowledge, and presence of fire prone vegetation around the site, (GHD Pty Ltd , January 2016) the site is assigned a High Risk classification for the purposes of this Landfill Master Plan and bushfire risk is considered as a key site constraint.
- Traffic Assessment - Roads and Maritime Services indicated in the SEARs for the EIS that the Proposal is not anticipated to cause impacts to traffic, but that the EIS should consider impact from traffic from construction of the Stage 4 Landfill Extension, which will be addressed in the EIS.

A number of site constraints of relevance to the Master Plan are summarised in **Table 2**.

Table 2 Summary of Environmental Constraints for Landfill Master Plan

Technical Study	Constraints Identified	Potential Impacts	Relevance to Masterplan and/or Design
Biodiversity	Riparian buffers	Potential impacts to water quality off-site	• Provision of buffers to avoid disturbance of riparian zones • Stormwater management measures to be developed in detailed design and environmental management plans. • Geometry of landfill footprint and maximum void space
	Triplarina nowraensis (Nowra Heath-Myrtle) communities	Potential impacts to biodiversity conservation	• Concept design to avoid disturbance of suitable habitat / create buffers • Stormwater management measures to be developed in detailed design and environmental management plans, and are to consider hydrology and drainage features required to support existing *Triplanaria* communities. • Geometry of landfill footprint and maximum void space.
		Reduced habitat connectivity and impacts to biodiversity distribution and abundance	• Create biodiversity corridors to retain habitat connectivity between bushland areas around the site and prevent habitat fragmentation
		Potential weed proliferation due to alteration of vegetation structure & introduction of weed material in compost / green waste / cover soils	• Weed control measures identified in Rehabilitation Plan to be developed in detailed design and environmental management plans • Weed hygiene measures to be identified in Operational Management Plans for site
Bushfire	Bushfire Hazard	Potential impact to landfill infrastructure area(s)	• Maintain managed separation to existing buildings • Provide 10 m wide fire break / fire access / service road around landfill and environmental controls areas • Provide access connections from boundary fire trails to internal access roads

Technical Study	Constraints Identified	Potential Impacts	Relevance to Masterplan and/or Design
	Bushfire Hazard	Potential impact to adjoining bush / conservation areas	• Provision of firebreaks and fire access tracks at site boundaries and around environmental / biodiversity buffer zones and site boundaries • Extension of existing fire trails to main road access points and provision of locked access gates • Environmental management plans (clearing & construction) to consider potential for fires during clearing
	Bushfire Hazard	Potential uncontrolled combustion of landfill gas emissions during bushfire	• Detailed design and operations plans to consider risk of bushfire relating to LFG flaring infrastructure / site and management infrastructure
	Bushfire Hazard	Asset Protection Zones (APZ)	• Detailed design to include APZ's for new infrastructure and design hazardous operation risk assessments (HAZOP) to identify infrastructure bushfire hazard and design considerations required to manage hazard.
	Bushfire Hazard	Potential uncontrolled combustion of unprocessed and processed green waste during bushfire	• Detailed design to identify suitable stockpile locations for green waste
Rural residential land use adjoining site	Neighbouring residential properties.	Noise, odour, vermin impacts to sensitive receptors	• Development of residential Buffer zones at Concept design, to be maintained in detailed design.
Soils	Stockpiling area	Inadequate stockpiling area for materials, resulting in sediment runoff or lack of beneficial reuse for materials	• Detailed design to quantify the quality and quantity of material on site available for capping and liner materials and identify appropriate stockpile locations and footprints for use throughout life of the facility
Hydrogeological Assessment	Landfill depth	Groundwater contamination	• Landfill design not required to incorporate under liner drainage system, based on known height of groundwater table. Additional hydrogeological analysis during detailed design to confirm groundwater levels from boreholes over longer term.

Technical Study	Constraints Identified	Potential Impacts	Relevance to Masterplan and/or Design
Cultural Heritage Assessment	Potential unidentified cultural heritage constraints	Impact to Aboriginal heritage item and/or delays in carrying out landfilling works	• Cultural heritage Study from Stage 4 Landfill Extension EIS to be considered in detailed design. Available information at Concept deign indicates no cultural heritage (indigenous or European) constraints.
Traffic Assessment	Number of accesses to property and configuration of existing accesses	Potential for queuing at site entry.	• Traffic Management Study from Stage 4 EIS recommendations to be considered in detailed design • Retain existing access points • Access configuration to be upgraded in line with standards if required.

5 Consultation

5.1 State Agency Consultations

Consultation with relevant state government agencies was also undertaken as part of the Secretary's Environmental Assessment Requirements (SEARs) for the Project. Key agency stakeholder requirements are summarised in **Table 3** below.

Table 3 Summary of SEARs Agency Consultation Feedback - State Significant Development SSD 15_7187

Agency	Requirement	Addressed
Department of Primary Industries	• All stormwater, septic & contaminated water contained on site • Asset Protection Zones (bushfire) on subject site not Crown Land	Concept design, detailed design LEMP EIS
Environment Protection Authority (EPA)	• Leachate & surface water runoff management • Noise • Odour • Dust	Concept design, detailed design LEMP EIS
Office of Environment & Heritage	• Biodiversity & offsets • Aboriginal cultural heritage • Historic heritage • Water and soils	EIS Biodiversity buffer zones incorporated into Concept design, detailed design LEMP
Road & Maritime Services	• Construction traffic impact on safety of surrounding road network to be assessed	EIS

Additional consultation was undertaken with the EPA to negotiate a variation to the existing Environmental Protection License (EPL) to incorporate the Stage 4 footprint and activities within the scope of the existing EPL, and this resulted in an agreement to vary the existing EPL, and associated supporting documentation.

5.2 Community Consultation

Community consultation was undertaken by Council, as detailed in the Consultation Plan (Shoalhaven City Council, 2015).

Issues raised by community stakeholders are summarised below:

- Resident Bamarang – litter, leachate, noise, smell, impacts to flora and fauna.
- Resident Kettlewel - West Nowra – traffic.
- Business Owner – Nowra – positive support for the proposal.

All community consultation issues will be addressed during the EIS process, and Council responded to all stakeholders directly in writing, to notify them how their concerns would be addressed.

6 Facility Definition

6.1 Overview

Landfilling and waste management activities have been conducted at the West Nowra site since 1979.

No significant changes to the existing site operations, uses, and areas are considered likely as a result of the Stage 4 Landfill Extension, which will provide additional landfill void space to the overall landfill footprint, and hence extend the life expectancy of the landfilling operations.

Ongoing activities comprise the following:

Site support facilities

- Entry and exit
- Site office for administration;
- Carpark;
- Staff amenity building;
- Plant and equipment shed – for equipment maintenance and storage; and
- Storage sheds for equipment.

Waste processing areas

- Weighbridges and gatehouse ;
- Transfer Station;
- Tyres collection area;
- Non-ferrous collection area;
- Green waste stockpile and processing area;
- Steel waste stockpiles and processing area;
- Construction & demolition waste stockpile area;
- Virgin Excavated Natural Material (VENM) stockpile area;
- Pavement materials stockpile area;
- Cathode Ray Tube (CRT) Waste Cell;
- Recycling shed, and sorting and collection area;
- Buyback shed; and
- Active landfill and wet weather disposal areas.

Environmental management infrastructure

- Landfill gas management infrastructure (generator and flare);

- Wash down bay
- Site water management infrastructure (sediment, leachate collection and disposal, and first flush capture dams);
- Irrigation area;
- Environmental buffer zones for biodiversity conservation;
- Residential buffer zones to protect amenity for nearby residential land use; and
- Fire access trails / firebreaks, Asset Protection Zones (APZ's).

6.2 Site Operations – Continued Uses

Detailed information regarding continued uses on site, and operational intensity is provided below.

6.2.1 Site Support Facilities

Entry / Exit

- Entrance and exit to and from the West Nowra Recycling and Waste Facility, Flatrock Road, Mundamia.
- Operating hours: 8am to 5pm – Monday to Sunday, closed public holidays except Easter Monday).

Site Office

- Supervisor and Administrative staff.
- Lunch room facilities.
- Number of staff: 4.

Carpark

- Car parking spaces for Site Office and Operational staff.
- Number of car park spaces: 12.

Staff Amenity Building

- Operational staff.
- Lunch room and sanitary facilities.
- Number of staff: 14.

Plant and Equipment Shed

- Operational staff.
- Storage of site equipment.
- Provision of site plant maintenance.

Storage Shed

- Operational staff.

- Storage of site equipment.

6.2.2 Waste Processing Areas

Weighbridges and Gatehouse

- In and out, 2 x 18m long concrete structure weighbridges.
- Gatehouse and weighbridge attendant.
- Small and heavy vehicle customers with waste materials must use the weighbridges.
- Signboard advice to all customers of fees and charges for each waste material type.
- All customers are asked of waste material type to be disposed and loads are inspected via the use of CCTV.
- All customers are directed to the appropriate waste disposal areas (only heavy vehicles are directed to the active landfill disposal area) on the way in.
- All customers are charged the appropriate fee for disposed waste material on the way out, except for steel waste which is free of charge.
- Outgoing recyclable materials (steel, processed green waste, etc.) are weighed on the way out.
- Number of weighbridge attendants: 1.

Transfer Station Area

- For use by small vehicle customers only, from municipal sources, with mixed municipal waste, after they have been weighed in over the weighbridge and charged on the way out.
- Mattresses and electronic wastes are collected in small bins, for recycling off-site.
- Waste deposited into a series of bays and bins.
- Available transfer bins are for mixed municipal waste and builders waste.
- Waste bins transferred, once full, to the appropriate disposal area, i.e.: active landfill disposal area.
- Number of transfer station attendants: 2.

Tyres Collection Area

- For use by small vehicle customers only, from municipal and commercial sources, with clean separated vehicle waste tyres, after they have been weighed in over the weighbridge and charged on the way out.
- Vehicle waste tyres deposited onto the ground and piled into manageable bundles.
- Vehicle waste tyres collected, by appropriately licenced recycler, and transported off site.
- Number of waste tyre attendants: 1/6 (or 0.167 of a person).

Non-Ferrous Collection Area

- For use by small vehicle customers, from municipal and commercial sources, only with clean separated non-ferrous materials, after they have been weighed in over the weighbridge at no charge.
- Non-ferrous materials deposited into aboveground bins.
- Non-ferrous materials collected, by appropriately licenced recycler, and transported off site.

- Number of non-ferrous attendants: 1/6 (or 0.167 of a person).

Green Waste Stockpile and Processing Area

- For use by small vehicle customers only, from municipal and commercial sources, with clean separated green wastes and untreated timbers, after they have been weighed in over the weighbridge and charged on the way out.
- Green waste deposited onto the ground and pushed up into stockpiles.
- Stockpiles maintained to manageable bundles and heights (maximum height of 3 m).
- Green waste and untreated timbers processed, by appropriately qualified and licenced contractor, into crude garden waste and woodchip materials.
- Crude garden waste placed in windrows and pasteurised prior to making available to municipal customers and commercial operators.
- Crude garden waste and woodchip materials collected free of charge by municipal customers, and sold to commercial operators.
- Crude garden waste and woodchip materials also used on site for batter rehabilitation purposes.
- Number of green waste attendants: 1/3 (or 0.33 of a person).

Steel Waste Stockpile and Processing Area

- For use by small vehicle customers, from municipal and commercial sources, only with clean separated steel waste including whitegoods, after they have been weighed in over the weighbridge at no charge.
- Steel waste deposited onto the ground and pushed up into stockpiles.
- Stockpiles maintained to manageable bundles and heights (maximum height of 3 m).
- Steel waste collected, by appropriately licenced recycler, and transported off site.
- Number of steel waste attendants: 1/3 (or 0.33 of a person).

Construction and Demolition Waste Stockpile Area

- For use by heavy vehicle customers, from construction and demolition sources, with clean separated brick, concrete and tiles, after they have been weighed in over the weighbridge and charged on the way out.
- Construction and demolition (C&D) waste deposited onto the ground and piled into manageable stockpiles.
- C&D waste used on site for the construction of hardstand areas.
- Number of C&D waste attendants: 1/4 (or 0.25 of a person).

VENM Stockpile Areas

- For use by heavy vehicle customers, from construction and demolition sources, with clean fill, after they have been weighed in over the weighbridge and charged on the way out.
- Also VENM material excavated on site and used for operational purposes, such as; daily cover, landfill cell clay base liner, etc.
- VENM deposited onto the ground and piled into manageable stockpiles (maximum height of 3 m).

- Number of VENM area attendants: 1/4 (or 0.25 of a person).

Pavement Materials Area

- For the stockpiling of recycled and virgin pavement materials, after they have been weighed in over the weighbridge at no charge.
- Recycled and virgin pavement materials deposited onto the ground and piled into manageable stockpiles.
- Pavement materials used in the construction and maintenance of internal roads and hardstand areas.
- Number of pavement materials area attendants: 1/4 (or 0.25 of a person).

Recycling sorting and collection area

- For use by small vehicle customers to drop off household recyclables.
- Number of staff at recycling area: 1
- Recycling shed for the drop-off and storage of recyclable materials, i.e.: polystyrene and any other recyclable materials.
- Recyclables deposited in front lift bins and receptacles.
- Area is before the weighbridge; hence customers do not need to pay to dispose of recyclables. Recycling of:
    - Paper / cardboard
    - Glass bottles
    - Aluminium / steel cans
    - Motor oil
    - Plastics and polystyrene and
    - Other recyclables

Buyback Area

- For use by small vehicle customers to drop off and buy resalable goods and items.
- Area is before the weighbridge hence customers do not need to pay to dispose of resalable goods and items.
- Includes a buyback shed for goods and items that need to be stored away from inclement weather conditions.
- Includes an outdoor area for goods and items that are not affected by weather conditions.
- Number of staff at buyback area: 1.

Active Landfill and Wet Weather Disposal Areas

- For the burial of mixed waste materials received from municipal, kerbside collection, construction and demolition sources (including waste materials deposited at the transfer station and internally transferred to this area).
- Only heavy vehicles permitted at the active landfill and wet weather disposal areas.

- Limited waste disposal area, and covered daily.
- Number of active landfill disposal area attendants: 3/2 (or 1.50 persons).

6.2.3 Environmental Management Infrastructure

Landfill Gas Generator

- Active landfill gas extraction of previously capped landfill cells.
- Electricity generation (back to the electricity grid).
- Owned by Council.
- Operated by Contractor.
- Maintained by Contractor's sub-contractor.

Landfill Gas Flare

- Operated during maintenance of landfill gas generator.
- Owned by Council.
- Operated by Contractor.
- Maintained by Contractor's sub-contractor.

Wash Down Bay

- Heavy vehicle wheel wash (for use by staff and customers).
- No tracking of mud off site (EPL condition).
- Concrete slab on ground.

6.3 Site Operations – Proposed Stage 4 Landfill Extension

No significant changes are proposed to the current operation as part of the Stage 4 Landfill Extension, which will add additional void capacity and extend landfill life expectancy, but not an increase in the intensity or nature of the current operations.

7 Conceptual Masterplan Layout

7.1 Overview

No significant changes are proposed to the Facility's operation as part of the Proposed Stage 4 Landfill Extension to the operation. The Facility will remain operationally similar, with the primary change being that the disturbance footprint of the Facility will be extended to the east of the existing disturbance footprint. The extension to the footprint is shown in red on **Figure 3** and will consist of six (6) staged landfill cells, developed progressively.

Entry to Facility is located on the eastern boundary of the site, off Flatrock Road, and will not be altered for incoming and outgoing traffic.

The landfill is bounded on the eastern and southern sides by biodiversity corridors, and in the south-east corner by a residential buffer zone, with a conservation area set aside on the eastern boundary of the proposed Stage 4 Landfill Extension.

A sedimentation dam, leachate collection dam, first flush dam, and irrigation area are situated on the north-western corner of the Facility, within the footprint of the closed Stage 1 landfill cells. There is another sedimentation dam associated with the Stage 3 landfill. It is anticipated that the existing leachate management infrastructure will be adequate to service the Stage 4 Landfill. However, it is proposed to develop a new leachate irrigation area over the existing closed Stage 2 landfill. Once established, the existing irrigation area located over the previous Stage 1 area will be decommissioned. Additional sedimentation dams are proposed for management of surface water within the Stage 4 landfill extension.

Landfill gas extraction and flaring infrastructure are situated to the west of the Facility entrance / exit, and it is proposed that there will be no alteration to the Landfill Gas Management infrastructure, pending confirmation during detailed design of the Stage 4 Landfill Extension, that the existing infrastructure has sufficient capacity to handle the quantity of landfill gas (LFG) expected to be generated by the Proposal.
Waste management infrastructure is predominantly located across the surface of the Facility, on closed and capped landfill cells of earlier stages of the Facility, and includes VENM stockpile areas, pavement material stockpile areas, construction and demolition waste areas, green waste processing areas, other recycling infrastructure for tyres, metal, non-ferrous metals, and buyback areas, as described in detail in Section 6.2**.** It is noted that existing stockpiles either have been or will be re-located prior to establishment of the Stage 4 leachate irrigation area.

The Master Plan is shown schematically in **Figure 3**.

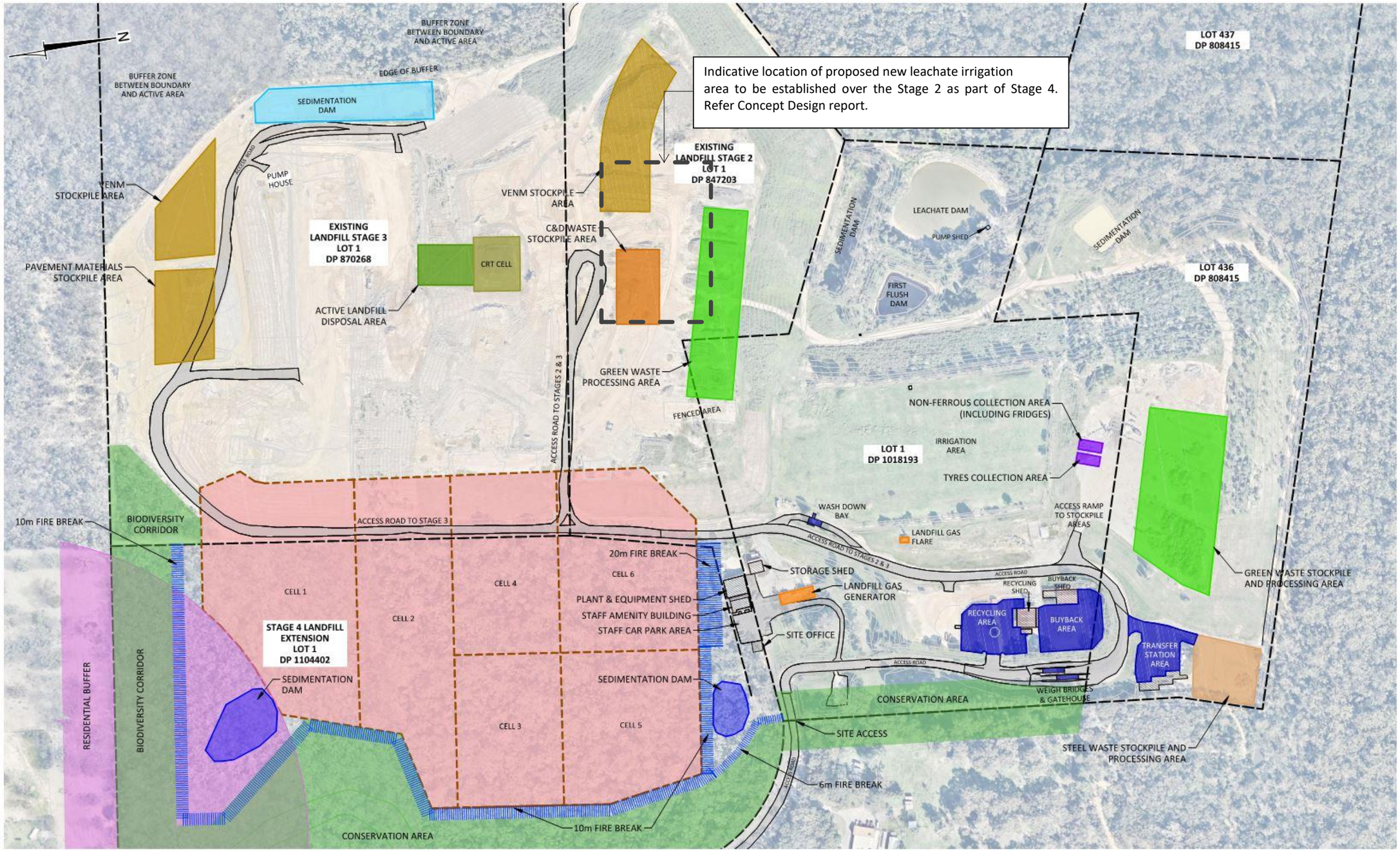

Figure 3 Master Plan and Infrastructure Layout

7.2 Stage 4 Landfill Extension Design

The landfill design has been undertaken in accordance with NSW EPA Environmental Guidelines for Solid Waste Landfills 2016 (NSW EPA Guidelines (2016)).

Stages 1, 2 and 3 of the landfill are at the operational stage, and no change is proposed to methods for waste emplacement, groundwater, landfill gas generation, and stormwater as part of Stage 4 extensions. It is proposed to establish a new leachate irrigation disposal area over the existing Stage 2 area (no longer operational). The proposed irrigation are will manage the combined leachate generation for the existing Stages1, 2 and 3 as well as Stage 4. The proposed irrigation area and process is outlined in the Concept Design Report.

The Proposed Stage 4 Landfill Extension is at the Concept Design stage, and Detailed Design is to follow. Full details of the Concept Design are contained in SLR Report Number 610.15781-R01-V1.1 January 2019. For the purposes of the Master Plan, the key components of the landfill are described in Table 4; however individual parameters may change in response to the iterative design process.

Table 4 Key elements of the landfill design

Element	Description
Landfill siting	An extension to the existing landfill site is proposed to avoid development of a new landfill site, and associated environmental liability, engineering and management controls. It enables utilisation of existing engineering and management controls in place at the Facility (i.e. avoids duplication).
Geometry/ Footprint	Development of the geometry of the extension footprint to maximise void space and landfill life expectancy whilst considering safe construction and operation. Site specific constraints for the facility considered at concept design stage, and to be considered in detailed design to achieve the design objectives, are: • Western boundary – existing Stages 2 and 3. Existing access road to be maintained for Stage 4, and be incorporated into Stage 4 footprint at end of life. • Northern boundary – the existing waste transfer station. • Eastern boundary – a biodiversity corridor to maintain habitat connectivity, plus an environmental conservation area set aside for *Triplarina Nowraensis* vegetation. A 10m fire break (asset protection zone, APZ) has also been included which allows for the construction of an access / service road for bushfire hazard management and response. • Southern boundary – Residential buffer zone in compliance with NSW EPA Guidelines (2016).
Side slope geometry and stability	Excavated side wall geometry angle of 1V:2H is proposed. Open excavation areas will be covered with lining system (see below), which will provide added slope stability and protection of slopes from erosion. Side slope batter slope angle has been determined utilising the ground conditions provided in Coffey's May 2016 geotechnical investigation. If ground conditions vary significantly from the conditions described in these boreholes, re-evaluation of side slope angle may be required, (for example, if a layer of loose sand is found upon excavation).

Element	Description
Lining system	The lining system is to comprise (from base upwards): • 200 mm compacted subgrade; • 1,000 mm compacted clay liner (CCL) or alternatively a geosynthetic clay liner (GCL); • 2.0 mm thick smooth HDPE flexible membrane overlain by a protective geotextile layer; and • 300 mm leachate drainage layer overlain by a separation (filter) geotextile layer.
Groundwater management	The landfill cells are to be formed by excavating to a subgrade level that ensures a minimum of 2m separation from the base of the waste (top of lining system, i.e. top of the leachate drainage layer) to the groundwater table. The groundwater table varies across the site, with an apparent divide approximately one third of the way between the north and south of the available extension footprint area. Based on the piezometer data available to date it is apparent that the average water table level can be defined as follows: • South – average of 41.5mAHD (approximately 9.5m below ground level) • North – average of 40.5mAHD (approximately 6.5 to 10.5m below ground level) In accordance with Victorian Guidelines, the base of the waste must be >2m above the average groundwater level, i.e. • South –43.5mAHD • North – 42.5mAHD The Stage 4 basal layer design has taken these levels into account. During the detailed design phase, groundwater levels across the site should be confirmed to be consistent with these constraints, and conduct Hydrogeological Risk Assessment (HRA) if design elevation contingencies are exceeded. Detailed design to include groundwater layer if HRA indicates necessity.
Material suitability CCL	The excavated clay material from site has been found in the past to be generally suitable for use, - in the CCL, and this has been confirmed by the recent Coffey field investigation results, which indicate the in-situ clay to be of low to moderate plasticity with a permeability of less than $1x10^{-9}$ m/s for the majority of the samples
Material suitability GCL	In the event that a permeability less than 1×10^{-9} m/s cannot be achieved using the on-site clays, then a geosynthetic clay liner (GCL) will be used as an alternative to the CCL to provide the necessary barrier requirement. The GCL permeability must be less than 1×10^{-11} m/sec.
Leachate collection layer	A minimum 300 mm thick layer of drainage aggregate with perforated (drilled holes or slotted) HDPE drainage pipes shall be placed to promote the flow of leachate under the waste and into the leachate collection system. A separation / filtration geotextile shall be placed over the leachate collection layer to minimise fines migration. The drainage aggregate shall be uniform, non-reactive aggregate with fines less than 1%, and particle size 20-50mm, with hydraulic conductivity greater than1×10^{-4} m/sec.

Element	Description
Leachate collection system	It is proposed to use the existing site leachate collection system. There is potential future connection to sewer, however this is not available at present. The Stage 4 leachate collection system to be graded at a minimum of 1% longitudinally into leachate collection sumps and 3% in the transverse direction. From the sumps, a series of inclined HDPE leachate extraction pipes shall be designed to draw leachate from the base of the landfill cell to the surface by a series of submersible pumps. Leachate collection pipes in each cell shall comprise a 200mm internal diameter (ID) spine drain with 150mm minimum ID spur drains placed at a maximum of 25m intervals. Leachate pipework inspection openings located between the access road and the south of Stages 2 and 3 to be cut back to subgrade and capped prior to construction of liner in this section of Stage 4 Landfill Extension. Pipe material to be chemically compatible with leachate and functional at elevated temperature consistent with landfill environment.
Leachate treatment	Leachate treatment, from Stages 1 to 4, will be spray irrigated overa new, adequately sized, irrigation area that will be established on the lined Stage 2 landfill area .
Surface water control	Existing surface water management infrastructure (first flush dam, sedimentation dams) to be maintained to ensure clean surface water runoff is intercepted and diverted from the landfill footprint prior to entering the waste mass and thus becoming leachate. Stormwater (rain) that falls directly onto the active landfill area is considered to be leachate, and will be managed as part of leachate collection and treatment system. Two sedimentation dams, one each to the north and south of the Stage 4 extension area are proposed. In addition, there will be erosion and sediment control structures such as surface diversion earthen bunds and swale drains around open excavations (unfilled) and active landfill cells. Stage 4 landfill extension to take place as 6 landfill cell sub-stages, minimising exposed soils and the potential for erosive effects.
Landfill gas controls	There is an existing LFG extraction system (generator and flare) operating at the Facility, which manages LFG generated from Stages 1 to 3. LFG generated from Stage 4 is expected to be managed by the existing system. Detailed design for stage 4 will establish the likely LFG generation and assess if the existing LFG extraction system has the ability and capacity to manage the additional LFG expected to be generated from Stage 4.
Final landform configuration	The Stage 4 final landform profile is in line with Stages 2 and 3. The maximum height of the final landform is to be approximately RL 59m at the western boundary of the Stage 4 landfill extension. As agreed with SCC, the maximum height has been established based on a slope of 1% falling from the highest point on Stages 2 and 3 (RL 61m) to Stage 4. The access road between Stages 2 and 3 and the Stage 4 landfill extension is to remain in place until final filling and closure.
Final Capping & rehabilitation	The proposed final landfill cap profile will typically comprise a 300 mm seal bearing layer over the disposed waste, with an overlying Geosynthetic Clay Liner (GCL), Low Density Polyethylene (LDPE) or an approved alternative, and then rehabilitation soil comprising 1,000 mm of topsoil and vegetation.

The landfill extension concept footprint is shown in Figure 4.

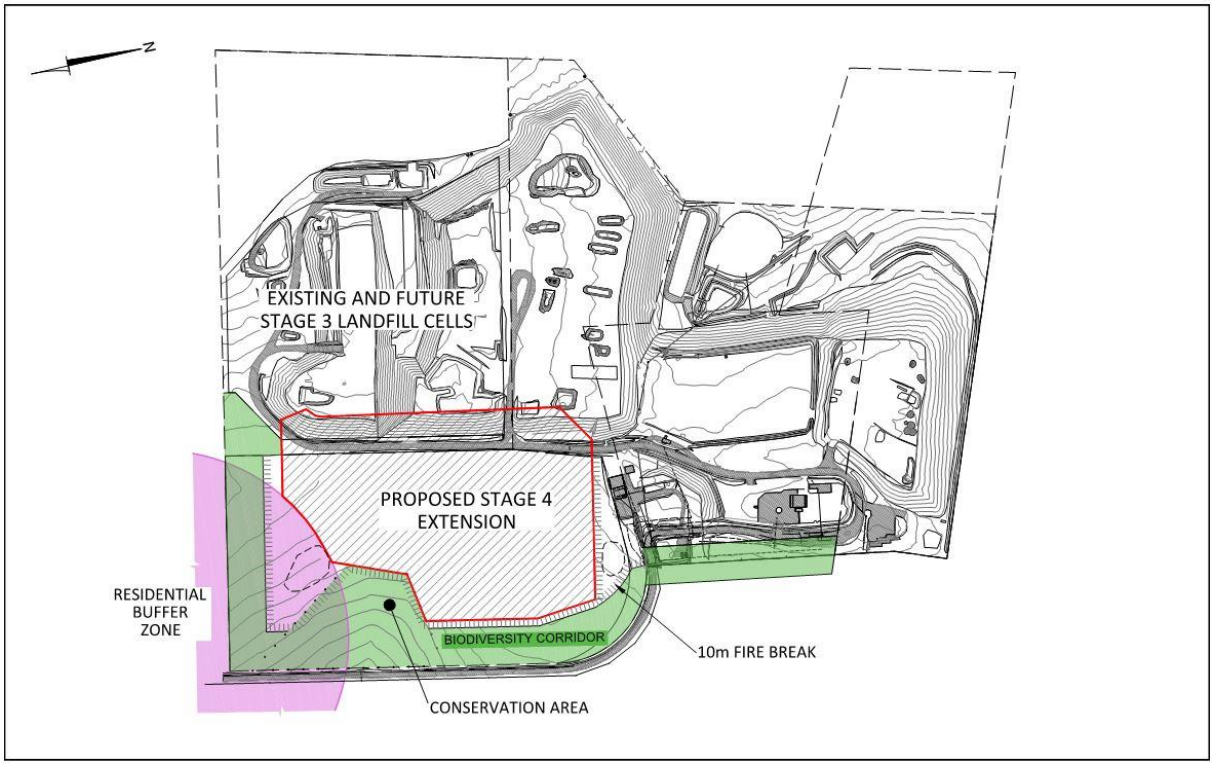

Figure 4: Proposed Stage 4 Landfill Extension Footprint Layout

It is proposed to develop the landfill extension in six landfill cell sub-stages, sequentially filled and moving from south (landfill cell 1) to north (landfill cell 6) with progressive side slope excavation and liner construction as required. Landfill cell 1 lies to the south of the groundwater divide and therefore will have an approximate subgrade base level of RL 43.5 m, while the remaining cells lie to the north of the divide and will have an approximate subgrade base level of RL 42.5m. The development will allow for a gradient drop between each cell to allow for leachate and surface water to be directed to (separate) low points progressively until landfill Cell 6.

The layout of the cells is shown in **Figure 5**.

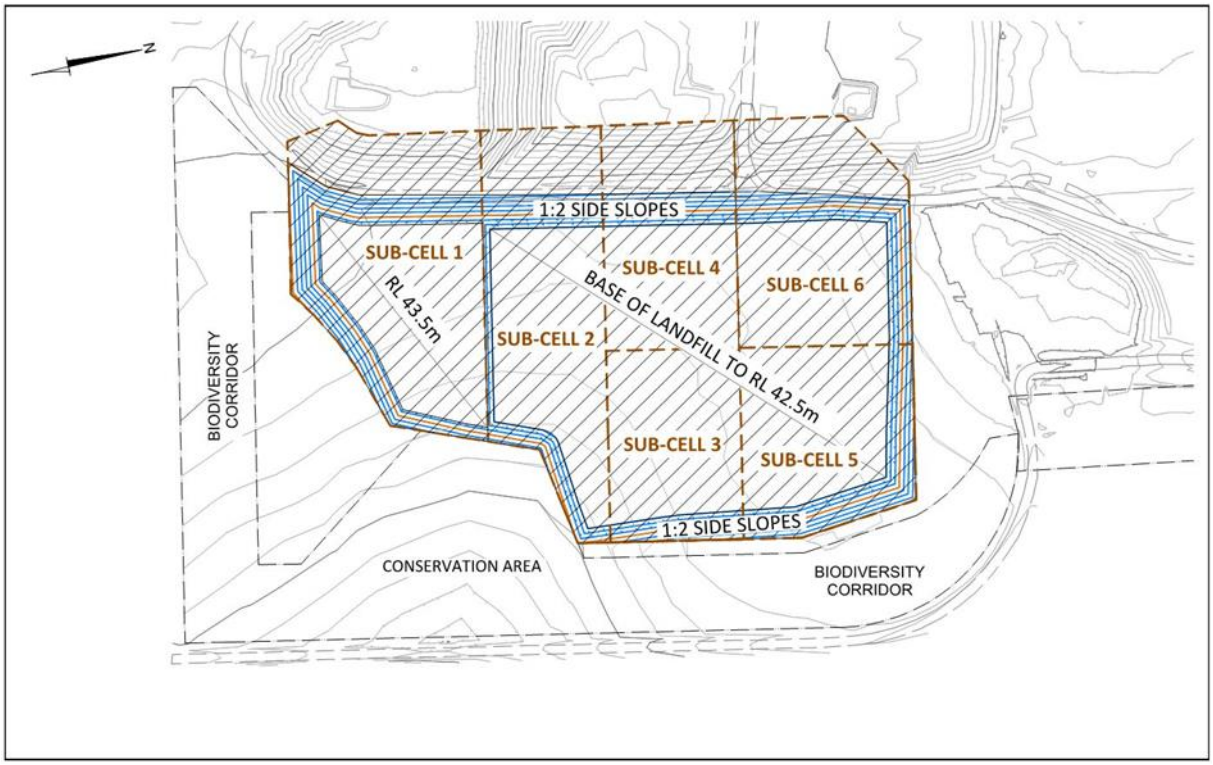

Figure 5: Proposed Stage 4 Landfill Cell Stages Layout

7.3 Landfill Filling Sequence

The waste landfilling sequence is to be developed from south to north in 6 cell sub stages. As each landfill cell stage is developed to nearing final waste filling design capacity, construction of an adjacent landfill cell stage shall commence. Access to each landfill cell stage is proposed via access ramps from road infrastructure between Stages 2 and 3, and Stage 4. These access ramps will be maintained until construction of each landfill cell stage is completed.

Earthen bunds shall be constructed between each landfill cell stage to provide stability while waste is placed in the active landfill cell, and to provide surface water management during construction. These bunds will incorporate a geomembrane liner overlap design with anchor trenches to ensure no continuity in the geomembrane is present and that there is minimal slippage of the liner when loaded.

Staging is shown in **Figure 6**.

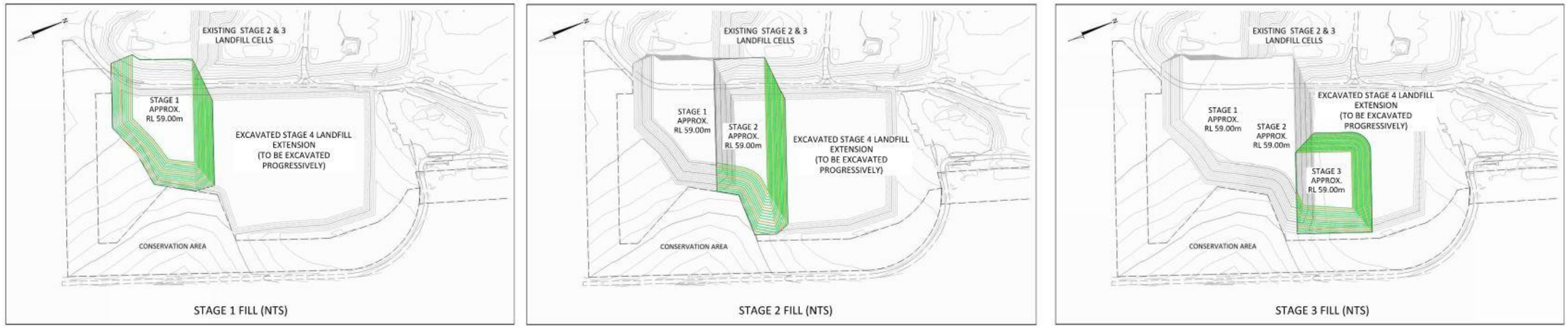

Figure 6: Stage 4 Landfill Filling Sequence Plan

7.4 Landfill Final Landform and Capacity

The Stage 4 landfill final landform can be found in **Figure 7**. The completed side batter slopes shall have a gradient no greater than (1V:3H) and the maximum height is approximately RL59m at the west boundary, which is equivalent to the maximum height on the Stage 3 development.

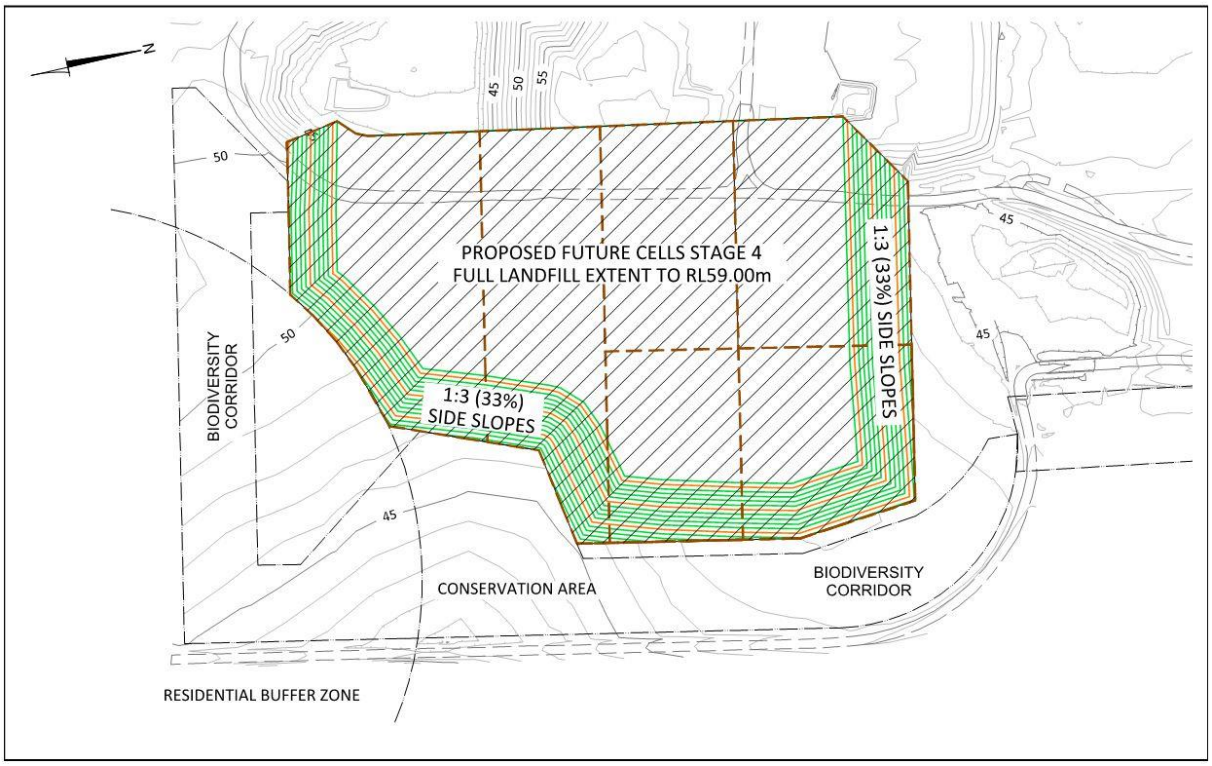

Figure 7: Proposed Stage 4 Final Landform

The final stage 4 landfill capacity will be approximately 1,385,600m^3 upon completion, at an approximate elevation of RL 59m.

8 General Operations

8.1 Environment Protection Licence

Environmental Protection Licences (EPLs) are issued under Section 55 of the Protection of the Environment Operations (POEO) Act 1997. Details of EPL Number 5877 for the Facility are shown in **Table 5**.

A copy of EPL Number 5877 is available on site.

Table 5 Environmental Protection Licence EPL 5877 details

Licence Number	**5877**
Anniversary Date	30 October
Review Period	Every 5 years
Licensee	Shoalhaven City Council PO Box 42 Nowra, NSW 2541
Premises	West Nowra Recycling and Waste Facility Flatrock Road Mundamia, NSW 2540
Scheduled Activity	Compositing Waste Disposal (application to land) Waste Processing (non-thermal treatment) Waste Storage
Fee Based Activity (and scale)	Composting (> 5,000 – 50,000 tonnes of organics received Non-thermal treatment of general waste (any tonnage treated) Waste disposal by application to land (any annual capacity) Waste storage – other types of waste (> 0 tonnes stored)
Region	Waste & Resources – Waste Management 59 – 61 Goulburn Street Sydney, NSW 2000 T: (02) 9995 5000 F: (02) 9995 5999 PO Box A290 Sydney South, NSW 1232

8.2 Waste Types

In accordance with the requirements of EPL Number 5877, the NSW EPA (2014) *Waste Classification Guidelines* (the *Waste Classification Guidelines)* and SCC policies, the Facility can accept the following types of waste:

- Mixed municipal waste (SCC kerbside collection and small vehicle/public drop off).
- Mixed commercial waste.
- Virgin Excavated Natural Material (VENM).

- Inert, construction and demolition waste (e.g. concrete, brick, tile and glass).
- Separated green and wood wastes.
- Tyres.
- Small household quantities of asbestos.
- Other solid wastes as defined as General Solid Waste in the *Waste Classification Guidelines* and permitted under the EPA guidelines or approved by the NSW EPA.

8.2.1 Hazardous Waste

The Facility is not licensed to accept hazardous waste.

8.2.2 Liquid Waste

The Facility is not licensed to accept any form of liquid waste.

8.2.3 Asbestos Waste

The Facility is licensed to accept asbestos waste.

SCC has, however, opted to receive only small household quantities of asbestos waste.

8.3 Site Access

The Facility is currently accessed from the northern end of Flatrock Road as shown in **Figure 1.**

8.4 Operating Hours

The Facility is open to the public from 8.00 am to 5.00 pm, Monday to Sunday. It is closed on public holidays except Easter Monday.

8.5 Site Security

During operating hours, the Flatrock Road main entrance gate is left open to the public. All other access gates to the Facility are not for public access and are locked at all times unless used by SCC staff for operational purposes.

Outside operating hours, the main entrance and other access gates will be locked and SCC will maintain the security of the site.

The Facility boundary is enclosed by a 2.1 m high security fence.

The gatehouse / weighbridge office will be locked outside operating hours.

Keys to gates and buildings will be kept only by necessary SCC site staff members.

The gates and surrounding fence areas will be inspected daily.

The boundary fence line will be inspected weekly and on an as needs basis, and maintained as required.

8.6 Health and Safety Procedures

SCC will take all necessary precautions to ensure the safety of all staff, contractors and visitors at the Facility.

SCC will provide and maintain first aid treatment facilities at the staff amenities facility, weighbridge office and landfill, and will have a trained first aid provider on site during operating hours.

SCC shall be familiar with, and able to readily carry out, its required duties in accordance with all relevant Workplace Health and Safety (WHS) SCC policies, regulations and guidelines.

SCC shall ensure all staff and contractors are informed of hazards at the Facility, are aware of their responsibilities with respect to relevant WHS regulations and guidelines and follow all applicable safe work procedures.

8.7 Wet Weather Operation

SCC will ensure that the landfill is able to accept permitted waste under all reasonable weather conditions without compromising the environmental management of the site.

Should SCC consider weather conditions will hinder effective environmental management of the site, no further waste will be accepted at the Facility until weather conditions become more favourable (with respect to environmental management of the site) or alternative environmental management measures are identified and implemented.

8.8 Access Roads

Temporary internal access roads will be maintained to provide effective access to operational areas within the Facility. These roads shall be constructed to a standard sufficient to support traffic of the vehicle(s) and/or mobile plant(s) with the greatest mass per unit area of its footprint.

Access roads shall be constructed to be wide enough for safe two-way movement of vehicles and mobile plant (i.e. width allowing for at least two lanes of traffic). A one-way circuit for traffic flow shall be established by SCC for access roads not wide enough to permit safe two-way movement of vehicles and mobile plant.

Access roads shall incorporate a physical barrier adjacent to slopes or embankments to ensure vehicles will not leave the road and deviate down any embankment.

A speed limit of 15 km/hr applies for all vehicles and moving plant within public areas of the Facility.

A speed limit of 40 km/hr applies for service vehicles and moving plant within restricted areas of the Facility.

8.9 Daily and Interim Cover Material

A stockpile of suitable material, for at least two weeks supply of waste cover, will be maintained adjacent to the active waste tipping area, and be readily available for use on a daily basis or when more frequently required. Stockpiles would not be located within 10 metres of a drainage line, including the landfill perimeter drains.

8.10 Leachate Management

The existing leachate collection system for Stages 2 and 3 involves diverting landfill generated leachate to a leachate collection dam. The leachate collected in the leachate dam is then treated by:

- spraying over the "irrigation area" (utilisation area EPA Identification No. 26 in EPL Number 5877), immediately north of Stage 2, and / or
- irrigation at tipping faces.

It is proposed to utilise the existing leachate management infrastructure for collection of Stage 4 leachate, however it is proposed to establish a new adequately sized irrigation area within the lined Stage 2 cell for leachate treatment. A water balance has been completed and modelling undertaken (SLR Concept Design, 2018) to determine monthly leachate volumes generated, rainfall input, storage requirements and irrigation area required to treat the generated leachate from stages 1 to 4.

8.11 Landfill Gas Management

Landfill gas generated at the Facility is used to power a 16-cylinder gas engine. The gas engine produces electricity for use in the local electricity grid and is located in a compound north of the staff amenities shed.

Excess landfill gas not used in the gas engine is destroyed with the use of a gas flare, located to the east of the existing irrigation area.

LFG generated from the Stage 4 landfill extension is expected to be managed by the existing system.

As part of the detailed design for Stage 4, the following shall be addressed:

- Establish the likely LFG generation from Stage 4 and assess if the existing LFG extraction system has the ability and capacity to manage the additional LFG expected to be generated from Stage 4;
- If an upgraded or replacement LFG management system is required:
    - Design the LFG management system to ensure compliance with LFG hierarchy;
    - LFG design shall include allowance for progressive installation; and
    - Details of ongoing monitoring required.

9 Monitoring and Management

Monitoring and reporting will continue in accordance with the EPL Number 5877 using existing, or new licensed monitoring points, at licensed frequencies, for licensed analytes. Event based, or investigative monitoring may be undertaken (as required) where risk assessment indicates the site conditions are changing, or in response to identified non-conformances with the EPL Number 5877. Where monitoring indicates non-conformance with the requirements of the EPL Number 5877, the Facility Pollution Incident Response Management Plan (PIRMP), in its most current version, shall be activated and implemented.

Monitoring and management will be undertaken for the following:

- Groundwater monitoring, to assess impact (if any) of leachate from the Facility on the local groundwater resources both inside and outside the Facility boundaries;
- Leachate quality monitoring, to chemically characterise the leachate in order to assess its suitability for discharge into local waterways;
- Surface water monitoring, to assess water quality and if it has been impacted by leachate, both inside and outside the Facility boundaries;
- Air quality monitoring, to assess LFG levels within enclosed structures and within 250m of landfilling and landfilled areas, and to determine if there are fugitive emissions from the landfill gas extraction / management system.
- Fire prevention;
- Odour management;
- Dust management;
- Noise management;
- Litter management; and
- Pest, environmental weed and noxious weed management.

10 Site Rehabilitation and Post-Closure Management

10.1 Site Rehabilitation

In considering future land uses for the Facility, SCC is considering the following post-closure uses for the site:

- Green waste processing facility.
- Pet cemetery.
- Carbon Farming Initiatives.
- Solar Farming.
- Passive Recreation.
- Recreation facility.
- Waste transfer station.

10.2 Landfill Closure Plan

SCC will prepare and submit to the EPA a Landfill Closure Plan (LCP) no later than 12 months before the last load of waste is due to be landfilled at the Facility.

A LCP typically:

- specifies the steps taken or to be taken in closing and stabilising the landfill, and the timeframe for doing so;
- specifies the detailed design, the materials to be used and the construction quality assurance plan for the final capping;
- specifies post-closure management and monitoring measures;
- identifies any proposed future use of the site;
- is consistent with all applicable conditions of the development consent or other planning approvals that apply to the premises; and
- provides details to neighbouring residents to contact SCC for queries regarding the Facility.

10.3 Landfill Final Capping Requirements

The proposed design for the final cap should prevent groundwater pollution and degradation of air quality, and should be capable of protecting the environment in the event of several components of the system failing.

The design objectives for the final cap, or surface, of the landfill are to:

- Isolate the deposited waste from the immediate environment;
- Reduce leachate generation by limiting water infiltration;
- Reduce surface emissions of landfill gas and assist in odour management; and
- Provide a stable and sustainable land form fit for its intended future purpose.

Development of the capping system should be in accordance with NSW EPA Guidelines and supported by best practice considerations.

The recommended typical system shall comprise the following as a minimum (from bottom to top):

- A seal bearing surface 300mm thick to provide a firm, stable, smooth surface of high bearing strength on which to install the cap. Engineered fill shall be used.
- A sealing layer comprising:
    - A 2mm low density polyethylene flexible membrane (i.e. LDPE) or an approved alternative; and
    - A GCL or a 600mm CCL;
- A 1,000 mm infiltration layer, the top 200 mm of which should be topsoil (and may include compost to support vegetation growth).

A typical section through the proposed conceptual final capping layer is shown in **Figure 8**. An alternate option designed in accordance with EPA guidelines could be considered by Council during the detail design phase.

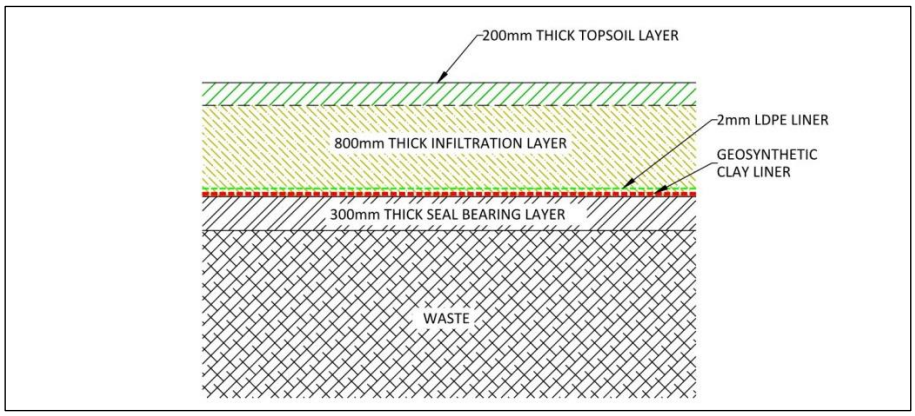

Figure 8: Typical Conceptual Final Capping and Rehabilitation Detail

Alternative landfill caps are also options that will be considered, such as evapotranspiration caps (also referred to as 'ET caps') or phytocaps shall be assessed, as well as the conventional geomembrane capping system. The final design of the capping system, for each landfill cell sub-stage, shall be based on the outcomes from the hydrogeological, stability and landfill gas risk assessments for the site, and addressed as part of the Landfill Closure Plan for the Facility.

10.4 Post-Closure Management

10.4.1 Environmental monitoring and management

After cessation of landfilling at the Facility, SCC will conduct regular monitoring of the site and carry out any maintenance actions as required.

SCC will ensure that waste materials for landfilling are not received for disposal at the Facility after cessation of landfilling operations. Waste materials that are intended for use in rehabilitation works will be documented and reported in the same method used during the operation of the landfill.

SCC will continue with Customer Service Management and Reporting during the post-closure period.

SCC will ensure that all stormwater controls and reporting practices at the Facility are maintained at the same level employed when the site was accepting landfill waste, unless agreed otherwise with the EPA.

SCC will continue monitoring and reporting of leachate, landfill gas, groundwater, surface water and overflow drain water quality in accordance with the monitoring plans in place during operation of the landfill, or with a revised monitoring program that has been approved by the EPA.

Environmental management and monitoring of the Landfill will continue to be undertaken by SCC until it is demonstrated that the waste is stable and non-polluting. Such an end-point is usually demonstrated by SCC submitting a certified statement of completion for approval by EPA, which shows the following criteria as having been met:

- Gas concentration levels in all perimeter gas wells have fallen to less than 1% methane (v/v) and less than 1.5% carbon dioxide for a period of 24 months.
- Analysis of the leachate composition indicates low levels of contamination posing no hazard to the environment and surface water and groundwater monitoring indicates no water pollution. These matters should be addressed in accordance with published water quality guidelines that are relevant at that time.
- The landfill final capping has been assessed over some years and found to be in a satisfactory condition and stable, with acceptable stormwater drainage and with no evidence of erosion, cracking, dead vegetation, water ponding, differential settlement or slope instability.
- The level of sediments in stormwater run-off from the final capping shall be less than 50 mg/L.
- The methane gas concentrations at the surface of the final capping shall not exceed 500 ppm at any point.
- The closed landfill no longer poses an adverse amenity risk. It does not generate offensive or excessive odour, dust, noise, litter or debris, present a fire risk, or attract scavengers and vermin.
- All other requirements of the LCP and Surrender Notice have been completed and/or satisfied.

10.4.2 Maintenance and repairs of final landform

SCC will take all required measures to maintain the integrity of the final landforms at the Facility, including landscaping. Maintenance works are expected to include, but are not limited to:

- Monitoring the condition and efficacy of surface water drains, and undertaking repairs where necessary;
- Filling of any cracks that may occur in the final capping layer;
- Filling of depressions created by settlement of the landfilled waste (to ensure shedding of surface water runoff);
- Replacement of vegetation, where necessary, to maintain the required vegetation cover density; and
- Repairing erosion scours.

SCC will continue maintenance and repairs of the final landforms until the landfill has been demonstrated to have stabilised.

11 References

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ASIA PACIFIC OFFICES

BRISBANE
Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

CANBERRA
GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

DARWIN
5 Foelsche Street
Darwin NT 0800
Australia
T: +61 8 8998 0100
F: +61 2 9427 8200

GOLD COAST
Ground Floor, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

MACKAY
21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

MELBOURNE
Suite 2, 2 Domville Avenue
Hawthorn VIC 3122
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

NEWCASTLE
10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

PERTH
Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

ROCKHAMPTON
rockhampton@slrconsulting.com
M: +61 407 810 417

SYDNEY
2 Lincoln Street
Lane Cove NSW 2066
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

TAMWORTH
PO Box 11034
Tamworth NSW 2340
Australia
M: +61 408 474 248
F: +61 2 9427 8200

TOWNSVILLE
Level 1, 514 Sturt Street
Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

AUCKLAND
68 Beach Road
Auckland 1010
New Zealand
T: +64 27 441 7849

NELSON
5 Duncan Street
Port Nelson 7010
New Zealand
T: +64 274 898 628

NEW PLYMOUTH
Level 2, 10 Devon Street East
New Plymouth 4310
New Zealand
T: +64 0800 757 695