SNOWY MONARO REGIONAL COUNCIL

ATTACHMENTS TO REPORTS

(Under Separate Cover)

Ordinary Council Meeting

18 March 2021

ATTACHMENTS TO REPORTS
FOR
ORDINARY COUNCIL MEETING
THURSDAY 18 MARCH 2021

Page No.

9.1.3 Nimmitabel Public School - Snowy Mountains PSSA Cross Country

Attachment 1 Notice of Intention to Organise an Event....2
Attachment 2 Police Traffic Management Plan 5
Attachment 3 Risk Assessment....27
Attachment 4 Schedule 1 and Check List 30
Attachment 5 Nimmitabel PS Cross Country - Traffic Control Plan - Signed 35
Attachment 6 Responses from LTC Members....36

9.3 KEY THEME 3. ENVIRONMENT

9.3.1 Draft Snowy Monaro Regional Council Waste Management Strategy for Public Exhibition

Attachment 1 Snowy Monaro Regional Council Waste Management Strategy Summary 38
Attachment 2 Snowy Monaro Regional Council Waste Management Strategy....58
Attachment 3 Addendum to the Landfill Options Analysis Report 133
Attachment 4 Landfill Options Analysis....138
Attachment 5 Rationalisation of Transfer Stations 176
Attachment 6 Jindabyne Regional Waste Management Facility Feasibility Analysis New Landfill Cell 211
Attachment 7 Appendices - JRWMF Feasibility Analysis....247
Attachment 8 Waste Management Strategy Risk Assessment 351

This Notice of Intention form is for use by organisers of all events (excluding normal daily Sporting Events held at Council sporting fields) intended to be held within Snowy Monaro Regional Shire, regardless of whether the event is to be held on public or private property.

THIS FORM IS NOT A DEVELOPMENT APPLICATION FORM NOR IS IT AN APPLICATION FOR ANY OTHER APPROVAL.

There is no fee associated with this form. The purpose of this form is to solicit information regarding the proposed event, to assist event organisers and Council staff to determine what if any applications and approvals may be required in order to plan for and conduct the proposed event.

Return your completed form to Snowy Monaro Regional Council – as early as possible. Council will respond in writing, listing the approvals you require for your event within 14 days of submitting this form.

Event Information						
Event Name:	Snowy Mountains PSSA District Cross Country					
Event Date:	Wednesday 24 March, 2021					
Event Location:	Nimmitabel Public School and Nimmitabel Country Club Golf Course					
Please tick where relevant	Map/Plan attached	✓	Council Land	✓	Private Land	✓
Has the venue been booked with the Visitors centre?	YES – Tentative booking	❐	YES	❐	NO	✓

Organiser Information							
Name/Company	Nimmitabel Public School/Snowy Mountains PSSA					Phone:	02 6454 6205
Contact Name:	Brad Austin					Fax:	
Postal Address:	1 Wolfe Street					Mobile:	0431 049 818
Town:	Nimmitabel	State:	NSW	Postcode:	2631	Email	bradley.austin1@det.nsw.edu.au

Organisation Status: Community ❐ Commercial ❐ Non-Profit ❐
Registered Charity/School: ✓ Other: ❐

I would prefer Council advice delivered via:	Mail: ❐	Email: ✓	
Signature of Event Organiser:		Date:	13/02/2021

Proposed Event Details				
Name of Event:	Snowy Mountains PSSA District Cross Country			
Event Schedule:	Start (Date/Time)	24/03/2021, 9.45am	End (Date/Time):	24/03/2021, 2.00pm
	Set Up:	Start: (Date/Time)	24/03/2021, 6.00am	
	Clean Up:	End (Date/Time)	24/03/2021, 3.00pm	
Is this a fundraising event?	YES ❐	NO ✓		
Frequency of Event	One-off ❐	Annual ✓	Monthly ❐	Other ❐
Estimated attendance (daily, if more than one day)	300 students			

Detailed description of Event:
8 Cross Country races (either 2km or 3km) for students from 11 local public schools across the Snowy Mountains.

Other Information:			
Which of the following will form part of the event? Please tick all that apply. Any additional information that can be supplied will be useful.			
❒	Public Event – General Public	❒	Provision of disabled access/facilities
❒	Public Event – Invitation only	❒	Vehicle races (including bicycles)
✓	Private Event	✓	Children's activities
❒	Service of Alcohol	❒	Crowd management
❒	Fireworks	❒	Dangerous goods and/or hazardous materials
❒	Amusement devices (Jumping castle, pony rides, etc)	❒	Electrical equipment
❒	Animals (Types:	✓	Food and beverages
❒	Circus	**Who is providing food:**	
❒	Retail/Commercial activity		❒ Commercial ✓ Non-profit
❒	Markets		✓ Types of food/drink: barbecue
❒	Music (Live performance)	✓	First Aid/medical person facilities
❒	Loud noise (eg concert, helicopters, PA system etc)	❒	Laser show/display
❒	Stages, large marquees or large temporary structure	❒	Activities that require insurance cover
❒	Any activity which contravenes the zoning of the land	❒	Provision of fire safety equipment
Parking spaces:		❒	Procession/parade in a public place
	❒ Onsite	❒	Security guards
	❒ Existing on-street spaces to be utilised	❒	Signage
✓	❒ Closing a road	**Toilets**	
✓	Using a footpath	✓	❒ Use of existing
❒	Filming (Commercial use)		❒ Additional brought to site
❒	Storage of waste (skip bins, etc) in addition to normal bins	❒	Traffic/transport management attendants
❒	Swing or hoist goods across or over a road or footpath	✓	Volunteers
❒	Camping	**Water based events**	
❒	Aircraft (Type:		❒ Water drawn from Council supply
			❒ Water from other source:

Please note: Council will use the information you have provided to determine whether a Development Application and/or other approvals may be necessary. This may include approvals obtained from agencies other than Council.

Council will provide you with advice in this regard within 14 days of submission of this form.

Some approvals may require at least 90 days for processing, so please ensure all necessary approval applications are lodged well in advance of your event.

SPECIAL EVENT DETAILS

Please complete information in BLUE cells. Create new pages rather than wrap around.

Name of Event:	*Snowy Mountains PSSA District Cross Country*
Event Organiser:	Brad Austin
Sponsor:	
Requested Date:	Wednesday 24 March 2021
Requested Times:	7.30am – 2.30pm

CONTACT DETAILS

Contact Name:	*Brad Austin*
Phone No.:	02 6454 6205
Fax No.:	
Mobile No.:	0431 049 818
Email:	Bradley.austin1@det.nsw.edu.au

AGENCY CONTACT INFORMATION

Council:	*Snowy Monaro Regional Council*
Police:	Cooma
Transport for NSW:	Southern Region RMS

Proponent / Event Organiser Declaration

I the undersigned declare that the herein proposed event will be staged and operated in accordance with AS1742.3, NSW Police Service Instructions, Work Health and Safety Act 2012 requirements and the conditions as set out in the RMS Traffic Control Manual.

Signed:		Date:	13/02/2021
Name:	Brad Austin	Contact No.	0431 049 818

TRAFFIC MANAGEMENT PLAN

Location:	*Wolfe Street Nimmitabel to Miller Street Nimmitabel*
Date and Time:	Wednesday 24 March 2021
Sponsored By:	
Event Organiser:	Brad Austin
TMP Version:	
Document Author:	

This Traffic Management Plan is approved by:

Position	***Name:***	***Date:***
Event Organiser:		
Police:		
Council:		
Transport for NSW:		

Authority of the Traffic Management Plan

This Traffic Management Plan (TMP), when approved by the relevant authorities becomes the prime document detailing the traffic and transport arrangements under which an event is to proceed.

Changes to the TMP require the approval of the Police and RMS and where necessary the appropriate local government organisation. All functional or single agency supporting plans are to recognise the primacy of the TMP and nothing contained in those plans may contravene any aspect of the TMP.

Signatories to this TMP should normally by the agency's senior officer appointed to the operational command team for the event on the day.

In case of emergencies, or for the management of incidents, the police are not subject to the conditions of the TMP but will make every effort to inform the other agencies of the nature of the incident and the police response.

PLANNING

Contact Names:

Event Organiser:	*Brad Austin*
Phone No.:	02 6454 6205 (Nimmitabel Public School)
Fax No.:	
Mobile No.:	0431 049 818 (Personal Mobile)
Email:	Bradley.austin1@det.nsw.edu.au
Police (LAC):	*Sgt Adam Kite – Cooma Highway Patrol*
Phone No.:	
Fax No.:	
Mobile No.:	
Email:	
Council:	*Graham Hope – Road Safety Officer – Snowy Monaro Regional Council*
Phone No.:	6451 1241
Fax No.:	-
Mobile No.:	0439 928 656
Email:	graham.hope@snowymonaro.nsw.gov.au
Transport for NSW:	*Jesse Fogg*
Phone No.:	
Fax No.:	
Mobile No.:	
Email:	

SITUATION ANALYSIS

The purpose of the proposed assembly is to hold the local district cross country (running) event on behalf of the Snowy Mountains District Primary School Sports Association. This will involve 11 local primary schools.

Mission
The mission is a concise statement about the objectives of the TMP.

School Cross Country event

EXECUTION

The Execution describes the Traffic Management Details at a high level. Individual plans are derived from the Execution.

General Outline

The Route – THIS SECTION IS MANDATORY.

Describe the route, showing distances and directions as required. Also include a map of the route.

260m of road from the corner of Miller and Kirke Street through to the school boundary on Wolfe Street (see image).

Golf
Course
Miller St
Monaro Hwy
Boyd St
Proposed
road
closure
Nimmitabel
Public School
Bendoc St
Bendley St
Nimmitabel
Lolly Shop
Milkwood
Gallery & Cafe
Kybeyan St
Clarke St
Nimmitabel Leather

Physical Survey of Route

Item	Verified	Action Taken if Required
All one way streets are described	Yes ☐ No ☐ N/A ☐	
Block access to Church on Sunday	Yes ☐ No ☐ N/A ☐	
Block access to local business	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*
Block Ambulance /Fire Access	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*
Block Heavy Vehicle Access	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*
Block Hospital Access	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*
Block Local Resident	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*
Block Police Vehicle Access	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*
Block Public Facility (oval etc)	Yes ☐ No ☐ N/A ☐	
Block Public Transport Access	Yes ☐ No ☐ N/A ☐	
Can route use alternatives such as bike tracks, paths, parks, bush tracks etc	Yes ☐ No ☐ N/A ☐	
Conflict with local construction	Yes ☐ No ☐ N/A ☐	
Distance measured is correct	Yes ☐ No ☐ N/A ☐	
Lane widths and numbers checked to ensure safety of participants and public	Yes ☐ No ☐ N/A ☐	
Restricted Turns / Movements Checked	Yes ☐ No ☐ N/A ☐	
Road Signage / Restrictions Checked	Yes ☐ No ☐ N/A ☐	*Signage to be checked by crew implementing TCP*
Route Impeded by Traffic Calming Devices?	Yes ☐ No ☐ N/A ☐	
Signalised Intersections Checked for event requirements / restrictions	Yes ☐ No ☐ N/A ☐	
Tidal Flows Relevant	Yes ☐ No ☐ N/A ☐	
Traffic Generators such as shopping centres, schools etc checked and notifications given	Yes ☐ No ☐ N/A ☐	*Notification to be given detailing alternate route*

TRAFFIC CONTROL PLAN

This section is mandatory.

The Traffic Control Plan contains the following elements: The Traffic Control Plan for any event must use AS1742.3 as its reference document.

The purpose of the Traffic Control Plan is to inform, control, guide road users and protect the safety of all event participants, spectators, marshals and volunteers.

- *See attached Traffic Control Plan (add TCP attachments)*

THE TRAFFIC CONTROL PLAN (TCP) IS A COMPULSORY ATTACHMENT TO THIS DOCUMENT

Responsibilities

Event Organiser:	Develop and implement TCP
Police:	Set out agreed responsibility (Review TMP & TCP's)
Council:	***Set out agreed responsibility (Review TMP & TCP's)***
Transport for NSW	***Set out agreed responsibility (Review TMP & TCP's)***
Other	

CONTINGENCY PLANS – **THIS SECTION IS MANDATORY**.

This section of the Traffic Management Plan describes the contingency plans for the event. The contingency plan checklist identifies all possible issues/risks that may interfere with the event and the action to be taken to minimise the disturbance of the event. Some examples of the issues/risks and the contingency plans are described as follows;

Contingency Plan Checklist

Issues/Risks	Applicable	Action Taken if Required
Heavy/Bad Weather	Yes ✓ No ☐	*Event continues in all weather conditions except lightning and hail.*
Poor Lighting	Yes ☐ No ✓	
Flood Hazard on route	Yes ☐ No ✓	
Flood Hazard at parking area	Yes ☐ No ✓	
Parking during Wet Weather	Yes ✓ No ☐	**Parking is accessible on the southern side of the school**
Bush fire Hazard	Yes ☐ No ✓	
Accident on route	Yes ✓ No ☐	**Supervising teachers on route with current CPR and first aid.**
Breakdown on route	Yes ☐ No ✓	
Absence of Marshal / Volunteer	Yes ☐ No ✓	
Absence of Event Signage	Yes ☐ No ✓	
Blockage to Public Transport	Yes ☐ No ✓	
Slow Participants	Yes ☐ No ✓	
Delayed Event	Yes ☐ No ✓	
Cancellation of Event	Yes ☐ No ✓	
Security of Participants	Yes ☐ No ✓	
Security of VIP's	Yes ☐ No ✓	
Bridge Crossing Problems	Yes ☐ No ✓	
	Yes ☐ No ☐	
	Yes ☐ No ☐	

Responsibilities

Event Organiser:	***Develop and implement Contingency Plan***

Police:	***Set out agreed responsibility (Review Contingency Plan)***

Council:	***Set out agreed responsibility (Review Contingency Plan)***

Transport for NSW	***Set out agreed responsibility (Review Contingency Plan)***

Other	***Set out agreed responsibility***

PREPARE TRAFFIC SIGNAL DATA

This Section ☒ Applies
☑ Does not apply

The RMS charges for ALL personnel or time required in the undertaking of Traffic Signal adjustments at fill cost to the Event Organiser.

Responsibilities

Event Organiser:	***To be discussed with Transport for NSW and Snowy Monaro Regional Council***
Police:	***Set out agreed responsibility***
Council:	***Set out agreed responsibility***
Transport for NSW	***Set out agreed responsibility***
Other	***Set out agreed responsibility***

RMS PERSONNEL REQUIRED

This Section ☒ Applies
☑ Does not apply

Requirements are:

Subject to Council's requirements and discussions between RMS and Snowy Monaro Regional Council

SPECIAL EVENT CLEARWAYS

This Section ☒ Applies
☑ Does not apply

The RMS can organise special event clearways in certain circumstances if required

The Special event clearway plan contains the following:

- **Clearway Enforcement**

- **Clearway Towing**
- **Clearway Advertising**
- **Clearway Signs**
- **Letterbox drops to local businesses and residents**

Responsibilities

Event Organiser:	***Not Applicable***

Police:	***Not Applicable***

Council:	***Not Applicable***

Transport for NSW	***Not Applicable***

Other	***Not Applicable***

ADVERTISE TRAFFIC MANAGEMENT ARRANGEMENTS

This section is mandatory.

Where Major changes to Traffic Conditions will occur, Advertising of Traffic Arrangements for an event will be carried out in the Local and Or Major Newspapers, as discussed with the Police, RMS and local Councils.

Set out Advertising Arrangements Here. Attach copies of newspaper bromides as applicable and discussed with the RMS in the planning process.

Event Organiser	
Others	

VOLUNTEERS AND EVENT MARSHALS

This Section ☐ Applies
☐ Does not apply

Volunteers

(Duties of Volunteers – SES, Marshalls, security, drivers, paramedics, doctors, nurses etc)

Responsibilities

Event Organiser:	Produce locations and lists of traffic control duties for event marshals. Produce contingency plans for personnel who fail to show on the day.
Others:	***Agreed responsibility***
Others:	***Agreed responsibility***
Others:	***Agreed responsibility***
Others:	***Agreed responsibility***

NOTE:

- **EVENT MARSHALS WHO CARRY OUT TRAFFIC CONTROL DUTIES MUST HOLD AN RTA TRAFFIC CONTROLLERS TICKET.**
- **ANY PERSON WHO SETS OUT TRAFFIC CONTROL SIGNAGE FOR THE EVENT MUST HOLD A TRAFFIC CONTROL AT WORKSITES TICKET.**

PUBLIC SAFETY – POLICE – This section is mandatory.

This section needs to be completed in consultation with the Police. Event organisers cannot direct Police.

Before you have preliminary discussions with the Police Service, you should put together the following details about the event. These are the same details required by local councils.

1. Provisions of the Road Transport Legislation to be observed at all times.
2. Any person competing in, organising, supporting competitors or in any other manner connected with the event, shall obey any reasonable directions given by a member of the NSW Police Force.
3. A member of the New South Wales Police Force has the authority to delay, halt or cancel the event at any stage of the event in the interests of road safety or the safety of the community.
4. Any directions issued by the Roads and Traffic Authority must be promptly obeyed.
5. The event is to be conducted in accordance with the timing and route supplied and approved by Police.

6. The event is to be conducted within the nominated dates of the event.

7. Any breach of these conditions may result in the event being halted by the NSW Police.

8. Organisers, Officials and Participants are to take all reasonable measures to reduce obstruction to pedestrians or vehicles during the course of the event.

9. Organisers must provide sufficient marshals to control participants in the event.

10. The Organiser is to ensure that all participants and event marshals are adequately briefed as to their roles and responsibilities.

11. Participants are not permitted on a road during periods of poor visibility due to inclement weather or fog, or where there is insufficient daylight to render a person dressed in dark clothing to be discernible at a distance of 100 metres.

12. Participants shall keep to the extreme left-hand side of the carriageway at all times.

13. Participants MUST NOT ride more than 2 abreast on multi lane roads.

14. Participants MUST ride in single file on single lane roads.

15. Participants to obey traffic lights and comply with “STOP” - “GIVE WAY” and “ DON’T WALK “ signs during the event.

16. Participants and passengers to wear approved helmet in compliance with the Road Transport Legislation.

17. Participants MUST wear suitable reflective clothing when cycling upon a road.

18. The organisers shall provide escort vehicles as detailed below which must be positioned so as to create a positive awareness of the presence of the participants on the carriageway to other road users. Escort vehicles must not be larger than a Toyota Hi Ace type vehicle.

19. Escort and support vehicles are to move off the carriageway when required to wait for the participants, so as not to obstruct traffic on single lane carriageways.

20. Except when held up by other traffic or mechanical failure, escort or support vehicles shall not stop on the trafficable portion of the roadway for any reason.

21. Lead and rear vehicles are to travel with head and tail lamps illuminated when on escort duty.

22. Unless otherwise directed by police, escort vehicles shall be positioned in the following manner.

23. On a single lane carriageway a lead escort vehicle shall be positioned ahead of the leading participants:

24. This vehicle shall display a sign directed to the front of the vehicle displaying the words “CAUTION CYCLISTS/RUNNERS FOLLOWING”, so as to provide advance warning to oncoming motorists and other road users. (Select appropriate wording)

25. A warning escort vehicle shall be positioned about 300 Metres to the rear of the last group of participants warning motorists of cyclists on the road ahead.

26. This vehicle shall display a sign directed to the rear of the vehicle displaying the words “CAUTION CYCLISTS/RUNNERS AHEAD” so as to provide advance warning to overtaking vehicles. (Select appropriate wording)

27. Warning signs referred to above shall be not be less than 900mm x 400mm in size, on yellow/orange background with large black lettering, 170mm proportionate to the dimensions of the sign and in accordance with the Road Transport Legislation.

28. Each escort vehicle shall also be fitted with flashing amber light on the highest point of the roof, and MUST have the hazard and warning lights operating at all times whilst performing escort duty.

29. Communication equipment is to be provided to escort vehicles to enable communication between those vehicles and the organisers. Communication is to be maintained between those vehicles at all times during the course of the event.

In addition the Police also require;

30. The organiser MUST monitor road traffic. In the event of traffic built up, the cyclists MUST clear the road and allow traffic to pass.

31. Under no circumstances must support vehicles be used as escort vehicles.

32. Cyclists must travel in single file on all sections of roadway where road works are in progress.

Responsibilities

Event Organiser:	Take out public liability insurance for a minimum of $20 million
Police:	***Organiser to consult***
Council:	***Organiser to consult***
Transport for NSW:	***Organiser to consult***

PUBLIC TRANSPORT

This Section ☐ Applies

☐ Does not apply

Public Transport requirements to be shown in detail if this section applies

Responsibilities

Event Organiser:	As required, negotiate with Transport Companies to arrange: • Provision of extra buses for the event spectators and ensure normal services continue to operate efficiently • Provision of extra trains for the event spectators and ensure normal services continue to operate efficiently
Police:	As agreed with Police Service
Council:	As agreed with SMRC
Transport for NSW	As agreed with Transport for NSW
Other	As agreed

EVENT SIGNS

This Section ☐ Applies
☐ Does not apply

These are general information signs installed one or two weeks prior to the event, informing road users of an impending event and resulting changed traffic conditions.

This section may also relate to the event signs that will be used on the day, which may not be specifically noted on the Traffic Management Plan.

These signs can also advise on alternate routes for major traffic flows and destinations.

The following is an example of these signs

SPECIAL EVENT
WEDNESDAY , 07 MARCH 2001
6.30AM TO 4.30PM
COMMISSIONER STREET, COOMA
CLOSED BETWEEN VALE STREET & SOHO STREET

We are happy to facilitate the signage suggested and required.

VARIABLE MESSAGE SIGNS

This Section ☐ Applies
☐ Does not apply

Variable Message Signs (VMS) are used to advise road users of altered traffic conditions on the day of an event and are placed in strategic locations.

NOTE: THE RMS MUST APPROVE PLACEMENT OF THESE SIGNS.

Responsibilities

Event Organiser:	***Consult with Council and Transport for NSW***
Police:	***To be consulted in the planning process***
Council:	***To be consulted in the planning process***
Transport for NSW	***To be consulted in the planning process***

Other	***To be consulted in the planning process***

ACCESS FOR LOCAL RESIDENTS, BUSINESSES, HOSPITALS AND EMERGENCY VEHICLES

This Section ☐ Applies
☐ Does not apply

Local Resident Access
If applicable, occupants in areas affected will receive a letterbox notice with a minimum seven days' notice. Alternative routes will be outlined in local media. Signs are to be displayed as per RMS & Local Council requirements, advising of the traffic arrangements.

Emergency Vehicle Access
Access for emergency vehicles during an event must be provided. Where necessary, any special arrangements should be shown in detail. Ambulance and Fire Brigade to endorse emergency access arrangements.

Responsibilities

Event Organiser:	***Consult with Council and Transport for NSW***
Police:	***To be consulted in the planning process***
Council:	***To be consulted in the planning process***
Transport for NSW	***To be consulted in the planning process***
Other	***To be consulted in the planning process***

PARKING

This Section ☐ Applies
☐ Does not apply

Sufficient parking for cars and buses should be identified and listed, including locations for any essential or emergency vehicles. These may include participants, officials, spectators, media, and marshals.

Responsibilities

Event Organiser:	***Organise all parking***
Police:	***Organiser to consult***
Council:	***Organiser to consult***

Transport for NSW	***Organiser to consult***

Other	***Organiser to consult***

HEAVY VEHICLE ALTERNATIVE ROUTES

This Section ☐ Applies
☐ Does not apply

All heavy vehicle alternative routes must be of similar standards to existing road system. Standards would include road width, structural strength and height clearances. E.g. bridges and overhead wires.

Heavy vehicle alternative routes need to be provided with advanced advisory sings 2-3 weeks prior to the event. These alternatives also need to be advertised in local and or major newspapers.

Responsibilities

Event Organiser:	***Organise with Police, Council and Transport for NSW***

Police:	***Organiser to consult***

Council:	***Organiser to consult***

Transport for NSW	***Organiser to consult***

Other	***Organiser to consult***

COUNCIL – SPECIAL CONDITIONS

Local councils usually have similar requirements for special events. However, every Local Council must be approached individually for approval of any special event within the boundary of that council.

Often times council will be satisfied with the submission of this Traffic Management Plan and will consult with the Police and the RMS. This is usually done directly with the Local Police Traffic Services Officer and the Transport for NSW Traffic Commander, or at the Council Local Traffic Committee.

Local Council Traffic Facilities Co-ordinator or Special Event Co-ordinator should be consulted in the planning process to find out their requirements.

Local Council Consulted was *Snowy Monaro Regional Council*

Council Officer Consulted was *Graham Hope*

Date of traffic Meeting at Council

Special Conditions Imposed / Requested by Council: As per Local Traffic Committee recommendations

OTHER CONSIDERATIONS

This Section ☐ Applies
☐ Does not apply

Television

Locations for all static television / camera crews and details of any mobile cameras should be shown. Traffic Control Plans are required for each static location, using AS1742.3 as its reference document.

Responsibilities

Event Organiser:	***Once approval is granted we will then have television producer/director attend to locate camera positions etc.***
Police:	***List as agreed***
Council:	***List as agreed***
Transport for NSW	***List as agreed***
Other	***List as agreed***

ADMINISTRATION, LOGISTICS, COMMAND AND COMMUNICATIONS

Administration and logistics builds on the previous section and describes the resources used on the day and who delivers those resources.

Table of Contact Names and Responsibilities:

#	DUTY	RESPONSIBILITY	CONTACT NAME	CONTACT NO.
1	Event Organiser	To manage the event	*Brad Austin*	
2	Police			
3	RMS			
4	Marshals			
5	Parking			
6	Event Signs			

7	Barriers / cones /delineation			
8	Media Liaison			
9	Confirm all marshals in position			
10	Advise NSW Ambulance Service			
11	Insurance			
	Other			

COMMAND & COMMUNICATIONS

This area sets out the location of the Command Post for the event and the personnel that will be in attendance at that command post.

All issues associated with staging the event are to be directed to the Event Command Post including the deployment of marshals and resources. Any emergency assistance is to be directed to the Police / Ambulance as required.

Command Post Location – if required

ORGANISATION	**CONTACT NAME**	**CONTACT NO:**
Event Organiser		
Police		
Transport for NSW		
SES		
Council		
Media Liaison		
Medical/First Aid		

Other		

ATTACHMENTS

Attachments should include:

1. **Map of the route**
2. **Pictorial Traffic Control Plan (May be overlaid on the map.)**
3. **Table of Anticipated Travel Times, including 1st Participant and Last Participant arrival times at significant check points**
4. **Any other information that may assist in the assessment of the Road Occupancy Application.**

RISK ASSESSMENT AND CONTROL PLAN (NON COUNCIL EVENTS ON COUNCIL LAND)

SNOWY MONARO REGIONAL COUNCIL
Stronger together Better together

Name of event: Snowy Mountains PSSA District Cross Country

Host Name	Nimmitabel Public School		Main Activity	Cross Country Running
Activity Date	Wednesday 24 March 2021		Activity Covered	Running
Host Safety Contact Number	02 6454 6205		Persons Consulted	
Number of Volunteers	15		Partners In Project:	
DATE OF ASSESSMENT	13.02/2021		Location	Nimmitabel Public School

Steps in filling out the risk assessment

1. Think about:
    a. What can happen,
    b. How it can happen and
    c. When it can happen. (Use the OHS Checklist and example Risk and Associated control for hints, plus consult with others to discuss possible issues that could come up.)
2. Then think about the likelihood (probability) that it could happen. Write that letter in the pre- assessment box on the form.
3. Think about the consequence of it happening (eg, could the person get seriously injured, or just require first aid?) Write that number down in the pre assessment box on the form.
4. Look at the matrix (Coloured table on the last page) and see where the likelihood and consequence meet up on the matrix. This is your rating. Write that letter in the pre-assessment box on the form.
5. Consider how you might prevent or minimise the chance of the incident happening. Write that in the Controls section of the form
6. Repeat steps 1-3, writing the numbers and letters in the Post assessment box on the form
7. Nominate a person responsible

INDIVIDUAL ACTIVITY	POTENTIAL HAZARDS and RISK IDENTIFICATION	Pre Assessment Risk Rating	Post Assessment Risk Rating	CONTROL MEASURES and PERSON RESPONSIBLE
Anaphylactic Emergency	Potential need to provide an emergency response	1CM	1CM	School staff to carry first-aid bag with epipen
Student injury	* slip/trip/fall/cut/graze * bites/stings from bees, snakes, spiders * sprains, strains, broken leg/arm	2CL	2CL	• All students to complete a 'warm-up • All students to wear appropriate footwear for sporting activities/walking • Course positions to be supervised by designated adults to keep the majority of the course in sight at all times. • 2-way radios to be available carried by the trailing runner to communicate with the school/coordinators • Students to undertake a 'walk the course' to identify the correct course path to run on • Course positions to be supervised by designated adults to keep the majority of the course in sight at all times. • First aid to be provided by school staff, if the incident is deemed more serious the supervising teacher will decide if it is appropriate to transport the injured person to school before seeking further medical assistance, or leave the injured person where they are and have medical assistance come to the location. • Staff to carry mobile phones to be able to contact the school office and/or emergency services if deemed necessary.

Risk Matrix

Risk Matrix		CONSEQUENCE (see examples below)		
		(1) Catastrophic * Death or Severe Injuries * Loss $100,001 or more * Complete loss of services * Toxic release or contamination off site	**(2) Moderate** * Injuries requiring Medical Treatment * $ Loss $5,001 - $100,000 * Major loss of services * Off site release or contamination with no detrimental effects	**(3) Insignificant** * No injury or medical attention * $ loss < $5,000 * No loss of service * No environmental contamination
LIKELIHOOD (see examples)	**(A) Almost Certain** Is expected to occur at most times	**1A H**	**2A H**	**3A M**
	(B) Possible Will possibly occur at most times	**1B H**	**2B M**	**3B L**
	(C) Rare Might occur at some time	**1C M**	**2C L**	**3C L**

SNOWY MONARO REGIONAL COUNCIL
Stronger together Better together

The risk rating of an incident is based on a combination of **Consequence** and **Likelihood**.

Refer to the SRSC Risk Matrix for suggestions

- Consider the Consequence
- Consider the Likelihood
- Where the two meet on the matrix determines the Risk Rating (Level of Risk)

Consequence + Likelihood = Risk Rating

All risks need to be made safe immediately and final corrective action taken within the High Medium or Low time frames below

Managers and Supervisors are responsible for Corrective Action

H = HIGH RISK

STOP WORK IMMEDIATELY - DO NOT COMMENCE WORK UNTIL RISK IS CONTROLLED and NO LONGER RED

Requires **first priority**

Senior Management to be advised.

IMMEDIATE action required

M = MEDIUM RISK

PROCEED WITH CAUTION

Requires **second priority**

Management responsibility must be specified.

Permanent control required within one - three months to lower risk to Green where possible

L = LOW RISK

CARRY OUT WORK

Requires **third priority**

Responsibility to be recorded

To be monitored to ensure risk does not increase

Schedule 1 – Notice of Intention to Hold a Public Assembly

Summary Offences Act – 1988 – Sec 23

To The Commissioner of Police

1	I Brad Austin (Name) Of 2/4 Campbell Street, Cooma, NSW, 2631 (Address) On behalf of Nimmitabel Public School (Organisation) Notify the Commissioner of Police that On the 24th (Day) March (Month) 2021 (Year) it is intended to hold **EITHER:** (a) A public assembly, NOT being a procession, of approximately 325 (number) persons, which will assemble at Nimmitabel Public School (Place) at approximately 9.00 am and disperse at approximately 2.00pm. OR ~~(b) A public assembly, being a procession of approximately . . . . . (number) persons which will assemble at . . . . . (Place) at approximately . . . . . am/pm and at approximately . . . . . am/pm the procession will commence and shall proceed:~~ . . . . (Specify route, any stopping places and the approximate duration of any stops, and the approximate time of termination. A diagram may be attached.)

2	The purpose of the proposed assembly is To hold the local district cross country (running) event on behalf of the Snowy Mountains District Primary School Sports Association. This will involve 11 local primary schools.

3	The following special characteristics associated with the assembly would be useful for the Commissioner of Police to be aware of in regulating the flow of traffic or in regulating the assembly *(strike out whichever is not applicable):* ☐ There will be . . . . . (number) of vehicles and/or . . . . . (number) of floats involved. The type and dimensions are as follows: . . . . ☐ There will be . . . . . (number) of bands, musicians, entertainers, etc which will entertain or address the assembly ☐ The following number and types of animals will be involved in the assembly: . . . . ☐ Other special characteristics of the proposed assemble are as follows: . . . .
4	I take responsibility for organising and conducting the proposed assembly
5	Notices for the purposes of the Summary Offences Act 1988 may be served upon me at the following address: . . . . Postcode . . . . .
6	Signed: Brad Austin Capacity/Title: Teaching Principal, Nimmitabel Public School Date: 13 February 2021

Check List for Special Event Transport Management Plan

1 Event details

1.1 Event summary

Event Name: Snowy Mountains PSSA Cross Country

Event Location: Nimmitabel Public School and Nimmitabel Country Club Golf Course

Event Date: Wednesday 24 March 2021 Event Start Time: 9.45am Event Finish Time: 2.00pm

Event Setup Start Time: 6.00am Event Packdown Finish Time: 3.00pm

Event is ☒ off street ☐ on street - moving ☐ on street non-moving
☐ held regularly throughout the year (calendar attached)

1.2 Contact names

Event Organiser* Brad Austin

Phone: 02 6454 6205 Fax:..... Mobile:0431 049 818 .... E-mail: Bradley.austin1@det.nsw.edu.au

Event Management Sponsor (if applicable) .....

Phone:..... Fax: ..... Mobile: ..... E-mail:.....

Police .....

Phone:..... Fax: ..... Mobile: ..... E-mail:.....

Council .....

Phone:..... Fax: ..... Mobile: ..... E-mail:.....

Transport for NSW (if required) .....

Phone:..... Fax: ..... Mobile: ..... E-mail:.....

**Note: The Event Organiser is the person or organisation who is the employer and in whose name the Public Liability Insurance is taken out.*

1.3 Brief description of the event (one paragraph)

Approximately 300 students from 11 local public primary schools competing in the district cross country event.

2 Risk Management - Traffic

CLASS 1 CLASS 2 CLASS 3

2.1 Occupational Health & Safety - Traffic Control

☐ Risk assessment plan (or plans) attached

2.2 Public Liability Insurance

☐ Public liability insurance arranged. Copy of Policy attached.

2.3 Police

☐ Police written approval obtained

2.4 Fire Brigades and Ambulance

☐ Fire brigades notified

☐ Ambulance notified

3 Traffic and transport management

CLASS 1 CLASS 2 CLASS 3

3.1 The route or location

☐ Map attached

3.2 Parking

☐ Parking organised - details attached

☐ Parking not required

3.3 Construction, traffic calming and traffic generating developments

☐ Plans to minimise impact of construction activities, traffic calming devices or traffic-generating developments attached

☐ There are no construction activities, traffic calming devices or traffic-generating developments at the location/route or on the detour routes

3.4 Trusts , Authorities or Government Enterprises

☐ This event uses a facility managed by a trust, authority or enterprise; written approval attached

☐ This event does not use a facility managed by a trust, authority or enterprise

3.5 Impact on/of Public transport

☐ Public transport plans created - details attached

☐ Public transport not impacted or will not impact event

3.6 Reopening roads after moving events

☐ This is a moving event - details attached.

☐ This is a non-moving event.

3.7 Traffic management requirements unique to this event

☐ Description of unique traffic management requirements attached

☐ There are no unique traffic requirements for this event

Class 1 Class 2

3.8 Contingency plans

☐ Contingency plans attached

Class 1 Class 2

3.9 Heavy vehicle impacts

☐ Impacts heavy vehicles - RTA to manage

☐ Does not impact heavy vehicles

Class 1 Class 2

3.10 Special event clearways

☐ Special event clearways required - RTA to arrange

☐ Special event clearways not required

4 Minimising impact on non-event community & emergency services

CLASS 1 CLASS 2 CLASS 3

4.1 Access for local residents, businesses, hospitals and emergency vehicles

☐ Plans to minimise impact on non-event community attached

☐ This event does not impact the non-event community either on the main route (or location) or detour routes

CLASS 1 CLASS 2

4.2 Advertise traffic management arrangements

☐ Road closures -advertising medium and copy of proposed advertisements attached

☐ No road closures but special event clearways in place - advertising medium and copy of proposed advertisements attached

☐ No road closures or special event clearways - advertising not required

CLASS 1 CLASS 2

4.3 Special event warning signs

☐ Special event information signs are described in the Traffic Control Plan/s

☐ This event does not require special event warning signs

CLASS 1

4.4 Permanent Variable Message Signs

☐ Messages, locations and times attached

☐ This event does not use permanent Variable Message Signs

CLASS 1

4.5 Portable Variable Message Signs

☐ The proposed messages and locations for portable VMS are attached

☐ This event does not use portable VMS

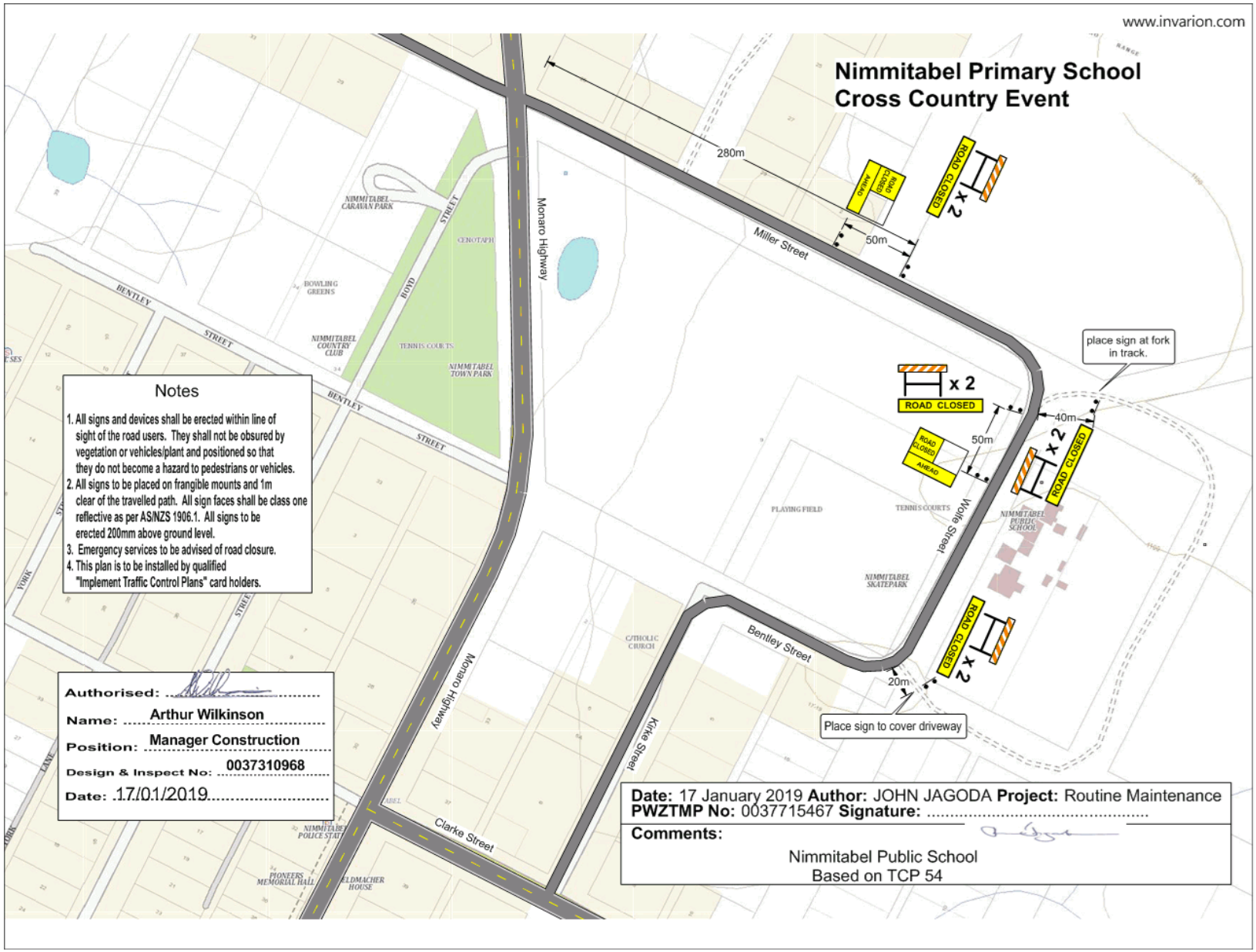
5 Approval

TMP approved by:

Event Organiser: Date:

Transport for NSW Date: **OR**

Snowy Monaro Regional Council Date:


www.invarion.com
Nimmitabel Primary School
Cross Country Event
280m
Miller Street
Monaro Highway
50m
ROAD CLOSED
AHEAD
x 2
place sign at fork in track.
40m
Wolle Street
Bentley Street
20m
Place sign to cover driveway
Kirke Street
Clarke Street
Notes
1. All signs and devices shall be erected within line of sight of the road users. They shall not be obsured by vegetation or vehicles/plant and positioned so that they do not become a hazard to pedestrians or vehicles.
2. All signs to be placed on frangible mounts and 1m clear of the travelled path. All sign faces shall be class one reflective as per AS/NZS 1906.1. All signs to be erected 200mm above ground level.
3. Emergency services to be advised of road closure.
4. This plan is to be installed by qualified "Implement Traffic Control Plans" card holders.
Authorised:
Name: Arthur Wilkinson
Position: Manager Construction
Design & Inspect No: 0037310968
Date: 17/01/2019
Date: 17 January 2019 Author: JOHN JAGODA Project: Routine Maintenance
PWZTMP No: 0037715467 Signature:
Comments:
Nimmitabel Public School
Based on TCP 54

Enquiries Graham Hope – Project Specialist
Our Ref LTC – Nimmitabel PS
Your Ref

Response from Sergeant Adam Kite – NSW Police Representative

Reply Reply All Forward

Adam Kite <kite1ada@police.nsw.gov.au> Graham Hope; Amanda McKinnon; Rebecca Copping; Sue Haslingden; Judie Winter; 'jesse.fogg@transport.nsw.gov.au'

RE: LTC item [SEC=OFFICIAL]

Greetings friends,

Hope this finds you all well,

Re the Nimmitabel Athletics Carnival....

Police have no issues with the carnival, I was there in attendance last year and the year before (no not competing..😂).

Traffic issues are minimal to say the least, no adverse impact on the Monaro Hwy that doesn't manage itself. Therefore, no objections from the Police.

I have notified my staff who are aware of the event and will make patrols when able.

Cheers Adam.

Regards

ADAM KITE
SERGEANT
TRAFFIC & HIGHWAY PATROL COMMAND
SOUTHERN TABLELANDS CLUSTER - MONARO HWP
SUPERVISOR - SNOWY MOUNTAINS SECTOR
87 MASSIE ST, COOMA, NEW SOUTH WALES,2630
MOBILE (W): 0427 706 110 | EAGLE: 81020

Response from Mrs Judie Winter – State Member's Representative

Reply Reply All Forward

Judie Winter <judie@highlander.net.au> Graham Hope; Amanda McKinnon; Rebecca Copping; 'Adam Kite'; Sue Haslingden; jesse.fogg@transport.nsw.gov.au

RE: LTC item

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Hi Graham
I have no issues or objections to the temporary road closures for this event
Kind regards
Judie Winter

Response from Clr Sue Haslingden

Reply Reply All Forward

Sue Haslingden Graham Hope; Amanda McKinnon; Rebecca Copping; Adam Kite; Judie Winter; 'jesse.fogg@transport.nsw.gov.au'

RE: LTC item

Hi Graham and all,
Welcome Rebecca!
I have no problems with this.
Cheers,
Sue

Reply Reply All Forward

Kelly Cherry <Kelly.CHERRY@transport.nsw.gov.au> Graham Hope

RE: LTC item

Hi Graham

This event is supported.

Regards Kelly

SNOWY MONARO
REGIONAL COUNCIL

Waste Management Strategy Summary

March 2021

Contents

01 **Where We Are Today** 4

02 **Where We Want to Get to** 12

03 **How We Will Get There** 14

04 **How to Measure Success** 16

05 **Glossary** 18

SNOWY MONARO
REGIONAL COUNCIL

Council Offices

Cooma
(Head Office)
81 Commissioner Street
Cooma NSW 2630

Berridale
2 Myack Street
Berridale NSW 2628

Bombala
71 Caveat Street
Bombala NSW 2632

Jindabyne
2/1 Gippsland Street
Jindabyne NSW 2627

Contact Us

Phone
1300 345 345

Post
PO Box 714
Cooma NSW 2630

Email
council@snowymonaro.nsw.gov.au

Web
snowymonaro.nsw.gov.au

This summary report and supporting documents were prepared by Council with the support of MRA Consulting Group.

We've been listening

The people of the Snowy Monaro are fearless and frank with their valuable feedback on the important topic of waste management in our community.

This new Waste Management Strategy shows that we've heard you – the Snowy Monaro community – and that Council is delivering the services and solutions that you want and are asking for.

There's no other place in Australia like our region. Our unique landscape, communities and geography are a big part of why we all choose to spend our lives here. However, the same things that make the Snowy Monaro such a great place to live also present a unique set of challenges and opportunities in providing services to our people and communities.

You've been asking for green bins and a bulky waste collection service.

Residential properties with a red and yellow bin will have the opportunity to receive a food and garden organics (FOGO) bin. Businesses can opt-in to get a FOGO bin too.

We will trial a bulky waste collection service for pensioners, concession card holders, and people with a disability. If this goes well, Council will consider the business case for further expansion of this service.

Council's focus in creating this strategy has been on unity, efficiency and cost effectiveness. We believe the new Waste Management Strategy will make our services more accessible and our facilities more efficient. Together we can reduce the environmental impact on our home region.

Under this strategy, if we work together to refuse, reduce, reuse and recycle our waste, our efforts will ensure the Snowy Monaro remains the place we love to live and the place Australia loves to visit.

Mayor Peter Beer
Snowy Monaro Regional Council

01
Where We Are Today

Snowy Monaro Regional Council (SMRC) is a Local Government Area (LGA) covering 15,163km over the Snowy Mountains and Monaro regions of South Eastern New South Wales (NSW). SMRC was proclaimed in 2016 with the amalgamation of three Councils; Bombala, Cooma-Monaro and Snowy River. It is home to an estimated population of 20,795 people, residing in approximately 12,424 households.

1.1
Government Policy and Regulatory Framework

1.1.1
National Waste Policy

The Australian Government prepared a National Waste Policy (NWP) and NWP Action Plan to encourage a shift away from a linear economy and 'take, make, use, dispose' behaviours to a circular economy where the system maintains the value of resources for as long as possible[1].

1.1.2
Waste Avoidance and Resource Recovery Act (WARR Act) 2001

The WARR Act defines the Waste Hierarchy (Figure 1), which ranks waste management options in order of general environmental desirability.

Generally, the higher waste is managed up the hierarchy, the lower the impact and risk to the environment and communities.

1.1.3
NSW Waste Avoidance and Resource Recovery Strategy 2014-21

The WARR Strategy provides a framework for waste management in NSW, focusing on the reduction of waste generation and the increase of recycling rates for households, business and industry.

[1]*National Waste Policy: Less Waste, More Resources 2018 (2018) Commonwealth of Australia, https://www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf*

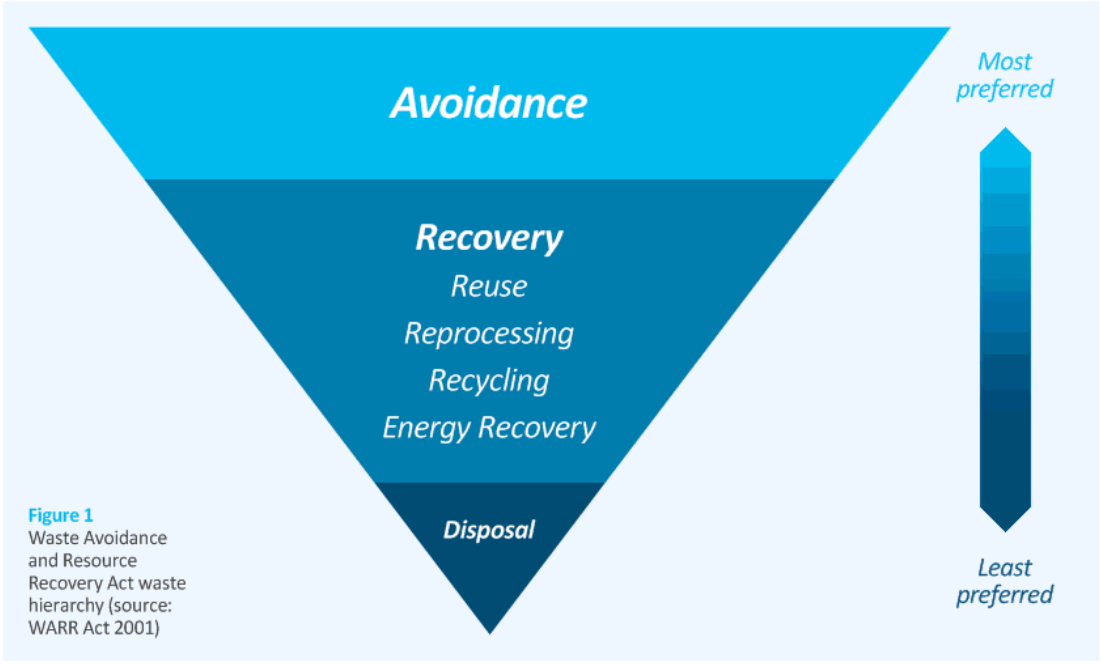


Figure 1
Waste Avoidance and Resource Recovery Act waste hierarchy (source: WARR Act 2001)

1.2
Cooma-Monaro Resource and Waste Strategy 2016-2021

The strategy focused on reducing waste to landfill and increasing recycling rates. It acknowledged waste as a resource; aiming to further Council's knowledge of the composition of waste generated and identify lost value in residential kerbside bins.

The strategy adopted the waste goals set by the WARR Strategy to increase recycling of municipal solid waste (MSW) to 70% through reducing waste to landfill and diverting organics to produce marketable end products.

1.3 Waste Services and Facilities

1.3.1 Waste Services

SMRC delivers a range of waste services that include:

- Domestic and commercial kerbside waste collection;
- Bank of bins (BOBs) service and collection points;
- Event waste removal;
- Annual Household Chemical CleanOut drop-off service; and
- Illegal dumping management and compliance.

1.3.1.1 Kerbside Waste Collection

SMRC provides a kerbside collection service to all major townships in the LGA. In 2020, kerbside collection services were offered to over 7,000 households.

Table 1 below shows bin size configurations and collection frequencies for the domestic collection service for each region of SMRC.

1.3.2 Waste Facilities

SMRC maintains a range of waste facilities (Figure 2) that include:

- Landfills (Bombala, Cooma, Jindabyne);
- Transfer stations (Adaminaby, Berridale, Bredbo, Delegate, Nimmitabel, Numeralla);
- CRCs;
- SCRAPMART tip shops; and
- 'Coompost' composting facility.

1.3.2.1 Waste Facilities Financial Performance

Council understands their waste facilities operations costs are 4 to 5 times higher (on average) than the revenue collected via gate fees.

Analysis of Council's facilities performance shows that Cooma and Jindabyne Landfills are covering operation costs, while all other facilities are operating at a loss.

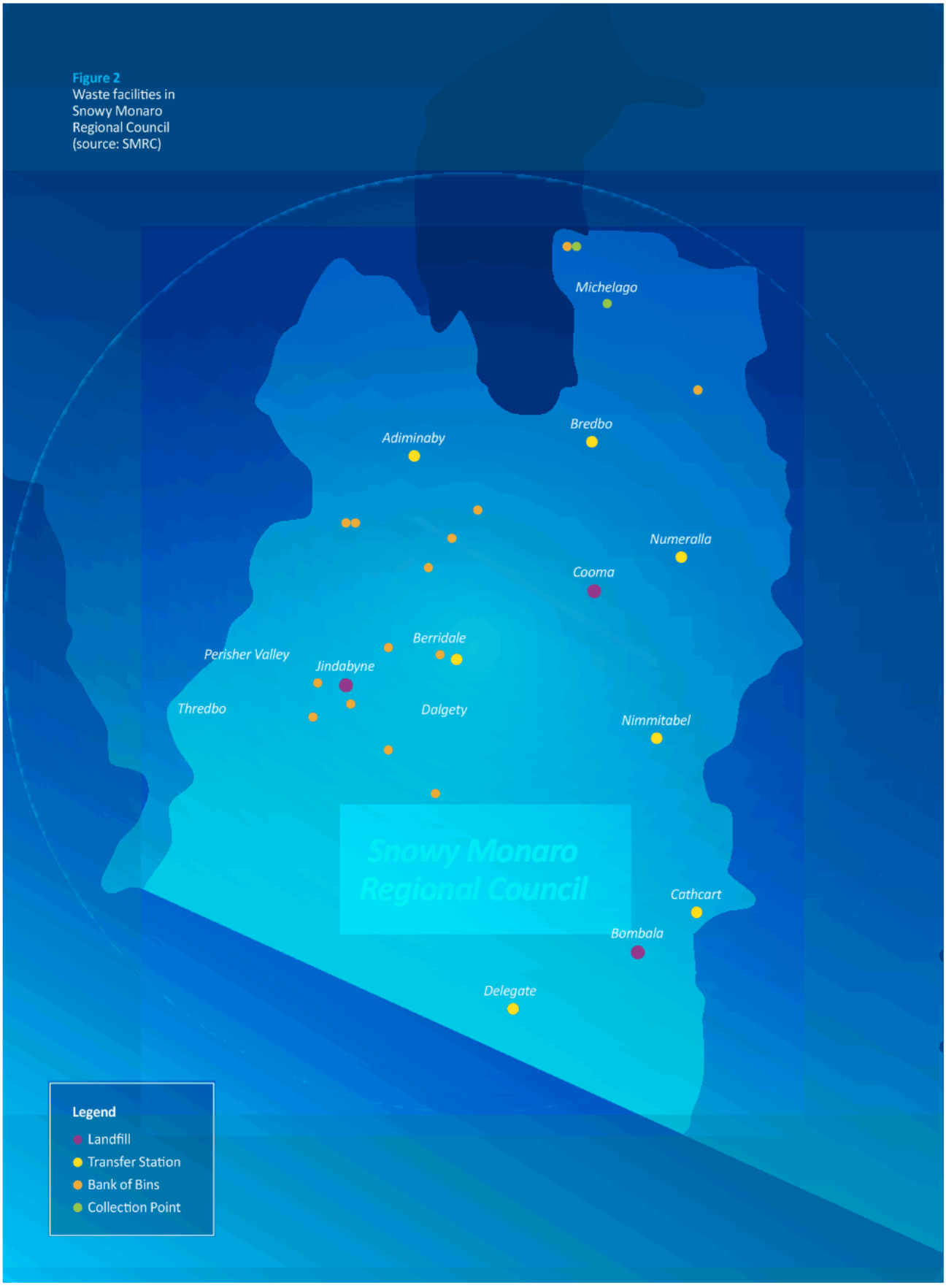
Council is looking to condense landfill operations to a single landfill, as well as identifying and implementing better and more economical waste transfer alternatives to service rural communities.

Table 1 Bin size configuration and collection frequencies for domestic collection service in SMRC LGA

	Bombala	Jindabyne	Cooma				
Stream	**Bin size**			**Collection frequency**	**Households serviced (hh)**	**Service coverage* (% hh)**	**Tonnes collected (t/year)**
General Waste	120L	240L	120L	Weekly	7,861	63%	3,315
Comingled Recycling	360L	360L	140L, 360L	Fortnightly	7,472	60%	1,401
FOGO	No service	No service	240L	Fortnightly	2,736	22%	414

**Based on a total of 12,424 households located in the SMRC LGA*

Figure 2
Waste facilities in Snowy Monaro Regional Council (source: SMRC)



1.4
Programs, Initiatives and Community Survey

1.4.1
Education Programs and Waste Projects

Council provides education programs and resources to improve awareness and engagement on waste diversion and sustainability such as:

- Resource and Waste Education Sessions;
- Pre-school Education;
- Bournda Environmental Education Centre;
- EnviroMentors Program; and
- Waste-free School Programs.

1.4.2
Community Survey

SMRC conducted an extensive consultation process to ensure the Strategy is representative of community stakeholders and to build a joint understanding of Council's current challenges, alternatives and solutions. Key issues identified include:

- Most available facilities were considered to be underutilised due to Council fees and charges, difficulty getting to the recycling facilities and inadequate information about what can be disposed of;
- Only half the residents believe waste from the yellow-lidded bin gets recycled;
- Approximately half of respondents don't want to pay more to improve recycling at landfill;
- 73% of respondents would use a FOGO collection service to dispose of food waste; and
- Most common feedback is requests for green waste and bulky waste kerbside service.

1.5 Waste Generation and Resource Recovery Performance

1.5.1 2018 Household Kerbside Bin Audit

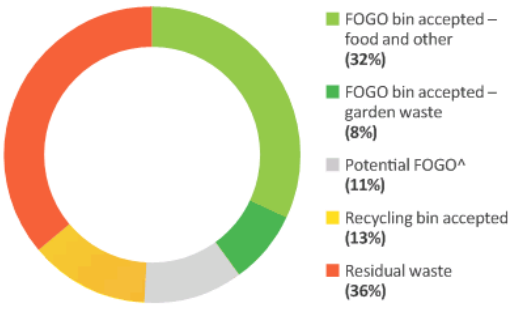
The key findings from the audit[2] include:

- 42% of waste is diverted from landfill (on average);
- 53% is the potential diversion rate if all recyclable and organic material in the general waste bin was recovered;
- The resource recovery rate was 77% for recyclables and 45% for organic material (on average); and
- Households generate an average of 13 eligible CDS containers per week, amounting to $453,000 per year in all bin streams, with $370,000 in the recycling bins.

1.5.1.1 General Waste

The audit found that households generate an average of 9.3kg of general waste per week. The composition of the general waste stream is presented in Figure 3.

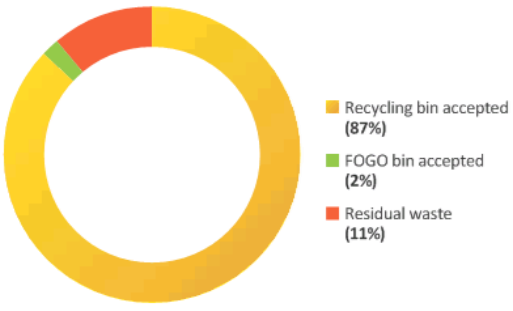
Figure 3
Kerbside General Waste composition*



1.5.1.2 Recycling

The audit found that households generate an average of 4.8kg of recycling waste per week with a contamination rate of 13%. Contaminated materials consisted of containerised food and liquid, textile/rags, plastic film and plastic bags (Figure 4).

Figure 4
Kerbside Recycling composition*



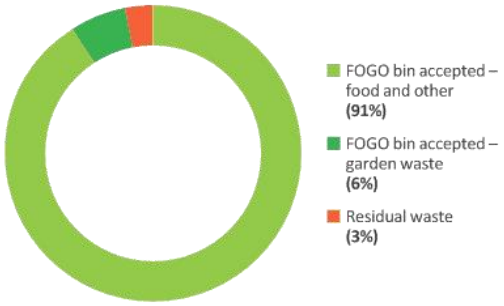
**Based on waste stream suitability (by weight)*
^Includes other material that may be accepted in a FOGO service, including contaminated soiled paper, other putrescibles and wood/timber waste

[2] *Household Kerbside Bin System Audit 2018 (2019) EC Sustainable.*

1.5.1.3
Food and Garden Organics (FOGO)

The audit found that the average household produced 3.2 kg of organic waste per week with a contamination rate of 3%. Contaminated materials consisted of ceramics/dust/dirt and treated wood/ timber (Figure 5).

Figure 5
Kerbside FOGO composition*



Based on waste stream suitability (by weight)

1.5.1.4
CDS Eligible Containers

The audit found there was a total of 12.7 eligible CDS container in all bin streams being disposed of per household per week.

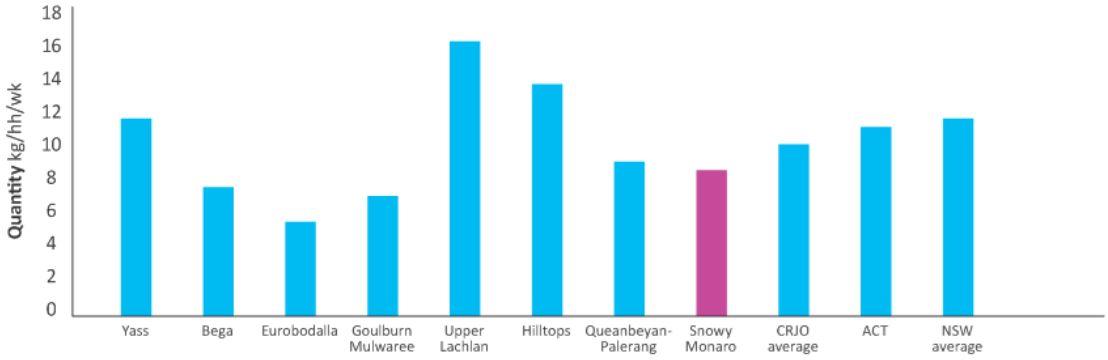
With an assumption that the audit reflects a 100% bin presentation rate, it was approximated that $453,000 worth of eligible CDS containers per year were disposed of in kerbside recycling. Of this, $370,000 was in the recycling stream.

1.5.2
Comparison with Other Regions

1.5.2.1
Waste Generation

Based on the CRJO Waste Strategy 2018-2023[3], SMRC households generate less general and recycling waste than the average for CRJO members, NSW and the ACT. SMRC households generate the same quantity of organic waste as the average for CRJO members.

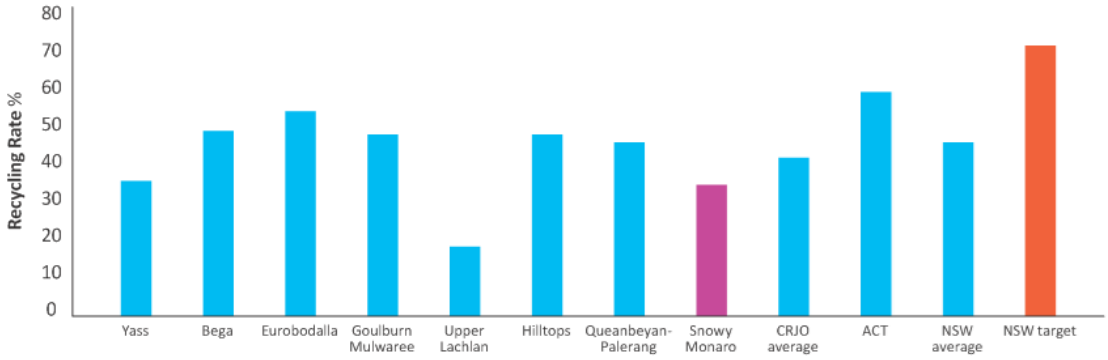
Figure 6
Comparison of household general waste generation with CRJO members, ACT and NSW 2016-17



1.5.2.2
Recycling Performance

In 2016-17, SMRC reported the second lowest recycling rate (34%), compared to an average recycling rate of 41% for CRJO members and 45% for NSW. This rate is well below the NSW target of 70%, see Figure 7.

Figure 7
Comparison of recycling rates with CRJO members, ACT and NSW 2016-17



[3]*Regional Waste Strategy 2018-2023 (2017) Canberra Region Joint Organisation.*

02
Where We Want to Get to

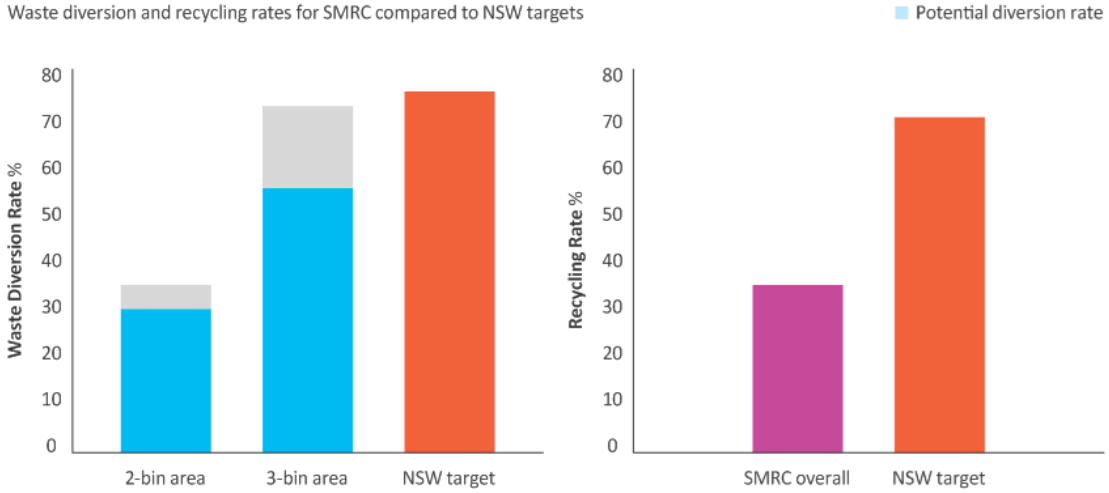
2.1
Current Waste and Recycling Performance

SMRC is driven to work towards the ambitious targets set out in the NSW WARR Strategy for waste diverted from landfill and recycling. Figure 8 displays the current waste diversion rates of 30% and 56% for 2-bin and 3-bin areas, compared to the NSW target of 75%. The gap between the SMRC rate and the NSW target can be reduced with a 3-bin service and increased resource recovery. A recycling rate of 35% was reported for SMRC in 2020 compared to the NSW target of 70%.

The NSW Government and the NSW Local Government and Shires Association have also signed a commitment under the National Waste Policy to achieve 80% diversion from landfill by 2030. The NSW 20 Year Waste Plan to be released in 2021 is likely to embrace this new target.

'A recycling rate of 35% was reported for SMRC in 2020 compared to the NSW target of 70%.'

Figure 8
Waste diversion and recycling rates for SMRC compared to NSW targets



2.2 Challenges to Overcome

SMRC faces the following waste management challenges to overcome and address in this strategy:

- Underperformance regarding NSW WARR targets, especially in areas with a 2-bin service;
- Variation of services and facilities between SMRC areas;
- High costs associated with operating waste management facilities and services; and
- Accessibility and utilisation of waste facilities.

2.3 Vision and Themes

To address the challenges faced by SMRC, a vision and themes were developed for the key areas of the waste management system (Figure 9).

Figure 9
SMRC's waste strategy vision and themes

03
How We Will Get There

A plan of action to achieve the strategy's vision, themes and objectives was developed in consultation with SMRC stakeholders and informed by community surveys.

3.1
Waste Infrastructure Key Actions

Table 2 Waste infrastructure key actions

Action	Description
Landfills upgrade	• Construction of new landfill areas at Cooma landfill. • Integration of weighbridge data system into SMRC financial system. • Stormwater leachate system upgrade at Cooma landfill.
Modern transfer stations upgrade	• Upgrade Bombala, Cooma and Jindabyne to modern transfer stations to provide a safer, easier and more efficient layout for source-separation and drop-off for residents and commercial users.
Conversion of drop off model service to collection & BOB service model	• Implement recommendations of the Rationalisation of Transfer Stations report, including transitioning to BOB sites at Adaminaby, Berridale, Bredbo, Delegate, Nimmitabel and Numeralla.
Expansion of bank of bins	• Expansion of BOBs in some locations.
Remediate legacy landfills and convert to emergency landfills where appropriate	• Rehabilitation of sites. • Progressive capping of current sites.
Upgrade collection trucks	• Cooma collection truck upgrade to enhance fleet with additional side lift truck.
Review gate fee structure	• Review of gate fee structure and investigation of option to introduce education levy.

3.2
Waste Services Key Actions

Table 3 Waste services key actions

Action	Description
FOGO collection service expansion	• Expansion of current residential FOGO service to all properties with a current 2-bin service within the LGA. • Opt-in commercial FOGO service for businesses.
Expand kerbside collection service	• Expansion of kerbside collection service to Numeralla, servicing 100 households.
Bulky waste – service on request for pensioners and disabled	• Business case for the provision of bulky waste services. • Provision of service to pensioners, disabled people and concession holders who may find transport of bulky waste to a landfill less accessible.
Mobile CRC	• Mobile CRC for household problem waste.
Increase recycling of C&D waste	• Targeted educational programs for construction entities to source separate C&D waste.
Implement recycling of difficult-to-recycle material	• Increase recycling of difficult-to-recycle materials through targeted education and collection programs, e.g., polystyrene.
Local procurement of recycled materials	• Increase local procurement of products with recycled content in construction and reduce use of virgin materials.
Support food rescue programs	• Collection of quality surplus food from retailers and donation to dedicated charities.
Illegal dumping	• Reduce illegal dumping through implementation of an illegal dumping awareness campaign, including dob-in-a-dumper, and data collection
Disability employment opportunities	• ScrapMart tip shops to provide employment opportunities for local people with disability.

04
How to Measure Success

4.1
Key Performance Measures

Progress will be measured to establish a consistent and reliable source of information regarding the LGA's waste performance over time. This will enable informed, evidence-based decisions to be made regarding the performance of the LGA's waste services and the effectiveness of the actions undertaken.

The following monitoring and analysis is recommended for each of the strategy objectives and themes.

'Progress will be measured to establish a consistent and reliable source of information.'

Theme 1

Improve Operational Efficiency of Waste Management Services and Facilities

- Annual kerbside bin audits to measure bin presentation, bin fullness, waste generation, rate of resource recovery and rate of contamination.
- Maintain local landfill capacity by measuring and analysing void space. Develop new landfill capacity when void space falls below 7 years.

Theme 2

Optimise Council's Waste Management Costs

- Conduct a study into the true cost of Council's waste facilities. Perform annual reviews of these metrics to support performance management.
- Review the gate fee structure. Investigate a waste education levy.
- Report on grant funding won and contribution to waste delivery costs.

Theme 3

Minimise the Environmental Impact of Waste Disposal, Meeting NSW WARR Strategy Targets

- Measure and record waste generation per year:
  - Residual waste;
  - Commingled recyclables;
  - FOGO;
  - C&I; and
  - C&D.
- Calculate resource recovery for each sector.
- Calculate Illegal dumping and public place litter metrics.

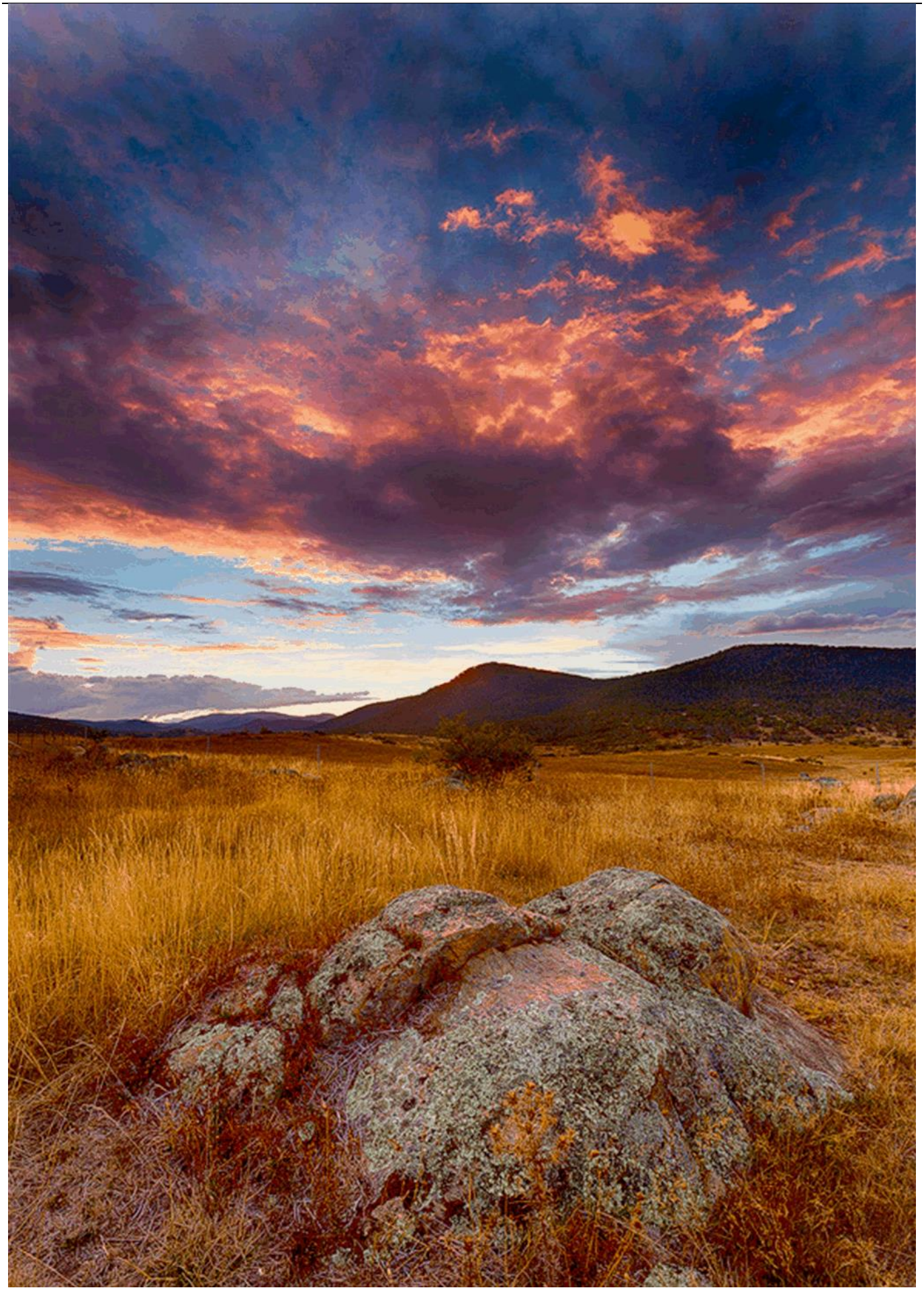
Theme 4

Increase the Accessibility and Utilisation of Waste Facilities for Residents

- Measure and record:
  - Number and percentage of SMRC households receiving kerbside services;
  - Percentage of households with access to kerbside collection and BOBs;
  - Percentage of households with access to CRC; and
  - Annual community survey results.
- Review the *Transfer Station Rationalisation* report and measure progress against recommendations provided.
- Review the *Landfill Options Analysis* report and measure progress against recommendations provided.

05
Glossary

Terminology	Definition
BOB	Bank of bins
C&D	Construction and Demolition
C&I	Commercial & Industrial
CRC	Community Recycling Centre
CRJO	Canberra Region Joint Organisation
FOGO	Food and Garden Organics
hh	Household
LGA	Local Government Area
MSW	Municipal Solid Waste
NSW	New South Wales
NWP	National Waste Policy
SMRC	Snowy Monaro Regional Council
t	Tonne(s)
WARR	Waste Avoidance and Resource Recovery
yr	Year



SNOWY MONARO
REGIONAL COUNCIL

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Snowy Monaro Regional Council Waste Management Strategy

Draft

11 February 2021

SNOWY MONARO REGIONAL COUNCIL

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Disclaimer

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Strategy at a glance

Where we are today

- Snowy Monaro Regional Council (SMRC) is a Local Government Area (LGA) in the Snowy Mountains and Monaro regions of South Eastern NSW. It is home to an estimated population of 20,795 people, residing in approximately 12,424 households.
- SMRC delivers a range of waste services that include kerbside waste collection, transfer stations, landfills, community recycling centres, tip shops, drop-off points for bulky items, annual household chemical drop-offs and illegal dumping management and compliance.
- Kerbside collection service varies based on area: Cooma township is provided with a 3-bin system (general waste, comingled recycling and food organics and garden organics (FOGO). Bombala, Jindabyne and other townships are provided with a 2-bin system (general waste and comingled recycling). The greater Cooma region SMRC also provides kerbside waste collection for businesses in the LGA, on an opt-in basis.
- SMRC generated close to 9,000 tonnes of domestic waste in 2019-2020. Of this, 35% was recycled.

Where we want to go

- It is projected that by 2036, SMRC will generate over 24,000 tonnes of domestic waste per year due to the rising population and trend in waste generation.
- SMRC aim to overcome challenges such as resource recovery underperformance; the variation of services and facilities across the LGA; high costs associated with waste management; and improve accessibility and utilisation of waste facilities.
- The vision of SMRC is to unify the LGA, reduce the recycling gap and waste to landfill, and deliver cost effective waste services that meet the needs of the community. Strategic objectives translate the vision and themes into measurable goals.

How we will get there

- Potential actions and options were identified to address the strategic objectives.
- Options for Bombala landfill, the kerbside collection service, transport of recyclables service, local CDS capture and bulky waste collection were analysed and compared based on cost and effectiveness in addressing the strategy objectives.
- The costs, benefits, disadvantages and risks were considered to assess potential actions, such as expansion of collection services and upgrades to facilities and infrastructure.

How the strategy will be implemented

- Recommended action plans for both waste infrastructure and services provide detailed steps for each potential action and option to be implemented in the short, medium and long term.
- Further investigations are recommended for a number of initiatives to determine their suitability for SMRC.

How to measure success

- Monitoring and analysis measures, including Key Performance Measures, for each theme are outlined to measure progress towards implementing the recommended action plans.

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Glossary

Terminology	Description
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AWT	Alternative Waste Treatment
CRJO	Canberra Region Joint Organisation of Councils
CDS	Container Deposit Scheme
CPI	Consumer Price Index
CRC	Community Recycling Centre
EPA	NSW Environment Protection Authority
EPR	Extended Producer Responsibility
ERF	Emissions Reduction Fund
FOGO	Food Organics and Garden Organics
HH	Households
LFG	Landfill Gas
LGA	Local Government Area
MBT	Mechanical Biological Treatment
MRF	Materials Recycling Facility
MSW	Municipal Solid Waste
MUD	Multi Unit Dwelling
MWOO	Mixed Waste Organic Outputs
NSW	New South Wales
NWP	National Waste Policy
OTC	Over the counter (for "Return and Earn" sites)
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RVM	Reverse Vending Machine
SMRC	Snowy Monaro Regional Council
SUD	Single Unit Dwelling

Terminology	Description
TAC	Technical Advisory Committee
VENM	Virgin Excavated Natural Material
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)

DRAFT

Contents

Glossary iv
Contents vi
List of Tables viii
List of Figures ix
1 Where We Are Today 1
1.1 Population and Demographics 1
1.2 Government Policy and Regulatory Framework 3
1.2.1 National 3
1.2.2 State 5
1.3 SMRC Policy and Strategy Framework 8
1.3.1 Cooma-Monaro Resource and Waste Strategy 2016 - 2021 8
1.3.2 Canberra Region Joint Organisation Waste Strategy 2018 - 2023 9
1.3.3 ACT Feasibility Study Roadmap and Recommendations – Discussion Paper 10
1.4 Waste Services and Facilities 10
1.4.1 Waste Services 10
1.4.2 Waste Facilities 12
1.5 Service Compliance 15
1.5.1 Landfills 15
1.5.2 Transfer Stations 15
1.5.3 Landfill Legacy Sites 16
1.6 Waste and Resource Recovery Collection, Processing and Disposal Contracts 16
1.7 Waste Costs and Financial Performance 16
1.7.1 Domestic Kerbside Collection Service 16
1.7.2 Waste Facilities Financial Performance 17
1.8 Programs, Initiatives and Community Expectations 18
1.8.1 Education Programs 18
1.8.2 Regional Waste Projects 19
1.8.3 Illegal Dumping 19
1.8.4 Community Expectations 20
1.9 Waste Generation and Resource Recovery Performance 21
1.9.1 2018 Household Kerbside Bin Audit 21
1.9.2 Comparison with Other Regions 24
2 Where We Want to Go 27
2.1 Gap Analysis 27
2.1.1 Current Waste and Recycling Performance 27
2.1.2 Future Population and Waste Generation 27

DRAFT

2.1.3 Rationalisation of Transfer Stations Report 28
2.1.4 Challenges to Overcome 30
2.2 Visions and Themes 30
2.3 Strategic Objectives 31
3 How We Will Get There 33
3.1 Planned Waste and Recycling Infrastructure 33
3.2 Options Identification 33
3.3 Options Analysis 36
3.4 Actions Assessment 40
4 How The Strategy Will Be Implemented 46
4.1 Recommended Waste Infrastructure Action Plan 46
4.2 Recommended Waste Services Action Plan 49
4.3 Further Actions 53
4.3.1 Develop a Business Case for the Glass Capture and CDS Beverage Container Recovery 53
4.3.2 Investigate 4-Bin System to Replace Current Bins at End of Life 53
4.3.3 Review of Data Collection and Analysis 53
4.3.4 True Cost of Waste Analysis 53
4.3.5 Risk Management Review for Cooma Landfill and Waste Complex 53
4.3.6 Regional Waste Contracts with CRJO 54
4.3.7 Investigation into Recycling and Reuse of Snow Gear 54
4.3.8 Review targets for waste reduction, resource recovery and diversion of waste 54
5 How to Measure Success 55
5.1 Key Performance Measures 55
5.1.1 Theme 1: Improve Operational Efficiency of Waste Management Services and Facilities 55
5.1.2 Theme 2: Optimise Waste Management Costs 55
5.1.3 Theme 3: Minimise the Environmental Impact of Waste Disposal, Meeting NSW WARR Strategy Targets 55
5.1.4 Theme 4: Increase the Accessibility and Utilisation of Waste Facilities for Residents 55
References 57
Appendix A Bank of Bin Sites 58
Appendix B Materials Accepted at Waste Facilities 59
Appendix C Staff Interviews 60
Appendix D Waste stream compositions based on material categories 64
Appendix E Transfer Station Financial Analysis 66

DRAFT

List of Tables

Table 1 Breakdown of occupied private dwellings in SMRC among different dwelling types (ABS, 2016) 1
Table 2 Key initiatives of the ACT Feasibility Study Roadmap 10
Table 3 Bin size configurations and collection frequencies for domestic kerbside collection service in SMRC LGA 11
Table 4 SMRC transfer stations and landfills 14
Table 5 SMRC NSW EPA Environment Protection Licences 15
Table 6 Waste received at transfer stations (average of 2018-19 and 2019-20) 15
Table 7 SMRC resource recovery contracts 16
Table 8 SMRC waste service contracts 16
Table 9 SMRC domestic kerbside collection service financial performance (2018-19 and 2019-20 averages) 17
Table 10 SMRC transfer station financial performance (2018-19 and 2019-20 averages) 17
Table 11 SMRC landfill financial performance (2018-19 and 2019-20 averages) 17
Table 12 Key issues for consideration in the Waste Strategy 20
Table 13 CDS material disposed through comingled recycling and general waste collections 24
Table 14 Traffic light analysis for transfer stations - summary of results 29
Table 15 Waste strategy themes and strategic objectives 31
Table 16 Potential actions and options to achieve the strategic objectives 33
Table 17 Options analysis for SMRC Waste Strategy 36
Table 18 Actions assessment for SMRC Waste Strategy 40
Table 19 Recommended 10 year action plan timeline for waste infrastructure in SMRC 46
Table 20 Recommended 10 year action plan timeline for waste services in SMRC 49
Table 21 Bank of bins sites 58
Table 22 Materials accepted at SMRC landfills 59
Table 23 Materials accepted at SMRC transfer stations 59
Table 24 Managerial council staff interview comments 60
Table 25 Operational council staff interview comments 63
Table 26 CAPEX, OPEX and net profit for transfer station scenarios 66

DRAFT

List of Figures

Figure 1 Map of NSW local government areas with the SMRC highlighted 1
Figure 2 CRJO member councils and associated members 3
Figure 3 Waste Avoidance and Resource Recovery Act waste hierarchy 6
Figure 4 Waste facilities in SMRC (source: SMRC) 13
Figure 5 Kerbside general waste composition based on waste stream suitability (by weight) 22
Figure 6 Kerbside recycling composition based on waste stream suitability (by weight) 23
Figure 7 Kerbside FOGO composition based on waste stream suitability (by weight) 23
Figure 8 Comparison of household general waste generation with CRJO members, ACT and NSW 2016-17 24
Figure 9 Comparison of household recycling waste generation with CRJO members, ACT and NSW 2016-17 25
Figure 10 Comparison of household organic waste generation with CRJO members, ACT and NSW 2016-17 25
Figure 11 Comparison of recycling rates with CRJO members, ACT and NSW 2016-17 26
Figure 12 Waste diversion and recycling rates for SMRC compared to NSW targets 27
Figure 13 SMRC projected population – 2006-2036 28
Figure 14 Projected domestic waste generation of SMRC 28
Figure 15 SMRC's waste strategy vision and themes 31
Figure 16 Kerbside general waste composition based on material category (by weight) 64
Figure 17 Kerbside recycling composition based on material category (by weight) 65
Figure 18 Kerbside FOGO composition based on material category (by weight) 65

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1 Where We Are Today

1.1 Population and Demographics

Snowy Monaro Regional Council (SMRC) is a Local Government Area (LGA) covering 15,163km over the Snowy Mountains and Monaro regions of South Eastern New South Wales (NSW). SMRC was proclaimed in 2016 with the amalgamation of three Councils; Bombala, Cooma-Monaro and Snowy River, and includes national park reserves, dedicated state forest and the catchment of Australia's famous Snowy Mountains Scheme. The LGA spans from the ACT border down to the Victorian border (Figure 1) and is part of the Canberra Region Joint Organisation of Councils (CRJO).

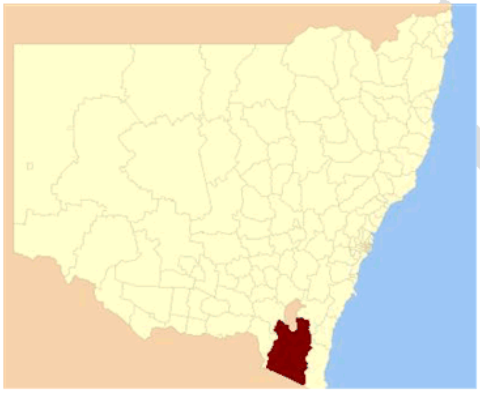


Figure 1 Map of NSW local government areas with the SMRC highlighted

The LGA is comprised of five major town centres: Cooma, Jindabyne, Bombala, Berridale and Michelago. There is an estimated population of 20,795 people[1], residing in approximately 12,424 households. Population varies significantly with seasons and the population of some towns can triple during peak skiing season. The average household size is 2.4 persons per dwelling and the population density is 1.4 persons/km^2 making SMRC one of least populated councils in South Eastern NSW. This is four times sparser than the CRJO average (4 persons/km^2) and sparser than the average in the state of South Australia (1.8 persons/km^2).

The percentage of SMRC dwellings falling into high or medium density categories is largely consistent with the NSW regional average in 2016. The breakdown of more specific dwelling types from the 2016 Census data is provided in Table 1.

Table 1 Breakdown of occupied private dwellings in SMRC among different dwelling types (ABS, 2016)

Dwelling type	Proportion of occupied private dwellings
Separate house	85.2%
Semi-detached	4.6%
Multi-unit	5.5%
Other/not stated	4.7%

[1] Regional Population Growth, Australia (3218.0) (2019) Australian Bureau of Statistics, https://profile.id.com.au/snowy-monaro/population-estimate

The median age of SMRC's population is 43.4 years and it has been slowly trending upwards[2]. 63% of the population is of working age. The region has high English proficiency. The 2016 Census found that of the 13% of residents who were born overseas, 93% were proficient in English. This will aid in the effectiveness of waste education initiatives.

Tourism is the key industry sector for the region with accommodation and food services being the highest employers; 19% of jobs fall into this category (ABS, 2016). Other important industries include agriculture, forestry and fishing, retail, and construction.

SMRC is located on the traditional lands of the Ngarigo, Walgalu, Bidawal and Southern Ngunnawal people. The population of Aboriginal and Torres Strait Islander peoples is 2.2% (ABS, 2016) and there are three protected Declared Aboriginal Places in the LGA; Coolamatong in Cooma, Curiosity Rocks in Jindabyne, and the Delegate Aboriginal Reserve. SMRC recognise the Ngario, Walgalu and Southern Ngunnawal people as the native custodians of the land and encourage a collaborative relationship with traditional landowners to further Council's core values.

The region includes a number of National Parks and nature reserves, with protected areas making up 26.9% of the total area of the SMRC LGA. This attracts tourism all year as there is abundant opportunity for fishing, horse riding, bushwalking, hiking, snow and water sports. Tourism is increasing every year both from summer and winter activities. By far the biggest drive for tourism is the ski season which runs from June to October. The region experiences unique weather patterns as it snows several times each year. SMRC is home to four main ski parks; Charlotte Pass, Thredbo, Perisher and Selwyn. The population in Jindabyne can triple during this time, greatly increasing waste generation which places extra requirements and challenges on the region's waste management system and operations.

The CRJO acts as a forum for stakeholders, Councils and government bodies to identify priorities and deliver shared projects. The CRJO's core functions include strategic planning and priority setting, intergovernmental collaboration and regional leadership and advocacy. The population across the organisation is 750,000 and provides opportunities to undertake joint waste procurements, to share learnings and educational materials. The CRJO consists of the following councils (refer to Figure 2):

- Bega Valley Shire Council
- Eurobodalla Shire Council
- Goulburn Mulwaree Council
- Hilltops Council
- Queanbeyan-Palerang Regional Council
- SMRC
- Snowy Valleys Council
- Upper Lachlan Shire Council
- Wingecarribee Shire Council
- Yass Valley Council

[2] 2016 Census QuickStats (2016) Australian Bureau of Statistics, https://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/LGA17040?opendocument#:~:text=The%20median%20age%20of%20people,up%2019.2%25%20of%20the%20population.

The CRJO is active in waste management; the Regional Waste Strategy currently in place spans from 2018-2023. It focuses on conserving resources, reducing waste to landfill and increasing recycling. In particular, it emphasises reducing organic waste to landfill. The strategy is discussed in more detail in Section 1.3.2.

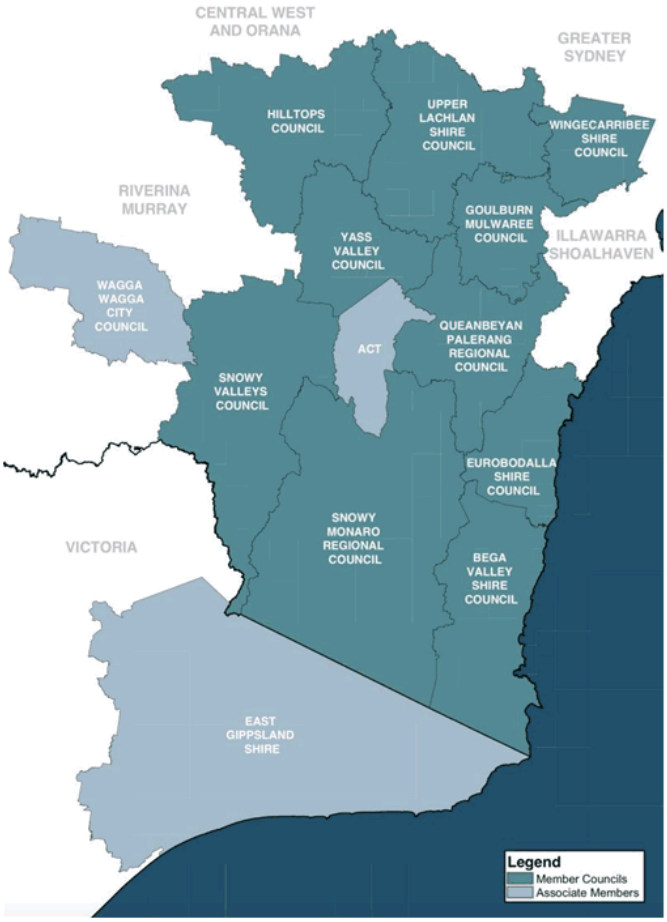


Figure 2 CRJO member councils and associated members

1.2 Government Policy and Regulatory Framework

1.2.1 National

The Australian Government (or Commonwealth of Australia) traditionally has had limited involvement in local waste management issues. This responsibility rests largely with state, territory and local governments. However, the Australian Government has a leadership role in waste management and resource recovery via the Council of Australian Governments (COAG) process.

1.2.1.1 National Waste Policy

The Australian Government prepared a National Waste Policy (NWP) in 2018 to encourage a shift away from a linear economy and 'take, make, use, dispose' behaviours to a circular economy where the system maintains the value of resources for as long as possible[3]. The policy provides five principles and fourteen

[3] National Waste Policy: Less Waste, More Resources 2018 (2018) Commonwealth of Australia, https://www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf

strategies to underpin and guide waste management, recycling and resource recovery in a circular economy. The principles and strategies are non-binding.

The Australian Government published the National Waste Policy Action Plan[4] which create targets and actions formulated in the 2018 NWP, including the waste export bans. The targets and actions detailed in the National Action Plan include the following:

- Ban the export of waste plastic, paper, glass and tyres, commencing in the second half of 2020;
- Reduce total waste generated in Australia by 10% per person by 2030;
- 80% average recovery rate from all waste streams by 2030;
- Significantly increase the use of recycled content by governments and industry;
- Phase out problematic and unnecessary plastics by 2025;
- Halve the amount of organic waste sent to landfill by 2030; and
- Make comprehensive, economy-wide and timely data publicly available to support better consumer, investment and policy decisions.

1.2.1.2 The Recycling and Waste Reduction Bill 2020

The bill establishes a framework to regulate the export of waste plastic, paper, glass and tyres and incorporates the existing *Product Stewardship Act 2011* with improvements to encourage better product design and increase recovery[5].

The timetable for the ban of export waste is as follows:

- Unprocessed glass by January 2021;
- Mixed waste plastics by July 2021;
- All whole tyres including baled tyres by December 2021;
- Single resin/polymer plastics by July 2022; and
- Remaining waste products, including mixed and unsorted paper and cardboard, by no later than July 2024.

Materials "processed into value-added materials" will still be allowed to be exported.

The waste export bans have the potential to impact on SMRC's comingled recycling in the short term, likely in the form of increased processing costs for comingled recyclables at Materials Recycling Facilities (MRFs).

1.2.1.3 Extended Producer Responsibility Schemes

Extended Producer Responsibility (EPR) policies engage producers and others involved in the supply chain of a product to take responsibility for the environmental, health and safety footprint of products they produce.

Following the adoption of the first NWP in 2009, the Commonwealth *Product Stewardship Act 2011* was introduced to provide the framework for EPR schemes. The Act creates three types of schemes:

- Mandatory schemes;
- Co-regulatory schemes; and

[4] National Waste Policy Action Plan 2019 (2019) Commonwealth of Australia, https://www.environment.gov.au/protection/waste-resource-recovery/publications/national-waste-policy-action-plan
[5] *Recycling and Waste Reduction Bill 2020* (as passed by both houses) (2020) Commonwealth of Australia, https://parlinfo.aph.gov.au/parlInfo/download/legislation/bills/r6573_aspassed/toc_pdf/20096b01.pdf;fileType=application%2Fpdf

- Voluntary schemes (either accredited or not).

There are no mandatory schemes created under the Act, and one co-regulatory scheme (the National Television and Computer Recycling Scheme). Most EPR schemes are voluntary, and include programs for:

- Mobile phones (MobileMuster, an accredited scheme);
- Fluorescent lamps (Fluorocycle, an accredited scheme);
- Tyres (Tyre Stewardship Australia);
- Agricultural chemical containers (DrumMuster);
- Paint (Paintback);
- Used Oil (Product Stewardship for Oil Scheme – PSO)
- Mattresses (Soft Landing Product Stewardship Scheme)
- PVC (PVC Stewardship); and
- Newspapers.

The Commonwealth Government establishes a "product list" every year, containing the products that it is considering for some form of EPR scheme. The 2020-21 list includes:

- Batteries;
- Child car seats;
- Electrical and electronic products;
- Plastic oil containers;
- Plastic microbeads; and
- Photovoltaic systems.

The Act is currently under review, including the "product list" process.

1.2.1.4 The Emissions Reduction Fund

The Commonwealth Government purchases abatement (in the form of Australian Carbon Credit Units (ACCUs)) from a wide range of sources through the Emissions Reduction (ERF). This provides an incentive to businesses, households and landowners to reduce emissions.

In order to participate in the ERF, project proponents must carry out a project in accordance with a methodology determination to appropriately estimate abatement from certain activities.

Approved methods for the waste and recycling sectors include:

- Landfill gas capture and destruction;
- Alternative Waste Treatment (AWT) [6]; and
- Source Separated Organics.

There are also two soil carbon methodologies that apply to farming practices and the improvement of agricultural lands which could be relevant to the use of SMRC compost material under specific circumstances.

1.2.2 State

The NSW Government administers the waste regulatory framework through the State's primary environment protection legislation, the *Protection of the Environment Operations (POEO) Act 1997*, together with the *Waste Avoidance and Resource Recovery (WARR) Act 2001* and the *Protection of the Environment Operations*

[6] This may be under review due to the NSW EPA's position to no longer allow the use of Mixed Waste Organic Outputs (MWOO) as a soil amendment on agricultural, mining rehabilitation or forestry land.

(Waste) Regulation 2014. These key statutes contain the requirements for managing, storing, transporting, processing, recovering and disposing of waste.

1.2.2.1 Protection of the Environment Operations (POEO) Act 1997

The POEO Act aims to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote pollution prevention, the elimination of harmful wastes, the reduction in the use of materials and the re-use and recovery or recycling of materials.

Council owns and operates three landfills in the SMRC LGA. Council must meet the legislative requirements and responsibilities under the POEO Act in operating these facilities. Council also owns a number of legacy landfill sites which are also subject to various provisions under the Act.

1.2.2.2 Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) is the primary Act governing resource recovery in NSW. The objectives of the WARR Act are to promote:

- The most efficient use of resources, including resource recovery and waste avoidance;
- A reduction in environmental harm, including pollution through waste;
- A consideration of the resource management hierarchy through avoidance of unnecessary resource consumption and disposal; and
- Resource recovery, which includes reuse, reprocessing, recycling and energy recovery.

The WARR Act defines the Waste Hierarchy (Figure 3), which ranks waste management options in order of general environmental desirability. Generally, the higher waste is managed up the hierarchy, the lower the impact and risk to the environment and communities. The waste hierarchy is intended for use alongside other assessment tools, such as cost benefit analysis, to guide decision-making.

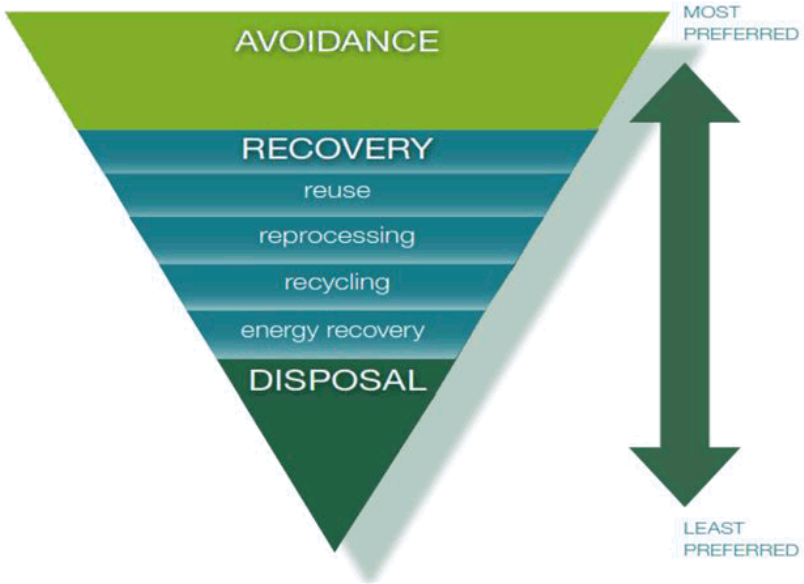


Figure 3 Waste Avoidance and Resource Recovery Act waste hierarchy

Source: Waste Avoidance and Resource Recovery Act 2001

1.2.2.3 NSW Waste Avoidance and Resource Recovery Strategy 2014–21

The WARR Strategy provides a framework for waste management in NSW. Development of a WARR Strategy, including targets for waste reduction, resource recovery and the diversion of waste from landfill disposal, is required under the WARR Act.

The following targets have been set to be achieved by 2021/22:

- Avoiding and reducing the amount of waste generated per person in NSW;
- Increasing recycling rates to 70% for municipal solid waste;
- Increasing recycling rates to 70% for commercial and industrial waste;
- Increasing recycling rates to 80% for construction and demolition waste;
- Increasing waste diverted from landfill to 75%;
- Managing problem waste better, establishing 86 drop-off facilities and services across NSW;
- Reducing litter, with 40% fewer items (compared to 2012) by 2017; and
- Combating illegal dumping, with 30% fewer incidents (compared to 2011) by 2017.

The WARR Strategy guides the development of Council's resource recovery targets. Council will also keep abreast of developments in all EPA funding schemes and have the opportunity to apply for funding to support and augment any of the described actions in order to achieve its objectives more efficiently.

The NSW Government is currently developing a new *20-Year Waste Strategy for NSW* which will set new targets and new waste initiatives out to 2040. The issues paper was released in March/April 2020 for public consultation and the draft 20 Year Waste Strategy is expected to be released in the first quarter of 2021.

1.2.2.4 Waste Less, Recycle More Initiative

The Waste Less, Recycle More (WLRM) grant program provides funding for organisations to improve their management of waste and recovery of resources.

Phase 1 of WLRM provided $465.7 million over the period July 2012 to June 2017, focusing on funding new, large-scale waste and recycling infrastructure, recycling facility upgrades, drop off centres, food and garden organics processing and recycling innovations. Phase 2 of WLRM commenced on 1 July 2017, with the capacity to award $337 million over 4 years. Priorities have already been outlined with a number of funding areas being potentially relevant to Council:

- Local government waste and resource recovery – $70 million;
- Illegal dumping prevention and waste enforcement – $65 million;
- Household problem waste – $57 million;
- Waste and recycling infrastructure – $48 million;
- Organics infrastructure – $35.5 million;
- Litter prevention and enforcement – $30 million;
- Business recycling – $22.5 million;
- Recycling innovation – $5 million; and
- Heads of Asbestos Co-ordinating Authorities – $4 million.

An extension of the Waste Less, Recycle More initiative to 2022 was announced in November 2020.

1.2.2.5 Waste and Resource Recovery (Container Deposit Scheme) Regulation 2017

The *Waste and Resource Recovery (Container Deposit Scheme) Regulation 2017* provides the framework for the implementation and operation of the Container Deposit Scheme (CDS), established under Part 5 of the WARR Act, which was implemented on 1 December 2017 under the brand "Return and Earn".

The CDS is an EPR scheme for eligible beverage containers. Under the scheme, a deposit of 10c per container is refunded to consumers in return for eligible beverage containers sold in NSW. The CDS only covers a selection of beverage containers (eligible containers), specifically those that are often consumed away from home and thus more likely to end up as litter. This deposit can be redeemed by presenting eligible containers at designated collection depots. The Scheme Coordinator ('Exchange for Change') manages scheme payments, establishes key agreements required for the operation of the scheme, and conducts auditing and verification. The Network Operator ('TOMRA-Cleanaway') establishes and manages collection points and ensures redeemed beverage containers are ultimately recycled.

SMRC has two Return and Earn reverse vending machines (RVMs) located in Cooma and Jindabyne. The Cooma RVM is located in the carpark of Cooma Woolworths and the Jindabyne RVM is located in the carpark of Lake Jindabyne Hotel. There is an over the counter (OTC) Return and Earn site in Bombala, located at the Bombala Powers IGA. The Return and Earn program commenced in December 2017.

1.2.2.6 Changes to use of Mixed Waste Organic Outputs (MWOO)

AWT or Mechanical Biological Treatment (MBT) facilities process mixed waste or garbage from municipal and sometimes commercial sources. Their main product output is a compost-like material known as 'mixed waste organic outputs' (MWOO), which have been generally used in mine rehabilitation, forestry plantations and agriculture in NSW.

In May 2018, a Technical Advisory Committee (TAC) convened by the NSW EPA recommended that MWOO was not suitable for use on broadacre agricultural or horticultural soils (TAC 2018). As a result, in October 2018, the EPA changed its regulations to prohibit the application of MWOO to land, having the effect of driving it to landfill.

The NSW Government is now focusing on third bin collection of Food Organics and Garden Organics (FOGO) to divert domestic organics from landfill. Hence, SMRC's will focus on the expansion of its existing FOGO service rather than the use of AWTs.

1.3 SMRC Policy and Strategy Framework

1.3.1 Cooma-Monaro Resource and Waste Strategy 2016 - 2021

SMRC has adopted the Cooma-Monaro Resource and Waste Strategy 2016 – 2021. This strategy focused on reducing waste to landfill and increasing recycling rates. It acknowledged waste as a resource; aiming to further Council's knowledge of the composition of waste generated and identify lost value in residential kerbside bins. It also intended to implement actions which would change the behaviour of waste generation in the region and allow Council to provide the best possible waste services. The strategy adopted the waste goals set by the WARR Strategy to increase recycling of municipal solid waste (MSW) to 70% through:

- reducing the amount putrescible waste going to landfill;
- diverting the organics from landfill with contamination rates of less than 5%, and producing marketable end products;
- ensuring disposal to landfill is the last resort in waste management;
- developing education programs for residents focussing on the benefits of organics collection; and
- achieving recycling participation rates of more than 70%.

The strategy broke down their aims into key result areas:

- **Resource recovery:** reduction in contamination rates, increase in recycling, increased participation in and services provided for recycling and organics collection and increasing community engagement.

- **Waste generation:** reducing waste generation rates by encouraging reduction, recycling, reuse and rethinking and encouraging higher participation of recycling in smaller towns and villages.
- **Landfill diversion:** increase landfill diversion of MSW to 70% and expand programs that help the effort toward this goal.
- **Local and regional collaboration:** maintain and improve communications with local and regional stakeholders and identify and implement solutions together toward waste minimisation outcomes.
- **Reduce litter:** reduce litter in public spaces through education of the community in the importance of litter reduction.
- **Bin Trim**[7]**:** promote the program, support the forums under the program and exchange information with regional partners regarding waste management matters of businesses.

1.3.2 Canberra Region Joint Organisation Waste Strategy 2018 - 2023

The CRJO Waste Strategy outlines a five-year plan for its member councils to drive more rapid medium-term change towards increased recycling and waste diverted from landfill.

Challenges identified in the CRJO Waste Strategy include:

- Under-priced landfills – impact resource recovery programs to sort and recycle waste streams;
- Threats to recycling – including expensive transport of comingled material to MRF's, flow-on effects for MRF operators from the CDS, collapsing export markets and a lack of investment in a domestic recycling capacity; and
- Data collection – lack of and poor data to inform strategic direction and investment.

By 2021-22, the CRJO aims to improve on 2010-11 rates as follows:

- Increase domestic recycling rates from 52% to 70%;
- Increase C&I recycling from 57% to 70%;
- Increase C&D recycling from 75% to 80%;
- Increase waste diversion to from 64% to 75%;
- Establish and upgrade up to 86 drop-off points to better manage problem wastes;
- Reduce the number of litter items by 40%; and
- Develop baseline data for illegal dumping to enable targeting setting for future strategies.

To meet its aims, the CRJO Waste Strategy provides actions under seven key themes:

1. Avoid and reduce waste generation;
2. Increase recycling;
3. Divert more waste from landfill;
4. Manage problem wastes better;
5. Reduce litter;
6. Reduce illegal dumping; and

[7] NSW EPA grant program to support NSW businesses to maximise recycling and minimise waste to landfill. https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/bin-trim

7. Develop regional collaboration and advocacy.

1.3.3 ACT Feasibility Study Roadmap and Recommendations – Discussion Paper

The 2018 ACT Waste Feasibility Study, A Roadmap to Improved Resource Recovery, aimed to bring the ACT closer to its ambitious target of 90% resource recovery. Currently sitting at 70%, the initiatives outlined in this study may enable the territory to reach 87% resource recovery by diverting over 170,000 tonnes of waste from landfill each year. Among the many suggested initiatives, the key points are summarised in Table 2.

Table 2 Key initiatives of the ACT Feasibility Study Roadmap

Key Area	Initiatives
Divert organics from landfill	Implement food waste social marketing and education campaigns
	Participate in national food waste initiatives
	Roll-out FOGO kerbside collections
	Develop an organics processing facility
Industry development and support	Identify and facilitate market development for materials that are currently sent to landfill
	Government 'buy-back' schemes for recycled products through procurement commitments
	Modify contracts for recovery and reuse of inert wastes
	Source separate C&I waste
	Improve waste advisory services to businesses
Energy from waste	Develop waste-to-energy policy for the ACT
	Consider establishment of a process-engineered fuel plant

The ACT banned single use plastic shopping bans in November 2011 and is currently exploring extending this ban to a range of other single use plastics such as straws and plastic cutlery.

1.4 Waste Services and Facilities

SMRC delivers and maintains a range of waste services and facilities. A core objective of SMRC's waste strategy is to unify services and facilities across the three amalgamated councils.

1.4.1 Waste Services

SMRC delivers a range of waste services that include:

- Domestic and commercial kerbside waste collection;
- Bank of bins (BOBs) service and collection points;
- Event waste removal;
- Annual Household Chemical CleanOut drop-off service; and
- Illegal dumping management and compliance (see Section 1.8.3).

1.4.1.1 Kerbside Waste Collection

SMRC provides a kerbside collection service to all major townships in the LGA. In 2020, kerbside collection services were offered to over 7,000 households. At present, SMRC provides the following kerbside waste collection services:

- Cooma township are provided with a 3-bin system (general waste, comingled recycling and food organics, garden organics or FOGO), operated by Council in-house staff;
- Berridale/Jindabyne and surrounds (formerly known as 'Snowy River') are provided with a 2-bin system (general waste and comingled recycling), operated by Council in-house staff; and
- Bombala/Delegate and surrounds are provided with a 2-bin system (general waste and comingled recycling), operated by an external contractor.

The bin size configurations and collection frequencies for the domestic collection service for each region of SMRC are provided in Table 3. The number of households serviced and tonnes collected are an average of 2019 and 2020 figures.

Table 3 Bin size configurations and collection frequencies for domestic kerbside collection service in SMRC LGA

Stream	Bin Size			Collection Frequency	Households Serviced (hh)	Service Coverage* (% hh)	Tonnes Collected (t/year)
	Bombala	Jindabyne	Cooma				
General waste	120L	240L	120L	Weekly	7,861	63%	3,315
Comingled recycling	360L	360L	140L, 360L	Fortnightly	7,472	60%	1,401
FOGO	No service	No service	240L	Fortnightly	2,736	22%	414

**Based on a total of 12,424 households located in the SMRC LGA.*

In addition, all residents have access to a self-haul and drop-off service at ten waste facilities (refer to Table 4).

Recyclables collected in the kerbside service are transported and processed at the Re.Group MRF in the ACT. Composting of FOGO waste is undertaken at the Cooma Landfill and the compost product can be purchased back by residents from Jindabyne Landfill, Bombala Landfill and Cooma Landfill.

1.4.1.2 Bank of Bins and Collection Points

SMRC provides BOB sites and collection points to help service properties located in remote regions. These residents would otherwise be required to drop-off their waste at the closest waste facility.

The BOB sites consist of several bins for general and recycling streams and the bins are serviced by the domestic waste and recycling vehicles. A list of the 16 BOB sites can be found in Appendix A.

1.4.1.3 Event Waste Removal

SMRC provides temporary special event bins for events and occasions where additional waste is generated. This service includes the delivery and pick up of the bins; and waste disposal.

1.4.1.4 Annual Household Chemical CleanOut Drop-off Service

SMRC provides an annual Household Chemical CleanOut drop-off service to allow residents to dispose of unwanted chemicals, paints, oils and other hazardous items which cannot be placed in the kerbside bins. Many of the chemicals collected are recycled. The Community Recycling Centres (CRCs) located at the Cooma and Jindabyne Landfills also accept problem wastes such as paint, gas bottles and oil free of charge.

1.4.2 Waste Facilities

SMRC maintains a range of waste facilities that include:

- Landfills;
- Transfer stations;
- CRCs;
- SCRAPMART tip shops; and
- "Coompost" composting facility.

SMRC's waste facilities accept a wide range of wastes, including MSW, commercial and industrial (C&I), construction and demolition (C&D), domestic and commercial recyclables, e-waste, green waste, hazardous waste (e.g. engine oils and car batteries) 'special' waste (e.g. biosolids and contaminated soils) and 'other' wastes (e.g. mattresses and tyres). A summary of the acceptable and non-acceptable waste materials for SMRC's transfer stations can be found in Appendix B.

Council do not own or operate any other MRFs in the region. Comingled material is sent to the ACT for processing at a considerable cost to Council. This strategy will explore options to reduce the costs associated with comingled material while maintaining or enhancing existing resource recovery rates.

1.4.2.1 Landfills and Transfer Stations

SMRC maintains a network of landfills and transfer stations across the LGA, including three operating landfills and six transfer stations, see Figure 4.

All residents, including rural residents outside the kerbside collection service area, have access to the these facilities for self-haul domestic waste disposal. In 2020, these sites were charging $7 - $14 per bin for general waste, $3 - $6 per bin for comingled recycling and $75 per tonne for green waste. Cooma and Jindabyne landfills charge by weight, whereas Bombala landfill and all transfer stations typically charge by volume. Variable charges have been set for residents, non-residents and commercial users at transfer stations and similar fees apply at landfill sites.

Domestic general waste, recyclables and green waste are accepted at all landfills and transfer stations which includes paper, cardboard, plastic and glass containers, aluminium and steel cans, waste oil and scrap metal. All facilities accept commercial waste; however, transfer stations do not accept large commercial loads.

All landfills accept e-waste: domestic e-waste is free of charge as part of the e-waste stewardship program while commercial e-waste is not free of charge. Accepted e-waste includes televisions, monitors, mobile phones, tablets, printers and computers. Asbestos can only be accepted at Cooma and Jindabyne landfills.

Currently each facility varies in its operating hours, see Table 4, and uncertainty about opening hours was cited in the 2020 community survey as one of the reasons these facilities are not utilised as effectively as they might be.

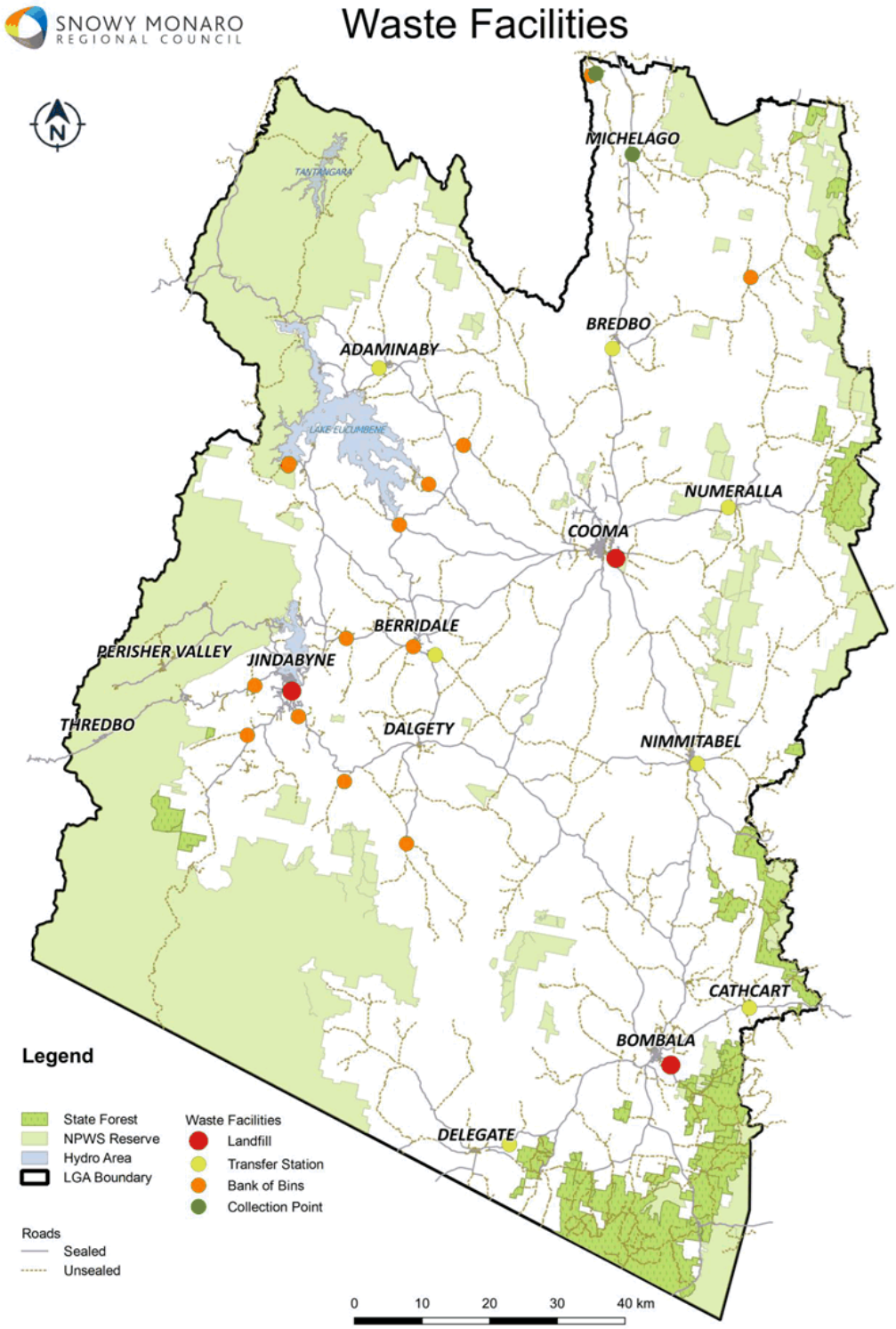


Figure 4 Waste facilities in SMRC (source: SMRC)

Table 4 SMRC transfer stations and landfills

Facility	Type of facility	Opening Hours	Projected remaining capacity
Adaminaby Transfer Station	Transfer Station (legacy landfill)	Sat 10am-3pm	Not applicable
Berridale Transfer Station	Transfer Station (legacy landfill)	Sun 10am-3pm	Not applicable
Bombala Landfill	Landfill	Fri-Mon 10am-4pm	30 – 37 years[8]
Bredbo Transfer Station	Transfer Station (legacy landfill)	Fri 10am-12pm Sun 10am-1pm	Not applicable
Clear Range (Smiths road)	Collection Point	Sat 8am-11am	Not applicable
Cooma Landfill	Landfill	Mon-Fri 9:30-4:30pm Sat 1pm-5pm Sun 11am-5pm	30 years[9]
Delegate Transfer Station	Transfer Station (legacy landfill)	Tue 9am-12pm Sat 9am-12:30pm	Not applicable
Jindabyne Landfill	Landfill	Mon-Fri 9:30-4:30pm Sat-Sun 10am-3pm	3 years*[10]
Nimmitabel	Transfer Station (legacy landfill)	Wed 9am-12pm Sun 11am-3pm	Not applicable
Numeralla	Transfer Station (legacy landfill)	Mon 8-10am Sat 9am-1pm	Not applicable

**Does not include capacity gained with quarry area expansion (32-53 years).*

1.4.2.2 Community Recycling Centres

The CRCs are situated at the Cooma and Jindabyne Landfills and are open for all NSW residents 7 days a week. Problem household wastes such as paint, gas bottles and oils can be dropped off free of charge.

1.4.2.3 ScrapMart Tip Shop

Two of Council's landfills, Cooma and Jindabyne, operate ScrapMart to sell reusable, second-hand products to the community. ScrapMart was opened in an effort to simultaneously reduce tipping fees for residents and reduce the amount of material being sent to landfill. The shop is owned and operated by Council staff who prepare items such as books, furniture, toys, outdoor goods, tools and electronics for sale.

[8] Based on estimates of the Bombala Landfill, by Tonkin.
[9] Regional Waste Strategy 2018-2023 (2017) Canberra Region Joint Organisation.
[10] Jindabyne Regional Waste Management Facility Options Assessment Report (2018) GHD.

1.5 Service Compliance

SMRC has had no compliance issues with the EPA.

1.5.1 Landfills

SMRC holds Environment Protection Licenses (EPL) for two of its three operational landfills at Jindabyne and Cooma as they receive more than 12,000 tonnes per annum, the threshold for requiring an EPL under the POEO Act, see Table 5.

Table 5 SMRC NSW EPA Environment Protection Licences

EPL number	Premises	Address	Issue Date
6194	Cooma Landfill	8448 Monaro Highway, COOMA, NSW 2630	16 Feb 2001
20060	Jindabyne Regional Waste Management Facility	6013 Kosciuszko Road, JINDABYNE, NSW 2627	01 May 2013

For 2019-2020:

- Jindabyne received 15,248 tonnes of waste;
- Cooma received 21,406 tonnes of waste; and
- Bombala received 1,297 tonnes of waste.

Note: waste received includes waste disposed to landfill and waste recycled/recovered.

Jindabyne and Cooma are licensed to accept asbestos material and other 'special' wastes such a ski's, ski boots and snowboards.

1.5.2 Transfer Stations

Transfer stations within SMRC are not required to hold EPLs as they receive less than 12,000 tonnes per annum. The average tonnes of waste received by Snowy Monaro transfer stations for 2018-19 and 2019-20 are presented in Table 6.

Table 6 Waste received at transfer stations (average of 2018-19 and 2019-20)

Facility	Mixed waste received (tonnes/yr)	Commingled recycling received (tonnes/yr)	Other waste received (tonnes/yr)	Total waste received (tonnes/yr)
Bredbo Transfer Station	43	15	74	132
Adaminaby Transfer Station	17	9	83	110
Numeralla Transfer Station	26	18	51	95
Berridale Transfer Station	17	11	105	132

Facility	Mixed waste received (tonnes/yr)	Commingled recycling received (tonnes/yr)	Other waste received (tonnes/yr)	Total waste received (tonnes/yr)
Nimmitabel Transfer Station	40	17	65	122
Delegate Transfer Station	10	4	52	65

1.5.3 Landfill Legacy Sites

SMRC has developed a landfill Legacy Sites Project Report to identify decommissioned landfill sites, determine the current level of remediation and evaluate the risk to the Council, community and environment. The report identified fourteen sites, with the possibility of five additional sites, and determined the site's risk and the approximate cost of rehabilitation. Total rehabilitation costs have been conservatively estimated at up to $30 million.

Council is in discussion with the NSW EPA about site specific remediation plans.

1.6 Waste and Resource Recovery Collection, Processing and Disposal Contracts

SMRC have a number of contracts for waste collection and resource recovery. These contracts have been summarised in Table 7 and Table 8.

Table 7 SMRC resource recovery contracts

Material	Recycling Contractor	Contract Expiry
Paper & cardboard, comingled recyclables	Re.Group ACT	Via contract with Remondis who freights the material to the Re.Group MRF in the ACT
Batteries	Dynamic Recycling	N/A
Cooking oil	Waste Away	N/A
Motor oil	Southern Oils	N/A

Table 8 SMRC waste service contracts

Service	Contractor	Contract Expiry
Kerbside collection - Bombala	Remondis	30/06/2022
Waste and Recycling Transportation Service	Remondis	30/06/2022

1.7 Waste Costs and Financial Performance

1.7.1 Domestic Kerbside Collection Service

A summary of the cost of the domestic kerbside collection service for SMRC is provided in Table 9. Figures are the average for 2018-19 and 2019-20.

Table 9 SMRC domestic kerbside collection service financial performance (2018-19 and 2019-20 averages)

Collection Service	Waste collected (tonnes/yr)	Households serviced (hh)	Total Cost ($/yr)	Cost per tonne ($/t)	Cost per hh ($)
General waste	3,315	7,861	$765,143	$232	$98
Recycling	1,401	7,472	$452,063	$324	$61
Organics	414	2,736	$107,312	$257	$39

1.7.2 Waste Facilities Financial Performance

SMRC's waste and recycling infrastructure's operations are subsidized by the Council (rate payers). MRA's analysis suggests that transfer station and landfill operations are 4 to 5 times higher (on average) than the revenue collected via gate fees. Table 10 and Table 11 summarise Council's expenditure across these areas, averaged across 2018-19 and 2019-20.

While gate fees could be increased to a fully user-pays model this may be perceived as unfair by those using higher cost transfer stations and facilities. Furthermore, such an action may lead to greater incidence of illegal dumping (see Section 1.8.3) or other misuse of the waste system such as the contamination of kerbside bins with hazardous waste.

Table 10 SMRC transfer station financial performance (2018-19 and 2019-20 averages)

Transfer Station	Waste received (tonnes/yr)	Revenue ($/yr)	Expenses ($/yr)	Expense per tonne ($/t)	Profit/loss($/yr)	Profit/loss per tonne ($/t)
Adaminaby	110	$9,102	$49,802	$453	**-$40,700**	**-$370**
Berridale	132	$11,816	$45,453	$344	**-$33,638**	**-$255**
Bredbo	132	$6,179	$61,937	$470	**-$55,758**	**-$423**
Delegate	65	$8,794	$28,765	$445	**-$19,971**	**-$309**
Nimmitabel	122	$7,620	$67,257	$553	**-$59,637**	**-$490**
Numeralla	95	$8,016	$52,977	$556	**-$44,961**	**-$472**

Table 11 SMRC landfill financial performance (2018-19 and 2019-20 averages)

Landfill	Waste received (tonnes/yr)	Revenue ($/yr)	Expenses ($/yr)	Expenses per tonne ($/t)	Profit/loss ($/yr)	Profit/loss per tonne ($/t)
Bombala	1,297	$103,128	$306,854	$237	**-$203,725**	**-$157**
Cooma	21,406	$1,636,817	$1,226,004	$57	**$410,812**	**$19**
Jindabyne	15,248	$1,365,822	$993,525	$65	**$372,297**	**$24**

1.8 Programs, Initiatives and Community Expectations

1.8.1 Education Programs

Resource and Waste Education Sessions

A Waste Education Officer is provided by Council to run workshops which aim to improve awareness and engagement on waste diversion and sustainability. The sessions include a range of informative and fun activities and are free for school or community groups. The topics they engage with include:

- Recycling Right;
- The 5Rs – Refuse, Reduce, Reuse, Recycle, Rot;
- Beyond the Bin; and
- Composting and Sustainable Living.

Pre-school Education

The Resource and Waste Department of SMRC is a grassroots level program encouraging sustainable living. It focuses on helping pre-schoolers learn and explore topics of waste and recycling. Council also offers help to pre-schools and day-cares in accessing equipment and education on sustainable gardens and worm farm, composting, etc. The education program includes activities such as:

- Reading books such as "Worms the Mechanics of Organics" or "Beyond the Bin";
- Sing and Learn education related songs;
- Home Composting and Sustainable Living education;
- Sorting waste and relay games;
- Colouring in and puzzle activities; and
- Worm handling.

Bournda Environmental Education Centre

The CRJO runs a Waste Education Program for all member councils though the Bournda Environmental Education Centre (BEEC). The programs are focused on diverting waste sent to landfill by schools and their communities. The program includes:

- Forming a school project team;
- Conducting a waste audit with support from the BEEC and Council;
- Visiting any relevant local resource and waste facility;
- Planning a project to divert waste from landfill;
- Record waste data before and after the project is conducted; and
- Presenting the project to the school community.

EnviroMentors Program

This mobile incursion-based environmental program is provided by Keep NSW Beautiful and runs across the state. It provides a range of educational services to boost community engagement with the environment and sustainability issues. It includes:

- School, community or corporate workshops;
- Litter and waste audits; and

- Community displays and educational material.

Waste-Free School Programs

These programs are supported by Council and aim at increasing waste avoidance through the adoption of initiatives. Some of these initiatives include:

- Bottle for Botol;
- Plastic Free July;
- Nude Food Day;
- Boomerang Bags;
- Plastic Pollution Solutions; and
- Stephanie Alexander Kitchen Garden Foundation.

1.8.2 Regional Waste Projects

- *Garage Sale Trail* provides residents, community groups and other organisations an opportunity to buy, sell and reuse second hand domestic goods. Council encourage this program to promote the upcycle, trade and reuse of items normally sent to landfill or disposed of through designated drop-off points. In 2019, SMRC received the 'Choose to Reuse Award' for their commitment and enthusiasm in the national reuse scheme. In 2018, over 50 households and organisations took park in the program. Out of 150 councils nation-wide, SMRC was one of only 14 councils to receive the award.
- Household Chemical Collection – SMRC in partnership with CRJO provides an annual drop off service for hazardous chemicals to help promote the collection, treatment and safe disposal of household chemical waste.
- *Recycle Right* is a community education program that provides information to residents on the types of material accepted in the comingled recycling service. It features a serious of short videos that outlines the type of materials accepted and common mistakes such as recycling flexible and/or soft plastic material, small items and soiled material. SMRC is one of the few regional Councils who proudly employ a Waste Education Officer, or similar, responsible for community engagement and education.

1.8.3 Illegal Dumping

Since 2018, SMRC has significantly improved the documentation of illegal dumping in the region's jurisdiction. Council have anecdotal evidence that suggest illegally dumped soil has been a significant issue in the past. Data collected by Council using the EPA's voluntary RID database between 2016 and 2019 indicates that household waste (59%), tyres (12%) and asbestos (10%) are the most common types of waste dumped illegally. Despite being the third most common, asbestos contributes 91% of the total weight of illegally dumped material (1,202 tonnes). The clean-up cost of illegal dumping cost Council over $6,000 in 2019.

Council have noticed illegal dumping spikes following increases in landfill fees and understand that disposals costs are one of the main drivers for dumping. Hence, the cost of clean-up, enforcement and education needs to be considered in the balance between user-pays gate fees at facilities versus subsidizing these facilities through charges in the general rates.

Although the Council website has information on the impacts and cost of illegal dumping and contact numbers for reporting illegal dumping; Council have not implemented education or community engagement campaigns to reduce illegal dumping, such as dob-in-a-dumper.

1.8.4 Community Expectations

SMRC conducted an extensive consultation process to ensure the Strategy is representative of community stakeholders and to build a joint understanding of Council's current challenges, alternatives and solutions. A combination of staff interviews, community survey and multi-day workshops have been conducted to shape Council's future direction for waste management and resource recovery.

1.8.4.1 Staff Interviews

Between December 2019 and April 2020, MRA interviewed Council staff involved in previous and current work within SMRC waste operations. The purpose of this consultation process was to develop an understanding of key issues for the Council and the directions and approach that MRA should take when drafting the new waste strategy. A total of 13 staff were interviewed, eight managerial and five operational staff, and responses were arranged by topic and are presented in Appendix C and the key issues raised summarised below in Table 12.

Table 12 Key issues for consideration in the Waste Strategy

Topic	Comments
Strategy	• Integrate the region's waste services to achieve consistent services and fees.
Operating facilities	• Jindabyne landfill expansion required in the short term, Cooma landfill expansion and upgrades required in the medium term; • Transfer station upgrades required to support recycling of C&D waste, easier access for the community and commercial users; • Installing a new data system would greatly improve SMRC's data collection and enable better oversight and management; • Bombala landfill costs a lot to run. May be better value as a transfer station.
Legacy landfill sites	• Keeping suitable sites for emergencies avoids costs of capping and reduces the cost and time to respond to emergencies and ensuing clean ups.
FOGO	• There is local demand for compost product; • FOGO service expansion should service properties with current 2-bin service and should be rolled out in stages.
CDS	• Currently no awareness among local builders to use recycled products, need to target education to construction entities.
Kerbside Service	• Lack of robust data about recycling performance but suspected recycling is falling; • Preference for in-house service to standardise and internalise service.
Bank of bins	• Change to lockable waste transfer trailer that can be moved using a light truck.
Freight of recycling	• The cost to freight recycling to ACT is much higher than the cost of landfilling; • Possible for new contractor to have a local glass crushing plant.
Bulky waste	• There is a demand for the service within the community.

1.8.4.2 Community Survey

SMRC conducted a survey via Facebook from 20 February 2020 to 20 March 2020 to engage residents and receive feedback for the Public Consultation Waste Strategy. 251 residents participated in the survey and provided answers to questions regarding use of available services, barriers to existing services, sources of

information, issues of problem waste and illegal dumping as well as providing general feedback about the Council's waste systems. The results of the survey are summarised as follows:

- The Waste and Recycling Transfer Station and the Tip Shop are the most utilised waste facilities;
- Most available facilities were considered to be underutilised due to Council fees and charges, difficulty getting to the recycling facilities (e.g. no trailer to transport waste, too far to travel, opening hours not long enough) and inadequate information about what can be disposed of;
- Most people follow the sticker on recycling bin for information on what to recycle;
- Only half of residents believe waste from the yellow-lidded bin gets recycled;
- Approximately half of respondents don't want to pay more to improve recycling at landfill;
- 10% of respondents are prepared to pay more if it actually gets recycled;
- 73% of respondents would use a FOGO collection service to dispose of food waste. 74% would use FOGO to dispose of garden waste;
- Over half of respondents believe illegal dumping is a problem and that people illegally dump because there is not enough access to bulky waste disposal;
- Respondents reported bulky/problem waste and green waste to be the hardest to dispose of;
- Most common feedback is requests for green waste service and bulky waste kerbside service;
- Education about what can be recycled and services available would increase recycling and benefit residents; and
- Facebook and letterbox/mail reported as best communication methods.

1.9 Waste Generation and Resource Recovery Performance

1.9.1 2018 Household Kerbside Bin Audit

SMRC engaged EC Sustainable Pty Ltd (EC Sustainable) to conduct a household kerbside waste audit for general waste, recycling and organic waste streams[11]. The audit was conducted in November 2018 and included 230 households across all three regions of SMRC: Bombala, Snowy River/Jindabyne and Cooma. The key findings from the audit include:

- 42.3% of waste is diverted from landfill, with the 3-bin area diverting more (56%) compared to the 2-bin area (29.5%);
- 52.9% is the potential diversion rate if all recyclable and organic material in general waste were recovered, with the 2-bin area at 34.5% and the 3-bin area at 72.7%;
- The resource recovery rate across both service areas was 77.5% for recyclables and 45.1% for organic material; and
- Households generate an average of 12.7 eligible CDS containers per week amounting to $453,000 per year in all bin streams, with $370,000 in the recycling bins.

The key recommendations from the audit include:

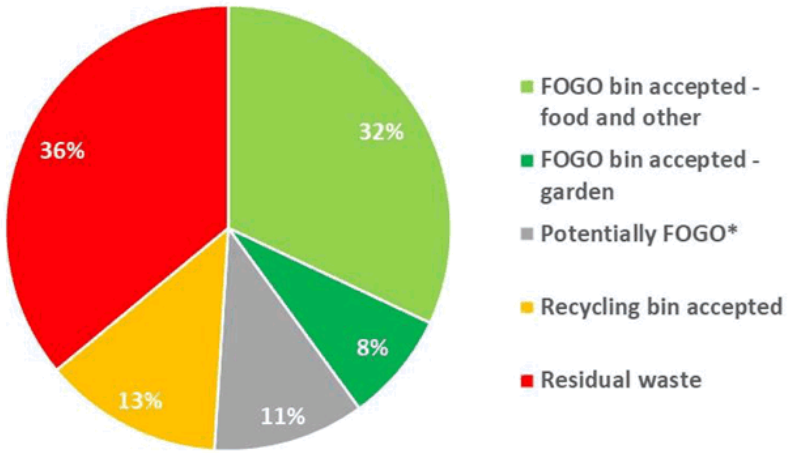
[11] Household Kerbside Bin System Audit 2018 (2019) EC Sustainable.

- Consider further initiatives to recover more recyclables and reduce contamination rates such as targeted education, community consultation survey to determine reasons for contamination and bin inspections to provide feedback to residents;
- Investigate option of 3-bin service in more areas to achieve higher resource recovery;
- Consider further initiatives to recover CDS containers;
- Conduct waste avoidance initiatives; and
- Conduct audits annually and seasonally to build up trend data.

1.9.1.1 General Waste

The audit found that households generate an average of 9.3kg of general waste per week. The composition of the general waste stream based on waste stream suitability is presented in Figure 5 and includes:

- 40% FOGO bin acceptable organic material (32% food and 8% garden organics);
- 11% potentially compostable material;
- 13% recycling bin acceptable material; and
- 36% residual waste.



*Includes other material that may be accepted in a FOGO service including contaminated soiled paper, other putrescible and wood/timber waste.

Figure 5 Kerbside general waste composition based on waste stream suitability (by weight)

1.9.1.2 Recycling

The audit found that households generate an average of 4.8kg of recycling waste per week with a contamination rate of 13%. Contaminated materials consisted of containerised food and liquid, textile/rags, plastic film and plastic bags. Composition of the recycling waste stream based on waste stream suitability is presented in Figure 6.

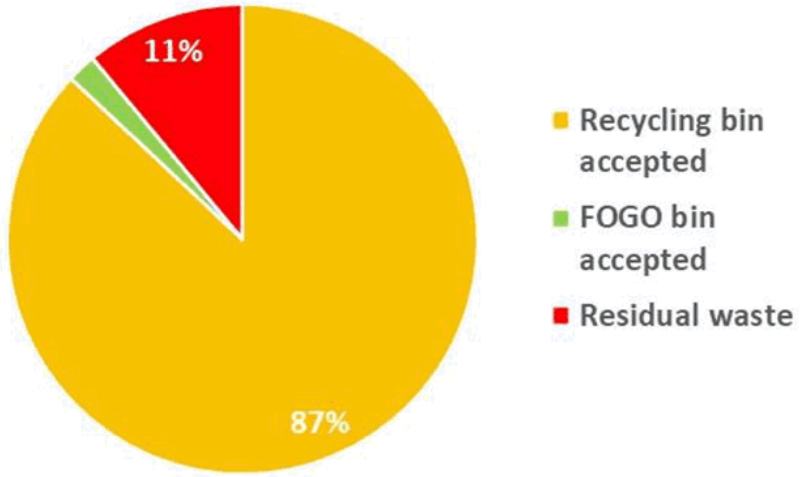


Figure 6 Kerbside recycling composition based on waste stream suitability (by weight)

1.9.1.3 Food and Garden Organics (FOGO)

The audit found that the average household produced 3.2 kg of organic waste per week with a contamination rate of 3%. Contaminated materials consisted of ceramics/dust/dirt and treated wood/timber. Compositionally, 91% was garden waste and 6% was food waste, see Figure 7.

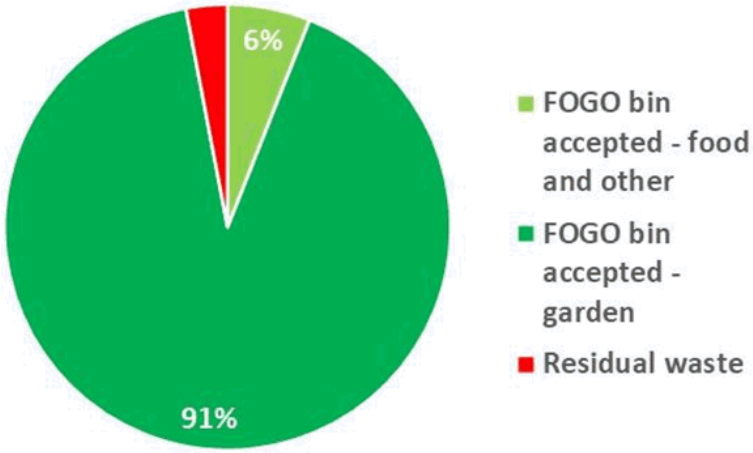


Figure 7 Kerbside FOGO composition based on waste stream suitability (by weight)

Detailed composition charts for each waste stream can be found in Appendix D.

1.9.1.4 CDS Eligible Containers

The audit analysed the weight of CDS material disposed of through kerbside collections and their composition in each waste stream. It found there was a total of 12.7 eligible CDS container in all bin streams being disposed of per household per week, weighing 1.1kg (refer to Table 13). By count, 81.7% (or 88.3% by weight) of these eligible containers were in the recycling stream.

With an assumption that the audit reflects a 100% bin presentation rate, it was approximated that $453,000 worth of eligible CDS containers per year were disposed of in kerbside recycling. Of this, $370,000 was in the recycling stream.

Table 13 CDS material disposed through comingled recycling and general waste collections

Stream	Beverage containers in the waste stream (kg/hh/wk)	Weight of those beverage containers which were CDS eligible	Weight of CDS eligible containers (kg/hh/wk)
Comingled recycling	1.63	58.6%	0.956
Residual waste	0.18	71.1%	0.127
Total	**1.81**	-	**1.083**

1.9.2 Comparison with Other Regions

1.9.2.1 Waste Generation

SMRC's waste generation and recycling performance can be compared with other regions for 2016-17 as reported in the CRJO Waste Strategy 2018-202312. Figure 8 reveals that SMRC households generate less general waste than the average for CRJO members, NSW and the ACT. Similarly, SMRC households generate less recycling waste than the average for CRJO members, NSW and the ACT, see Figure 9. SMRC households generate the same quantity of organic waste as the average for CRJO members, see Figure 10.

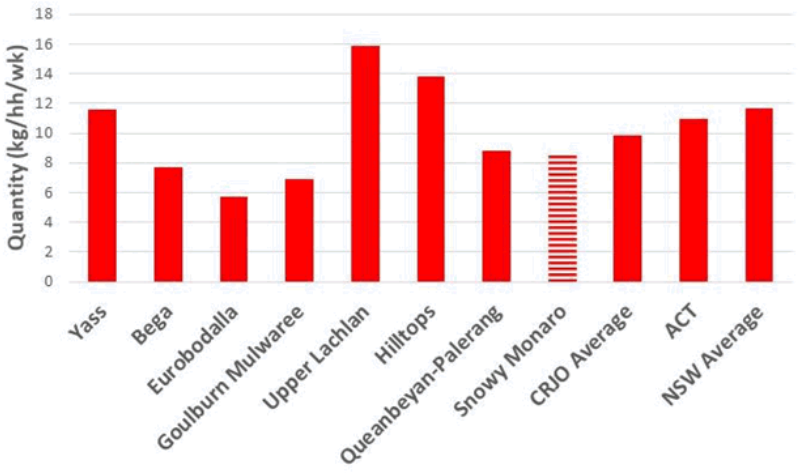


Figure 8 Comparison of household general waste generation with CRJO members, ACT and NSW 2016-17

[12] Regional Waste Strategy 2018-2023 (2017) Canberra Region Joint Organisation.

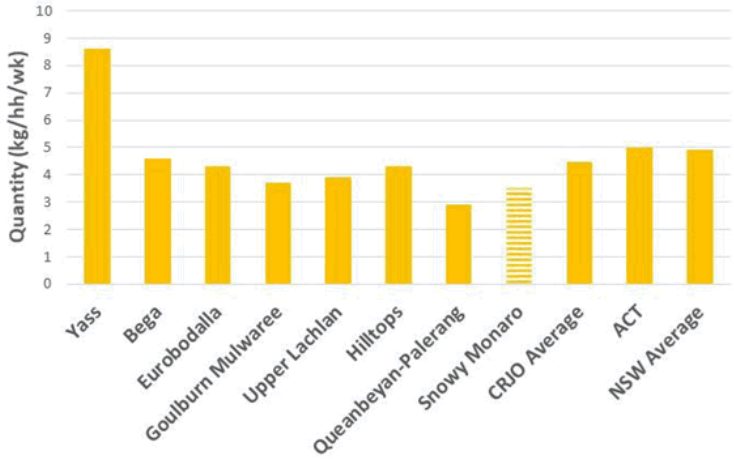


Figure 9 Comparison of household recycling waste generation with CRJO members, ACT and NSW 2016-17

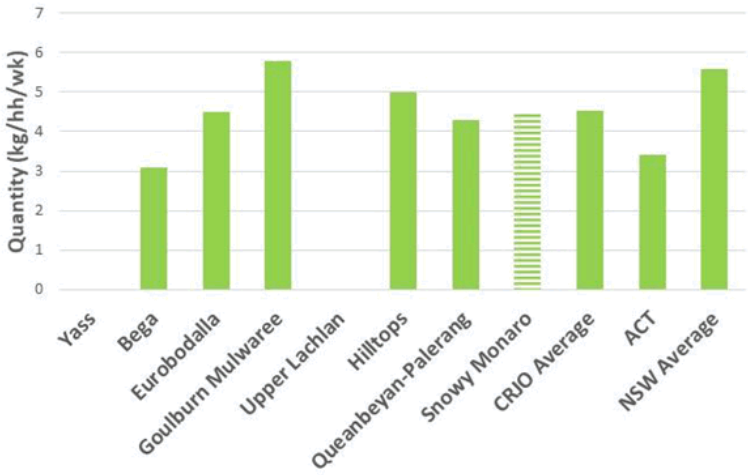


Figure 10 Comparison of household organic waste generation with CRJO members, ACT and NSW 2016-17

1.9.2.2 Recycling Performance

In 2016-17, SMRC reported the second lowest recycling rate (34%), compared to an average recycling rate of 41% for CRJO members and 45% for NSW. This rate is well below the NSW target of 70%, see Figure 11.

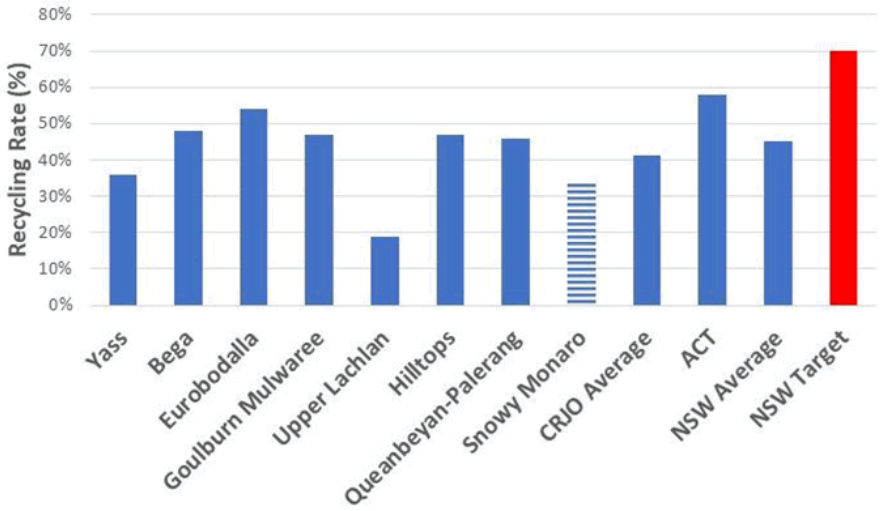


Figure 11 Comparison of recycling rates with CRJO members, ACT and NSW 2016-17

2 Where We Want to Go

2.1 Gap Analysis

2.1.1 Current Waste and Recycling Performance

SMRC is driven to work towards the ambitious targets set out in the NSW WARR Strategy for waste diverted from landfill and recycling. Figure 12 displays the current waste diversion rates of 30% and 56% for 2-bin and 3-bin areas, respectively, in SMRC, as found in the 2018 household audit, compared to the NSW target of 75%. The gap between the SMRC rate and the NSW target can be reduced with a 3-bin service and increased resource recovery. A recycling rate of 35% was reported for SMRC in 2020 compared to the NSW target of 70%. Separate recycling rate data for 2-bin and 3-bin areas was not available.

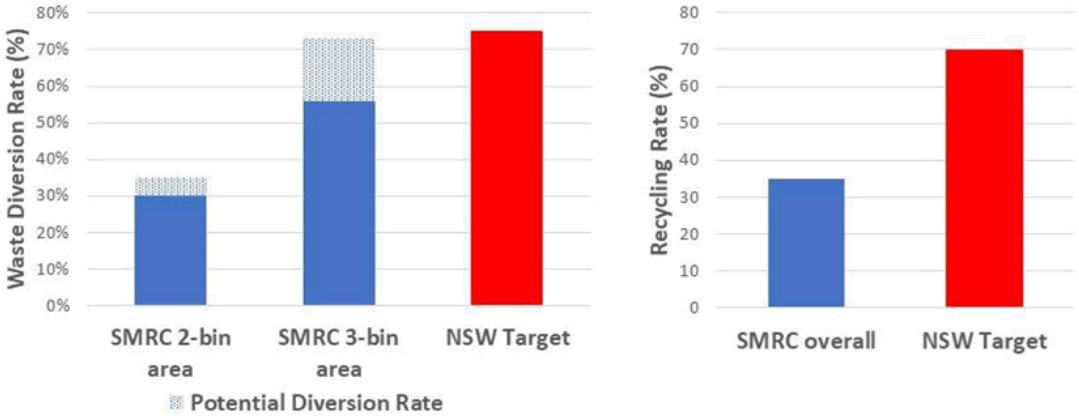


Figure 12 Waste diversion and recycling rates for SMRC compared to NSW targets

2.1.2 Future Population and Waste Generation

The population of SMRC is estimated to increase to 21,885 by 2036 according to forecasts based on ABS data[13], see Figure 13. This gradual increase will be attributed to the creep of residents from the Canberra region who will settle in townships such as Jindabyne, Berridale and Michelago. These areas will see an increase in development.

A Special Activation Precinct (SAP) has been announced for the Snowy Mountains region. Through the SAP, a new Master Plan for the Snowy Mountains will be formed and will focus on increasing year-round tourism for the local economy, growing employment opportunities, and investing in the region's infrastructure to accommodate this increase in permanent residents, and temporary visitors and workers. Therefore the SMRC population may increase significantly beyond the ABS projections particularly during peak tourism season. .

[13] https://housing.id.com.au/snowy-monaro/population-households

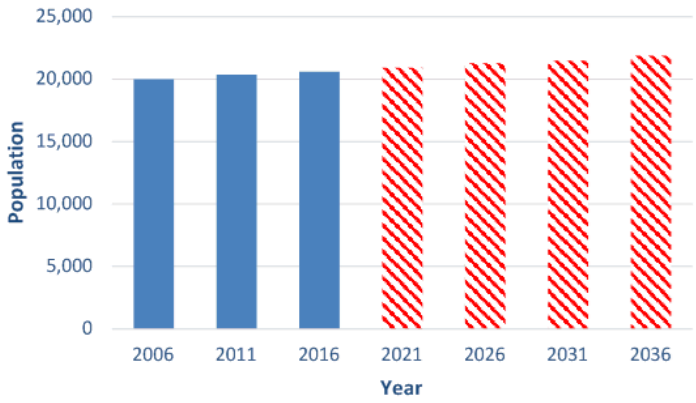


Figure 13 SMRC projected population – 2006-2036

Source data: id.community Demographic Resources Population Estimations from ABS Census data

Based on historic waste generation data from WARR surveys and the ABS population projection forecast, SMRC is projected to generate close to 24,000 tonnes of domestic waste by 2036, see Figure 14.

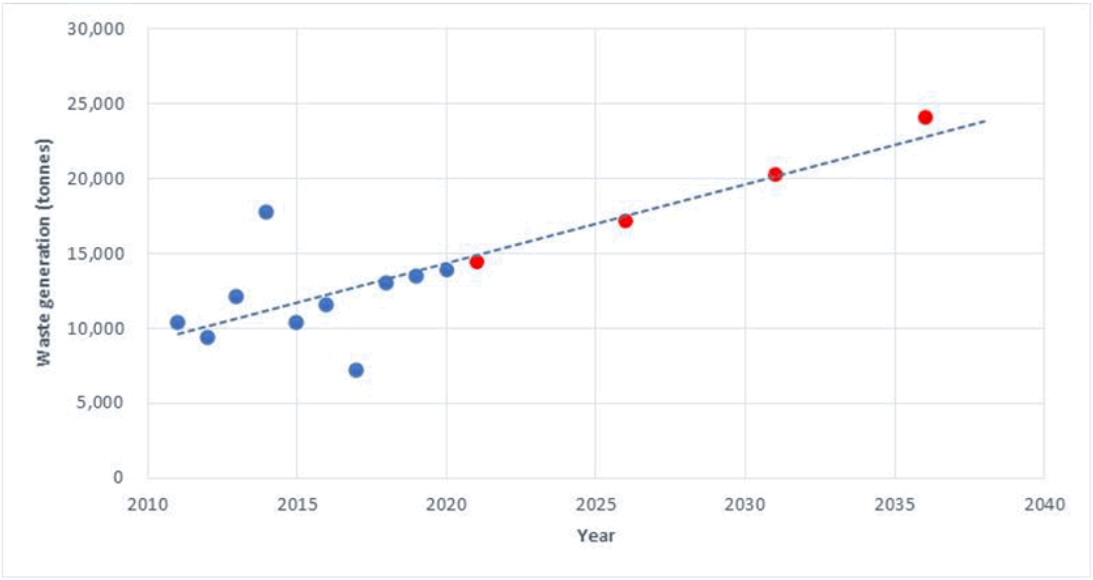


Figure 14 Projected domestic waste generation of SMRC

The upwards trend in waste generation per person from the annual WARR surveys was extrapolated using the calculated compounded annual growth rate and multiplied by the estimated population. This produced the total increase in domestic waste generation over the region seen in Figure 14. Please note the waste generation for years 2014 and 2017 have been excluded in trend calculations due to inaccurate data reporting.

With an increase in population and waste generation, Council will need to ensure the waste management system is maintained and continues to adequately serve the community.

2.1.3 Rationalisation of Transfer Stations Report

In November 2020, MRA was engaged by SMRC to review the financial and social viability of Council's six waste transfer stations and explore alternative options to reduce costs to council. A cost-benefit analysis was

performed to compare the current financial performance (business as usual (BAU)) against the option to establish BoB sites to service self-haul residents within each transfer station catchment area. Service rates of 100% and 75% of self-haul households were considered and CAPEX, OPEX and net profit for each scenario can be found in Appendix E.

Table 14 provides a traffic light summary of comparative analysis across the transfer stations for the service catchment and cost-benefit results. For the service catchment analysis, a sliding scale is used to rank the most preferred (green light) against the least preferred (red light) outcomes.

The cost-benefit analysis shows that there would be a financial benefit to SMRC in establishing BoB services compared with running the transfer stations for each of the six transfer station facilities analysed. Therefore, the traffic light summary reflects this but indicates that for Delegate the financial benefit is significantly smaller than for the other transfer station options.

Table 14 Traffic light analysis for transfer stations - summary of results

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Service Catchment Analysis						
Average time to 2nd facility for disposal of green, bulky and problem wastes (mean)						
Households travelling 60mins+ to 2nd facility (#hh)						
Cumulative change in travel time[14]						
Cost-benefit Analysis						
Net Revenue						
Comparison to BAU						
Benefit per current self-haul household						

The following recommendations from the study have been incorporated into the Waste Strategy:

- Establish transition plans to convert transfer stations to BoB services, ensuring BoBs services are fully operational prior to the closure of any transfer stations;
- Council may structure the BoB services as an opt-in service;

[14] Cumulative change in travel time is the difference between the average time to the 2nd facility and the average time to existing transfer station for self-haul households multiplied by the number of self-haul households.

- Review bulky waste management options for the transfer station household catchments to reduce illegal dumping; and
- Phase the conversion of transfer stations to BoB services, commencing with transfer station closures that provide the greatest benefit to SMRC and those that result in the least impact to residents.

2.1.4 Challenges to Overcome

As outlined in previous sections of this report, SMRC faces the following waste management challenges to overcome and address in this strategy:

- Underperformance regarding NSW WARR targets, especially in areas with a 2-bin service;
- Variation of services and facilities between SMRC areas;
- High costs associated with operating waste management facilities and services; and
- Accessibility and utilisation of waste facilities.

2.2 Visions and Themes

To address the challenges faced by SMRC and enable decisions to be made, the strategy process involved developing an overall vision for SMRC's waste management system over the next 10 years. This vision was translated into a set of themes and strategic objectives. Broadly, the themes and objectives will be guided by best practices principles and revolve around a Circular Economy, consolidation and optimisation of operations, reductions in waste generation and increased recovery while delivering a comprehensive, sustainable, efficient and budget conscious waste management service to community. The themes describe the vision, see Figure 15, and what it would mean for four key areas of the waste management system:

1. Improve waste management services and facilities;
2. Costs and finances;
3. The environment; and
4. Access and use.

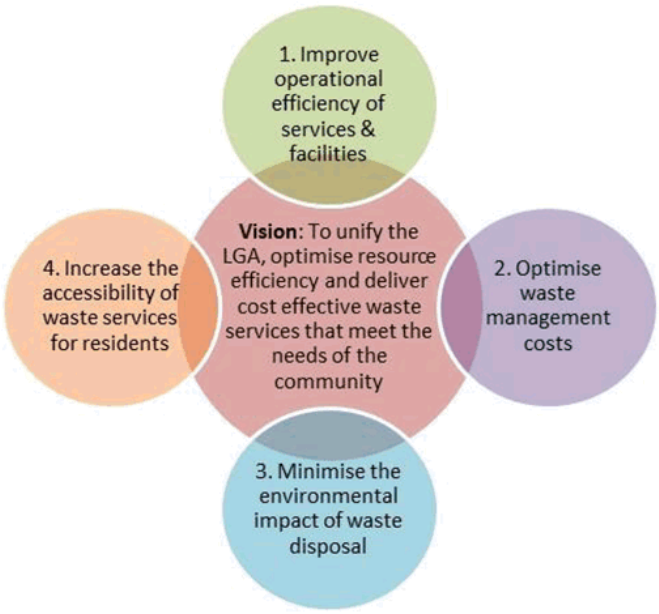


Figure 15 SMRC's waste strategy vision and themes

2.3 Strategic Objectives

Table 15 presents a list of strategic objectives developed to translate each theme into specific measurable goals. The strategic objectives were then used to develop a set of actions and options that Council could undertake over the next ten years to achieve the objectives of this strategy.

Table 15 Waste strategy themes and strategic objectives

Theme 1	**Improve operational efficiency of waste management services and facilities**			
Objectives		Description	Alignment to the Community Strategic Plan Objectives	
1.1	Improve and expand existing waste management services and facilities	Continue to provide waste services for the full range of waste streams from households and businesses while seeking to continuously improve facilities via upgrades to infrastructure, environmental protection, software, staff training and customer service.	8.2	Improve and maintain our publicly owned infrastructure, assets, and facilities to a high standard
1.2	Unify services across LGA	Ensure there is a consistent level of service provided across the three historic LGAs[15].	11.1	Public services and processes are delivered reliably and efficiently in response to community needs
Theme 2	**Optimise waste management costs**			

[15] Note there will still be a least three levels of service – full kerbside service in towns, bank of bins in remote communities, and self-haul for rural properties.

Objectives		Description	Alignment to the Community Strategic Plan Objectives	
2.1	Increase the cost efficiency of waste facilities and services	Improve the efficiency of spending on waste management services, including reviewing contracts, to generate more value from every dollar spent on waste management	11.2	Council utilises sound fiscal management practices, and pursues and attracts other sources of revenue
			7.2	Water, waste, sewer and stormwater management practices are contemporary and efficient
2.2	Optimise use of waste facilities and services	Consolidate and optimise waste facilities and services to maximise value for money to rate payers while achieving SMRC's waste objectives	11.2	Council utilises sound fiscal management practices, and pursues and attracts other sources of revenue
			8.2	Improve and maintain our publicly owned infrastructure, assets, and facilities to a high standard
Theme 3	**Minimise the environmental impact associated with waste disposal and meet NSW WARR Strategy targets**			
Objectives		Description	Alignment to the Community Strategic Plan Objectives	
3.1	Improve resource recovery and divert waste from landfill to work towards achieving state and national targets	Undertake actions to improve the LGA's resource recovery performance and divert more waste from landfill	7.2	Water, waste, sewer and stormwater management practices are contemporary and efficient
3.2	Minimise environment impact of waste management and disposal	Undertake actions to minimise environment impact of waste management and disposal	7.1	Protect, value, and enhance the existing natural environment
Theme 4	**Increase the accessibility and utilisation of waste facilities for residents**			
Objectives		Description	Alignment to the Community Strategic Plan Objectives	
4.1	Increase access to waste services and facilities	Undertake actions to increase residents' access to SMRC's waste services and facilities	3.2	Positive social behaviours (including law and order) are fostered and encouraged to maintain our safe, healthy and connected community
4.2	Improve the ease of use of waste facilities and services	Improve the ease of disposing waste or recycling via SMRC's waste facilities and services	3.2	Positive social behaviours (including law and order) are fostered and encouraged to maintain our safe, healthy and connected community

3 How We Will Get There

3.1 Planned Waste and Recycling Infrastructure

At the time of writing this Strategy, SMRC had identified a number of waste and recycling infrastructure projects for the LGA, these include:

- Jindabyne landfill expansion;
- Bombala landfill upgrade to a modern transfer station;
- Cooma landfill compost facility expansion and associated regulatory permitting;
- Cooma landfill surface contour and fill plan;
- Review of transfer station recommendations;
- Expansion of BOBs service; and
- Remediation of legacy landfill sites.

3.2 Options Identification

A plan of action to achieve the strategy's vision, themes and objectives was developed by MRA in consultation with SMRC stakeholders and informed by community surveys. (Note that some actions are listed under more than one objective as they contribute to multiple objectives).

Table 16 Potential actions and options to achieve the strategic objectives

Theme 1	**Improve operational efficiency of waste management services and facilities**	
Objectives		Potential Actions/Options
1.1	Improve and expand existing waste management services and facilities	1. New landfill cell at Jindabyne landfill 2. Upgrade resource recovery areas at Jindabyne and Bombala waste facilities 3. Conduct a review and options analysis for the operation of SMRC landfill facilities 4. Investigate the establishment of emergency landfill sites at suitable legacy landfills 5. Expand compost facility at Cooma Landfill to provide capacity to receive organic waste from across the LGA 6. Upgrade waste collection trucks 7. Improve data collection and analysis to enable system optimisation, e.g. weigh bridge IT integration 8. Expansion of BOB service
1.2	Unify services across LGA	1. Expand FOGO kerbside collection service 2. Optimise and unify kerbside collection services (**option analysis**) 3. Mobile CRC

Theme 2	**Optimise waste management costs**	
Objectives		Potential Actions/Options
2.1	Increase the cost efficiency of waste facilities and services	1. CDS capture from residential comingled recycling and select commercial waste streams (**option analysis**) 2. Local sorting of recyclables (**option analysis**) 3. Council procurement of local recycled content 4. Optimise kerbside collection and waste transport services (**option analysis**) 5. Upgrade Bombala landfill to a modern transfer station (**option analysis**) 6. Utilise grant funding 7. Improve data collection and analysis to enable system optimisation, e.g. Radio Frequency Identification Device (RFID) bin-tagging and weigh bridge IT integration 8. Implement recommendations of the Rationalisation of Transfer Station report, including transition plans for conversion of transfer stations to BOBs at Adaminaby, Berridale, Bredbo, Delegate, Nimmitabel and Numeralla 9. Maintain and expand education campaigns to enhance upstream sorting and optimal use of SMRC waste services 10. Conduct review of waste facilities gate fee structure
2.2	Optimise use of waste facilities	1. Upgrade resource recovery areas at Jindabyne and Bombala waste facilities 2. Improve data collection and analysis to enable system optimisation, e.g. weigh bridge IT integration 3. Expand compost facility at Cooma Landfill to provide capacity to receive organic waste from across the LGA 4. Implement recommendations of the Rationalisation of Transfer Station report, including transition plans for conversion of transfer stations to BOBs at Adaminaby, Berridale, Bredbo, Delegate, Nimmitabel and Numeralla 5. Conduct a review and options analysis for the operation of SMRC landfill facilities
Theme 3	**Minimise the environmental impact of waste disposal, meeting NSW WARR Strategy targets**	
Objectives		Potential Actions/Options
3.1	Improve resource recovery and divert waste from landfill to work towards	1. Mobile CRC 2. Expand FOGO kerbside collection service 3. Expand FOGO commercial collection service to most households with a kerbside service[16]

[16] Note that some rural properties with a kerbside service for residual waste and comingled recycling may not need a FOGO service as they will have sufficient space to compost onside. This decision will be subject to further consultation.

	achieving state and national targets	4. Support food rescue programs from food retailers (e.g. from supermarkets & bakeries) 5. Bulky waste collection service (**options analysis**) 6. Upgrade transfer stations at Jindabyne, Cooma and Bombala to increase recovery 7. Undertake FOGO educational programs 8. Increase recycling of C&D and difficult-to-recycle waste through increased separation and targeted education programs 9. Council procurement of local recycled content 10. Maintain and expand education campaigns to enhance upstream sorting and optimal use of SMRC waste services
3.2	Minimise the environmental impact of waste management and disposal	1. Investigate illegal dumping hot spots and initiate an illegal dumping awareness campaign 2. Bulky waste collection service (**options analysis**) to help reduce illegal dumping 3. Remediate legacy landfill sites to protect the environment and human health 4. Upgrade water management systems at Cooma and Bombala waste facilities 5. Environmental improvements at waste facilities 6. Conduct a review and options analysis for the operation of SMRC landfill facilities
Theme 4	**Increase the accessibility of waste facilities for residents**	
Objectives		Potential Actions/Options
4.1	Increase access to waste services and facilities	1. Expansion of BOB services 2. Kerbside service expanded to Numeralla 3. Mobile CRC
4.2	Improve the ease of use of waste facilities	1. Upgrade transfer stations at Jindabyne, Cooma and Bombala to improve ease of use and increase recovery of resources. 2. Awareness/education of both residents and commercial users on how to access waste facilities and how to use them properly (e.g. source separation).

3.3 Options Analysis

Options were analysed and compared based on cost and effectiveness in addressing the strategy objectives and how it aligns to other objectives. Table 17 displays a summary of the options analyses performed.

Table 17 Options analysis for SMRC Waste Strategy

Project/ Service	Options	Estimated Costs & Savings ($FY20)	Benefits, Disadvantages and Risks
Bombala Landfill	Continue to operate Bombala Landfill	Useful life: 20 years Capital cost: $3.2M (Inclusive of closure of old cell and stormwater project) Operating cost: $350/tonne (Inclusive of staff, equipment, materials & contracts, administration and other operating costs)	**Benefits**: • Avoids freighting waste to Cooma landfill **Disadvantages & Risks**: • High operating costs due to low throughput • WHS risk for staff and community from existing facilities • Increased environmental and health risks • Higher fleet management costs
	• Upgrade Bombala to a modern transfer station • Freight general waste material to Cooma landfill[17] • Keep Bombala landfill for emergency disposal location	Useful life: 20 years Capital cost: 17% more expensive (Inclusive of closure of old cell, stormwater project, transfer station upgrades, tip shop and prime movers) Operating cost: 50% cheaper (Inclusive of disposal and freight costs to Cooma) Cost savings from not operating Bombala landfill, avoided costs of landfill upgrades and equipment replacement	**Benefits**: • Reduced risk to the environment from fewer active landfills • Improved work, health and safety through reduce vehicle movements on the tip face • Increased resource recovery and improved community waste facility experience through transfer station upgrade • Lower fleet management costs **Disadvantages & Risks**: • Increased truck movements between Bombala and Cooma

[17] Note that this option analysis does not investigate the opportunity for collection trucks to drive straight to Cooma landfill.

Project/ Service	Options	Estimated Costs & Savings ($FY20)	Benefits, Disadvantages and Risks
Council or contractor provisions of waste collection and transportation services	External contractor to provide: • Kerbside collection service (for entire LGA) • Transport of comingled recyclables to ACT MRF	These costs are being assessed internally by SMRC but remain commercial in confidence due to probity issues associated with any forth coming tender. **Kerbside collection** contract - cost for SMRC Kerbside collection residual + recycling: 35% cheaper with external contractor Kerbside collection residual + recycling + FOGO: 26% cheaper with external contractor **Comingled to ACT MRF** - cost for SMRC No capital cost Weighted average cost of transport to ACT MRF: $235/t or $346k/yr	**Benefits**: • Reduced WHS risk and liability for Council • Reduced administrative costs for council **Disadvantages & Risks**: • Less direct control of service quality and delivery • Less flexibility to revise services during the contract period • Potential for staff to be sourced from outside the region and for profits to leave the region
	Council to provide: • Kerbside collection service (for entire LGA) • Transport of comingled recyclables to ACT MRF	**Kerbside collection** cost difference in % as above **Comingled to ACT MRF** cost for SMRC Weighted average cost of transport to ACT MRF: $264/t or $388k/yr	**Benefits**: • Increased control of service quality and delivery • Increased flexibility • Potential to keep a greater portion of employment and funds in the region • Potential to achieve cost savings by merging and streamlining waste freight services currently provided by a range of contractors e.g. e-waste, scrap metal and other speciality wastes **Disadvantages & Risks**: • Increased WHS risk and liability for Council • Increased administrative costs for the Council

Project/ Service	Options	Estimated Costs & Savings ($FY20)	Benefits, Disadvantages and Risks
Capture CDS and glass for use locally	Continue operations as usual: collection of comingled recycling material and transport to ACT MRF.	None	**Benefits**: • Reduced WHS risk and liability for Council **Disadvantages & Risks**: • Loss of CDS revenue • Maintained or increasing waste truck movements
	Capture glass and CDS eligible beverage containers from comingled recycling at a local sorting facility. Support businesses and sporting organisations to sort and recover CDS containers onsite. Crush glass locally for use as a sand or gravel replacement in council construction projects and road works.	Costs: • Establishing a local sorting facility • Establishing a glass processing facility • Hiring and training staff • Operating and maintaining the equipment and facility • Education of businesses and sporting organisations Savings: • Freight of recyclables to ACT • Cost of processing recyclables in ACT • Income from 10c per eligible container	**Benefits**: • Local employment • Reduced trucks taking recyclables to the ACT • Keeps CDS revenue in the region **Disadvantages & Risks**: • Costs and benefits may differ from predictions – undermining the business case • Change in community behaviour may lead to CDS containers being recovered at the household level rather than left in the yellow top bin • Increased WHS risk and liability for Council
Bulky waste collection service	Continue operations as usual (no bulky waste collection)	None	**Benefits**: • Least cost to council • Minimised WHS risk and liability to the Council **Disadvantages & Risks**: • Potentially greater levels of bulky waste dumping

Project/ Service	Options	Estimated Costs & Savings ($FY20)	Benefits, Disadvantages and Risks
Bulky waste collection service (cont.)	a) Bulky waste collection service available on request to urban households Rural households have a drop-off day to specified location (2 times per year)	Urban collection costs: $170k-$280k/year Rural collection cost $2k-$5k/year **Estimate based on similar regional NSW Council and a 23% uptake of the service. Service fees for SMRC would need to be confirmed through a tender process.*	**Benefits**: • Satisfy community demand for bulky waste service • Increase opportunity to recover and re-sell bulky waste at tip-shops or ensure they are recycled (e.g. fridges) • Reduced dumping • Cost recovery through fee for service **Disadvantages & Risks**: • Unsustainable service based on sparsity of residents/properties • Community dissatisfaction with fee for service • Scheme costs and WHS risks
	b) Scheduled annual bulky waste collection from kerbside	Collection & disposal costs: $290k-$380k/year **Estimate based on similar regional NSW Council and a 33% uptake of the service. Service fees for SMRC would need to be confirmed through a tender process.*	**Benefits**: • Satisfy community demand for bulky waste service • Increase opportunity to recover and re-sell bulky waste at tip-shops or ensure they are recycled (e.g. fridges) • Reduced dumping **Disadvantages & Risks**: • Unsustainable service based on sparsity of residents/properties • Increased waste to landfill • Scheme costs and WHS risks
	c) On request collection service for pensioners, disabled people and concession holders only	Collection & disposal costs: $65k-$110k/year **Based on a 60% uptake from 1,200 hh.*	**Benefits**: • Provides service to pensioners and concession holders who may find transport of bulky waste to a landfill facility less accessible. **Disadvantages and Risks**: • Does not provide equitable service to all SMRC residents. • Scheme costs and WHS risks

3.4 Actions Assessment

The results from the assessment of the considered actions are presented in Table 18 to provide the reader with the assessed benefits of the potential actions.

Table 18 Actions assessment for SMRC Waste Strategy

Potential Action	Description	Establishment Cost ($FY20)	Estimated Operating costs & savings ($/annum)	Benefits, Disadvantages & Risks
FOGO collection service expansion	Expansion of current residential FOGO service to all properties with a current 2-bin service within the LGA. Opt-in commercial FOGO service for businesses.	Expansion of composting facility: $230k (BIS_Capital Budget 2021) New bins and truck: $392k Community education campaign associated with roll out: Simple - $50k/year Complete - $120k/year	Costs: $55/household/year (FOGO expansion only) $187/tonne (FOGO expansion only) Saving: $199/tonne residual waste collection and disposal avoided via FOGO	**Benefits**: • Satisfies community demand • Unify kerbside waste services across LGA • Increase resource recovery and diversion from landfill • Reduced environmental impacts, such as greenhouse gas emissions and leachate, due to diversion from landfill • Sale of compost – with benefits to local landscapers, farmers and gardeners **Disadvantages & Risks**: • Administrative effort and costs associated with the roll out • Product contamination risk if education campaigns are not successful • Low organic waste capture rate if community participation is low

Potential Action	Description	Establishment Cost ($FY20)	Estimated Operating costs & savings ($/annum)	Benefits, Disadvantages & Risks
RFID bin-tagging	Installing RFID tags on bins to provide real-time bin collection and servicing data for Bombala and Cooma households. Requires installation of chips into new bins or retrofitting chips into existing bins, truck readers and handheld devices.	RFID bin tags: $14,904-$26,082 ($2-$3.50 per unit for 7,452 bins) + installation when retrofitting + labour Truck reader: Approx. $3,000 + installation + licencing + integration into software system Handheld units: $3,000 per unit (for bin repair teams/bin auditors)	Data analysis	**Benefits**: • Improved data collection and analysis to enable system optimisation (potential cost savings) • Collection of accurate waste data: bin presentation, weight/ fullness, contamination • Reduced collections (based on bin fullness), e.g. BOBs **Disadvantages & Risks**: • Administrative costs and effort in successful roll out • Perceived breach of privacy • Increased fleet maintenance costs
Expand kerbside collection service	Expansion of kerbside collection service to Numeralla, servicing 100 households.	240L red- and yellow-lidded bins: $75/bin x 100hh x 2 bins = $15k New truck not required	Annual OPEX (collections, recycling transfer to MRF, disposal/gate fee, additional travel time off current collection route): $32,283 Annual revenue: $37,900 Annual Net Profit: $5,617	**Benefits**: • Satisfies community demand • Services rural properties • Increased revenue to Council • Reduces WHS risk to residents now receiving a kerbside service **Disadvantages & Risks**: • Increase kerbside collection costs • Increased waste truck movements on rural roads

Potential Action	Description	Establishment Cost ($FY20)	Estimated Operating costs & savings ($/annum)	Benefits, Disadvantages & Risks
Landfill Upgrade	Construction of new landfill areas at Jindabyne and Cooma landfills. Integration of weighbridge data system into SMRC financial system. Stormwater leachate system upgrade at Cooma landfill.	Design & construction: $11.8m (GHD) $500k (2021 budget) Weigh bridge IT replacement: $100k Cooma lining cost: $11.6M split in three stages (SMRC) Cooma Stormwater upgrade: $2M (BIS_Capital Budget 2021) Cooma LFG capture system: $400k (indicative cost based on similar size landfills)	No additional ongoing costs as landfill costs will transfer from old to new cell	**Benefits**: • Optimise use of waste facilities • Serve the current and future waste needs of the SMRC community • Improved data collection and analysis to enable system optimisation (potential cost savings) **Disadvantages & Risks**: • Constraints of available site at Cooma may slow regulatory approvals
Modern transfer station upgrades	Upgrade to modern transfer stations to provide a safer, easier and more efficient layout for source-separation and drop-off for residents and commercial users.	Bombala - $600k Delegate - $200k	N/A	**Benefits**: • Optimise use of waste facilities • Support recycling of C&D waste • Increase resource recovery **Disadvantages & Risks**: • Administrative costs and risks in delivering the project successfully
Conversion of a drop off service model to collection & BOB service model	Implement recommendations of the Rationalisation of Transfer Stations report, including transitioning to BOB sites at Adaminaby, Berridale, Bredbo, Delegate, Nimmitabel and Numeralla.	Refer to Appendix E for CAPEX, OPEX and net profit for each transfer station site		**Benefits**: • Optimise use of waste facilities • Financial benefit to council • Increased access for residents **Disadvantages & Risks**: • Decreased resource recovery • No local bulky waste disposal – may lead to dumping • Increased drive time for self-haul residents • Community resistance

Potential Action	Description	Establishment Cost ($FY20)	Estimated Operating costs & savings ($/annum)	Benefits, Disadvantages & Risks
Replace bank of bins	Waste trailers to replace BOBs in some locations.	$12k for three 8m^3 split trailers	Reduced ongoing costs Utility truck hourly cost: $54/hour Savings from not using kerbside collection trucks for pick up: $150/hour	**Benefits**: • Reduced costs to rate payers • Reduced movement of large waste trucks to remote areas **Disadvantages & Risks**: • Managing community acceptance • Risk of trailers being stolen
Remediate legacy landfills and convert to emergency landfill's where appropriate	Remediation of legacy landfills to ensure sites comply with legislative requirements. Investigation into the establishment of emergency landfill sites at suitable legacy landfills.	Remediation of all (14) legacy landfills: $30m (legacy site report)		**Benefits**: • Reduced risk to human health and the environment from these sites • Establishment of relatively low-cost emergency landfill capacity distributed more efficiently across the SMRC **Disadvantage & Risks**: • Uncertain remediation costs that may escalate if certain contaminants are found • Gaining EPA approvals/ sign off
Mobile CRC	Mobile CRC for household problem waste	N/A	Funded by EPA	**Benefits**: • Increase resource recovery • Increase access to waste services • Reduce hazardous contamination of general waste and associated risks at landfills • Reduce community risk from household hazardous wastes **Disadvantages & Risks**: • Increase WHS from operating the CRC and receiving hazardous wastes

Potential Action	Description	Establishment Cost ($FY20)	Estimated Operating costs & savings ($/annum)	Benefits, Disadvantages & Risks
Upgrade Collection Trucks	Cooma collection truck upgrade to enhance fleet with additional side lift truck	$425K per truck	Marginal reduction in operating costs	**Benefits**: • Reduced worker WHS risks • Improvement in kerbside collection efficiency • Reduced noise and emissions standards **Disadvantages & Risks**: • Minimal
Increase recycling of C&D waste	Targeted educational programs for construction entities to source separate C&D waste.	Initial funding to be provided via NSW EPA Bin Trim funding	Reduces costs to landfill	**Benefits**: • Increased resource recovery • Reduced waste disposal costs for businesses **Disadvantages & Risks**: • Administrative effort for successful program
Implement recycling of difficult-to-recycle material	Increase recycling of difficult-to-recycle materials through targeted education and collection programs, e.g. polystyrene.	Requires further investigation	Reduces costs to landfill	**Benefits**: • Increased resource recovery • Reduced waste disposal costs for businesses **Disadvantages & Risks**: • Administrative effort for successful program
Local procurement of recycled materials	Increase local procurement of products with recycled content in construction and reduce use of virgin materials	Requires further investigation	Potential cost savings	**Benefits**: • Increase resource recovery • Circular economy initiative • Increase return on waste management costs spent **Disadvantages & Risks**: • Administrative effort for successful program • Need to ensure that construction activities are not compromised by the use of recycled material

Potential Action	Description	Establishment Cost ($FY20)	Estimated Operating costs & savings ($/annum)	Benefits, Disadvantages & Risks
Support food rescue programs	Collection of quality surplus food from retailers and donation to dedicated charities	Requires further investigation	Requires further investigation	**Benefits**: • Increase resource recovery • Socially benefit to disadvantages community members **Disadvantages & Risks**: • Administrative effort for successful program is relatively high compared to the amount of material recovered
Illegal dumping	Reduce illegal dumping through implementation of an illegal dumping awareness campaign, including dob-in-a-dumper, and data collection	Requires further investigation	Requires further investigation	**Benefits**: • Reduce illegal dumping **Disadvantages & Risks**: • Administrative effort and cost may out way reduction in dumping
Review gate fee structure	Review of gate fee structure and investigation of option to introduce education levy	$Consultants report – $20K – $30K	N/A	**Benefits**: • Increased funding to provide waste education • Increased resource recovery through education **Disadvantages & Risks**: • Increased cost to residents • Community resistance
Disability employment opportunities	ScrapMart tip shops to provide employment opportunities for local people with disability	Council may undertake these investigations in house or contract a consultant to review opportunities for implementation		**Benefits**: • Employment opportunities for local disabled people • Community support **Disadvantages & Risks**: • Increased employment costs

4 How The Strategy Will Be Implemented

4.1 Recommended Waste Infrastructure Action Plan

Table 19 presents the action plan for implementing SMRC's waste management vision and strategic objectives over the short term (1-5 years), medium term (5-10 years) and long term (10+ years) for waste infrastructure.

Table 19 Recommended 10 year action plan timeline for waste infrastructure in SMRC

Action	Steps required	Complete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
Bombala landfill	1. Upgrade to modern transfer station			■										
	2. Purchase equipment			■										
	3. Consult with community about changes			■										
	4. Transition landfill to modern transfer station				■									
	5. Freight waste to Cooma landfill				■	■	■	■	■	■	■	■	■	■
Jindabyne landfill	1. Review and implement landfill options analysis recommendations			■	■	■	■	■	■	■	■	■	■	■
	2. Design modern transfer station upgrade					■								
	3. Construct modern transfer station upgrade						■							
	4. Implement weigh bridge IT replacement, including handheld devices, to integrate data into SMRC financial system.						■							
	5. Cap old cell						■	■						
Cooma landfill	1. Review and implement landfill options analysis recommendations			■	■	■	■	■	■	■	■	■	■	■
	2. Gain regulatory approval for compost facility expansion			■										

Action	Steps required	Complete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
	3. Construct works at compost facility													
	4. Gain regulatory approval for stormwater & leachate upgrades													
	5. Construct stormwater & leachate upgrades													
	6. Implement weigh bridge IT replacement, including handheld devices, to integrate data into SMRC financial system													
Review gate fee structure	1. Conduct a review of landfill gate fee structure model													
	2. Implement recommendations													
Transfer stations	1. Design transfer station upgrades to improve safety, accessibility and encourage source separation													
	2. Implement upgrades at Delegate transfer station													
	3. Transition transfer stations to bank of bins and implement recommendations of the Transfer Station Analysis Report.													
Legacy landfills	1. Gain approval for Delegate landfill to be used as an emergency landfill													
	2. Investigate opportunities for waste sites to be used as emergency landfill sites													
	3. Undertake detailed remediation plan for each legacy site, including testing and comprehensive cost estimates, to identify priority order													
	4. Rehabilitate legacy sites gradually over 20 years													

Action	Steps required	Complete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
CDS collection	1. Develop business case for local glass and CDS capture (only if Council gains access to funding) 1a. Council to proceed only if access to funding is successful			■	■									
	2. Identify site for local MRF and gain regulatory approval					■	■							
	3. Establish local MRF						■	■						
	4. Recruit and train local casual staff							■						
	5. Sort comingled recycling waste for CDS collection								■	■	■	■	■	■
	6. Work with relevant Council departments to integrate use of recovered glass in roads and construction activities							■	■					
	7. Ongoing use of the recovered glass by Council								■	■	■	■	■	■
RFID bin-tagging	1. Investigate suitability of RFID bin-tagging options		■											

4.2 Recommended Waste Services Action Plan

Table 20 presents the action plan for implementing SMRC's waste management vision and strategic objectives over the short term (1-5 years), medium term (5-10 years) and long term (10+ years) for waste services.

Table 20 Recommended 10 year action plan timeline for waste services in SMRC

Action	Detailed action required	Com-plete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
Kerbside collection service provision	1. Agree to expand collection service to entire LGA				■			■					■	
	2. Review kerbside service routes and identify expansion potential into rural areas				■			■				■		■
	3. Expand service as needed					■			■				■	■
Transporting recycling	1. Commence tender process for service contractor			■				■					■	
	2. Select contractor to provide freight service				■									
Bulky waste – service on request for pensioners, disabled people, and concession holders	1. Plan collection service roll-out			■										
	2. Implement education program and update website				■									
	3. Roll-out collection service				■	■	■	■	■	■	■	■	■	■
Expand kerbside collection service	1. Purchase 200 new bins and distribute to 100 Numeralla households			■										
	2. Commence waste and recycling service in Numeralla			■										
	3. Review kerbside service and expand as needed				■				■				■	■
Bank of Bins	1. Investigate which rural sites to introduce BOBs		■	■										
	2. Introduce BOBs at some rural sites				■	■								

Action	Detailed action required	Com-plete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
	3. Assess effectiveness of BOBs and introduce more if required						■				■			■
FOGO	1. Design and gain regulatory approval for compost facility expansion (see recommended waste infrastructure action plan for Cooma landfill)			■	■	■								
	1. Procurement: tender, evaluate and award for subcontractor, receivals building, mechanical plant & equipment				■	■								
	2. Construct works at compost facility				■	■								
	4. Perform testing/commissioning and determine roll-out schedule for households and investigate demand for commercial service					■								
	5. Perform 'before' waste audit					■								
	6. Implement education program to residents and businesses. Education to be based on previous Cooma-Monaro FOGO education					■	■	■	■	■	■	■	■	■
	7. Roll-out FOGO service to Jindabyne and Bombala regions						■							
	8. Perform annual waste audit to gauge effectiveness and identify problems and barriers						■	■	■	■	■	■	■	■
	9. Address problems and barriers through changes to service/education							■		■		■		■
Mobile CRC	1. Determine mobile CRC schedule		■											
	2. Advertise schedule via multiple media channels			■										

Action	Detailed action required	Com-plete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
Support food rescue programs	1. Consult with stakeholders including local businesses that generate significant food-waste, food recue charities and charities that could use the food			■										
	2. Develop a business case including an implementation plan and grant funding			■										
	3. Roll-out food rescue grant program				■									
Illegal Dumping	1. Implement illegal dumping awareness campaign, e.g. dob-in-a-dumper			■										
	2. Implement campaign			■	■	■	■	■	■	■	■	■	■	■
	3. Continue collecting data to identify illegal dumping hot spots and assess campaign effectiveness		■	■	■	■	■	■	■	■	■	■	■	■
Education	1. Develop education campaign to target C&D waste source separation and recycling			■										
	2. Implement education campaign via community groups for construction entities, 'Lunch and Learn' sessions, etc.				■	■	■	■	■	■	■	■	■	■
	3. Other community education programs		■	■	■	■	■	■	■	■	■	■	■	■
Difficult-to-recycle material	1. Review waste materials to target			■										
	2. Engage suppliers			■										
	3. Acquire equipment			■										
	4. Develop and implement targeted education campaign			■	■	■	■	■	■	■	■	■	■	■
	5. Commence collection of material				■	■	■	■	■	■	■	■	■	■

Action	Detailed action required	Com-plete	Short term						Medium term					Long term
			'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'30+
	6. Review and expand waste materials to target													
Disability Employment Opportunity	1. Investigate opportunity to employ local disabled people at ScrapMart tip shops													
	2. Recruitment and training													

4.3 Further Actions

In addition to the implementation of the above action plan, the following investigations are recommended:

4.3.1 Develop a Business Case for the Glass Capture and CDS Beverage Container Recovery

A high-level analysis of the recovery of glass and CDS beverage containers was undertaken as part of the option analysis for this waste strategy (see Section 3.3). There appears to be the potential for Council to significantly save on waste transport costs and to raise revenue while creating local jobs leading to social, economic and environmental benefits for the SMRC LGA. However, the costs of implementing such a scheme remains uncertain and further investigations are required to more accurately assess the costs, benefits and preferred implementation approach for such an initiative. Hence, further investigation should be undertaken and a business case developed to gain Council approval and funding for this initiative if the final business case is sufficiently compelling.

4.3.2 Investigate 4-Bin System to Replace Current Bins at End of Life

Instead of establishing a MRF to recover glass for local use the council may choose to establish a four-bin collection system with a separate bin for glass. This approach is being rolled out across Victoria. The four-bin approach could be investigated as part of the study discussed above.

4.3.3 Review of Data Collection and Analysis

Annual waste audits to be undertaken to provide up to date information to inform the efficacy of the FOGO roll out and provide more accurate data to assess the two options discussed above. Following the implementation of FOGO, further audits of residual and FOGO bins should be undertaken to help inform educational requirements and evaluate progress towards resource recovery goals.

4.3.4 True Cost of Waste Analysis

Conduct a detailed study into the whole of life costs for SMRC's landfills, transfer stations and the composting facility. Seek to benchmark facility performance against national and CRJO best practices. Develop recommendations to optimise the operation of these facilities.

A review of gate fee structure to be conducted including an investigation into the introduction of a waste education levy. The study would evaluate the cost implications and tonnage predictions as well as the policy framework for establishing a long-term levy. The amount levied should be calculated on a $/t basis to achieve the required revenue.

4.3.5 Risk Management Review for Cooma Landfill and Waste Complex

The Cooma landfill is relatively simple with unlined cells and no landfill gas (LFG) extraction infrastructure. The landfill and composting facility are sited upon a relatively shallow groundwater body (some 2-10 meters below ground level). This potentially poses threats to ground water.

Capping of areas that have reached final height to prevent water infiltration and thus minimise leachate while new areas could be lined. However, capping may lead to LFG migrating laterally. During cold "inversion" events LFG may not disperse – creating risks of explosions or asphyxiation.

A study of human and environmental risks at the Cooma waste complex would be appropriate with mitigation measures identified and costed. Some mitigation measures may be relatively cheap – for example capping material may be received for free in the form of VENM while simple handheld methane monitors many enable LFG risks to be mitigated. The implementation of a LFG capture system would also lead to increased environmental benefits associated with LFG capture, without a significant impact in the facility's financial performance.

4.3.6 Regional Waste Contracts with CRJO

As a small council SMRC does not always attract many competitive tenders for the provision of waste services. SMRC should seek to work with CRJO to undertake regional contracts for waste services where possible to achieve economies of scale and better value for money.

4.3.7 Investigation into Recycling and Reuse of Snow Gear

As the home of Australia's snow sports, SMRC has to manage more discarded snow gear than any other council in Australia. This provides an opportunity for SMRC to lead Australia in best practice management of this material and to educate visitors about better management of end-of-life snow gear.

Such education could potentially be enhanced via community art installations and upcycling of skis into public outdoor furniture, such as tables and chairs, to be made at ScrapMart tip shops. While such initiatives will not directly make a significant difference to the quantities of waste presenting at landfill – they can lead to community awareness and behaviour change that improves the overall interaction of residents and visitors with SMRC waste facilities and services.

4.3.8 Review targets for waste reduction, resource recovery and diversion of waste

The NSW Government is currently developing a new *20-Year Waste Strategy for NSW* which will set new targets and new waste initiatives out to 2040. Once released, Council should review the SMRC Waste Strategy and set waste targets to align with the 20-Year Waste Strategy.

5 How to Measure Success

5.1 Key Performance Measures

Progress towards implementing the proposed action plans will be measured to establish a consistent and reliable source of information regarding the LGA's waste performance over time. Furthermore, it will enable informed, evidence-based decisions to be made regarding the performance of the LGA's waste services and the effectiveness of the actions undertaken.

The following monitoring and analysis is recommended for each of the strategy objectives and themes.

5.1.1 Theme 1: Improve Operational Efficiency of Waste Management Services and Facilities

- Annual kerbside bin audits to measure key performance measures (KPIs) and to assess that capacity is matching demand. KPIs include bin presentation, bin fullness, waste generation, rate of resource recovery and rate of contamination. This allows greater targeting of waste education.
- Maintain local landfill capacity
    - Measure: aerial surveying of void space minimum annually
    - Analyse: determine fill rates since the last aerial survey and calculate remaining life of cell
    - Act: develop budget bids for new landfill capacity when void space falls below 7 years

5.1.2 Theme 2: Optimise Waste Management Costs

- Conduct a study into the true cost of landfill, transfer stations and other waste facilities. Determine the key metric and benchmarks that can be readily recorded. Then annually review performance against these metrics to support performance management.
- Review the gate fee structure to optimise waste management costs and investigate a waste education levy
- Report on grant funding won and percentage contribution to waste delivery costs.

5.1.3 Theme 3: Minimise the Environmental Impact of Waste Disposal, Meeting NSW WARR Strategy Targets

Measure and record in Excel:

- Waste generation per year
    - Residual waste
    - Comingled recyclables
    - FOGO
    - C&I
    - C&D
    - Others;
- Calculate resource recovery for each sector; and
- Illegal dumping and public place litter metrics.

5.1.4 Theme 4: Increase the Accessibility and Utilisation of Waste Facilities for Residents

Measure and record in Excel:

- Number of households receiving kerbside services (red, yellow and green) and percentage of SMRC households receiving kerbside services;
- Percentage of households with access to kerbside collection and BOBs;
- Percentage of households with access to CRC for at least one week per year;
- Quantity of specialty waste presenting per household; and

  - Annual community survey to determine satisfaction levels and understand of services to better target education initiatives and new waste services.
- Review the Transfer Station Rationalisation report and measure progress against recommendations provided.
- Review the Landfill Options Analysis report and measure progress against recommendations provided.

References

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Australian Bureau of Statistics (2016) 2016 Census QuickStats – Snowy Monaro Regional Council

Canberra Region Joint Organisation (2018) Regional Waste Strategy 2018-2023

Commonwealth of Australia (2018) National Waste Policy: less waste more resources

Commonwealth of Australia (2019) National Waste Policy Action Plan 2019

Commonwealth of Australia (2020) Recycling and Waste Reduction Bill 2020 (as passed by both houses)

EC Sustainable, 2019, Household Kerbside Bin System Audit 2018

GHD (2018) Jindabyne Regional Waste Management Facility Options Assessment Report

NSW Department of Planning and Environment, 2016, 2016 New South Wales State and Local Government Area Population and Household Projections, and Implied Dwelling Requirements

NSW EPA (2019) Local Government Waste and Resource Recovery Data Survey 2018-19 (SMRC)

Appendix A Bank of Bin Sites

Table 21 Bank of bins sites

Facility	Operator
Clear Range (Yellowbox road)	SMRC
Jerangle (Jerangle road)	SMRC
Dry Plain (Caddigat road)	SMRC
Frying Pan (Frying pan road)	SMRC
Buckanderra (Buckenderra road)	SMRC
Eucumbene (Happy jacks road)	SMRC
Eucumbene (Cove hill road)	SMRC
Avonside (Avonside road)	SMRC
Berridale (Rockwell road)	SMRC
Jindabyne (The snowy river way)	SMRC
Crackenback (Alpine way)	SMRC
Beloka (Paupong road)	SMRC
Numbla Vale (Jimenbuen road)	SMRC
Cathcart Bank of Bins	SMRC
Delegate Bank of Bins	SMRC
Michelago Bank of Bins Shed	SMRC

Appendix B Materials Accepted at Waste Facilities

Table 22 Materials accepted at SMRC landfills

Landfill	MSW	C&I	C&D	Recyclables						E-Waste	Green Waste	Hazardous Waste	Other waste
				White goods	Scrap metal	Batteries	Dom. COM	Comm. COM	Waste Oil				
Cooma	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Jindabyne	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Bombala	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×

Table 23 Materials accepted at SMRC transfer stations

Transfer Station	MSW	C&I	C&D	Recyclables						E-Waste	Green Waste	Hazardous Waste	Other waste
				White goods	Scrap metal	Batteries	Dom. COM	Comm. COM	Waste Oil				
Bredbo	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Adaminaby	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Numeralla	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Berridale	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Nimmitabel	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×
Delegate	✓	✓	×	×	✓	✓	✓	✓	✓	✓	✓	×	×

Appendix C Staff Interviews

Table 24 Managerial council staff interview comments

Topic	Comments
Strategy objectives	• Integrate the region's waste services to achieve consistent levels of service, fees and targets; • Integrate practical strategy with NSW EPA guidelines and CRJO waste strategy for a 3-5 year, 10 year and 20 year vision.
Urgent actions needed	• Capping and remediating legacy landfills, developing new landfill cells (Jindabyne and Cooma), exploring CDS opportunities, new weigh-bridge data systems to integrate with SMRC financial system, fire control infrastructure, changing BOBs to waste collection cages, new waste truck(s), expanding the composting facility and FOGO service, food rescue.
FOGO	• There is local demand for compost product; • Compost facility expansion will require additional composting equipment; • Shredders and loading equipment needed at other transfer stations to shred FOGO material before freighting to Cooma site; • Demand for FOGO service is mainly from urban residents; • FOGO service expansion should service properties with current 2-bin service excluding households on larger rural-residential blocks as they can compost onsite; • Expand FOGO service in stages to gauge success: first Bombala then to intermediate towns like Michelago, Berridale and Adaminaby. Jindabyne should be last: logistical problems such as high-density dwellings, less street space, tourism, etc. • Commercial FOGO is a good idea as restaurants and cafes have large quantities of organic waste and some in Jindabyne are asking Council for FOGO collection; • Smaller towns aren't generating large volumes of FOGO waste.
CDS	• Currently people already rummaging through street bins, CDS collection not needed; • Don't have the quantity required to set up infrastructure or the capacity, funds or manpower to collect, sort and crush locally; • No issue with use of recycled glass/sand in construction; • Currently no awareness among local builders to use recycled products, need to target education to construction entities; • Start by backloading material from ACT for a demonstration construction project.
Education	• FOGO service education should mimic the successful campaign used for the former Cooma-Monaro council; • Need to communicate why fees and charges are levied and the requirements to provide waste services to the community; • Pop-up education stalls in shopping centres are very effective and allow voluntary face-to-face contact; • Face-to-face communication, such as 'Lunch and Learn', is much more effective than written communication; • Main challenge is reading the whole community, especially rural community, only option is through mail;

Topic	Comments
	• Campaign targeting construction entities could involve a community group with entity owners or providing Council building department with leaflets to give to new construction developments to educate about recycling C&D waste, cost savings and using recycled products.
Kerbside Collection Service	• Reducing general bins from 240L to 120L in Jindabyne to encourage diverting material to recycling and FOGO services could increase contamination; • Reuse 120L bins as FOGO bins by replacing lids; • Lack of robust data about recycling performance but suspected recycling is falling; • Preference for in-house service to standardise and internalise service; • One of Cooma's collection trucks is old and still involves manual rear lift of bins. Does not meet modern WHS expectations. Plan to replace it this year however, it may be kept in service for commercial collections of skips for which it is still suitable.
Bank of Bins	• BOBs are expensive to service if not located near a conventional kerbside collection run; • One solution is to change to a lockable waste transfer cage or trailer that can be moved using a light truck. Likely to be best option for Jerangle and Smith's Road BOB site.
Freight to ACT service	• The cost to freight to ACT is much higher than the cost of landfilling; • Costs are expensive relative to what other members of the CRJO are paying; • Sometimes using a contractor is more efficient than in-house service – requires less workers, costs less and specialises in service. No WHS risk for Council; • Possible for new contractor to have a local crushing plant.
Operating Facilities	• Maintaining local landfills is critical to keeping SMRC's waste disposal costs down (avoiding freight costs and gate fees along with earnings from commercial waste); • Jindabyne landfill expansion required in the short term, Cooma landfill expansion required in the medium term; • Transfer station upgrades required to support recycling of C&D waste, easier access for the community and commercial users. Upgrades needed at Delegate and Bombala to increase safety of disposal process; • Jindabyne landfill has best practice stormwater management; • Stormwater and leachate management system at Cooma landfill needs improvements during next fill plan; • Strategy should rationalise opening hours and service provision; • Weigh bridges at Jindabyne and Cooma landfills use different data management systems which are not integrated with SMRC's new financial data system. Installing a new data system, that supports handheld devices, would greatly improve SMRC's data collection and enable better oversight and management; • Bombala landfill is remote and has no onsite power or weight bridge. The facility likely receives waste from individuals and businesses in Bega Valley Shire and Victorian residents; • Connecting three phase power to Bombala landfill would cost around $60,000. There is lots of airspace but costs a lot to run. May be better value as a transfer station; • Bombala's population similar to Berridale who are serviced quite well with a 1 day a week for 5 hours transfer station;

Topic	Comments
	• Bombala community would strongly oppose shorter opening hours, would require serious community consultation. Gradual change in opening hours to allow community to adjust.
Legacy Landfills	• Recent bushfires and storms have underlined the need for emergency landfills to take non-putrescible material from the clean up process; • SMRC is currently in consultation with Snowy Hydro 2.0 project managers regarding the provision of a new emergency landfill; • There are at least 15 legacy landfills that may need to be capped and remediated. SMRC has conservatively noted $30 million of liabilities associated with these remediation works in budget however these estimates could fall considerably as more detailed investigations are undertaken; • Keeping suitable sites for emergencies avoids the costs of capping and remediating these landfills and reduces the cost and time to respond to emergencies and ensuing clean ups; • Need a detailed investigation into the potential residual capacity of these sites along with an assessment of suitability for future use and more detailed closure plans and cost estimates for sites deemed unsuitable for future use; • Attempts to fill up Cooma landfill in January (after bushfires) as part of the remediation process proved too expensive and difficult to get EPA approval; • There is currently a written proposal to set up old Delegate landfill for remediation, doesn't require DA. Cooma landfill would require DA process.
Fees & Charges	• General belief that waste fees and charges are too high but reducing fees wouldn't be sustainable and would require services be cut back dramatically; • Need to communicate true cost of waste management to community.
Bulky Waste Collection Service	• Not supportive of a bulky waste collection service due to its costs, complexity, risk to operate and significant generation of waste; • Area too big. Would need more staff and transport which would greatly increase expenses; • Understanding about demand for service within the community; • Good option could be targeted service for concession card holders on request; • Instead of bulky waste pickup, free weekend for drop off; • Including the possibility in the strategy would give false hope.
Illegal Dumping	• Possibility for further community awareness campaigns to further target these issues. E.g. Council website doesn't have much information on how to "dob in a dumper".

Table 25 Operational council staff interview comments

Topic	Comments
Strengths of waste management	• Happy with equipment upgrades, e.g. waste collection trucks and compactor ordered for Jindabyne landfill; • Bank of bins work well; • Kerbside service are worth the fees as residents get a good service.
Improvement Opportunities	• Reported issues with polystyrene being blown around at Jindabyne landfill sites exposed to high winds. Polystyrene also creates problems for landfill compaction rates; • Would like to see more education for FOGO, often see contamination; • Expanding FOGO kerbside service would increase fees due to requiring additional staff, trucks, fuel, etc; • Commercial FOGO collection would have high contamination. Current FOGO in ski areas has high contamination. Difficult to get employees to comply (care factor is low); • Advertise the Council website and Facebook page for education material more; • Lower fees for recycling and increase fees for landfill to encourage source separation and recycling. Landfill staff are often pulling recyclable material out of tip face. It shouldn't cost people so much to recycle. • Commercial waste price vs commercial recycling (they save $10/tonne) – not much incentive for businesses to recycle. It would cost more for them in wages to properly sort waste than it does to put it in landfill; • Builders are sorting at the tip: paying as waste but putting material aside for staff to grab and put it in recycling; • Need more landfill infrastructure; • More education required about what can be recycled.

Appendix D Waste stream compositions based on material categories

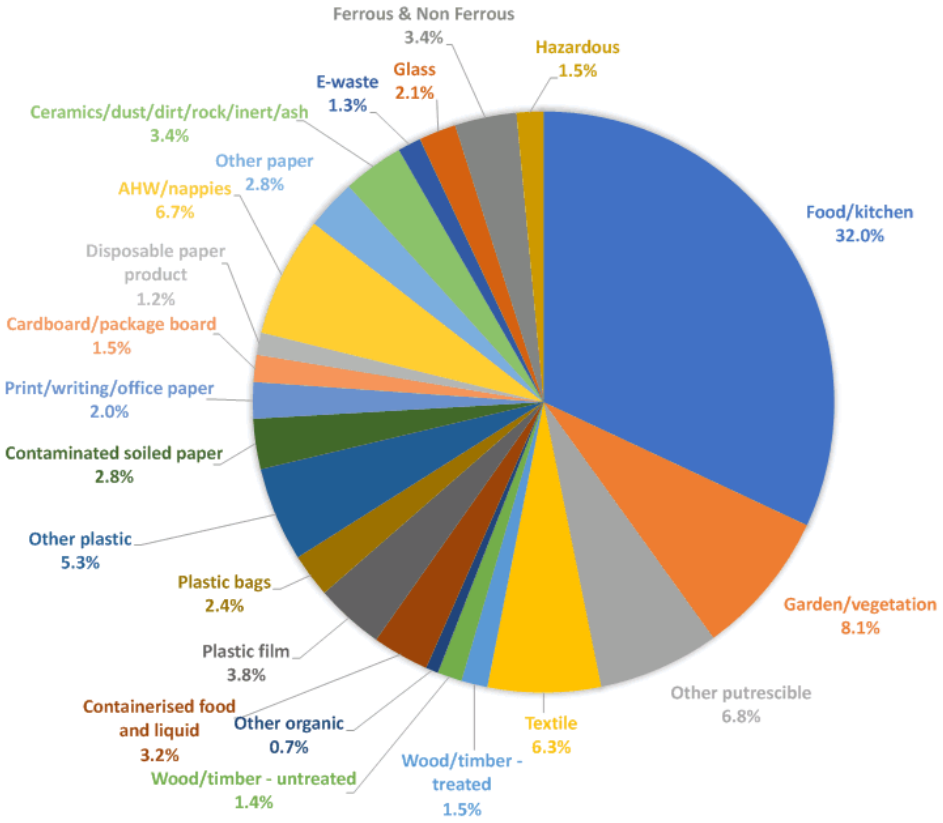

Figure 16 Kerbside general waste composition based on material category (by weight)

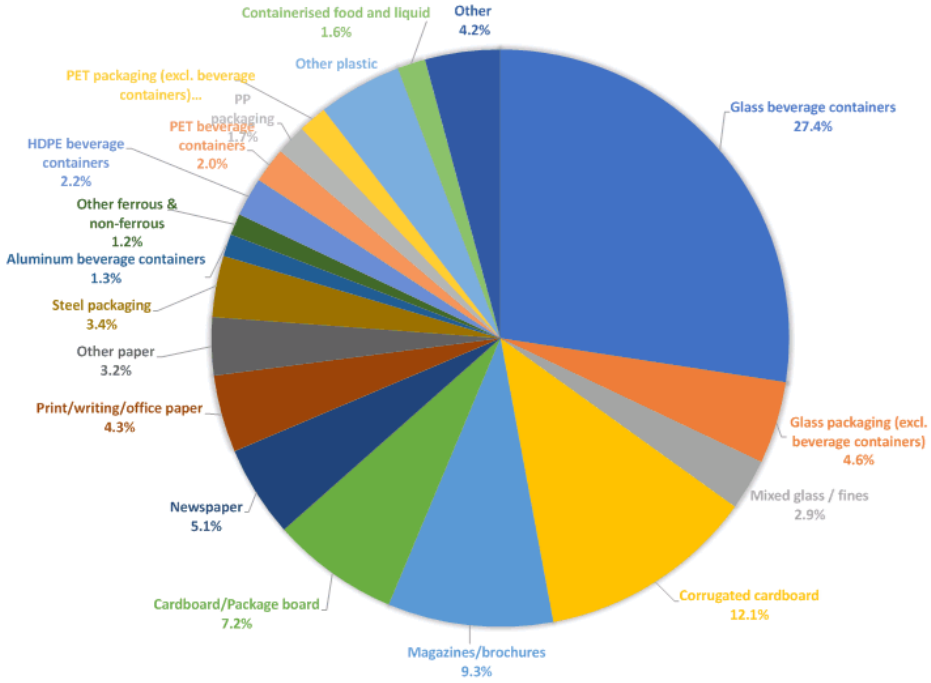

Figure 17 Kerbside recycling composition based on material category (by weight)

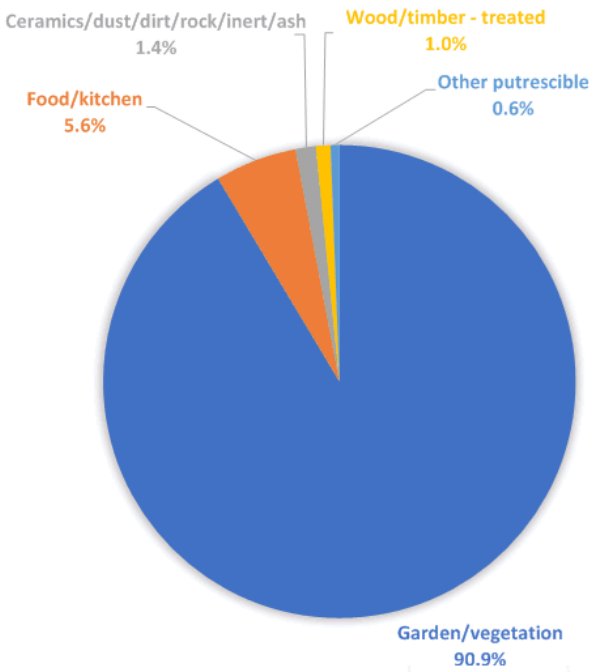

Figure 18 Kerbside FOGO composition based on material category (by weight)

Appendix E Transfer Station Financial Analysis

Table 26 CAPEX, OPEX and net profit for transfer station scenarios

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Business as Usual						
Net Profit	-$40,520	-$34,503	-$55,290	-$19,795	-$59,873	-$44,684
Scenario 1 – 100% Service Rate						
CAPEX	$276,330	$285,460	$428,370	$133,510	$220,920	$303,720
OPEX	$78,529	$80,657	$110,128	$56,027	$60,566	$76,954
Net Profit	$11,838	$12,547	$30,285	-$12,628	$10,842	$25,292
Scenario 2 – 75% Service Rate						
CAPEX	$207,270	$216,310	$322,430	$101,240	$165,780	$225,710
OPEX	$62,065	$62,440	$84,615	$48,142	$47,586	$66,215
Net Profit	$5,708	$7,242	$20,580	-$15,703	$5,961	$11,706

1 March 2021

Addendum to the Landfill Options Analysis Report

Snowy Monaro Regional Council

1 Introduction

MRA Consulting Group (MRA) was engaged by Snowy Monaro Regional Council (Council) to undertake a variation of Option 2 – Operate Cooma landfill as Council's primary landfill, in the Landfill Options Analysis Report dated 21 December 2020 (the Report). Council seeks to understand the economic and environmental impact of landfill gas infrastructure and an increased recycling rate, as recommended in the Report.

The variation is a sensitivity analysis of Option 2, including:

- The installation of landfill gas (LFG) capture for Cooma landfill in 2025 – MRA assumed 50% capture of lifetime LFG emissions and LFG infrastructure CAPEX and OPEX as per Appendix A in the Report;
- The addition of capping costs every 10 years for the Greenfield (Option 3) and East of Cooma (Option 4) sites – MRA assumed similar capping cost to those for Cooma landfill; and
- Finding a diversion rate (MSW, C&I and C&D) that makes Option 2's total costs match those of Option 3.

Results obtained from the variation override those presented in the Report. Updated results, **in bold**, are outlined in the following sections of this addendum.

2 Economic Assessment

Update to "Table 3 Landfill completion dates" in the Report:

Table 1 Updated landfill completion dates

Facility	Option 1	Option 2	Option 3	Option 4	Option 5
Cooma landfill	2049	**2046**	2030	2030	2022
Jindabyne landfill	2043	2022	2022	2022	2022
Bombala landfill	2022	2022	2022	2022	2022

Update to text in section 2.1 in the report:

"*Based on landfills performance, a greenfield site landfill is required to start operation in **2046** in Option 2, and 2031 in Option 3. [...].*"

Update to "Table 4 Total CAPEX, average OPEX & Transport cost (actual cost in millions)" in the Report:

Table 2 Updated total CAPEX, average OPEX & transport cost (actual cost in millions)

Overall (millions)	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($)	$62.6	**$61.5**	**$57.3**	**$60.5**	$21.3
OPEX ($/yr)	$11.5	**$6.17**	$5.40	$7.05	$9.49
Transport ($/yr)	$0.09	**$0.05**	$0.05	$0.13	$0.09

Update to "Table 5 Economic assessment results (NPC[1] in millions)" in the Report:

Table 3 Updated economic assessment results (NPC in millions)

	Option 1	Option 2	Option 3	Option 4	Option 5
NPC ($ in millions)	$73.5	**$73.1**	**$79.0**	**$94.0**	$118.1

3 GHG Assessment

Update to "Table 6 GHG assessment results" in the Report:

Table 4 Updated GHG assessment results

Item	Option 1	Option 2	Option 3	Option 4	Option 5
Landfill emissions (kt CO2-e)	536	**243**	336	336	281
Transport emissions (kt CO2-e)	0.40	**0.77**	0.89	1.72	1.50
Total GHG emissions (kt CO2-e)	537	**244**	338	339	283

Update to "Table 7 Average annual emissions over 30 years" in the Report:

Table 5 Updated Average annual emissions over 30 years

Item	Option 1	Option 2	Option 3	Option 4	Option 5
Landfill emissions (kt CO2-e/yr)	17.3	**7.85**	10.9	10.9	9.07
Transport emissions (kt CO2-e/yr)	0.01	0.03	0.03	0.06	0.05

[1] Net Present Cost (NPC)

Item	Option 1	Option 2	Option 3	Option 4	Option 5
Total GHG emissions (kt CO2-e/yr)	17.3	**7.9**	10.9	10.9	9.1

4 Recycling and Diversion Rates

Modelling suggests 20% additional diversion of waste (MSW, C&I and C&D streams) makes Option 2 more economically attractive than Option 1 and Option 3 (See Net Present Costs in Table 3 above). This represents a **recycling rate of 50%** (up from Council's current rate of 38%).

5 Qualitative Assessment and Multi-Criteria Analysis

Update to "Table 10 SWOT – Option 2" in the Report:

Table 6 Updated SWOT - Option 2

Strengths	Weaknesses
• No expansion of Jindabyne landfill required • Reduced environmental and health risk following the upgrade of Bombala landfill to a modern transfer station • **GHG emissions reduction due to installation of LFG capture at Cooma landfill**	• Reduced lifespan of Cooma landfill from 2049 to **2043** • Environmental risk due to leachate from extended operation at Cooma and Jindabyne landfills • Increased transport of asbestos and contaminated soil due to early upgrade of Jindabyne landfill. Modern transfer stations to avoid double handling of asbestos and contaminated soils
Opportunities	**Threats**
• Diversion of waste from landfill and expansion of Cooma and Jindabyne landfill lifespans due to FOGO service expansion • Increased resource recovery due to modern transfer station upgrades • Reduced environmental risk due to lining of Cooma landfill • GHG emissions reduction due to LFG capture system at new greenfield site landfill	• Increased illegal dumping upon upgrade of Bombala and Jindabyne landfills to modern transfer stations • Community or regulatory opposition to development of greenfield site may delay planning approvals (**only compost facility is proposed on the greenfield site, not whole landfill**) • Proposed greenfield site land to be re-zoned for development of **compost facility**, as proposed land is primary production land. Industrial purpose land is required

Update to "Table 16 Quantitative results" in the Report:

Table 7 Updated Quantitative results

Concept	Weightings	Option 1	Option 2	Option 3	Option 4	Option 5
Economic (NPC $, millions)	40%	$73.5	**$73.1**	**$79.0**	**$94.0**	$118.1
Absolute weighted score (Economic)	40%	40%	**40%**	**37%**	**31%**	25%

Concept	Weightings	Option 1	Option 2	Option 3	Option 4	Option 5
Environmental (GHG kt CO2-e)	15%	537	**244**	338	339	283
Absolute weighted score (GHG)	15%	**7%**	**15%**	**11%**	**11%**	**13%**
Quantitative score	55%	**47%**	**55%**	**48%**	**42%**	**38%**

Update to "Table 17 Qualitative results" in the Report:

Table 8 Updated Qualitative results

Concept	Absolute weighting	Criterion weighting	Option 1	Option 2	Option 3	Option 4	Option 5
Policy	2.5%	6%	2	3	3	3	3
Economic Growth	5%	11%	3	3	3	1	4
Social	15%	33%	4	3	2	1	2
Technical	10%	22%	1	3	3	4	3
Environmental	10%	22%	1	**4**	4	4	4
Legal	2.5%	6%	2	3	3	4	3
Qualitative score	45%	100%	26%	**36%**	32%	29%	34%

Update to text in section 5.3.1. in the Report:

"*Both quantitative and qualitative scores were assessed [...], where the highest ranked option was* ***Option 2 – Operate Cooma landfill as Council's primary landfill***".

Update to "Table 18 MCA results" in the Report:

Table 9 Updated MCA results

Concept	Weightings	Option 1	Option 2	Option 3	Option 4	Option 5
Economic & GHG	55%	**47%**	**55%**	**48%**	**42%**	**38%**
PESTEL	45%	26%	**36%**	32%	29%	34%
Total Score	100%	**73%**	**91%**	**80%**	**71%**	**71%**

6 Discussion of Results

Update to text in section 6 in the Report:

"*The landfill options analysis undertaken by MRA highlights the following options as best performing:*

*Economic (NPC $): Option 1 – **Cooma and Jindabyne landfills**;*

*Environmental (t CO2-e): **Option 2 – Operate Cooma landfill as Council's primary landfill**; and*

PESTEL[2]: Option 2 – Operate Cooma landfill as Council's primary landfill.

*The multi-criteria analysis indicates that, overall, the better scored option for operation of Council's landfills is **Option 2 – Operate Cooma landfill as Council's primary landfill**, with a total score of **91%** out of 100%. Operation of landfills under this configuration can help Council achieve positive economic and environmental outcomes, in line with Council's policy and strategy goals. **It is likely that operational efficiencies will be observed by operating fewer landfills (one instead of three), which further supports the option of a single landfill**.*

*As presented in Section **Error! Reference source not found.** and **Error! Reference source not found.** in this report, the implementation of LFG capture in new landfills and FOGO kerbside collection in Council LGA will achieve further environmental benefits, including the reduction of landfill emissions and an increased resource recovery rate, which are in line with key objectives and goals, such as reduction of waste to landfill and increase in resource recovery*".

Disclaimer

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Attachments

SMRC_LF Options(30yrs)_addendum (diversion all streams)

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[2] Political, Economic growth, Social, Technical, Environmental, Legal (PESTEL)

Landfills Options Analysis

A Submission to Snowy Monaro Regional Council

21 December 2020

MRA Consulting Group

Landfills Options Analysis

A Submission to Snowy Monaro Regional Council
Job No. 220-5262-02-02

Prepared by

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0.1	6/11/2020	Draft	Bec Larkin & Robin Gonzalez / Environmental Consultant	N/A	N/A
0.2	17/11/2020	Review	Katherine Dodd / General Manager & Principal Consultant	N/A	N/A
0.3	13/12/2020	Final Draft	Robin Gonzalez / Environmental Consultant	Katherine Dodd / General Manager & Principal Consultant	N/A
0.4	21/12/2020	Final	Robin Gonzalez / Environmental Consultant	Katherine Dodd / General Manager & Principal Consultant	Final version approved by Katherine Dodd
0.5	17/02/2021	Reissue (reword "BAU" to "Cooma and Jindabyne landfills"	Robin Gonzalez / Environmental Consultant	N/A	

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Table of contents

Glossary 5

Executive Summary 6

1 Introduction 7
1.1 Snowy Mountains Special Activation Precinct 7
1.2 Scope and options 7

2 Economic Assessment 12
2.1 Landfill completion dates 12
2.2 Economic assessment results 12

3 GHG Assessment 13
3.1 GHG assessment results 14

4 Recycling and Diversion Rates Sensitivity Analysis 14
4.1 Landfill completion dates – FOGO 15
4.2 Economic assessment results – FOGO 15
4.3 Economic assessment results – Discount rate 16
4.4 GHG assessment – FOGO 17
4.5 Resource recovery – FOGO 18

5 Qualitative Assessment and Multi-Criteria Assessment 19
5.1 Qualitative assessment 19
5.2 PESTEL assessment 22
5.3 MCA 24

6 Discussion of Results 26

Appendix A 27

Appendix B 28

Appendix C 32

List of Tables

Table 1 Council landfill facilities' performance 7

Table 2 Landfill options summary 11

Table 3 Landfill completion dates 12

Table 4 Total CAPEX, average OPEX & Transport cost (actual cost in millions) 13

Table 5 Economic assessment results (NPC in millions) 13

Table 6 GHG assessment results 14

Table 7 Average annual emissions over 30 years 14

Table 8 Landfill end of life date FOGO 75% & 50% uptake....15
Table 9 SWOT - Option 1....19
Table 10 SWOT - Option 2....19
Table 11 SWOT - Option 3....20
Table 12 SWOT - Option 4....21
Table 13 SWOT - Option 4....21
Table 14 PESTEL criteria description....22
Table 15 PESTEL assessment scoring criteria....23
Table 16 Quantitative results....25
Table 17 Qualitative results....25
Table 18 MCA results....26
Table 19 Key financial assumptions....27
Table 20 Actual cost - Cooma....28
Table 21 Actual cost - Jindabyne....28
Table 22 Actual cost - Bombala....28
Table 23 Actual cost - Greenfield site....29
Table 24 Actual cost – East of Cooma landfill....29
Table 25 Actual cost - Private landfill....29
Table 26 NPC - Cooma....30
Table 27 NPC - Jindabyne....30
Table 28 NPC - Bombala....30
Table 29 NPC - Greenfield site....30
Table 30 NPC – East of Cooma landfill....31
Table 31 NPC - Private landfill....31
Table 32 PESTEL assessment....32

List of Figures

Figure 1 Flowcharts key....8
Figure 2 Option 1 – Cooma and Jindabyne Landfills....8
Figure 3 Option 2 - Operate Cooma landfill as Council's primary landfill....9

Figure 4 Option 3 - Operate one new Council landfill at greenfield site 9
Figure 5 Option 4 – East of Cooma site landfill 10
Figure 6 Option 5 - Transport and disposal of waste to Mugga Lane landfill 10
Figure 7 Economic assessment results – FOGO 16
Figure 8 Economic assessment results - Discount rate 16
Figure 9 GHG assessment results – FOGO 17
Figure 10 Average annual GHG emissions - FOGO 17
Figure 11 Reduction of waste to landfill – FOGO 18
Figure 12 Resource recovery rate – FOGO 18
Figure 13 MCA weightings 24

Glossary

Terminology	Definition
CAPEX	Capital expenditure
Council	Snowy Monaro Regional Council
C&D	Construction and Demolition
C&I	Commercial and Industrial
FOGO	Food Organics and Garden Organics
FY	Financial year
GHG	Greenhouse Gas
LF	Landfill
LFG	Landfill gas
LGA	Local Government Area
MCA	Multi-Criteria Analysis
MSW	Municipal Solid Waste
MRA	MRA Consulting Group
NPC	Net Present Cost
OPEX	Operating expenditure
PESTEL	Policy, Economic Growth, Social, Technical, Environmental, Legal
SAP	Special Activation Precinct
SMRC	Snowy Monaro Regional Council
SWOT	Strengths, Weaknesses, Opportunities, Threats
t CO_2-e	tonnes of carbon dioxide equivalents
TS	Transfer Station

Executive Summary

Snowy Monaro Regional Council (Council) operates three landfills located in the local government area (LGA):

- Bombala landfill;
- Cooma landfill; and
- Jindabyne landfill.

Council foresees the potential impacts of the Snowy Mountains Special Activation Precinct (SAP) to the LGA's landfills and requires further investigation into the economic and environmental performance of the waste facilities to make an informed decision that considers the Snowy Mountains SAP Master Plan.

MRA Consulting Group (MRA) was engaged by Council to investigate options and provide recommendations for the operation of the region's landfills over 30 years. The options assessed in this analysis are:

- Option 1 – Cooma and Jindabyne Landfills;
- Option 2 – Operate Cooma landfill as Council's primary landfill;
- Option 3 – Operate one new Council landfill at greenfield site near Cooma;
- Option 4 – Operate one new Council landfill at a site east of Cooma; and
- Option 5 – Transport and disposal of waste to Mugga Lane landfill, in the Australian Capital Territory (ACT).

MRA developed a model to evaluate landfills lifespan, as well as economic and greenhouse gas (GHG) emissions performance for each option. Also, a qualitative analysis was performed to assess the Policy, Economic Growth, Social, Technical, Environmental and Legal (PESTEL) impacts of each option.

Quantitative and qualitative results were assessed in a multi-criteria analysis (MCA), where weightings were used to evaluate the overall impact of each option.

The landfill options analysis undertaken by MRA highlights the following options as best performing:

- Economic (NPC $): Option 1 – Cooma and Jindabyne Landfills;
- Environmental (t CO_2-e): Option 5 – Transport and disposal of waste to Mugga Lane landfill; and
- PESTEL: Option 2 – Operate Cooma landfill as Council's primary landfill.

The MCA indicates that, overall, the better scored option for operation of Council's landfills is **Option 3 – Operate one new landfill at greenfield site in the Cooma area**, with a total score of 84% out of 100%. Operation of landfills under this configuration can help Council achieve positive economic and environmental outcomes, in line with Council's policy and strategy goals.

As presented in Section 3 and 4 in this report, the implementation of LFG capture in new landfills and food organics and garden organics (FOGO) kerbside collection in the Council LGA will achieve further environmental benefits, including the reduction of landfill gas emissions and an increased resource recovery rate, which are in line with key objectives and goals, such as reduction of waste to landfill and increase in resource recovery.

Based on MRA experience with emissions from Council operations, addressing emissions from waste is the single activity that can reduce the most GHG emissions and this can be done by installing LFG capture and reducing disposal of organics to landfill, i.e., kerbside FOGO. Nevertheless, it should be noted these environmental benefits come along with a higher economic cost when compared to current waste operations.

1 Introduction

Snowy Monaro Regional Council (Council) currently operates three landfill facilities in the local government area (LGA). The average throughput and financial performance for financial years (FY) 2018-19 to 2019-20[1] are displayed in Table 1.

Table 1 Council landfill facilities' performance

Facility	Tonnes received (t)	Profit/loss per tonne ($/t)
Bombala Landfill	1,297	-$130
Cooma Landfill	21,406	$19
Jindabyne Landfill	15,248	$24

Cooma and Jindabyne Landfills manage most of the LGA's residual waste, hence the current review / update of the Council's Waste Strategy (draft dated, 29 July 2020) and includes an options analysis assessing the upgrade of the Bombala landfill to a modern transfer station.

Council foresees the potential impacts of the Snowy Mountains Special Activation Precinct (SAP) to Council's landfills and requires further investigation into the economic and environmental performance of the Council landfills to make an informed decision that considers the Snowy Mountains SAP Master Plan.

1.1 Snowy Mountains Special Activation Precinct

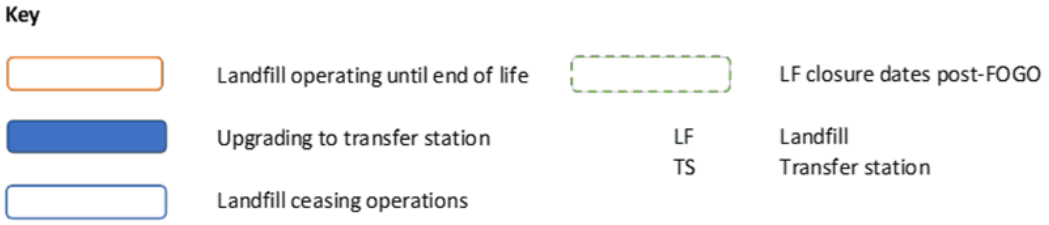
In November 2019, the NSW Government announced the establishment of the Snowy Mountains SAP, including Jindabyne, Kosciuszko National Park and the alpine resorts[2]. Through the SAP, a new Master Plan will be formed and will focus on increasing year-round tourism, growing employment opportunities, and investing in infrastructure to accommodate the increase in permanent residents, and temporary visitors and workers to the region. The Master Plan will also include aims to be a national training base for high-performance alpine athletes. The draft Master Plan is expected to be released in 2021[3]. Implementation of the Master Plan is expected to commence in five to ten years.

1.2 Scope and options

MRA Consulting Group (MRA) was engaged by Council to investigate options and provide recommendations for the operation of the region's landfills over 30 years, taking into consideration the Snowy Mountains SAP timeframes. The options are outlined in this section, accompanied by flowcharts. See flowcharts key in Figure 1.

[1] Estimated using average tonnes received per facility and financial performance average for FY 2018-19 & 2019-20.
[2] Snowy Mountains Special Activation Precinct Fact Sheet (2020) NSW Government.
[3] Snowy Mountains Special Activation Precinct, NSW Government website: https://www.planning.nsw.gov.au/Plans-for-your-area/Special-Activation-Precincts/Snowy-Mountains-Special-Activation-Precinct

Figure 1 Flowcharts key

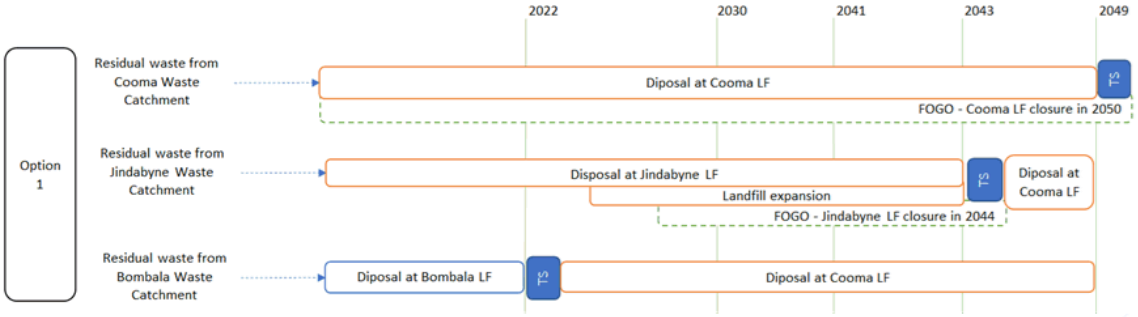


1.2.1 Option 1: Cooma and Jindabyne Landfills

This option represents no change to the waste management operations planned for Council[4]. The key elements of this option include:

- Bombala landfill upgrade to a modern transfer station in 2022 and waste to be transferred to Cooma landfill for disposal.
- Cooma landfill upgrade to a modern transfer station at end of life in 2049. Waste to be transferred to private landfill for disposal[5].
- Jindabyne landfill to operate to end of life (2043) assuming Jindabyne landfill will undergo proposed expansion into the former quarry area. Upgrade to modern transfer station and waste to be sent to Cooma landfill for disposal.
- No subsequent landfill plans are considered following Cooma landfill upgrade to transfer station (Figure 2). Waste transferred to private landfill (Mugga Lane in 2049 and 2050).

Figure 2 Option 1 – Cooma and Jindabyne Landfills



[4] During preparation of this report, Deputy Premier of NSW John Barilaro, announced the construction of a new education campus at the Jindabyne Sport and Recreation Centre, which affects the viability of Option 1 Cooma and Jindabyne Landfills. Option 1 includes the expansion of Jindabyne landfill and this may be hindered by political and public constraints associated with the new education campus. 1 December 2020. https://fb.watch/29m5f93ead/

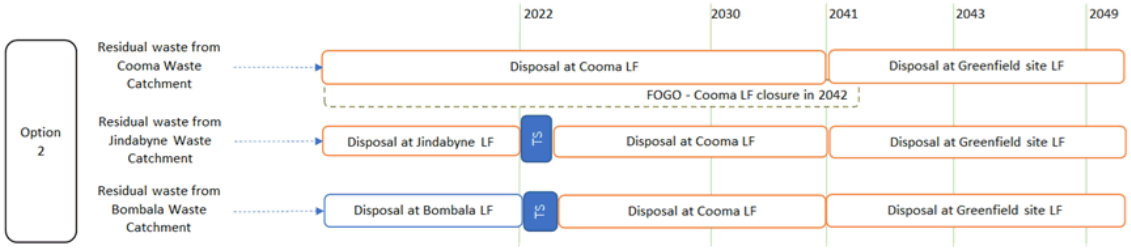
[5] MRA assumed transfer of waste to Mugga Lane landfill for 2 years (Option 1) and 1 year (Option 1 FOGO) to ensure disposal costs where considered following Cooma landfill end of life in 2049 (Option 1) and 2050 (Option 1 FOGO).

1.2.2 Option 2: Operate Cooma landfill as Council's primary landfill

The key elements of this option include:

- Bombala landfill to be upgraded to transfer station in 2022 and waste to be transferred to Cooma landfill for disposal.
- Jindabyne landfill to upgrade to modern transfer station at end of life in 2022. Waste to be transferred to Cooma landfill for disposal.
- Cooma landfill to undergo minor transfer station upgrades in 2026 and to operate until end of life (2041), followed by landfill operations at a greenfield site (Figure 3).
- Greenfield site location assumed near the Snowy Mountains Airport, as the population weighted centroid is in near proximity to the airport. Assumed greenfield site is 18 kilometres distance from Cooma landfill.

Figure 3 Option 2 - Operate Cooma landfill as Council's primary landfill



1.2.3 Option 3: Operate one new Council landfill at greenfield site near Cooma

The key elements of this option include:

- Bombala landfill to be upgraded to transfer station in 2022 and waste to be transferred to Cooma landfill for disposal.
- Jindabyne landfill to upgrade to modern transfer station at end of life in 2022. Waste to be transferred to Cooma landfill for disposal.
- Cooma landfill operations to cease in 2030 (to allow for Council to acquire land, planning, approvals and construction of a new landfill at a greenfield site) and landfill operations transferred to new greenfield site.
- Landfill operations to commence at a greenfield site from 2031. Waste to be transferred from Bombala and Jindabyne transfer stations and waste to be disposed of directly from the Cooma catchment at the new greenfield site landfill.

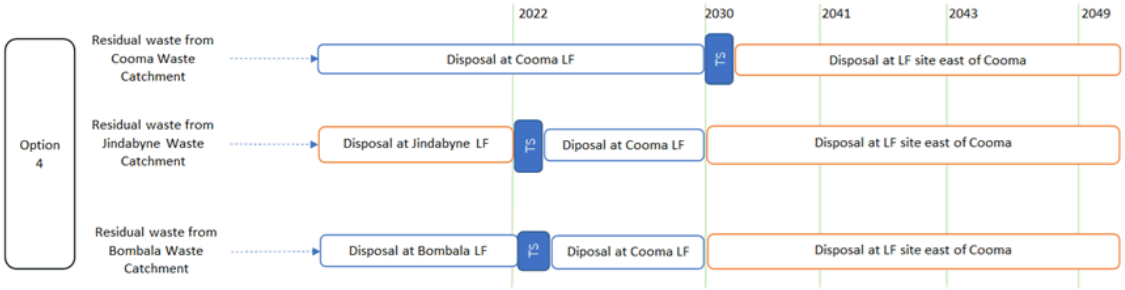
Figure 4 Option 3 - Operate one new Council landfill at greenfield site

1.2.4 Option 4: Operate one new Council landfill at site east of Cooma

The key elements of this option include:

- Bombala landfill upgrade to a modern transfer station in 2022 and waste to be transferred to Cooma landfill for disposal.
- Jindabyne landfill to upgrade to modern transfer station at end of life in 2022. Waste to be transferred to Cooma landfill for disposal.
- Cooma landfill to upgrade to modern transfer station in 2030 (to allow for Council to acquire land, planning approvals and construction of a new landfill in the east of Cooma area).
- Landfill operations to commence at a landfill site east of Cooma from 2031[6]. Waste to be transferred from Bombala, Jindabyne and Cooma transfer stations to the new landfill site east of Cooma.

Figure 5 Option 4 – East of Cooma site landfill

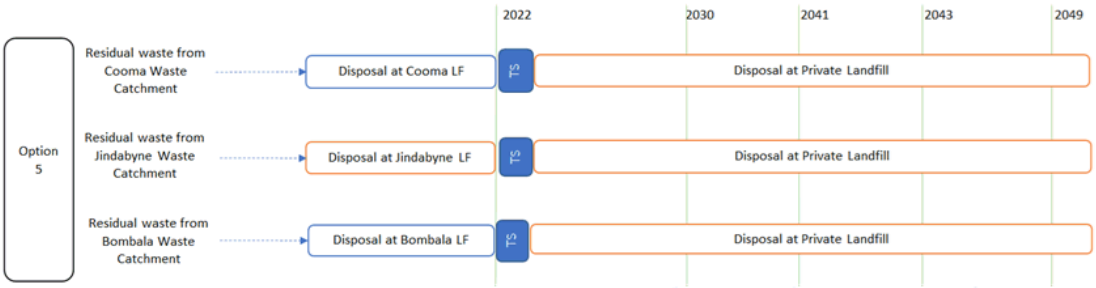


1.2.5 Option 5: Transport and disposal of waste to Mugga Lane landfill

The key elements of this option include:

- Bombala landfill to upgrade to modern transfer station in 2022.
- Cooma landfill to upgrade to modern transfer station in 2022.
- Jindabyne landfill to upgrade to modern transfer station at end of life in 2022.
- Waste from Bombala, Jindabyne and Cooma to be transferred to Mugga Lane landfill, ACT.

Figure 6 Option 5 - Transport and disposal of waste to Mugga Lane landfill



An options summary is provided in Table 2 below.

[6] For this analysis, the Nimmitabel transfer station in 52 Warrigal Road, Nimmitabel NSW 2631 was used as site location.

Table 2 Landfill options summary

Facility	Option 1 – Cooma and Jindabyne Landfills	Option 2 - Operate Cooma landfill as Council's primary landfill	Option 3 – Operate one new Council landfill at greenfield site	Option 4 – Operate one new Council landfill at site east of Cooma	Option 5 - Transport and disposal of waste to Mugga Lane landfill
Cooma landfill	Upgrade to modern transfer station at end of life in 2049. Assuming waste is sent to Private landfill following upgrade of Cooma to transfer station.	Operate until end of life (2041) followed by landfill operations at greenfield site.	Cease landfill operations (2030) followed by landfill operations at greenfield site.	Cooma landfill to upgrade to modern transfer station in 2030, waste to be sent to landfill site east of Cooma.	Upgrade to modern transfer station in 2022. Transfer waste to private landfill.
Jindabyne landfill	Expansion of Jindabyne landfill to operate until end of life (2043) and upgrade with modern transfer station.	Upgrade with modern transfer station at end of life in 2022. Waste transferred to Cooma landfill until 2041 and then to greenfield site.	Upgrade to modern transfer station at end of life in 2022. Transfer waste to Cooma landfill until 2030 and then to greenfield site.	Upgrade to modern transfer station at end of life in 2022. Transfer waste to Cooma landfill until 2030 and then to landfill site east of Cooma.	Upgrade to modern transfer station at end of life in 2022. Transfer waste to private landfill.
Bombala landfill	Bombala to upgrade to modern transfer station in 2022. Waste transferred to Cooma landfill until 2049.	Upgrade with modern transfer station in 2022. Waste transferred to Cooma landfill until 2041 and then to greenfield site.	Upgrade to modern transfer station in 2022. Transfer waste to Cooma until 2030 and then to greenfield site.	Upgrade to modern transfer station in 2022. Transfer waste to Cooma until 2030 and then to landfill site east of Cooma.	Upgrade to modern transfer station in 2022. Transfer waste to private landfill.
Greenfield landfill site near Cooma	N/A	Operations start in 2041.	Operations start in 2031.	N/A	N/A
Landfill site east of Cooma	N/A	N/A	N/A	Operations start in 2031.	N/A
Private landfill site	Receiving waste from 2049, following Cooma end of life.	N/A	N/A	N/A	To start receiving waste in 2022.

2 Economic Assessment

MRA developed a model to evaluate the performance of Council's landfills based on cost and operating effectiveness, in line with the options outlined above. Each option was modelled over 30 years and included the following considerations:

- Landfill end of life dates based on landfill capacity and Council's waste disposal[7];
- Allocation of waste (tonnes) to Council's facilities, in line with the options outlined in Table 2;
- Capital costs – for landfill expansion, construction (including relocation of Cooma composting facility in Option 4), capping/rehabilitation, implementation of landfill gas (LFG) capture (for new greenfield site and landfill site east of Cooma), transfer station upgrades and prime movers;
- Operating costs – for landfill & transfer station operating costs, LFG operation & maintenance (for new Greenfield site and landfill site east of Cooma), and landfill aftercare; and
- Transport costs – for transport of waste from transfer stations to domestic and interstate landfills.

Tonnages and most capital and operating costs were provided by Council and estimated by MRA based on Council's financial data. MRA also provided Council with minor capital and operating costs. Key financial assumptions are provided in Appendix A.

Results obtained through the economic assessment are presented in the following sections.

2.1 Landfill completion dates

Table 3 shows landfill completion dates, per facility, per option.

Table 3 Landfill completion dates

Facility	Option 1	Option 2	Option 3	Option 4	Option 5
Cooma landfill	2049	2041	2030	2030	2022
Jindabyne landfill	2043	2022	2022	2022	2022
Bombala landfill	2022	2022	2022	2022	2022

Based on landfills performance, a greenfield site landfill is required to start operations in 2041 in Option 2, and 2031 in Option 3. A landfill site east of Cooma is required to start operation in 2031 in Option 4.

2.2 Economic assessment results

Table 4 outlines total capital expenditure (CAPEX), average annual operating expenditure (OPEX) and transport costs, per option. Results consider all facilities and are presented in 2020 Australian dollar's value, as no discount rate was applied to figures presented in Table 4.

[7] MSW disposal projected using a Compound Average Growth Rate (CAGR) of 3.46%. C&I and C&D waste streams were assumed to remain constant for the length of the analysis (30 years).

Table 4 Total CAPEX, average OPEX & Transport cost (actual cost in millions)

Overall (millions)	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($)	$62.6	$58.8	$41.5	$44.7	$21.3
OPEX ($/yr)	$11.5	$6.54	$5.40	$7.05	$9.49
Transport ($/yr)	$0.09	$0.06	$0.05	$0.13	$0.09

Table 5 shows the economic assessment's result for each option, presented in net present cost (NPC), with a discount rate of 7%. These results consider all facilities and evaluate the financial performance of each option for a period of 30 years (2020 to 2050).

Table 5 Economic assessment results (NPC in millions)

	Option 1	Option 2	Option 3	Option 4	Option 5
NPC ($ in millions)	**$73.5**	**$79.7**	**$76.1**	**$91.0**	**$118.1**

Breakdown of actual costs and NPC per facility, and per option, are presented in Appendix B.

3 GHG Assessment

MRA estimated greenhouse gas (GHG) emissions of the Cooma and Jindabyne Landfills scenario (current waste operations) and compared them against the emissions generated in each of the modelled options. Modelled emissions include:

- Lifetime landfill emissions – generated from decomposition of organic waste in Council and private landfills; and
- Transport emissions – generated from the transport of waste from Council transfer stations to Council and private landfills.

Emissions from organic waste were estimated using emissions factors from the National Greenhouse Accounts Factors 2020[8], and the following waste characterisations:

- MSW – Based on Council's kerbside audit[9]; and
- C&I and C&D waste – National Waste Report 2018[10] data.

Current Council's landfills have no LFG capture in place. Construction of a new landfill at a greenfield site and east of Cooma site must adhere to the NSW landfill guidelines, which include a requirement for LFG monitoring and management. Based on the expected waste throughput and composition, the greenfield site and east of Cooma site landfills could be suitable for a LFG management method, e.g., biocover or active LFG capture with flare.

For this analysis, MRA assumed the implementation of a flare system for capture of LFG at the new greenfield and east of Cooma landfills, as this is a more conservative approach than biocover and is more likely to be approved by the EPA. MRA notes the environmental impact and costs associated with a LFG capture system should be tailored further in future assessments, as these vary from site to site.

[8] National Greenhouse Accounts Factors. October 2020. Department of Industry, Science, Energy and Resources.
[9] Household Kerbside Bin System Audit 2018. February 2019. EC Sustainable.
[10] National Waste Report 2018. Department of the Environment and Energy.

The following assumption was made for lifetime LFG capture:

- Cooma, Jindabyne and Bombala LFG capture – 0%; and
- Greenfield, east of Cooma and Mugga Lane LFG capture – 50%.

Emissions from transport assumed articulated trucks consuming diesel fuel. The assessment considered distance (kilometres) between each facility and only accounted for one-way trip emissions[11].

3.1 GHG assessment results

Table 6 shows a breakdown of total (30 years) landfill and transport emissions for each option. Note that total emissions in Option 5 are significantly lower due to the assumption of Mugga Lane landfill capturing 50% of LFG.

Table 6 GHG assessment results

Item	Option 1[12]	Option 2	Option 3	Option 4	Option 5
Landfill emissions (kt CO_2-e)	536	429	336	336	281
Transport emissions (kt CO_2-e)	0.40	0.95	0.89	1.72	1.50
Total GHG emissions (kt CO_2-e)	**537**	**431**	**338**	**339**	**283**

Table 7 shows a breakdown of average annual emissions from landfill and transportation of waste for each option.

Table 7 Average annual emissions over 30 years

Item	Option 1	Option 2	Option 3	Option 4	Option 5
Landfill emissions (kt CO_2-e/yr)	17.3	13.9	10.9	10.9	9.07
Transport emissions (kt CO_2-e/yr)	0.01	0.03	0.03	0.06	0.05
Total GHG emissions (kt CO_2-e/yr)	**17.3**	**13.9**	**10.9**	**10.9**	**9.1**

The analysis included an estimation of GHG emissions when a kerbside FOGO collection service is implemented, as shown in section 4 below.

4 Recycling and Diversion Rates Sensitivity Analysis

MRA performed a sensitivity analysis to assess the impacts of a kerbside FOGO collection service on landfill lifespan, economic, GHG emissions and resource recovery. Implementation of FOGO was assessed with the following uptake levels:

- High FOGO uptake – 75% of households in Council LGA; and
- Medium FOGO uptake – 50% of households in Council LGA.

The analysis included the following assumptions:

[11] Only one-way trip emissions considered to avoid double counting.
[12] GHG emissions for Option 1 show the total emissions released from landfills without LFG capture.

- Organic waste in red-lidded bin (MSW): 40% organic waste (including food and garden organics), based on Council's kerbside audit;
- Organic waste diversion due to FOGO: 50%, based on NSW Councils average performance[13];
- Organic waste diverted from red-lidded bin is shifted to green-lidded bin (FOGO); and
- FOGO collections are implemented in line with the FOGO rollout timeframes outlined in the Waste Strategy's Action Plan, as follows:
  - Cooma catchment – 2020;
  - Jindabyne catchment – 2024; and
  - Bombala catchment – 2025.

4.1 Landfill completion dates – FOGO

Table 8 shows the end of life landfill dates when a FOGO collection service is implemented. Note that end of life dates are similar for both high and medium FOGO uptake.

The only changes observed compared the end of life dates modelled with no FOGO (Table 3) are:

- Option 1 – Cooma landfill end of life date in 2050 (i.e. one additional year of operation) and Jindabyne landfill end of life date in 2044 (i.e. one additional year of operation); and
- Option 2 – Cooma landfill end of life date in 2042 (i.e. one additional year of operation).

Bombala landfill end of life date is 2022 in each of the five options.

Table 8 Landfill end of life date FOGO 75% & 50% uptake

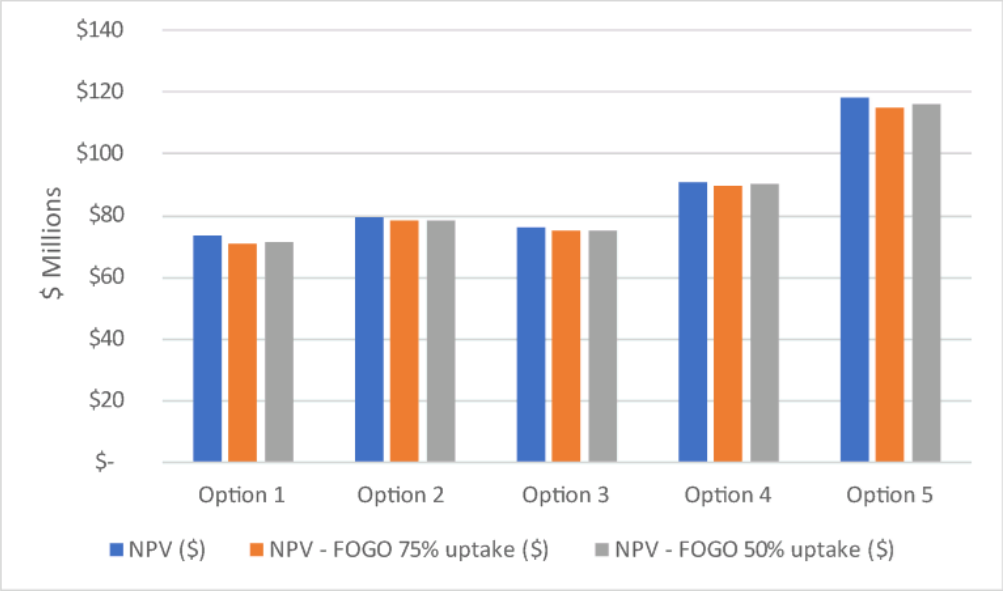
Facility	Option 1	Option 2	Option 3	Option 4	Option 5
Cooma landfill	**2050**	**2042**	2030	2030	2022
Jindabyne landfill	**2044**	2022	2022	2022	2022

4.2 Economic assessment results – FOGO

Figure 7 shows the change in NPC results with a high and medium FOGO uptake. Note that the economic assessment excludes kerbside collection costs.

[13] Average excluding underperforming Councils. 50% is a realistic organics diversion rate - MRA experience.

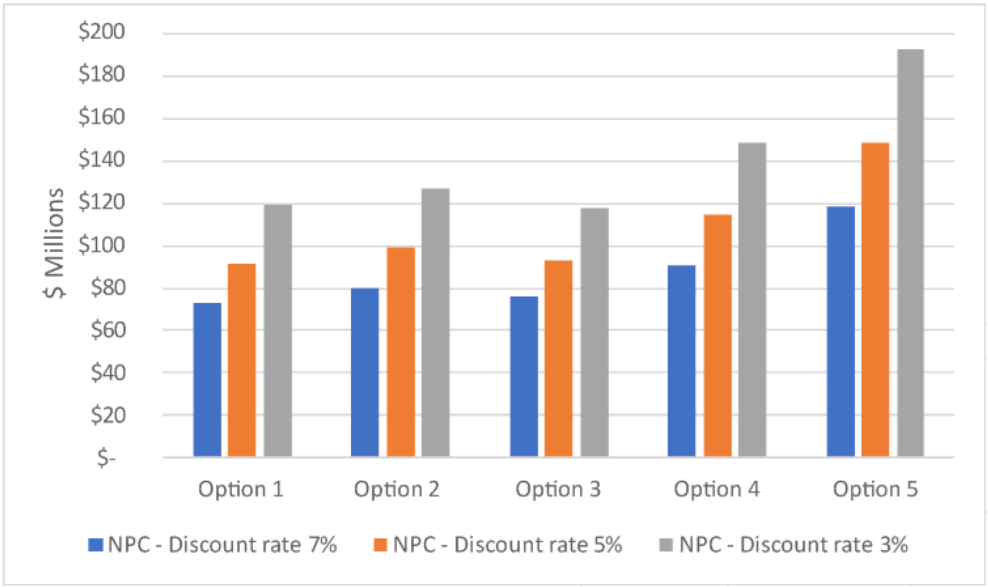
Figure 7 Economic assessment results – FOGO



4.3 Economic assessment results – Discount rate

Figure 8 shows the change in NPC results with a 5% and 3% discount rate for the base scenario, without FOGO uptake considerations.

Figure 8 Economic assessment results - Discount rate



4.4 GHG assessment – FOGO

Figure 9 shows the change in total GHG emissions (including landfill and transport) when a kerbside FOGO service is implemented. Note that Option 2 considers the implementation of LFG capture until new greenfield site starts operations (2041). MRA recommends the early implementation of LFG capture at Cooma landfill in Option 2 should be investigated further, as this could lead to increased environmental benefits without a significant impact on the Option's financial performance.

Figure 9 GHG assessment results – FOGO

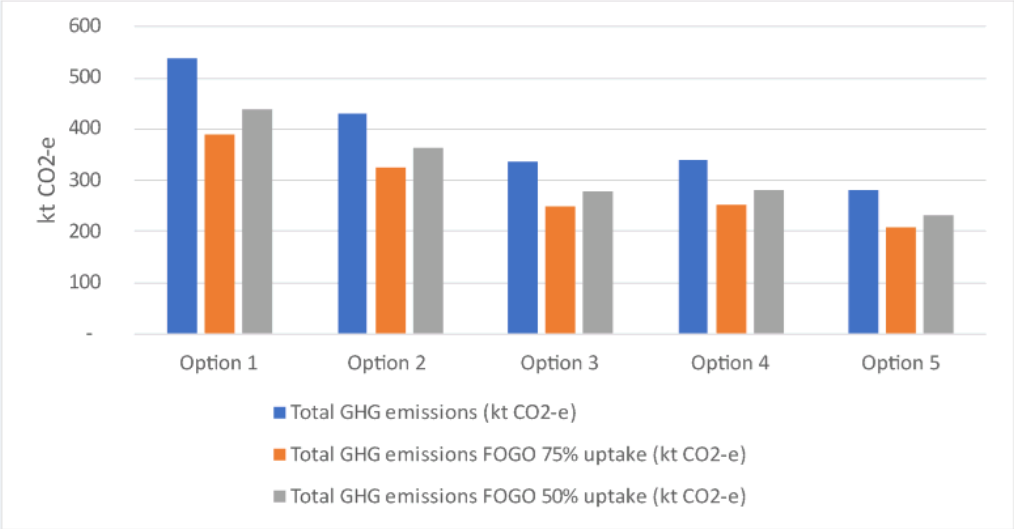
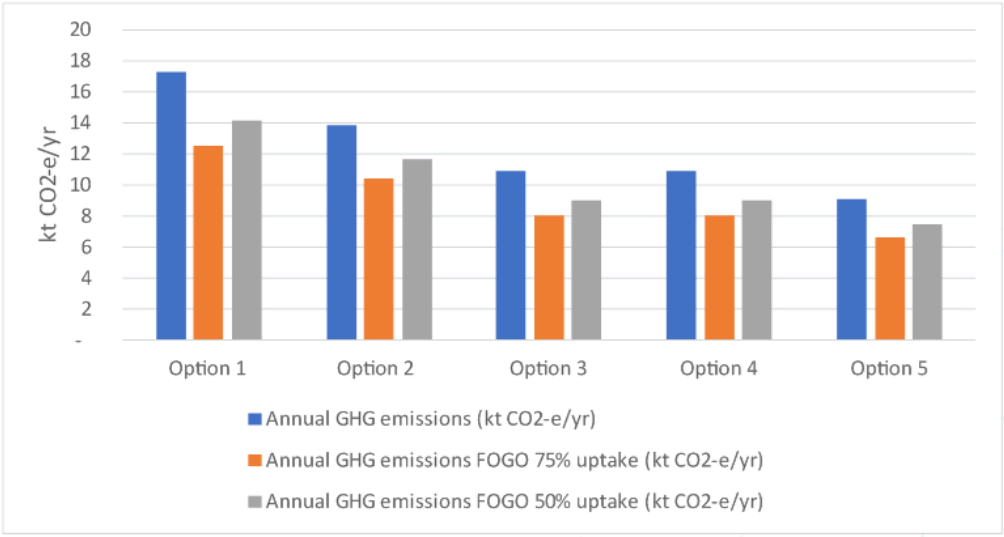


Figure 10 shows the change in average annual GHG emissions (including landfill and transport) when a kerbside FOGO service is implemented.

Figure 10 Average annual GHG emissions - FOGO



4.5 Resource recovery – FOGO

Figure 11 shows reduction of MSW and total waste to each of the Council landfills due to high and medium uptake of FOGO in Council LGA.

Figure 11 Reduction of waste to landfill – FOGO

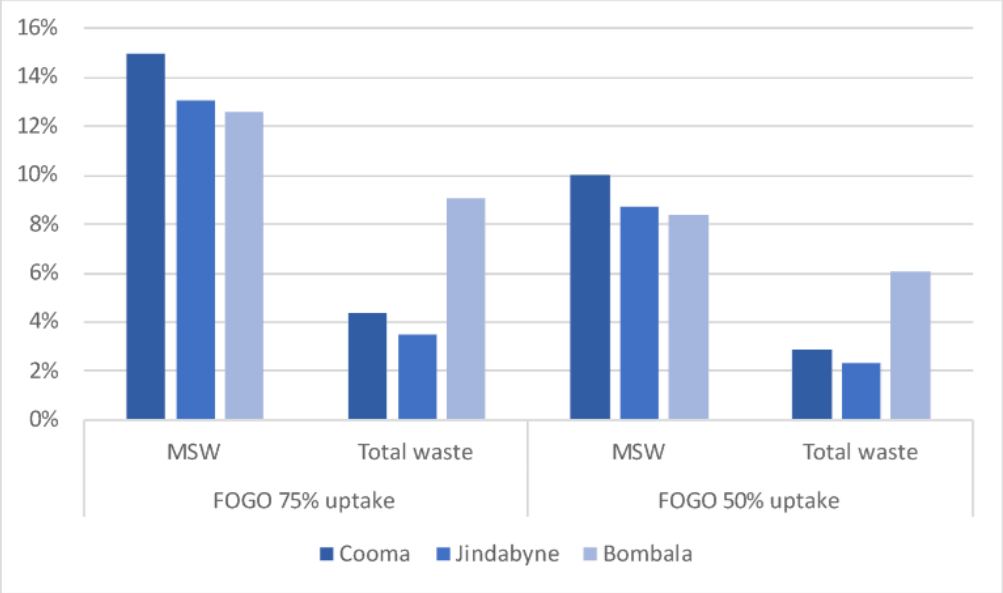
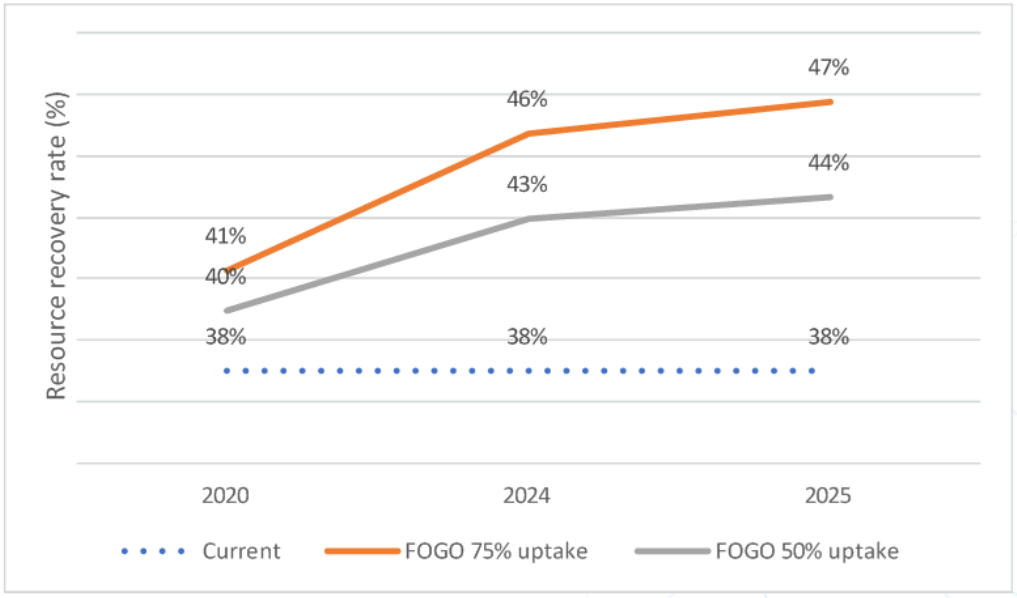


Figure 12 presents the change in resource recovery rate due to high and medium uptake of FOGO in the Council LGA. Recovery rates consider Council's overall performance in line with the proposed FOGO rollout timeframes.

Figure 12 Resource recovery rate – FOGO



5 Qualitative Assessment and Multi-Criteria Assessment

5.1 Qualitative assessment

An analysis of the strengths, weaknesses, opportunities and threats (SWOT) has been performed to gain a qualitative assessment of each option. Strengths and weaknesses consider the immediate or direct impact of the option while opportunities and threats describe the potential impacts depending on external factors, such as social and political factors.

5.1.1 Option 1 – Cooma and Jindabyne Landfills

Table 9 SWOT - Option 1

Strengths	Weaknesses
• No change to Council waste operations • Reduced environmental and health risk following the upgrade of Bombala landfill to a modern transfer station • Minimal changes to local employment • Low/no risk of increased illegal dumping	• Major expansion required at Jindabyne landfill • No Council landfill option considered after 2049 (Cooma landfill end of life) • Environmental risk due to leachate at Cooma and Jindabyne landfills, as both landfills operate for extended periods of time (2049 and 2043 respectively). Leachate from Jindabyne landfill poses risk to local water bodies, e.g. Snowy River. Groundwater in the Cooma area is vulnerable, hence posing a significant environmental risk • Environmental impact associated with landfill emissions as no LFG capture is considered
Opportunities	**Threats**
• Diversion of waste from landfill and expansion of Cooma and Jindabyne landfill lifespans due to FOGO service expansion • Increased resource recovery due to modern transfer station upgrades • Reduced environmental risk due to lining of Cooma landfill	• Jindabyne landfill unsuitable for expansion following further geotechnical and hydrogeological assessment • Increase in capital cost of Jindabyne expansion due to difficulty of quarry wall preparation and establishment works • Jindabyne landfill expansion not approved due to expansion of the Jindabyne Sports & Rec Centre and announced education facility • Increased illegal dumping upon upgrade of Bombala landfill to modern transfer station

5.1.2 Option 2 – Operate Cooma landfill as Council's primary landfill

Table 10 SWOT - Option 2

Strengths	Weaknesses
• No expansion of Jindabyne landfill required • Reduced environmental and health risk following the upgrade of Bombala landfill to a modern transfer station	• Reduced lifespan of Cooma landfill from 2049 to 2041 • Environmental risk due to leachate from extended operation at Cooma and Jindabyne landfills • Increased transport of asbestos and contaminated soil due to early upgrade of Jindabyne landfill.

Strengths	Weaknesses
	Modern transfer stations to avoid double handling of asbestos and contaminated soils
Opportunities	**Threats**
• Diversion of waste from landfill and expansion of Cooma and Jindabyne landfill lifespans due to FOGO service expansion • Increased resource recovery due to modern transfer station upgrades • Reduced environmental risk due to lining of Cooma landfill • GHG emissions reduction due to LFG capture system at new greenfield site landfill	• Increased illegal dumping upon upgrade of Bombala and Jindabyne landfills to modern transfer stations • Community or regulatory opposition to development of greenfield site may delay planning approvals • Proposed greenfield site land to be re-zoned for development of landfill, as proposed land is primary production land. Industrial purpose land is required

5.1.3 Option 3 – Operate one new Council landfill at greenfield site

Table 11 SWOT - Option 3

Strengths	Weaknesses
• No expansion of Jindabyne landfill required • Reduced environmental and health risk following the upgrade of Bombala, Jindabyne and Cooma landfills to modern transfer stations • Low environmental and human health risks due to best practice construction of greenfield site	• Developing a new landfill goes against circular economy principles and goals Council is trying to meet • Change to collection and disposal logistics in the Cooma area • Increased transport of asbestos and contaminated soil due to early upgrade of Jindabyne landfill. Modern transfer stations to avoid double handling of asbestos and contaminated soils
Opportunities	**Threats**
• Diversion of waste from landfill and expansion of Cooma and Jindabyne landfill lifespans due to FOGO service expansion • Increased resource recovery due to modern transfer station upgrades • GHG emissions reduction due to LFG capture system at new greenfield site landfill	• Increased illegal dumping upon the upgrade of Bombala, Jindabyne and Cooma landfills to modern transfer stations • Community or regulatory opposition to development of greenfield site may delay planning approvals • Proposed greenfield site land to be re-zoned for development of landfill, as proposed land is primary production land. Industrial purpose land is required • Risk of Council not finding an appropriate greenfield site near Cooma

5.1.4 Option 4 – Operate one new Council landfill at a site east of Cooma

Table 12 SWOT - Option 4

Strengths	Weaknesses
• No expansion of Jindabyne landfill required • Reduced environmental and health risk following the upgrade of Bombala, Jindabyne and Cooma landfills to modern transfer stations • Low environmental and human health risks due to best practice construction of greenfield site • Upgrade of Cooma landfill to modern transfer station and relocation of Cooma composting facility near east of Cooma landfill to optimize waste operations • Use of Council-owned land for development of east of Cooma landfill	• Developing a new landfill goes against circular economy principles and goals Council is trying to meet • Increase in capital and operating expenses due to one additional facility (ending up with 3 transfer stations and 1 landfill) • Increased transport of asbestos and contaminated soil due to early upgrade of Jindabyne landfill. Modern transfer stations to avoid double handling of asbestos and contaminated soils
Opportunities	**Threats**
• Diversion of waste from landfill and expansion of Cooma and Jindabyne landfill lifespans due to FOGO service expansion • Increased resource recovery due to modern transfer station upgrades • GHG emissions reduction due to LFG capture system at new landfill at a site east of Cooma • Potential increased employment due to additional waste facility	• Increased illegal dumping upon the upgrade of Bombala, Jindabyne and Cooma landfills to modern transfer stations • Community or regulatory opposition to development of greenfield site may delay planning approvals • Risk of Council not finding a suitable site

5.1.5 Option 5 – Transport and disposal of waste to Mugga Lane landfill

Table 13 SWOT - Option 4

Strengths	Weaknesses
• Low environmental and human health risk and liability for Council	• No control over gate fee • Increased freight of waste • Waste management uncertainty (e.g., Mugga Lane not accepting Council's waste) • Landfilling jobs outside of Council LGA • Increased transport of asbestos and contaminated soil due to early upgrade of Jindabyne landfill. Modern transfer stations to avoid double handling of asbestos and contaminated soils
Opportunities	Threats
• Increased resource recovery due to modern transfer station upgrades • Reduction of local emissions from landfill	• Increased illegal dumping upon the upgrade of Bombala, Jindabyne and Cooma landfills to modern transfer stations

Strengths	Weaknesses
	• Closure of Mugga Lane landfill could occur between 2030-2050 depending on investment in expanding the landfill

To compare the qualitative impacts of the different options, the strengths and weaknesses were used to determine an objective score under a number of criteria: policy, economic growth, social, technical, environmental and legal (PESTEL) (Appendix C). A description of each of these qualitative criteria is given in Table 14 and the scoring criteria is outlined in Table 15. The PESTEL assessment was then utilised in a multi-criteria analysis (MCA).

Table 14 PESTEL criteria description

Criteria	Description
Policy	Considers how an option aligns or supports relevant policy or strategy goals and objectives. Relevant policies and strategies include: • The National Waste Policy 2018 • *Protection of the Environment Operations (POEO) Act 1997* • *Waste Avoidance and Resource Recovery (WARR) Act 2001* • NSW WARR Strategy 2014-21 • Canberra Region Joint Organisation (CRJO) Waste Strategy 2018-23 Key goals and objectives from strategies: • Reduce waste generation • Increase recycling rates • Increase waste diverted from landfill • Manage problem wastes better
Economic Growth	Considers the broader economic benefits and impacts of each option including the effect on local economic growth and indirect costs such as those associated with illegal dumping. Local economic growth may result from upgrades and ongoing operations of facilities due to the creation of full-time employment.
Social	Considers how an option will impact residents and the broader community. Waste management systems regarding domestic waste are reliant on community effort and engagement to operate successfully, which is influenced by simplicity, education, convenience and accessibility. This criterion addresses the public effort required to adopt the new system, i.e. the ease of transition, and potential community resistance.
Technical	Considers the technical feasibility of executing an option and its integration within the existing waste management system.
Environmental	Considers the broader environmental impacts of each option, not including greenhouse gas emissions, such as vehicle kilometres travelled, diversion from landfill, resource recovery, illegal dumping and environmental contamination, e.g. leachate.
Legal	Considers the legal regulation requirements for each option such as development applications and EPA approvals.

5.2 PESTEL assessment

Based on the SWOT analysis performed for each option, qualities were allocated to each of the PESTEL categories in each of the modelled options. The categories were then assessed on a scale of 1 to 4 using the scoring criteria outlined in Table 15.

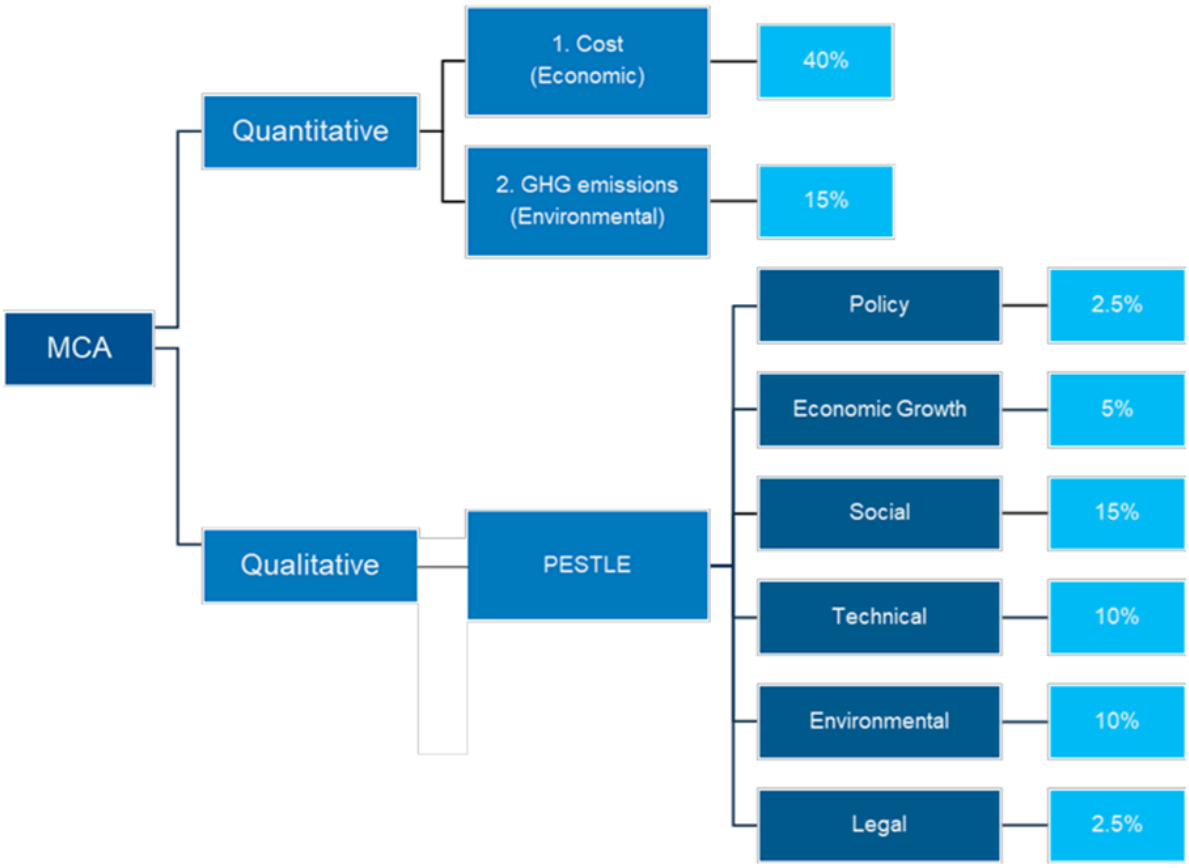
Table 15 PESTEL assessment scoring criteria

Factor	Criteria	Score
Policy	Poor: option does not align/support policy/strategy goals and objectives	1
	Limited: option marginally aligns/supports policy/strategy goals and objectives	2
	Good: option aligns/supports policy/strategy goals and objectives	3
	Excellent: option aligns/supports policy/strategy and best practice	4
Economic Growth	Poor: option does not improve upon current waste operations economic growth	1
	Limited: marginal improvements in local economic growth	2
	Good: option facilitates good local economic growth	3
	Excellent: option facilitates the best local economic growth	4
Social	Poor: significant changes require major behaviour change by residents. High potential for community resistance	1
	Limited: significant changes require some behaviour change by residents. Potential for community resistance	2
	Good: changes requiring marginal behaviour change by residents. Potential for community acceptance	3
	Excellent: no changes requiring behaviour change by residents. High potential for community acceptance	4
Technical	Poor: high difficulty in executing and integrating with existing systems	1
	Limited: some difficulty in executing and integrating with existing systems	2
	Good: negligible difficulty in executing and integrating with existing systems	3
	Excellent: no difficulty in executing and/or complements existing system	4
Environmental	Poor: significant environmental impacts	1
	Limited: some environmental impacts	2
	Good: negligible environmental impacts	3
	Excellent: improved environmental impacts	4
Legal	Poor: significant legal challenges	1
	Limited: some legal challenges	2
	Good: negligible legal challenges	3
	Excellent: no legal challenges	4

5.3 MCA

An MCA was performed to compare the four landfill options in regards to both the quantitative results and the qualitative impacts as outlined in section 5.1. The quantitative and qualitative impacts of each option were assessed utilising the criteria and weightings, developed in consultation with Council, outlined in Figure 13.

Figure 13 MCA weightings



5.3.1 MCA results

Table 16 shows results obtained for the quantitative component of the analysis, which includes the economic and GHG emissions results for each option.

Table 16 Quantitative results

Concept	Weightings	Option 1	Option 2	Option 3	Option 4	Option 5
Economic (NPC $, millions)	40%	$73.5	$79.7	$76.1	$91.0	$118.1
Absolute weighted score (Economic)	40%	40%	37%	39%	32%	25%
Environmental (GHG kt CO_2-e)	15%	537	431	338	339	283
Absolute weighted score (GHG)	15%	8%	10%	13%	13%	15%
Quantitative score	**55%**	**48%**	**47%**	**51%**	**45%**	**40%**

Table 17 presents results obtained for the qualitative component of the analysis, which assesses the PESTEL impacts of each option.

Table 17 Qualitative results

Concept	Absolute weighting	Criterion weighting	Option 1	Option 2	Option 3	Option 4	Option 5
Policy	2.5%	6%	2	3	3	3	3
Economic Growth	5%	11%	3	3	3	1	4
Social	15%	33%	4	3	2	1	2
Technical	10%	22%	1	3	3	4	3
Environmental	10%	22%	1	3	4	4	4
Legal	2.5%	6%	2	3	3	4	3
Qualitative score	**45%**	**100%**	**26%**	**34%**	**32%**	**29%**	**34%**

Both quantitative and qualitative scores were assessed to obtain a total score. The results of the MCA are provided in Table 18, where the highest ranked option was **Option 3 – Operate one new Council landfill at greenfield site near Cooma**.

Table 18 MCA results

Concept	Weightings	Option 1	Option 2	Option 3	Option 4	Option 5
Economic & GHG	55%	48%	47%	51%	45%	40%
PESTEL	45%	26%	34%	32%	29%	34%
Total Score	**100%**	**74%**	**80%**	**84%**	**74%**	**74%**

6 Discussion of Results

The landfill options analysis undertaken by MRA highlights the following options as best performing:

- Economic (NPC $): Option 1 – Cooma and Jindabyne Landfills;
- Environmental (t CO_2-e): Option 5 – Transport and disposal of waste to Mugga Lane landfill; and
- PESTEL: Option 2 – Operate Cooma landfill as Council's primary landfill.

The multi-criteria analysis indicates that, overall, the better scored option for operation of Council's landfills is **Option 3 – Operate one new landfill at greenfield site near Cooma**, with a total score of 84% out of 100%. Operation of landfills under this configuration can help Council achieve positive economic and environmental outcomes, in line with Council's policy and strategy goals.

As presented in Section 3 and 4 in this report, the implementation of LFG capture in new landfills and FOGO kerbside collection in Council LGA will achieve further environmental benefits, including the reduction of landfill emissions and an increased resource recovery rate, which are in line with key objectives and goals, such as reduction of waste to landfill and increase in resource recovery.

Based on MRA experience with emissions from Council operations, addressing emissions from waste is the single activity that can reduce the most GHG emissions and this can be done by installing LFG capture and reducing disposal of organics to landfill, i.e., kerbside FOGO. Nevertheless, it should be noted these environmental benefits come along with a higher economic cost when compared to current waste operations.

Appendix A

Table 19 Key financial assumptions

Item	Value	Justification/Source
Greenfield & east of Cooma landfill land cost ($/m^2)	$5/m^2, giving a total landfill land cost of $1M	Total land cost for 200,000 m^2 of land (similar to Cooma landfill) in near proximity to Cooma LGA. Based on a review of land in near proximity to the Snowy Mountains Airport and to Cooma landfill. Land cost found to be variable and reasonably cheap. MRA has doubled up the cost of land found through the review, to ensure the total land cost is conservative in the landfill options model.
Greenfield & east of Cooma landfill construction cost ($)	$8.8M	Based on landfill construction costs provided by GHD in their Jindabyne Regional Waste Management Facility Options Assessment report for Council, and complementary costs provided by MRA, such as weighbridge ($91.5k) and fencing ($10/m).
Gate fee at Mugga Lane landfill ($/t)	$150	Mugga lane landfill chosen over Woodlawn for transport and disposal of waste as Woodlawn has a regional waste limit in their Environment Protection Licence. Gate fee provided based on MRA experience. MRA note this gate fee may be variable based on contractual arrangements between Council and Mugga Lane landfill.
Jindabyne landfill expansion cost ($)	$11.4M	Based on Jindabyne Regional Waste Management Facility Options Assessment report by GHD.
Cooma landfill upgrade costs ($)	Leachate dam - $1.5M Stormwater - $2M Liner - $120/m^2	Provided by Council.
Greenfield & east of Cooma landfill LFG capture	Capex $400k Opex $40k/yr	Note that LFG capture systems cost varies depending on equipment, landfill layout and other conditions to tailor infrastructure to each landfill needs. Indicative cost includes flare, pipework, pumps, ancillary equipment, earthworks and commissioning. Based on MRA experience for landfills 30-40 ktpa.

Appendix B

Economic assessment results

Cost breakdown per facility

Table 20 Actual cost - Cooma

Cooma	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($, millions)	$39.5	$34.5	$17.2	$20.4	$11.6
OPEX ($, millions/yr)	$1.96	$1.78	$0.83	$2.49	$1.10
OPEX ($/t)	$87	$61	$32	$118	$63
Transport ($, millions/yr)	$0.08	$-	$-	$0.05	$0.04
Avg tonnes received (t/yr)	22,431	29,063	26,042	21,114	17,501

Table 21 Actual cost - Jindabyne

Jindabyne	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($, millions)	$19.2	$4.86	$4.86	$4.86	$5.74
OPEX ($, millions/yr)	$1.17	$1.11	$1.11	$1.11	$1.11
OPEX ($/t)	$90	$86	$86	$86	$86
Transport ($, millions/yr)	$-	$0.05	$0.04	$0.07	$0.04
Avg tonnes received (t/yr)	13,011	13,011	13,011	13,011	13,011

Table 22 Actual cost - Bombala

Bombala	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($, millions)	$3.94	$3.94	$3.94	$3.94	$3.94
OPEX ($, millions/yr)	$0.45	$0.45	$0.45	$0.45	$0.45
OPEX ($/t)	$278	$278	$278	$278	$278
Transport ($, millions/yr)	$0.01	$0.01	$0.01	$0.01	$0.01
Avg tonnes received (t/yr)	1,632	1,632	1,632	1,632	1,632

Table 23 Actual cost - Greenfield site

GF	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($, millions)	$-	$15.5	$15.5	$-	$-
OPEX ($, millions/yr)	$-	$3.19	$3.00	$-	$-
OPEX ($/t)	$-	$98	$89	$-	$-
Transport ($, millions/yr)	$-	$-	$-	$-	$-
Avg tonnes received (t/yr)	-	32,654	33,832	$-	-

Table 24 Actual cost – East of Cooma landfill

East of Cooma	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX ($, millions)	$ -	$ -	$ -	$15.5	$ -
OPEX ($, millions/yr)	$ -	$ -	v	$3.00	$ -
OPEX ($/t)	$ -	$ -	$ -	$89	$ -
Transport ($, millions/yr)	$ -	$ -	$ -	$-	$ -
Avg tonnes received (t/yr)	$ -	$ -	$ -	$33,832	$ -

Table 25 Actual cost - Private landfill

Private LF	Option 1	Option 2	Option 3	Option 4	Option 5
OPEX (External cost to Council $, millions/yr)	$7.93	$-	$-	$-	$6.82
OPEX (External cost to Council $/t)	$270	$-	$-	$-	$212
Avg tonnes received (t/yr)	29,395	-	-	$-	32,152

NPC breakdown per facility

Table 26 NPC - Cooma

Cooma	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX (NPC $, millions)	$17.8	$19.6	$12.5	$14.2	$10.5
OPEX (NPC$, millions)	$20.4	$24.7	$15.0	$27.9	$13.4
Transport (NPC$, millions)	$0.02	$-	$-	$0.24	$0.39
Total, millions	$38.2	$44.2	$27.5	$42.3	$24.3

Table 27 NPC - Jindabyne

Jindabyne	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX (NPC $, millions)	$11.0	$4.25	$4.25	$4.25	$4.42
OPEX (NPC$, millions)	$13.6	$13.0	$13.0	$13.0	$13.0
Transport (NPC$, millions)	$0.09	$0.50	$0.46	$0.66	$0.43
Total, millions	$24.7	$17.8	$17.7	$17.9	$17.9

Table 28 NPC - Bombala

Bombala	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX (NPC $, millions)	$3.44	$3.44	$3.44	$3.44	$3.44
OPEX (NPC$, millions)	$4.90	$4.90	$4.90	$4.90	$4.90
Transport (NPC$, millions)	$0.09	$0.09	$0.10	$0.07	$0.06
Total, millions	$8.43	$8.43	$8.44	$8.41	$8.40

Table 29 NPC - Greenfield site

GF	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX (NPC $, millions)	$-	$3.74	$7.34	$-	$-
OPEX (NPC$, millions)	$-	$5.51	$15.1	$-	$-
Transport (NPC$, millions)	$-	$-	$-	$-	$-
Total, millions	$-	$9.26	$22.4	$-	$-

Table 30 NPC – East of Cooma landfill

East of Cooma LF	Option 1	Option 2	Option 3	Option 4	Option 5
CAPEX (NPC $, millions)	$-	$-	$-	$7.34	$-
OPEX (NPC$, millions)	$-	$-	$-	$15.1	$-
Transport (NPC$, millions)	$-	$-	$-	$-	$-
Total, millions	$-	$-	$-	$22.4	$-

Table 31 NPC - Private landfill

Private LF	Option 1	Option 2	Option 3	Option 4	Option 5
OPEX (External cost to Council, NPC $, millions)	$2.13	$-	$-	$-	$67.6
Total, millions	$2.13	$-	$-	$-	$67.6

Appendix C

Table 32 PESTEL assessment

Option	Policy (governance + alignment w/ strategy targets)	Economic (broader than costs, e.g. employment, illegal dumping)	Social	Technical (how feasible it is to build a landfill, transport of waste)	Environmental (other than GHG e.g. vehicle kms travelled, diversion/resource recovery, illegal dumping, leachate management)	Legal (DPIE, EPA approvals)
Option 1 - Cooma and Jindabyne Landfills	Increased resource recovery due to modern transfer station upgrades – Jindabyne landfill expansion may not be approved due to SAP plans (expansion of Sports & Rec Centre and education facility)	Change from landfill to Transfer stations would not negatively impact on local employment Access to Bombala ScrapMart	Lowest social impact of all options Minimal behaviour change required for residents Improved user experience at modern transfer facilities No change in service level provided to residents	Expansion required at Jindabyne landfill (rock-wall construction technical constraints) No landfill option considered after 2049 More cover material required to operate multiple landfill sites Lining over old landfill cell at Cooma requires additional stability works, monitoring of subsidence of waste	Low environmental & health risks due to upgrade of Bombala to a Transfer Station Lowest risk of increased illegal dumping of all options Environmental risk due to leachate at Cooma (groundwater vulnerable) and Jindabyne landfills, as both landfills operate for extended periods of time (20349 and 2043 respectively). Leachate from Jindabyne landfill poses risk to local water bodies, e.g. Snowy River. No gas capture due to tonnes of waste received at existing facilities Opportunity to divert FOGO from landfill Increased resource recovery due to modern transfer station upgrades Odour/ litter management issues with existing operations Reduced environmental risk due to lining of Cooma landfill	Jindabyne landfill expansion dependent on approval (also requires further geotechnical and hydrogeological assessment)

Option	Policy (governance + alignment w/ strategy targets)	Economic (broader than costs, e.g. employment, illegal dumping)	Social	Technical (how feasible it is to build a landfill, transport of waste)	Environmental (other than GHG e.g. vehicle kms travelled, diversion/resource recovery, illegal dumping, leachate management)	Legal (DPIE, EPA approvals)
Option 2 – Operate Cooma landfill as Council's primary landfill	Increased resource recovery due to modern transfer station upgrades Increased illegal dumping upon upgrade of Bombala Landfill and Jindabyne landfill to transfer stations	Change from landfill to transfer stations would not negatively impact on local employment Access to Bombala ScrapMart	Jindabyne and Cooma upgrade to Transfer Stations trigger at end of landfill life Community or regulatory opposition to development of greenfield site may delay planning approvals	Reduced lifespan of Cooma LF from 2049 to 2041 Jindabyne landfill is not expanded to quarry area	No expansion to Jindabyne LF required Reduced environmental and health risk due to upgrade of Bombala landfill to transfer station Low environmental and human health risks due to best practice construction of Greenfield site Environmental risk due to leachate from extended operation at Cooma and Jindabyne landfills GHG emissions reduction due to LFG capture system at new greenfield site landfill Increased resource recovery due to modern transfer station upgrades Increased illegal dumping upon upgrade of landfills to transfer stations Reduced environmental risk due to lining of Cooma landfill	Community or regulatory opposition to development of greenfield site may delay planning approvals Licence variation required following all waste being diverted Cooma (>20,000 tonnes per year) Proposed greenfield site land to be re-zoned for development of landfill, as proposed land is primary production land. Industrial purpose land is required

Option	Policy (governance + alignment w/ strategy targets)	Economic (broader than costs, e.g. employment, illegal dumping)	Social	Technical (how feasible it is to build a landfill, transport of waste)	Environmental (other than GHG e.g. vehicle kms travelled, diversion/resource recovery, illegal dumping, leachate management)	Legal (DPIE, EPA approvals)
Option 3 – Operate one new Council landfill at greenfield site	Increased resource recovery due to modern transfer station upgrades Increased illegal dumping upon upgrade of Bombala LF and Jindabyne LF to transfer stations, and closure of Cooma LF	Increased illegal dumping upon upgrade of landfills to transfer stations Potential for additional jobs with construction of new landfill in addition to two modern transfer stations	Jindabyne upgrade to Transfer Station and Cooma closure triggered earlier than end of landfill life which may be opposed by the community Community or regulatory opposition to development of greenfield site may delay planning approvals	Rehabilitation of Cooma prior to final planned landform is reached Relocation of composting site at Cooma to the greenfield site Identification of a suitable landfill site and within the timeframe	Reduced environmental and health risk due to upgrade of Bombala Landfill to transfer station Low environmental and human health risks due to best practice construction of Greenfield site Increased resource recovery due to modern transfer station upgrades GHG emissions reduction due to LFG capture system at new greenfield site landfill	Community or regulatory opposition to development of greenfield site may delay planning approvals Proposed greenfield site land to be re-zoned for development of landfill, as proposed land is primary production land. Industrial purpose land is required.

Option	Policy (governance + alignment w/ strategy targets)	Economic (broader than costs, e.g. employment, illegal dumping)	Social	Technical (how feasible it is to build a landfill, transport of waste)	Environmental (other than GHG e.g. vehicle kms travelled, diversion/resource recovery, illegal dumping, leachate management)	Legal (DPIE, EPA approvals)
Option 4 – Operate one new Council landfill at a site east of Cooma	Increased resource recovery due to modern transfer station upgrades Potential increased illegal dumping upon upgrade of landfills to transfer stations	Increased illegal dumping upon upgrade of landfills to transfer stations Potential for additional jobs with construction of new landfill in addition to three modern transfer stations Higher capital and operating costs associated with an additional waste facility	Jindabyne and Cooma upgrade to Transfer Stations triggered earlier than end of landfill life which may be opposed by the community Community or regulatory opposition to development of site east of Cooma may delay planning approvals Community rejection/acceptance to an additional waste facility	Rehabilitation of Cooma prior to final planned landform is reached Relocation of composting site at Cooma near the site east of Cooma Use of a suitable Council-owned property for use as landfill site	Reduced environmental and health risk due to upgrade of Bombala Landfill to transfer station Low environmental and human health risks due to best practice construction of site east of Cooma Increased resource recovery due to modern transfer station upgrades GHG emissions reduction due to LFG capture system at new landfill site east of Cooma	Community or regulatory opposition to development of site east of Cooma may delay planning approvals

Option	Policy (governance + alignment w/ strategy targets)	Economic (broader than costs, e.g. employment, illegal dumping)	Social	Technical (how feasible it is to build a landfill, transport of waste)	Environmental (other than GHG e.g. vehicle kms travelled, diversion/resource recovery, illegal dumping, leachate management)	Legal (DPIE, EPA approvals)
Option 5 – Transport and disposal of waste to Mugga Lane landfill	Increased resource recovery due to modern transfer station upgrades Potential increased illegal dumping upon upgrade of landfills to transfer stations	Minimal impacts on employment numbers / change in work requirements No control over gate fee Landfilling jobs outside of Council LGA	Variable community reactions to movement of waste out of the local area Community resistance due to increased gate fee	Lowest environmental and human health risk and liability for Council No control of timeframe for closure of Mugga Lane landfill (2030-2050)	Lowest environmental and human health risk and liability for Council Increased freight of waste on local / major transport routes Increased transport risks (collision, littering, fires) Increased resource recovery due to modern transfer station upgrades	Challenges associated with contractual arrangements to transport and dispose waste a Mugga Lane landfill

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Rationalisation of Transfer Stations

A Submission to Snowy Monaro Regional Council

2 December 2020

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Table of contents

1 Introduction 4
1.1 Scope 5
2 Service Catchments 6
2.1 Service Catchment Maps 9
3 Alternative Options 16
4 Cost Benefit Analysis 18
4.1 Method and Assumptions 18
4.2 Results 20
4.3 Findings 22
5 Qualitative Analysis 24
5.1 Adaminaby transfer station 24
5.2 Berridale transfer station 25
5.3 Bredbo transfer station 26
5.4 Delegate transfer station 27
5.5 Nimmitabel transfer station 28
5.6 Numeralla transfer station 29
6 Discussion and Recommendations 30
Appendix A 33

List of Tables

Table 1 Operational details and financial performance of transfer stations 4
Table 2 Current and expected disposal at transfer stations 5
Table 3 Number of households by service catchment 6
Table 4 Service catchment summary 8
Table 5 Bin requirements under Method 1 16
Table 6 Bin requirements under Method 2 17
Table 7 Average financial performance of transfer stations across 2018/19 and 2019/20 18
Table 8 Financial model assumptions 19
Table 9 Bank of Bins revenue 20
Table 10 Scenario 1 CAPEX and OPEX 20

Table 11 Scenario 2 CAPEX and OPEX....21
Table 12 Numeralla kerbside collection cost estimate....22
Table 13 Summary of results....23
Table 14 SWOT analysis of Adaminaby transfer station options....24
Table 15 SWOT analysis of Berridale transfer station options....25
Table 16 SWOT analysis of Bredbo transfer station options....26
Table 17 SWOT analysis of Delegate transfer station options....27
Table 18 SWOT analysis of Nimmitabel transfer station options....28
Table 19 SWOT analysis of Numeralla transfer station options....29
Table 20 Traffic light analysis - summary of results....30

List of Figures

Figure 1 Service catchment areas showing all households.... 7
Figure 2 Adaminaby Service Catchment....10
Figure 3 Berridale Service Catchment....11
Figure 4 Bredbo Service Catchment....12
Figure 5 Delegate Service Catchment....13
Figure 6 Nimmitabel Service Catchment....14
Figure 7 Numeralla Service Catchment....15

1 Introduction

Snowy Monaro Regional Council (SMRC) currently operates six waste Transfer Stations located in in the LGA, these include:

- Bredbo Transfer Station
- Adaminaby Transfer Station
- Numeralla Transfer Station
- Berridale Transfer Station
- Nimmitabel Transfer Station
- Delegate Transfer Station

The transfer stations are available for all residents, including rural residents who are not serviced by the kerbside collection service, to drop off domestic waste, including general waste, commingled recycling, garden waste, ferrous waste, e-waste, oil, batteries and mattresses, and small amounts of commercial and industrial (C&I) waste. The waste is then transported elsewhere for recycling or disposal.

In addition to the transfer stations, Council provides 16 Bank of Bin sites (BoBs) to service properties located in remote regions across the LGA. These residents would otherwise be required to drop off their waste at the closest waste facility. The BoBs consist of 360L mobile garbage bins (MGBs), for general waste and commingled recycling, contained within a lockable enclosure, only accessible by designated residents. The BoBs are currently serviced by the domestic and recycling kerbside collection vehicles and have the potential to be serviced by a trailer.

During MRA's preparation for the development of the SMRC Waste Management Strategy, the operational and financial performances of the Council's transfer stations were highlighted with all transfer stations operating at a loss, refer to Table 1.

Table 1 Operational details and financial performance of transfer stations

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Location	7 Old Adaminaby Road, Adaminaby 2629	160 Bobundara Road, Berridale 2628	3221 Monaro Highway, Bredbo 2626	Delegate Road, Delegate 2633	52 Warregal Corner Road, Nimmitabel 2631	2086 Numeralla Road, Numeralla 2630
Opening Hours	Sat 10am-3pm	Sun 10am-3pm	Fri 10am-12pm Sun 10am-1pm	Tue 9am-12pm Sat 9am-12:30pm	Wed 9am-12pm Sun 11am-3pm	Mon 8am-10am Sat 9am-1pm
Profit/loss per tonne ($/t)	-$369	-$198	-$422	-$308	-$489	-$471

It is also noted that the transfer stations are currently underutilised. Table 2 compares the average tonnes of waste and recycling received at each transfer station compared with expected disposal based

on SMRC's average household generation according to the 2018 household kerbside bin audit[1] and the number of self-haul households serviced.

Table 2 Current and expected disposal at transfer stations

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Actual tonnes received (avg. 2019/2020)	110	172	132	65	122	95
Expected tonnes based on household generation rates	346	357	537	166	274	450

1.1 Scope

MRA Consulting was engaged by SMRC to review the financial, environmental and social viability of the six waste Transfer Stations in the LGA.. MRA conducted an analysis to rationalise transfer station infrastructure servicing the region, including:

1. Identification of service catchment areas;
2. Identification of alternative options for each catchment;
3. Conduct a cost benefit analysis; and
4. Conduct a qualitative analysis.

[1] EC Sustainable *Household Kerbside Bin System Audit 2018*

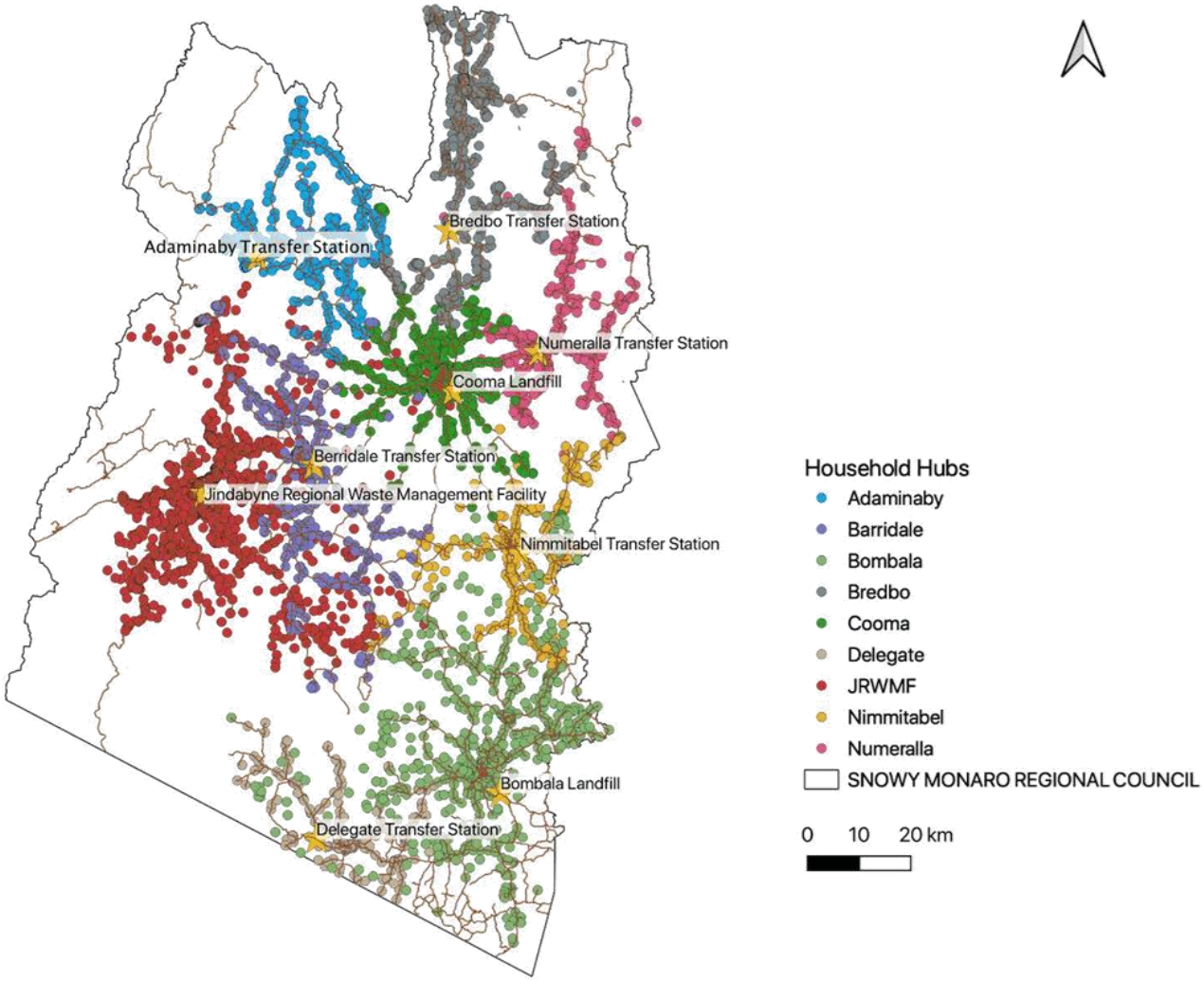
2 Service Catchments

Analysis of geographical information systems (GIS) data was performed by SMRC to identify service catchments, capturing the approximate number of households using each SMRC waste facility (transfer stations and landfill sites). The number of households in each service catchment is quantified in Table 3 and visualised in Figure 1.

Table 3 Number of households by service catchment

Service Catchment Area	Households
Adaminaby	876
Berridale	1,209
Bombala	1,436
Bredbo	903
Cooma	4,045
Delegate	387
Jindabyne	4,095
Nimmitabel	515
Numeralla	620
Unassigned	25
Total	**14,111**

Figure 1 Service catchment areas showing all households



Households in each service catchment were classified based on the waste management service they receive, including:

- Self-haul residents (i.e. no kerbside household collection of residual and recycling);
- Kerbside service residents (i.e. residents who receive a kerbside waste collection but may use the transfer stations for bulky waste drop-off); and
- Residents with an existing BoB (i.e. use the existing transfer stations for bulky waste drop-off).

Households were also classified based on the time (10, 20, 30, 40 or 60 minutes) required to drive to their nearest waste facility. The breakdown of households by service type and the average times for residents to drive to their nearest and second nearest waste sites for each service catchment (transfer stations only) are provided in Table 4. Jindabyne (4,095 hh), Cooma (4,045 hh) and Bombala (1,436 hh) catchment areas were excluded as well as the households not allocated to any service catchment area (refer to Table 3 "Unassigned").

Households more than 60 minutes from a second nearest facility were not allocated a second nearest facility. These households were excluded from average time to second nearest facility calculations.

Table 4 Service catchment summary

Service Catchment Area	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Households (#hh)	876	1209	903	387	515	620
Self-haul households (#hh (%))	472 (54%)	487 (40%)	733 (81%)	227 (59%)	374 (73%)	614 (99%)
Kerbside households (#hh (%))	394 (45%)	694 (57%)	153 (17%)	160 (41%)	141 (27%)	-
BoB households (#hh (%))	10 (1%)	28 (2%)	17 (2%)	-	-	6 (1%)
Average time to existing transfer station[1] (mean)	22mins	20mins	29mins	15mins	19mins	31mins
Average time to existing transfer station for self-haul households only (mean)	28mins	13mins	32mins	19mins	23mins	31mins
Average time to 2nd facility[2] (mean)	57mins	36mins	51mins	42mins	45mins	47mins
Households travelling 60mins+ to 2nd facility (#hh)	207	14	196	2	6	14

Service Catchment Area	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Average time to 2nd facility for self-haul households only[3] (mean)	56mins	39mins	53mins	43mins	47mins	47mins
Self-haul households travelling 60mins+ to 2nd facility (#hh)	102	13	195	2	6	14

Note 1: includes all households (self-haul, kerbside service & BoBs).
Note 2: second nearest facility assumes all other transfer stations will remain open. Average time excludes households that travel more than 60mins.
Note 3: average time excludes households that travel more than 60mins.

2.1 Service Catchment Maps

Map images of each service catchment with household data points and time intervals were generated using GIS software. Due to limitations of the data, not all households are visualised.

2.1.1 Adaminaby Service Catchment

A map image of Adaminaby service catchment is shown in Figure 2. It includes households that have Adaminaby transfer station as their closest waste facility (shortest drive time compared to other waste facilities).

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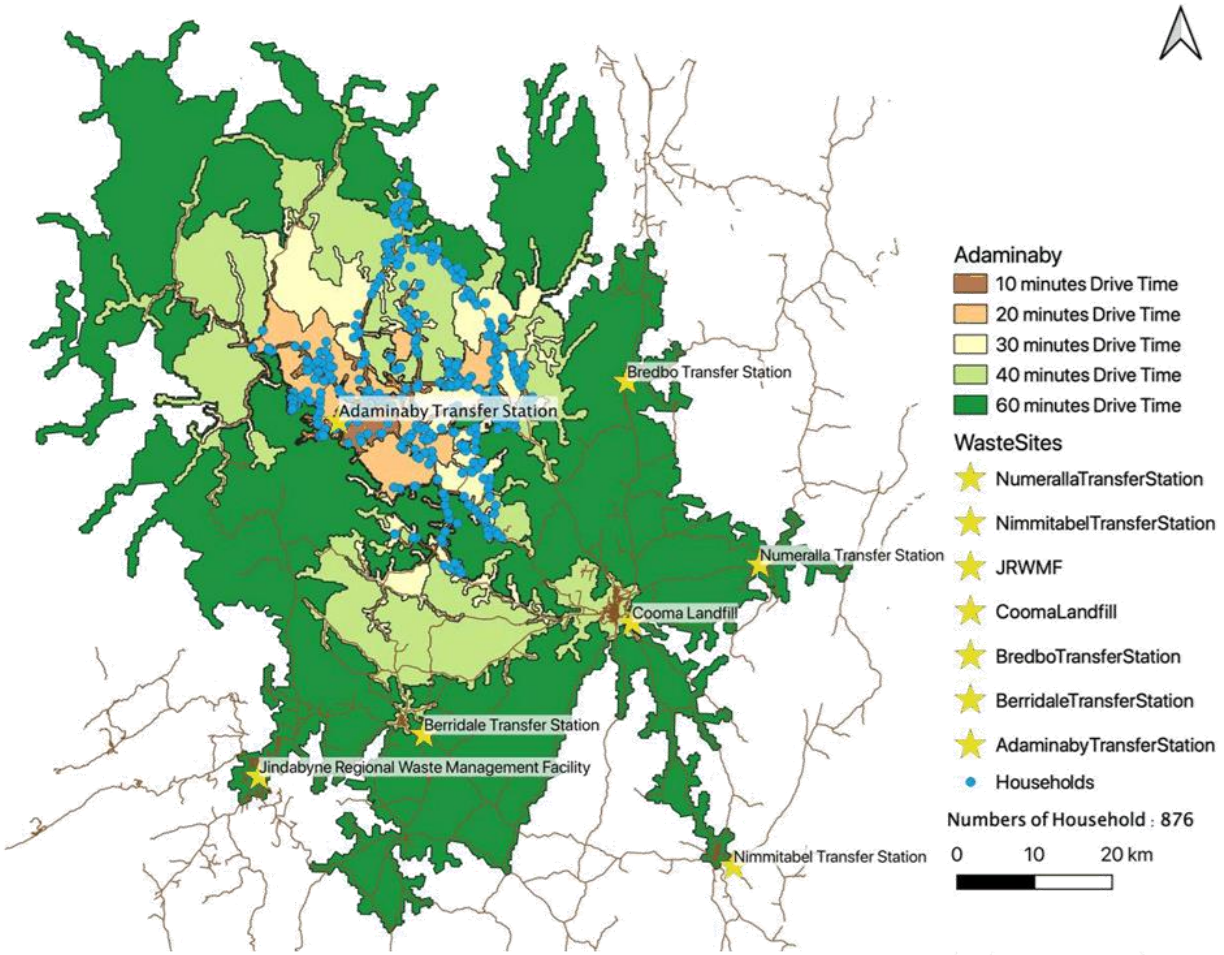
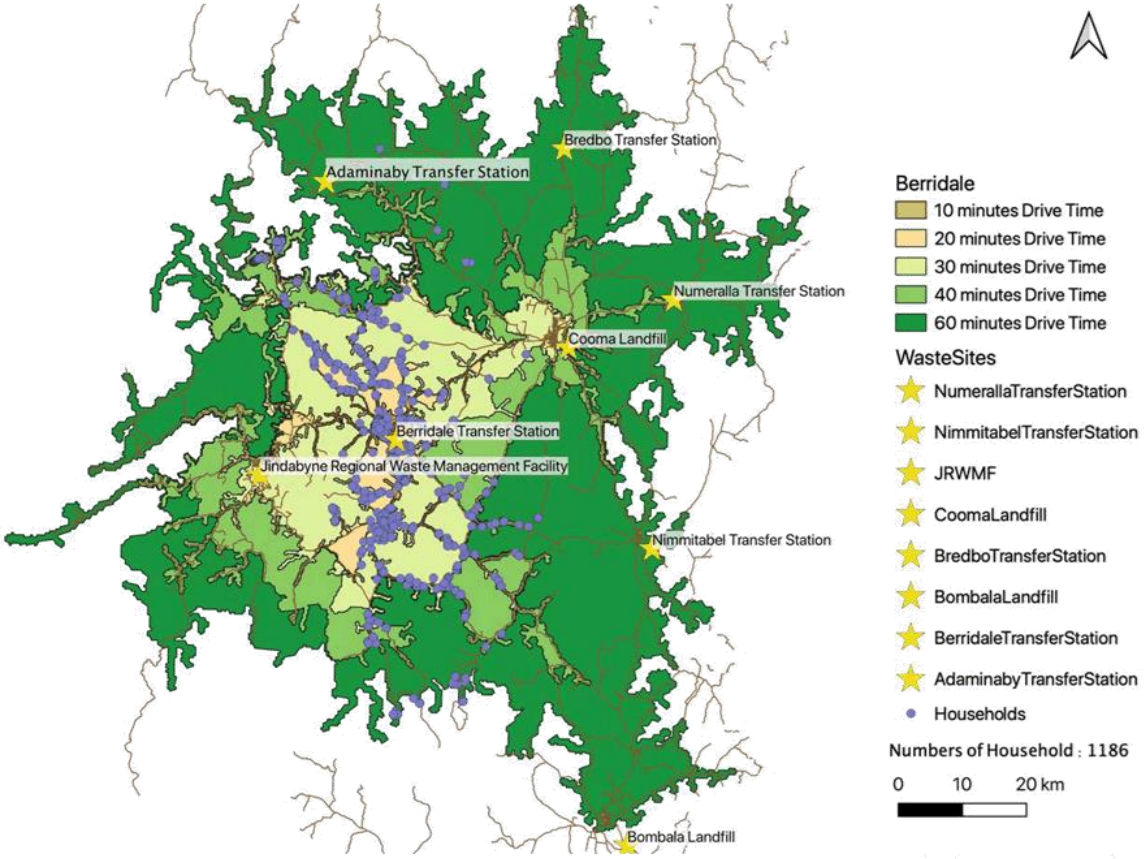
Figure 2 Adaminaby Service Catchment



2.1.2 Berridale Service Catchment

A map image of Berridale service catchment is shown in Figure 3. It includes households that have Berridale transfer station as their closest waste facility (shortest drive time compared to other waste facilities).

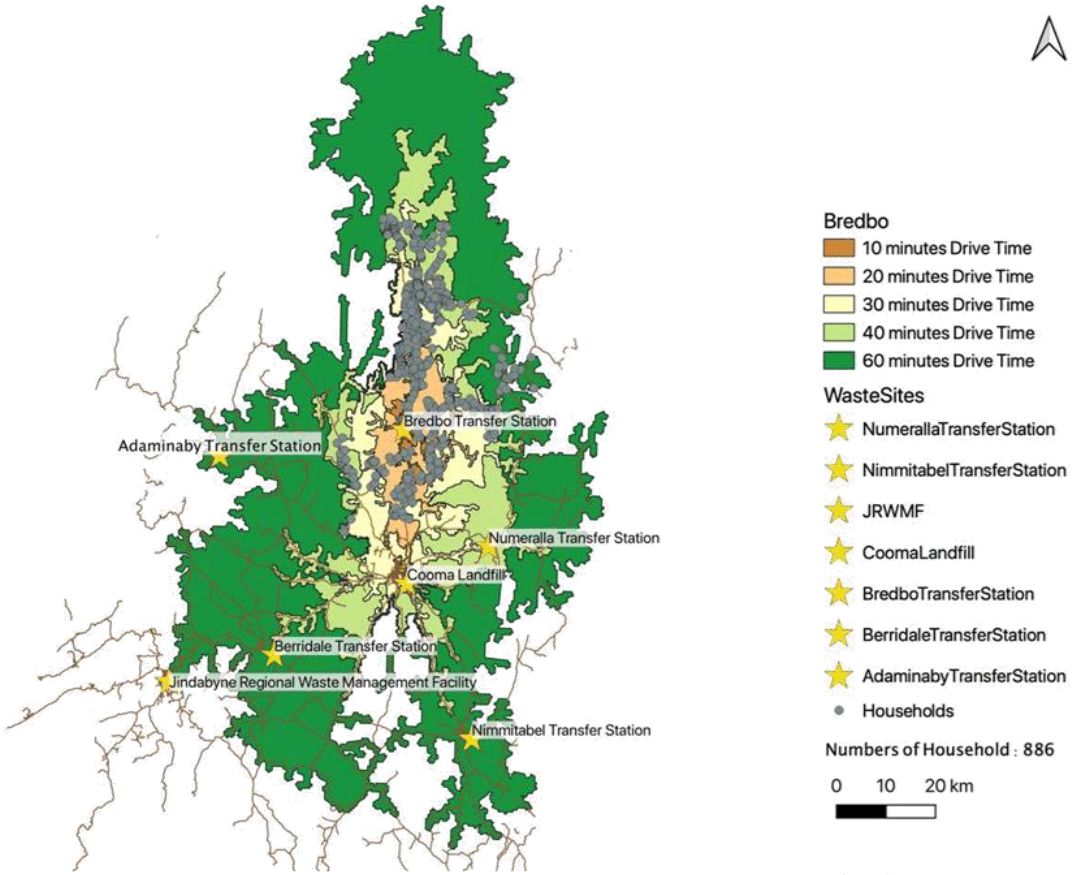
Figure 3 Berridale Service Catchment



2.1.3 Bredbo Service Catchment

A map image of Bredbo service catchment is shown in Figure 4. It includes households that have Bredbo transfer station as their closest waste facility (shortest drive time compared to other waste facilities).

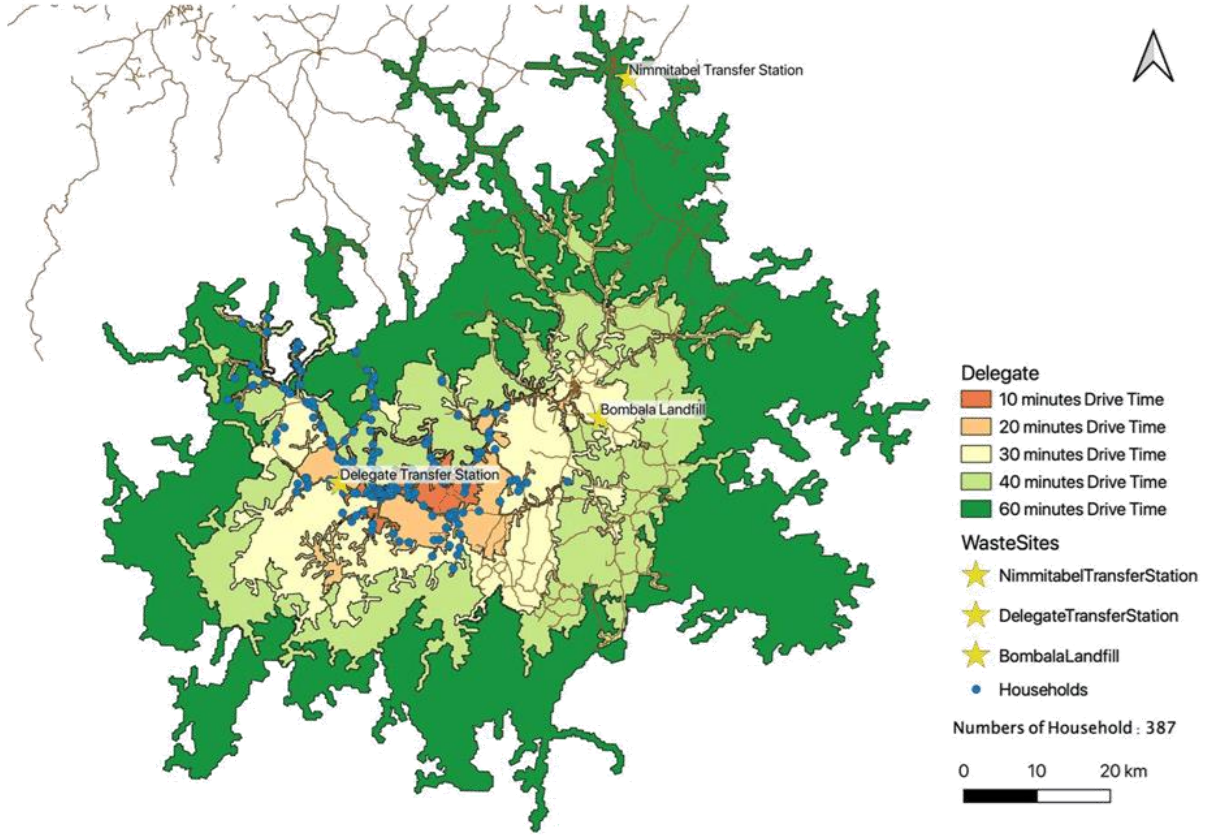
Figure 4 Bredbo Service Catchment



2.1.4 Delegate Service Catchment

A map image of Delegate service catchment is shown in Figure 5. It includes households that have Delegate transfer station as their closest waste facility (shortest drive time compared to other waste facilities).

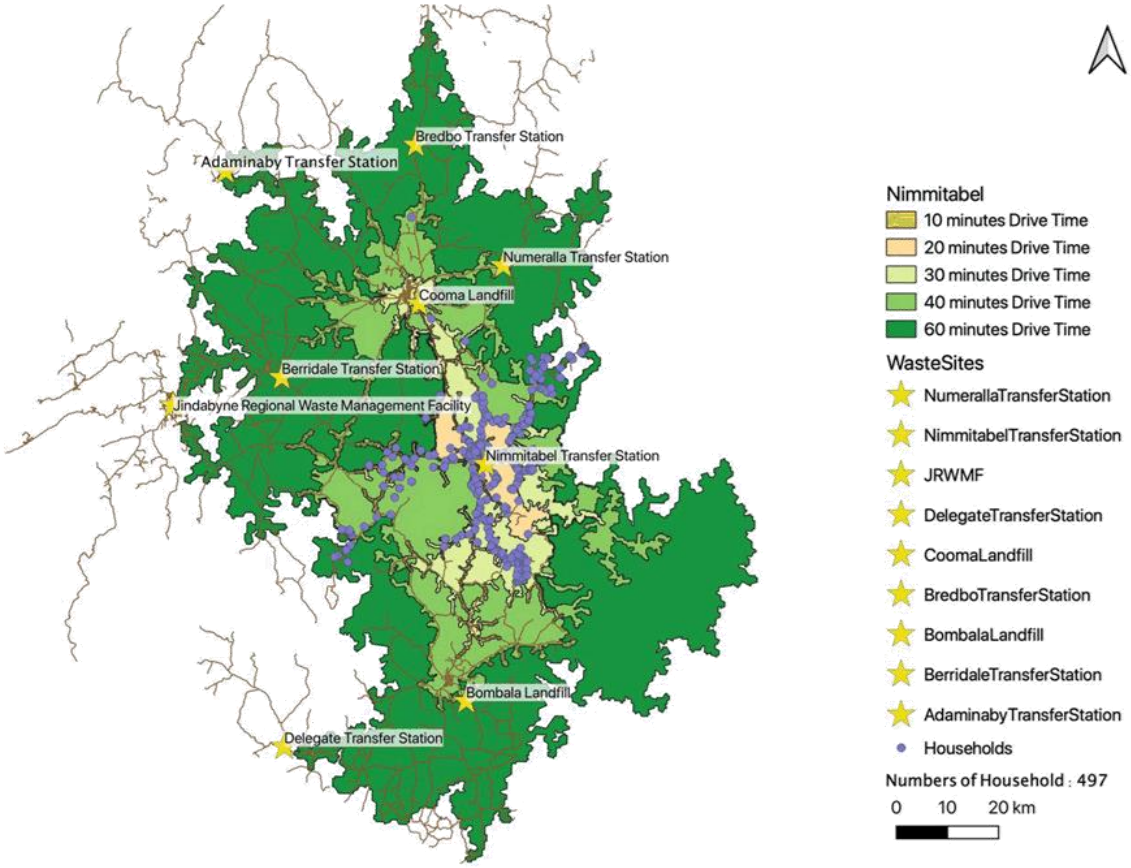
Figure 5 Delegate Service Catchment



2.1.5 Nimmitabel Service Catchment

A map image of Nimmitabel service catchment is shown in Figure 6. It includes households that have Nimmitabel transfer station as their closest waste facility (shortest drive time compared to other waste facilities).

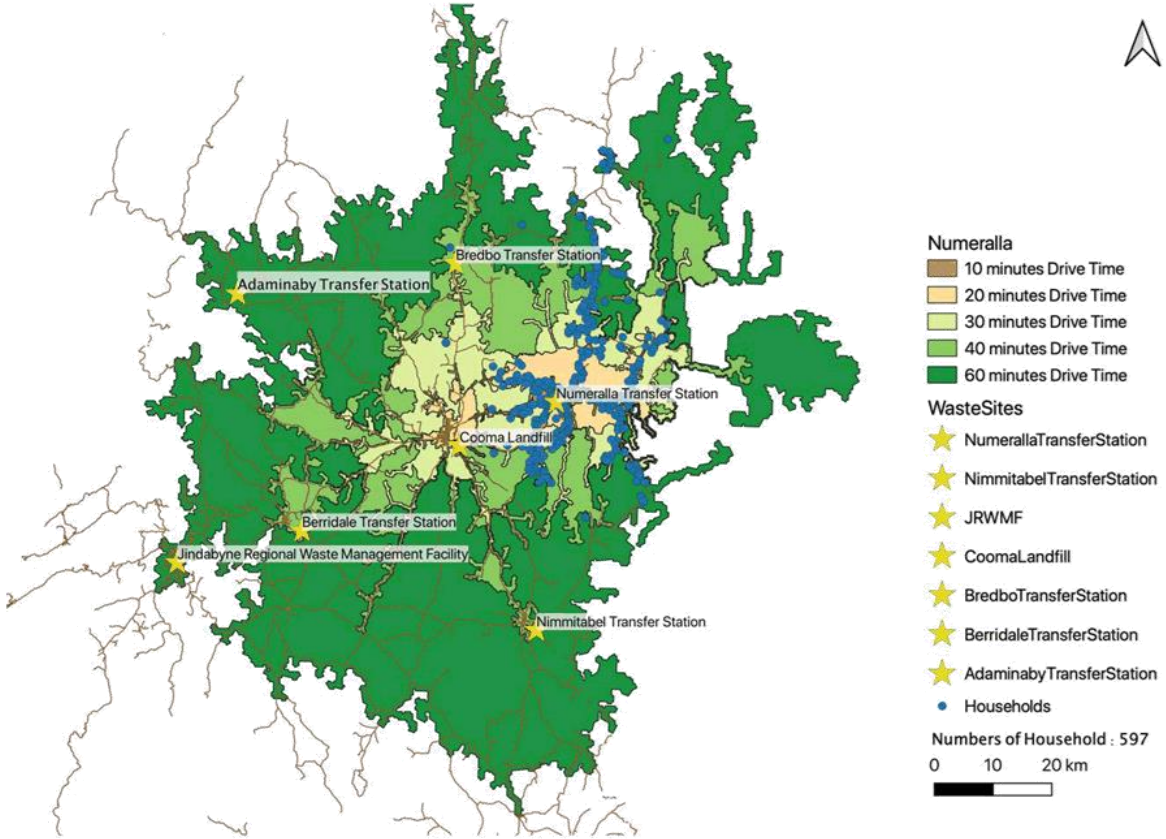
Figure 6 Nimmitabel Service Catchment



2.1.6 Numeralla Service Catchment

A map image of Numeralla service catchment is shown in Figure 7. It includes households that have Numeralla transfer station as their closest waste facility (shortest drive time compared to other waste facilities).

Figure 7 Numeralla Service Catchment



3 Alternative Options

The options identified for each transfer station are:

- Option 1: Business as usual (BAU). Transfer station to continue with current operations, servicing residents who self-haul domestic waste.
- Option 2: BoBs to replace the transfer station to service residents who self-haul. BoBs to be serviced by the kerbside collection trucks according to the current collection schedule. Bin sizes are 360L for both the red (general waste) and yellow (commingled recycling) bins.

For option 2, all residents will be required to haul green, bulky and problem waste to the next closest transfer station/ landfill, or to dedicated drop-off days arranged by Council at the BoB site. These activities have not been costed in the cost benefit analysis.

The number of bins required has been calculated using two different methods:

- Method 1 - the tonnages received at the transfer station.
- Method 2 - average household generation based on the 2018 household kerbside bin audit.

Method 1 is based on the average annual tonnages received (2019 and 2020) of general waste and commingled recycling waste at each transfer station. Average tonnes of waste per week were calculated from the annual tonnage.

Method 2 is based on the average generation of waste per household for general waste (9.3kg) and commingled recycling waste (4.8kg) for SMRC[2]. The average generation per week was multiplied by the number of households to get tonnes of waste per week.

For both method 1 and method 2, the tonnes per week were converted to volumes of waste using the following density values[3]:

- 0.089 t/m^3 for general waste
- 0.063 t/m^3 for commingled recycling

These volumes of waste were converted to the number of bins required. Table 5 and Table 6 detail the number of general waste (red) bins and recycling (yellow) bins under Method 1 and Method 2 respectively.

Table 5 Bin requirements under Method 1

Options	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Option 1 BAU	BAU	BAU	BAU	BAU	BAU	BAU
Option 2 BoBs	# of red bins: **9** # of yellow bins: **6**	# of red bins: **10** # of yellow bins: **9**	# of red bins: **26** # of yellow bins: **12**	# of red bins: **5** # of yellow bins: **3**	# of red bins: **24** # of yellow bins: **14**	# of red bins: **15** # of yellow bins: **15***

**There is currently no kerbside collection service in Numeralla therefore no collection truck to service the BoBs.*

[2] EC Sustainable *Household Kerbside Bin System Audit 2018*
[3] Bin Trim material density values, NSW EPA.

Table 6 Bin requirements under Method 2

Options	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Option 1 Business as Usual	BAU	BAU	BAU	BAU	BAU	BAU
Option 2 BoBs	# of red bins: **137** # of yellow bins: **100**	# of red bins: **141** # of yellow bins: **103**	# of red bins: **213** # of yellow bins: **155**	# of red bins: **66** # of yellow bins: **48**	# of red bins: **109** # of yellow bins: **79**	# of red bins: **178** # of yellow bins: **130***

**There is currently no kerbside collection service in Numeralla therefore no collection truck to service the BoBs.*

Following discussion with SMRC, Method 2 was used as the basis for the cost benefit analysis.

4 Cost Benefit Analysis

4.1 Method and Assumptions

MRA developed a high-level model to assess the current financial performance of Council's transfer stations against the option to establish BoBs sites to service self-haul residents within each transfer station catchment area.

The current financial performance (BAU) of the transfer stations is based on average revenue, expenses and administration costs for each transfer station across the 2018/19 and 2019/20 financial years. Administration costs were allocated to each transfer station based on the average tonnes of waste received. The calculated average net cost (financial loss) for each transfer station is shown in Table 7 below.

Table 7 Average financial performance of transfer stations across 2018/19 and 2019/20

Transfer Station	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
BAU average annual net cost	-$40,599	-$34,119	-$55,637	-$19,912	-$59,525	-$44,873

The revenue generated from the provision of a BoBs service was calculated based on the current number of self-haul properties allocated to each transfer station per Table 4 and SMRC's *Domestic Waste Service Charge for Bank of Bins Waste and Recycling*.

Capital and operating costs for the establishment and servicing of BoBs to replace the transfer stations were estimated.

Two scenarios were assessed. The first assumed that the BoBs would service 100% of the self-haul properties. The second scenario assumed that the BoBs would service 75% of the self-haul properties, that is, the number of bins provided would have capacity to hold waste generated by 75% of the households that currently self-haul based on the average household waste and recycling generation rates. Accordingly, 25% less revenue would be received.

The following assumptions in Table 8 were used in the model.

Table 8 Financial model assumptions

Assumption	Value	Source
Cost of 240L bin (for Numeralla kerbside collections)	$75	MRA industry knowledge
Cost of 360L bin (for BoBs)	$90	MRA industry knowledge
Cost per cage	$4,250	SMRC
Bins held per cage	4	SMRC
BoBs Service charge revenue received (per property)	$250	SMRC
Domestic Waste Collection Service (per property)	$257	SMRC
Domestic Recycling Collection Service (per property)	$122	SMRC
Lift cost per bin	$1.69	MRA value used in Strategy options assessment
General waste disposal cost (per tonne) - Cooma	$49	SMRC
General waste disposal cost (per tonne) - Jindabyne	$57	SMRC
Recycling gate fee/processing cost (per tonne)	$80	SMRC
Cost of recycling transfer to MRF (per tonne) - from Cooma	$208.03	SMRC
Cost of recycling transfer to MRF (per tonne) - from Jindabyne	$235.53	SMRC
Weekly collection from BoBs		SMRC
All but one of the new BoBs are located on the existing collection route		SMRC
The additional distance travelled to the BoBs off the collection route is the distance from the existing transfer station to the nearest main facility (Cooma, Jindabyne or Bombala)		SMRC
Travel time estimated using Google Maps, plus 10% to account for travel time premium for trucks		MRA industry knowledge
Cost per truck hour	$150	MRA industry knowledge
New kerbside collection established for Numeralla, servicing 100 households. New truck not required		SMRC

4.2 Results

4.2.1 Revenue

The additional Domestic Waste Service Charge revenue that would be generated from the provision of a BoBs service is shown in Table 9.

Table 9 Bank of Bins revenue

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
BoBs Waste and Recycling Charge – 100% service rate	$118,000	$121,750	$183,250	$56,750	$93,500	$128,500
BoBs Waste and Recycling Charge – 75% service rate	$88,500	$91,313	$137,438	$42,563	$70,125	$96,375

4.2.2 Scenario 1 – 100% service rate

The following capital costs (CAPEX) and operating costs (OPEX) were calculated for the establishment of BoBs to service 100% of the self-haul households. Disposal costs were calculated based on tonnes generated from average waste and recycling generation rates for SMRC, rather than actual rates of general waste and recycling historically received at the transfer stations.

Table 10 Scenario 1 CAPEX and OPEX

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
CAPEX						
Bins	$21,330	$21,960	$33,120	$10,260	$16,920	$23,220
Cages	$255,000	$263,500	$395,250	$123,250	$204,000	$280,500
Total CAPEX	**$276,330**	**$285,460**	**$428,370**	**$133,510**	**$220,920**	**$303,720**
Annual OPEX						
Collections	$20,828	$21,443	$32,340	$10,018	$16,521	$22,673
Recycling transfer to MRF	$24,508	$28,630	$38,061	$11,787	$19,420	$26,689
Disposal/gate fee	$20,610	$23,149	$32,006	$9,912	$16,330	$22,444
Additional travel time off current collection route	$12,584	$7,436	$7,722	$24,310	$8,294	$5,148
Total OPEX	**$78,529**	**$80,657**	**$110,128**	**$56,027**	**$60,566**	**$76,954**

4.2.3 Scenario 2 – 75% service rate

CAPEX and OPEX were calculated for the establishment of BoBs to service 75% of the self-haul households. Disposal costs were calculated based on tonnes generated from average waste and recycling generation rates for SMRC, rather than actual disposal rates of general waste and recycling at the transfer stations. It was assumed that 75% of the waste would be disposed through the BoBs. CAPEX and OPEX for scenario 2 are shown in Table 11.

Table 11 Scenario 2 CAPEX and OPEX

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
CAPEX						
Bins	$16,020	$16,560	$24,930	$7,740	$12,780	$17,460
Cages	$191,250	$199,750	$297,500	$93,500	$153,000	$208,250
Total CAPEX	**$207,270**	**$216,310**	**$322,430**	**$101,240**	**$165,780**	**$225,710**
Annual OPEX						
Collections	$15,643	$16,170	$24,343	$7,558	$12,479	$17,049
Recycling transfer to MRF	$18,381	$21,472	$28,545	$8,840	$14,565	$23,911
Disposal/gate fee	$15,457	$17,362	$24,005	$7,434	$12,248	$20,107
Additional travel time off current collection route	$12,584	$7,436	$7,722	$24,310	$8,294	$5,148
Total OPEX	**$62,065**	**$62,440**	**$84,615**	**$48,142**	**$47,586**	**$66,215**

4.2.4 Cost of Numeralla kerbside collections

In the costing model it was assumed that a waste and recycling kerbside collection would be established for 100 households in the Numeralla township, serviced by existing collection vehicles. The revenues from domestic waste service charges and costs for bins, collection, transfer, disposal and additional travel time were estimated and are shown in Table 12.

Table 12 Numeralla kerbside collection cost estimate

Cost type	Value
Annual Revenue	
Domestic Waste Collection Service	$25,700
Domestic Recycling Collection Service	$12,200
Total Revenue	**$37,900**
CAPEX	
Bins	$15,000
Annual OPEX	
Collections	$17,576
Recycling transfer to MRF	$5,192
Disposal/gate fee	$4,366
Additional travel time off current collection route	$5,148
Total OPEX	**$32,283**

4.3 Findings

The results are summarised in Table 13, including an analysis of the cost benefit of establishing BoB services compared with operating the transfer station and what this benefit represents per household.

A detailed results table can be found in Appendix A.

Table 13 Summary of results

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Business as Usual						
Net Cost	-$40,520	-$34,503	-$55,290	-$19,795	-$59,873	-$44,684
Scenario 1 – 100% Service Rate						
Net Profit	**$11,838**	**$12,547**	**$30,285**	**-$12,628**	**$10,842**	**$25,292**
Benefit over BAU	**$52,358**	**$47,050**	**$85,575**	**$7,167**	**$70,715**	**$69,976**
Benefit per current self-haul household	$111	$97	$117	$32	$189	$114
CAPEX payback period based on benefit over BAU (years)	5.3	6.1	5.0	18.6	3.1	4.3
Scenario 2 – 75% Service Rate						
Net Profit	**$5,708**	**$7,242**	**$20,580**	**-$15,703**	**$5,961**	**$11,706**
Benefit over BAU	**$46,228**	**$41,745**	**$75,870**	**$4,092**	**$65,834**	**$56,390**
Benefit per current self-haul household	$98	$86	$104	$18	$176	$92
CAPEX payback period based on benefit over BAU (years)	4.5	5.2	4.2	24.7	2.5	4.0

The conversion of transfer stations into BoB services would represent a cost benefit to SMRC. Table 2 demonstrates that the transfer stations are currently underutilised which also means that residents are not currently paying the cost to dispose of waste and recycling at the level expected based on SMRC's average waste and recycling generation rates. Based on these rates, the typical cost for a self-haul resident to dispose of the material to a transfer station once per month would be $444 per annum. In comparison, the cost to residents for use of the BoB service (at $250 per annum) would represent a cost saving of $194.

However, self-haul households are potentially generating less waste than the average SMRC household and may incur an increase in costs if they were to be supplied and charged for a BoB service. Therefore, an option to opt-in to a BoB service may be required.

5 Qualitative Analysis

To support the rationalisation of each transfer station, MRA conducted an analysis of the strengths, weaknesses, opportunities and threats (SWOT) of each option. Strengths and weaknesses consider the immediate or direct impacts of the option while opportunities and threats describe the potential impacts depending on external factors, such as sociological and political factors.

5.1 Adaminaby transfer station

Table 14 SWOT analysis of Adaminaby transfer station options

Option	Strengths	Weaknesses	Opportunities	Threats
Option 1 - BAU	• Site already established • Services majority of catchment who don't have a kerbside service (472 hh, 54%) • Services rural residents (average drive time is 22mins) • No behaviour change required • Problem and bulky waste disposal: 23% of waste received is garden waste and 53% is bulky/problem waste	• Site is underutilised: low tonnage received • Site is running at a deficit • Limited opening hours • Staff working alone in remote site		• Increased waste charges for residents due to facility deficits
Option 2 – BoBs	• Residents not restricted to operating hours • No local bulky waste disposal – discourages landfilling of bulky waste (but may lead to dumping) • Reduced travel times due to establishment of BoBs on and off current collection route	• Requires large number of bins to service large proportion of users who self-haul waste (54%) • Residents will drive an average of 35 minutes extra (+159%) to next facility for disposal of green, bulky and problem wastes (all hh) • BoBs infrastructure needed • No additional diversion or resource recovery • Potentially higher cost option for self-haul residents who generate less than average amounts of waste and recycling • No financial incentive to reduce waste	• Repurpose transfer station site • Improved amenity of waste presentation • Council to divert cost savings to other areas such as education about recycling and illegal dumping • Potential to increase kerbside services	• Potential decreased resource recovery and increased Illegal dumping of green, problem or bulky waste due to additional drive time • Community may be resistant to change of service type, perceive it as a reduction in services available to them

5.2 Berridale transfer station

Table 15 SWOT analysis of Berridale transfer station options

Option	Strengths	Weaknesses	Opportunities	Threats
Option 1 - BAU	• Site already established • Services residents who don't have a kerbside service (487, 40%) • No behaviour change required • Provides local problem and bulky waste disposal: 18% of waste received is garden waste and 63% is bulky/problem waste	• Site is underutilised: low tonnage received • Site is running at a deficit • Limited opening hours • Staff working alone in remote site		• Increased waste charges for residents due to facility deficits
Option 2 – BoBs	• Residents not restricted to operating hours • Minimal extra drive time of 16mins (+80%) to access next closest facility for disposal of green, bulky and problem wastes (average for all hh) • No local bulky waste disposal – discourages landfilling of bulky waste (but may lead to dumping) • Reduced travel times due to establishment of BoBs on and off current collection route	• Requires large number of bins to service high number of users who self-haul waste (487 hh) • BoBs infrastructure needed • No additional diversion or resource recovery • Potentially higher cost option for self-haul residents who generate less than average amounts of waste and recycling • No financial incentive to reduce waste	• Repurpose transfer station site • Improved amenity of waste presentation • Council to divert cost savings to other areas such as education about recycling and illegal dumping • Potential to increase kerbside services	• Decreased resource recovery and increased Illegal dumping of green, problem or bulky waste due to additional drive time • Community may be resistant to change of service type, perceive it as a reduction in services available to them

5.3 Bredbo transfer station

Table 16 SWOT analysis of Bredbo transfer station options

Option	Strengths	Weaknesses	Opportunities	Threats
Option 1 - BAU	• Site already established • Services residents who don't have a kerbside service (733 hh, 81%) • Services rural residents (average drive time is 29mins) • No behaviour change required • Provides local problem and bulky waste disposal: 6% of waste received is garden waste and 51% is bulky/problem waste	• Site is underutilised: low tonnage received • Site is running at a deficit • Limited opening hours • Staff working alone in remote site		• Increased waste charges for residents due to facility deficits
Option 2 – BoBs	• Residents not restricted to operating hours • Minimal extra drive time of 22mins (+76%) to access next closest facility for disposal of green, bulky and problem wastes (average for all hh) • No local bulky waste disposal – discourages landfilling of bulky waste (but may lead to dumping) • 44% of waste received is general/commingled • Reduced travel times due to establishment of BoBs on and off current collection route	• Requires large number of bins to service high number of users who self-haul waste (733 hh) • BoBs infrastructure needed • No additional diversion or resource recovery • Potentially higher cost option for self-haul residents who generate less than average amounts of waste and recycling • No financial incentive to reduce waste	• Repurpose transfer station site • Improved amenity of waste presentation • Council to divert cost savings to other areas such as education about recycling and illegal dumping • Potential to increase kerbside services	• Decreased resource recovery and increased Illegal dumping of green, problem or bulky waste due to additional drive time • Community may be resistant to change of service type, perceive it as a reduction in services available to them

5.4 Delegate transfer station

Table 17 SWOT analysis of Delegate transfer station options

Option	Strengths	Weaknesses	Opportunities	Threats
Option 1 - BAU	• Site already established • Services residents who don't have a kerbside service (227 hh, 59%) • No behaviour change required • Provides local problem and bulky waste disposal: 19% of waste received is garden waste and 59% is bulky/problem waste	• Site is underutilised: low tonnage received • Site is running at a deficit • Limited opening hours • Staff working alone in remote site		• Increased waste charges for residents due to facility deficits
Option 2 – BoBs	• Residents not restricted to operating hours • No local bulky waste disposal – discourages landfilling of bulky waste (but may lead to dumping) • Reduced travel times due to establishment of BoBs on and off current collection route	• Requires bins to service users who self-haul waste (227 hh) • BoBs infrastructure needed • No additional diversion or resource recovery • Residents required to drive an additional 27 minutes (+180%) to next closest facility for disposal of green, bulky and problem wastes (average for all hh) • Potentially higher cost option for self-haul residents who generate less than average amounts of waste and recycling • No financial incentive to reduce waste	• Repurpose transfer station site • Improved amenity of waste presentation • Council to divert cost savings to other areas such as education about recycling and illegal dumping • Potential to increase kerbside services	• Decreased resource recovery and increased Illegal dumping of green, problem or bulky waste due to additional drive time • Community may be resistant to change of service type, perceive it as a reduction in services available to them

5.5 Nimmitabel transfer station

Table 18 SWOT analysis of Nimmitabel transfer station options

Option	Strengths	Weaknesses	Opportunities	Threats
Option 1 - BAU	• Site already established • Services residents who don't have a kerbside service (374 hh, 73%) • No behaviour change required • Provides local problem and bulky waste disposal: 14% of waste received is garden waste and 43% is bulky/problem waste	• Site is underutilised: low tonnage received • Site is running at a deficit • Limited opening hours • Site is underutilised • Staff working alone in remote site		• Increased waste charges for residents due to facility deficits
Option 2 – BoBs	• Reduced waste costs • Residents not restricted to operating hours • No local bulky waste disposal – discourages landfilling of bulky waste (but may lead to dumping) • Reduced travel times due to establishment of BoBs on and off current collection route	• Requires bins to service users who self-haul waste (374 hh) • BoBs infrastructure needed • No additional diversion or resource recovery • Residents required to drive an additional 26 minutes (+137%) to next closest facility for disposal of green, bulky and problem wastes (average for all hh) • Potentially higher cost option for self-haul residents who generate less than average amounts of waste and recycling • No financial incentive to reduce waste	• Repurpose transfer station site • Improved amenity of waste presentation • Council to divert cost savings to other areas such as education about recycling and illegal dumping • Potential to increase kerbside services	• Decreased resource recovery and increased Illegal dumping of green, problem or bulky waste due to additional drive time • Community may be resistant to change of service type, perceive it as a reduction in services available to them

5.6 Numeralla transfer station

Table 19 SWOT analysis of Numeralla transfer station options

Option	Strengths	Weaknesses	Opportunities	Threats
Option 1 - BAU	• Site already established • Services residents who don't have a kerbside service (614 hh,99%) • Services rural residents (average drive time is 31 mins) • No behaviour change required • Provides local problem and bulky waste disposal: 14% of waste received is garden waste and 46% is bulky/problem waste	• Site is underutilised: low tonnage received • Site is running at a deficit • Limited opening hours • Staff working alone in remote site		• Increased waste charges for residents due to facility deficits
Option 2 – BoBs	• Residents not restricted to operating hours • Minimal extra drive time of 16mins (+52%) to access next closest facility for disposal of green, bulky and problem wastes (average for all hh) • No local bulky waste disposal – discourages landfilling of bulky waste (but may lead to dumping) • Reduced travel times due to establishment of BoBs on and off current collection route • Establishment of kerbside collection services for township	• Requires bins to service users who self-haul waste (614 hh) • BoBs infrastructure needed • No additional diversion or resource recovery • Potentially higher cost option for self-haul residents who generate less than average amounts of waste and recycling • No financial incentive to reduce waste	• Repurpose transfer station site • Improved amenity of waste presentation • Council to divert cost savings to other areas such as education about recycling and illegal dumping • Potential to increase kerbside services	• Decreased resource recovery and increased Illegal dumping of green, problem or bulky waste due to additional drive time • Community may be resistant to change of service type, perceive it as a reduction in services available to them

6 Discussion and Recommendations

Table 20 provides a traffic light summary of comparative analysis across the transfer stations for the service catchment and cost-benefit results. For the service catchment analysis, a sliding scale is used to rank the most preferred (green light) against the least preferred (red light) outcomes.

The cost-benefit analysis shows that there would be a financial benefit to SMRC in establishing BoB services compared with running the transfer stations for each of the six transfer station facilities analysed. Therefore, the traffic light summary reflects this but indicates that for Delegate the financial benefit is significantly smaller than for the other transfer station options.

Table 20 Traffic light analysis - summary of results

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Service Catchment Analysis						
Average time to 2nd facility for disposal of green, bulky and problem wastes (mean)						
Households travelling 60mins+ to 2nd facility (#hh)						
Cumulative change in travel time[4]						
Cost-benefit Analysi						
Net Revenue						
Comparison to BAU						
Benefit per current self-haul household						

[4] Cumulative change in travel time is the difference between the average time to the 2nd facility and the average time to existing transfer station for self-haul households multiplied by the number of self-haul households.

The following section provides key results for each transfer station after comparison against the other transfer stations.

Adaminaby:

- Closure of the transfer station would result in the longest travel time (57mins) to the next nearest transfer station/landfill
- Closure of the transfer station would result in the highest change in travel times for self-haul households (28mins current to 56mins)
- Closure of the transfer station would result in a significant number of self-haul households needing to travel >60mins to the next nearest transfer station/landfill

Berridale:

- Closure of the transfer station would result in the shortest travel time (36mins) to the next nearest transfer station/landfill

Bredbo:

- Closure of the transfer station would affect the highest number of self-haul households (733 households)
- Closure of the transfer station would result in the second longest travel time (51mins) to the next nearest transfer station/landfill
- Closure of the transfer station would result in the greatest number of self-haul households needing to travel >60mins to the next nearest transfer station/landfill
- Closure of the transfer station and provision of BoB services would provide the greatest financial benefit in comparison to BAU costs of operating the transfer station

Delegate:

- Closure of the transfer station would affect the smallest number of self-haul households (227 households)
- Although still financially favourable to close the transfer station and provide BoB services for the catchment area, the financial benefit is significantly lower compared with closure of the other transfer stations

Nimmitabel:

- Closure of the transfer station and provision of BoB services would provide the greatest financial benefit per household in comparison to BAU costs of operating the transfer station

Numeralla:

- Closure of the transfer station would result in the smallest change in travel times for self-haul households (31mins to 47mins)

In summary, it would be financially beneficial to SMRC to transition each of the six transfer stations to BoB services. For this transition to occur the following is recommended:

- Establish transitions plans to ensure that BoB services are fully operational prior to the closure of any transfer stations (i.e. operate in parallel for a defined period of time);
- Based on the tonnes currently received at the transfer stations, which indicate that not all households in the catchments currently use the Transfer Stations for waste disposal, Council may also structure the BoB services as an opt-in service to ensure that residents who do not utilise council waste disposal services are not issued a Domestic Waste Charge;

- Review bulky waste management options for the transfer station household catchments to reduce illegal dumping, as discussed in Section 3.3 of the draft Snowy Monaro Waste Strategy; and
- Phase the conversion of transfer stations to BoB services, commencing with transfer stations closures that provide the greatest benefit to SMRC and/or those that result in the least impact based on additional travel times for the households and other social and community impacts and considerations.

Appendix A

	Adaminaby	Berridale	Bredbo	Delegate	Nimmitabel	Numeralla
Business as Usual						
Net Profit	-$40,520	-$34,503	-$55,290	-$19,795	-$59,873	-$44,684
Scenario 1 – 100% Service Rate						
Revenue	$118,000	$121,750	$183,250	$56,750	$93,500	$128,500
OPEX	$78,529	$80,657	$110,128	$56,027	$60,566	$76,954
CAPEX Depreciation	$27,633	$28,546	$42,837	$13,351	$22,092	$30,372
Net kerbside collections revenue						$4,117
Net Profit	**$11,838**	**$12,547**	**$30,285**	**-$12,628**	**$10,842**	**$25,292**
Benefit over BAU	**$52,358**	**$47,050**	**$85,575**	**$7,167**	**$70,715**	**$69,976**
Benefit per current self-haul household	$111	$97	$117	$32	$189	$114
Scenario 2 – 75% Service Rate						
Revenue	$88,500	$91,313	$137,438	$42,563	$70,125	$96,375
OPEX	$62,065	$62,440	$84,615	$48,142	$47,586	$66,215
CAPEX Depreciation	$20,727	$21,631	$32,243	$10,124	$16,578	$22,571
Net kerbside collections revenue						$4,117
Net Profit	**$5,708**	**$7,242**	**$20,580**	**-$15,703**	**$5,961**	**$11,706**
Benefit over BAU	**$46,228**	**$41,745**	**$75,870**	**$4,092**	**$65,834**	**$56,390**
Benefit per current self-haul household	$98	$86	$104	$18	$176	$92

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Snowy Monaro Regional Council

Jindabyne Regional Waste Management Facility

Feasibility Analysis

New Landfill Cell

December 2020

Executive summary

The Jindabyne Regional Waste Management Facility (JRWMF, or the site) is located at 6013 Kosciusko Road, Jindabyne, NSW. It is owned and operated by the Snowy Monaro Regional Council (Council).

The site is at a critical stage, with limited airspace available at the existing landfill cell. Both options to extend the landfilling capacity at the site, a second lift above the existing cell or a new cell in the quarry area, require planning approvals and the associated time constraints to complete these approvals. In addition, given the limited space the second lift would provide, the quarry area may present a much more cost-effective solution with respect to airspace gained. Council has requested a suitably qualified consultant to analyse the feasibility of establishing a new landfill cell in a quarry area adjacent to the existing landfill cell (an option previously explored by Council). Pending the conclusions of this analysis, this would be followed up by design, planning approval and environmental protection licensing of the proposed landfill cell.

The feasibility analysis considered the following options for future landfill disposal for waste received at the JRWMF:

- Option 1 – Waste diversion, with all future waste for landfill disposal diverted to Cooma Landfill.
- Option 2 – Landfill expansion, with a new landfill cell established in the adjacent quarry area to accept future waste for landfill disposal.

Previous concept design work completed for Option 2 confirmed the technical feasibility of this option.

Both options impact on the ongoing operations of the Cooma Landfill, with Option 1 reducing the lifespan of the site by approximately 15 years and potentially requiring additional planning approvals and lining requirements. Where possible, these considerations where included as part of the feasibility analysis.

The financial assessment completed for the options using discounted life cycle cost analysis identified both options to be approximately equivalent for the base cases that were considered, however with a higher initial capital cost for Option 2. The sensitivity analysis highlighted the reliance of the model on OPEX and waste generation rates, with Option 2 considered more favourable in a lower waste generation scenario, particularly when considered alongside potential hidden costs for Option 1 associated with cover material purchase, planning approvals and piggy-back lining.

The triple bottom line assessment suggested similar feedback from a financial perspective, with comparable ratings or a slight preference for Option 2 from an environmental and social perspective, with consideration to increased greenhouse gases, traffic movements, impacts to receiving groundwater and surface water, and public perception.

Ultimately, both options are considered feasible, however the final selection of a preferred option would be defined by the weighting placed by Council of the financial, environmental and social impacts of the options. To help inform this decision, it is suggested that Council further consider the hidden costs associated with Option 1 and their likelihood, as well as likely community acceptance of each option. These are regarded as key considerations for the final selection of the preferred option. In particular, the development of a new Jindabyne education campus to neighbour the JRMWF was identified as a potential 'showstopper' for Option 2, given it would result in a reduced buffer zone for the new landfill cell and bring it in closer proximity to sensitive receptors. It is recommended that further consultation is conducted and information gathered on this project to inform the preferred option.

Table of contents

1. Introduction 1
1.1 Background 1
1.2 Purpose 1
1.3 Scope of works 1
1.4 Limitations 1
2. Site setting 3
2.1 Site location and surrounds 3
2.2 Site features 4
2.3 Site history 4
2.4 Topography and hydrology 4
2.5 Soils and geology 4
2.6 Hydrogeology 5
2.7 Climate 5
3. Waste generation 7
3.1 Accepted waste types and quantities 7
3.2 Historical waste types and quantities 7
3.3 Projected future waste types and peak volumes 8
4. Landfill cell design 11
4.1 Overview 11
4.2 Site conditions 11
4.3 Key design features 11
5. Options identification 13
5.1 Summary of options 13
5.2 Option 1: Waste diversion 13
5.3 Option 2: Landfill expansion 13
5.4 Qualifications 13
6. Impacts on Cooma Landfill 14
6.1 General 14
6.2 Landfill lifespan 14
6.3 Landfill operations 15
6.4 Planning approvals 15
7. Financial assessment 17
7.1 Overview 17
7.2 Indicative costs 17
7.3 Financial modelling 18
8. Triple bottom line assessment 25
8.1 Overview 25
8.2 Methodology 25

8.3 Results 26
8.4 Discussion 28
9. Conclusions and recommendations 30
10. References 31

Table index

Table 2-1 Site information summary 3
Table 3-1 Licenced incoming waste quantities and types 7
Table 3-2 Waste quantities 7
Table 3-3 Waste source distribution 7
Table 3-4 Historical waste received and transferred 8
Table 3-5 Projected annual waste composition 9
Table 3-6 Projected annual waste to landfill 10
Table 6-1 Impacts on landfill lifespan 14
Table 7-1 Financial assessment parameters 19
Table 7-2 OPEX parameters 19
Table 7-3 Financial assessment summary results 22
Table 7-4 Sensitivity analysis summary results 24
Table 8-1 TBL financial, environmental and social criteria 25
Table 8-2 TBL rating guidance 26
Table 8-3 Financial results 26
Table 8-4 Environmental results 27
Table 8-5 Social results 28

Figure index

Figure 2-1 Site location 3
Figure 2-2 Climate statistics 5
Figure 6-1 Cooma landfill life span 15
Figure 7-1 Life cycle costing comparison 23

Appendices

Appendix A – Concept Design Sketches
Appendix B – Life Cycle Cost Calculations

1. Introduction

1.1 Background

The Jindabyne Regional Waste Management Facility (JRWMF, or the site) is located at 6013 Kosciusko Road, Jindabyne, NSW. It is owned and operated by the Snowy Monaro Regional Council (Council).

The site is at a critical stage, with limited airspace available at the existing landfill cell. Both options to extend the landfilling capacity at the site, a second lift above the existing cell or a new cell in the quarry area, require planning approvals and the associated time constraints to complete these approvals. In addition, given the limited space the second lift would provide, the quarry area may present a much more cost-effective solution with respect to airspace gained. Council has requested a suitably qualified consultant to analyse the feasibility of establishing a new landfill cell in a quarry area adjacent to the existing landfill cell (an option previously explored by Council). Pending the conclusions of this analysis, this would be followed up by design, planning approval and environmental protection licensing of the proposed landfill cell.

1.2 Purpose

The purpose of this report is to analyse the feasibility of establishing a new landfill cell in a quarry area adjacent to the existing landfill cell at the site.

1.3 Scope of works

Specifically, the scope of works included:

- Review of site setting.
- Assessment of historical and projected future waste types and quantities.
- Summary of new landfill cell design based on previously completed concept design works.
- Identification of relevant options for consideration as part of the feasibility analysis, including relevant qualifications.
- Identification of impacts of each option on the lifespan of Cooma Landfill.
- Financial assessment of the available options using a discounted cash flow model, with appropriate sensitivity analysis of key variables.
- Consideration of financial, environmental and social impacts using a triple bottom line assessment.
- Provision of this report summarised the findings of the analysis.

1.4 Limitations

This report has been prepared by GHD for Snowy Monaro Regional Council and may only be used and relied on by Snowy Monaro Regional Council for the purpose agreed between GHD and the Snowy Monaro Regional Council as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Snowy Monaro Regional Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Snowy Monaro Regional Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

GHD has prepared the preliminary cost estimates set out in this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD described throughout this report.

The Cost Estimate has been prepared for the purpose of analysing the feasibility of the proposed new landfill cell and must not be used for any other purpose.

The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.

2. Site setting

2.1 Site location and surrounds

A summary of key site location details is provided in Table 2-1. The site locality and surrounding lands is shown on Figure 2-1.

Table 2-1 Site information summary

Item	Details
Address	6013 Kosciusko Road, Jindabyne, NSW, 2627
Land title	Lot 1, DP 592719 Lot 20, DP715572
Site land owner	Snowy Monaro Regional Council
Site use	Landfill and waste management (does not include disused quarry)
Land zoning	SP2: Infrastructure
Overview of site location and surrounds	The site is located approximately 0.75 km south-west from the Lake Jindabyne and approximately 1.5 km south of the Jindabyne Township. The closest residential area is directly north of site separated by the grazing land and open fields. The surrounding landscape of the site primarily consists of sparsely vegetated hilly paddocks, further downhill to the south-east of the site is the Snowy River.

Figure 2-1 Site location[1]

[1] Aerial imagery access from SIXMaps on 24 June 2020

2.2 Site features

The site comprises:

- A ScrapMart for drop off and sale for reuse of second hand items.
- A Community Recycling Centre for drop off, storage, and diversion of liquid waste and hazardous waste (including gas bottles, fire extinguishers, paint, fluoro globes and tubes, car batteries, household batteries, motor oils, other oils, and smoke detectors).
- A saw-tooth design transfer station for accumulation and hauling of recovered materials. Various material including construction and demolition (C&D) products, timber and wood and garden waste are stockpiled nearby.
- A landfill for disposal of kerbside and drop-off general solid waste (putrescible), general solid waste (non-putrescible), and special waste including asbestos.
- A disused quarry.

The adjacent and surrounding area comprises:

- Undeveloped land adjacent to site to the west, north, and south.
- Sewage treatment works adjacent to the site to the east.
- Jindabyne Sport and Recreation Centre to the west and northwest.
- Pearse Property Group Pty Ltd to the north.
- Snowy Hydro Ltd facilities and the Jindabyne Dam to the north and east.
- Body Corporate Lakewood Estate to the south.

2.3 Site history

Based on discussions with Council and review of available background information, it is understood that site originally operated as a hard rock quarry used for the construction of the nearby lake Jindabyne Dam during the 1960s. This includes the disused quarry area and the location of the existing landfill. The site was decommissioned after completion of the project, with landfilling initiating at the existing landfill area during the 1970s. The disused quarry has remained largely unused for decades.

2.4 Topography and hydrology

Reference to NSW Spatial Collaboration Portal by the New South Wales Government indicates that the site is at an elevation between 920 m and 1000 m Australian Height Datum (AHD). The western side of the site, near the current quarry site is the highest point. Overall the site falls to the south-west following the natural topography. Approximately 1 km east of the site is the Snowy River and surface water runoff that is not captured by on-site drainage or infiltrated into the ground at the site is expected to flow towards the river.

2.5 Soils and geology

Reference to the 1:250,000 Bega-Mallacoota Geological Series Sheet SJ/55-4 and SJ/55-8 (Department of Mineral Resources, 1995) indicates that the site is underlain by the Jindabyne Suite which includes Jindabyne Tonalite, Grosses Plain Tonalite and Moonbah Tonalite and others. The rock types are mainly described as hornblende-biotite tonalite.

2.6 Hydrogeology

The site is located near Cobbin Creek, which is a tributary of the Snowy River below the Jindabyne Dam. Previous site investigations deduced that the groundwater flow direction from the north-west corner towards the south and east (Douglas Partners, 1999). The tightly interwoven crystal structure of the granite typically results in low rock permeability. However, groundwater flow rates are variable as a result of discontinuities, such as localised jointing, fractures and shear zones. There are a number of groundwater boreholes monitoring several locations across the site (Minchem, 2011).

2.7 Climate

The climate at the site is shown in Figure 2-2 below, which summarises weather data available from both the Bereau of Meteorology (BOM) Jindabyne (Caryinya Lane) weather monitoring station (No. 071071)[2] and the Cooma Airport AWS (No. 070217)[2]. The Jindabyne BOM station is approximately 4.0 km south of the site and was used for the mean monthly rainfall data. The Cooma Airport BOM station is approximately 50 km north-east of the site and was the closest available station with mean maximum and minimum temperature data. Data estimates of monthly evaporation was taken from the BOM average monthly evaporation map.

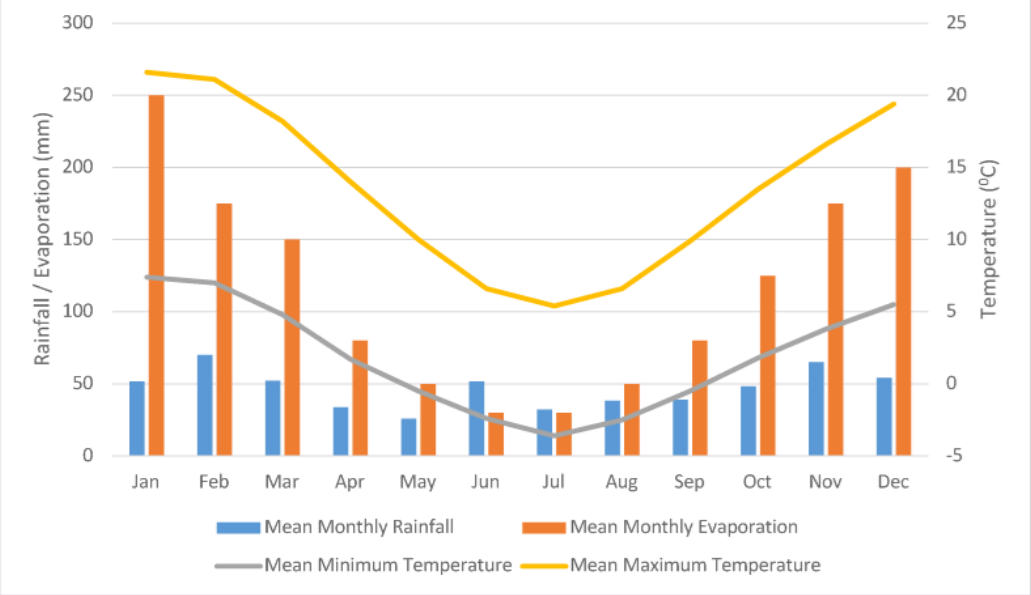

Figure 2-2 Climate statistics

The data shown in Figure 2-2 indicates the following:

- Mean monthly maximum and minimum temperatures are lowest during winter months (June to August) and highest during the summer months (December to February).
- Mean monthly rainfall varies across the year with the lowest during early autumn months and spring (July to September) and highest during late autumn and summer months (November to March).

[2] Accessed on 5 May 2020

- Estimated monthly evaporation is lowest during the late autumn and early winter months (May to August) and highest during late spring and summer months (November to February).
- Estimated monthly evaporation exceeds mean monthly rainfall for most months and estimated annual evaporation exceeds the estimated annual rainfall.

3. Waste generation

3.1 Accepted waste types and quantities

As stated in the EPL 20060, the site is licenced to accept the following waste types and quantities shown below in Table 3-1. The new landfill cell was designed to accommodate the waste types licensed for landfill disposal at the site as shown in this table.

Table 3-1 Licenced incoming waste quantities and types

Waste type	Quantity/limit	Activity
Liquid waste	n/a	Storage
General solid waste (non-putrescible)	5,000 tonnes/annum 2,500 tonnes	Landfill disposal Storage
General solid waste (putrescible)	7,000 tonnes/annum	Landfill disposal
Hazardous wastes	5,000 tonnes	Storage
Special waste (Asbestos) (Tyres)	500 tonnes/annum 50 tonnes/ annum or 5000 tyres	 Accepted (Not stored) Stored

3.2 Historical waste types and quantities

An overview of historic waste tonnages received and diverted from the site for recent years as reported in Annual Waste Report: Jindabyne Landfill – 20060 (NSW EPA) reports is provided in Table 3-2.

Table 3-2 Waste quantities

Reporting period	Waste received (tonnes)	Waste diverted (transport from site) (tonnes)
2017-2018	14,232	1,335
2016-2017	11,717	2,033
2015-2016	12,365	1,344
2014-2015	10,021	2,407
2013-2014	11,753	1,233

A distribution of incoming waste by source is provided in Table 3-3.

Table 3-3 Waste source distribution

Waste source	Reporting year					
	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Municipal	26%	16%	33%	30%	24%	TBC
C&I	31%	39%	34%	27%	23%	TBC
C&D	43%	45%	33%	43%	54%	TBC

Based on the annual reports, a summary of the waste types received and transferred from site is provided in Table 3-4.

Table 3-4 Historical waste received and transferred

Waste type	Received on site	Transferred from site
Asbestos	✓	✗
Batteries	✓	✓
Biosolids or manures	✓	✗
Bricks or concrete	✓	✓
Commingled recyclables	✓	✓
Composts or mulches	✓	✓
Contaminated soil	✓	✗
E-waste	✓	✓
Ferrous (iron or steel)	✓	✓
Mattresses	✓	✓
Mixed waste	✓	✓
Non-ferrous (metals nor AL or FE)	✓	✗
Oil	✓	✓
Paper or cardboard	✓	✓
Problem waste	✓	✗
Textiles, rags	✓	✗
Tyres	✓	✓
Vegetation or garden	✓	✓
Virgin excavated natural material (VENM)	✓	✗
Veterinary waste	✓	✗
Wood, trees or timber	✓	✓

3.3 Projected future waste types and peak volumes

Projected future composition of annual waste received on site is summarised in Table 3-5. The projections were based on the incoming waste composition data contained within NSW EPA (2018) with an assumed annual waste generation growth rate of 5%. This growth rate has been estimated based on population growth data provided by Council with consideration to the Snowy Mountains Special Activation Precinct (SAP) and appropriate tolerance levels for these estimates.

We note that there is a level of uncertainty with extrapolating historical waste generation rates to predict future waste generation, given that the NSW Government recently classified the wider Snowy Mountains area (including Jindabyne) as an SAP. Consequently, the population growth rates and tourism visitation rates may fluctuate from current trends as the outcomes of the Snowy Mountains SAP attract more visitors. This in turn may affect waste generation rates and makes it difficult to predict future trends.

Table 3-5 Projected annual waste composition

Year	Annual waste received (tonnes)	Key category breakdown (tonnes)	
2018 (NSW EPA WARR data)	14,232	Biosolids or manures	968
		Bricks or concrete	1,059
		Commingled recyclables	1,060
		Mixed waste	4,622
		VENM	5,740
2030 (projected)	25,559	Biosolids or manures	1,739
		Bricks or concrete	1,902
		Commingled recyclables	1,903
		Mixed waste	8,301
		VENM	10,309
2040 (projected)	41,633	Biosolids or manures	2,832
		Bricks or concrete	3,099
		Commingled recyclables	3,100
		Mixed waste	13,522
		VENM	16,792
2050 (projected)	67,815	Biosolids or manures	4,614
		Bricks or concrete	5,047
		Commingled recyclables	5,050
		Mixed waste	22,026
		VENM	27,352

Based on discussions with Council it is understood that the following waste types would be deposited to landfill:

- Asbestos
- Mixed waste
- Veterinary waste

Projected future annual waste to landfill is summarised in Table 3-6.

Table 3-6 Projected annual waste to landfill

Year	Annual waste to landfill (tonnes)	Key category breakdown (tonnes)	
2018 (NSW EPA WARR data)	4,633	Asbestos	10
		Mixed waste	4,622
		Veterinary waste	0.1
2030 (projected)	8,320	Asbestos	19
		Mixed waste	8,301
		Veterinary waste	0.2
2040 (projected)	13,553	Asbestos	31
		Mixed waste	13,522
		Veterinary waste	0.3
2050 (projected)	22,076	Asbestos	50
		Mixed waste	22,026
		Veterinary waste	0.5

4. Landfill cell design

4.1 Overview

To support the feasibility analysis, a concept design was prepared for the new landfill cell, as documented in GHD (2020a) and summarised below. Associated sketches for the cell design are presented in Appendix A.

4.2 Site conditions

To support the preparation of the concept design, a site walkover was undertaken by an engineering geologist from GHD on 18 and 19 March 2020, with a detailed report on the investigation contained in GHD (2020).

The investigation identified that the quarry walls consist of generally high strength rock and whist fractured, large scale instability is not expected. The investigation concluded that due to its proximity to existing facilities, underlying rock mass stability, relatively low levels of groundwater inflows and stable foundation, the site is generally considered geotechnically suitable for a landfill cell. The primary geotechnical concern identified was that regular and relatively large rockfalls are expected to occur from the quarry walls. This presents a significant geotechnical hazard to people working at the base of the slope. This is discussed further below.

4.3 Key design features

Based on feedback on the rockfall strategies, the lateral cell extent generally aligns with the existing extent of the disused quarry. Due to the shape of the quarry, an engineered berm will be established along the north-eastern and eastern sides to achieve a suitable final landform shape, laterally extending the lateral extent in these areas.

The concept design assumes the vertical extent of the cell base to be generally aligned with the existing base levels, with minor reshaping to provide sufficient grading for leachate flow. Based on further geotechnical investigations on the base of the cell (if progressed by Council), the basal levels may be able to be lowered to the existing weathered rock levels once the overburden fill is removed. This can be addressed further during the detailed design phase. A number of basal liner options were considered, however a geosynthetic liner option was recommended given the relative cost due to material availability and additional airspace generated.

The sidewall liner and lateral cell extent were defined based on different rockfall risk management options identified in GHD (2020). These include:

- Strategy 1: Batter back existing quarry slopes where possible, extending the lateral extent of the quarry
- Strategy 2: Install rockfall protection across the sidewall areas
- Strategy 3: Allow a catch ditch in cell design adjacent to the sidewall areas
- Strategy 4: Set the cell back from the quarry wall to allow a safe working distance

Based on further discussions with Council, the concept design focused on Strategies 2 and 3. Strategy 4 will severely limit the amount of airspace available. Strategy 1, whilst technically and potentially economically sound, will likely run into timing issues due to adjacent land ownership. Based on this feedback, Strategy 1 was not progressed further as part of the concept design, however Strategy 4 was considered for completeness to estimate the landfill airspace this

strategy would generate. These three strategies have been considered as part of this feasibility analysis.

Various final landforms were considered for the landfill cell with differing geometry and associated considerations for approvals and long-term maintenance. A number of capping options were considered, with either a geosynthetic capping option or phytocapping option considered as the most viable options available.

The concept design identifies that the new landfill cell is a technically feasible option, with the necessary refinement from additional works that would be completed as part of the detailed design phase.

5. Options identification

5.1 Summary of options

The feasibility analysis considered the following options:

- Option 1 – Waste diversion, with all future waste for landfill disposal diverted to Cooma Landfill.
- Option 2 – Landfill expansion, with a new landfill cell established in the adjacent quarry area to accept future waste for landfill disposal.

5.2 Option 1: Waste diversion

Under Option 1, landfill operations at the site would continue existing landfill cell until it has reached capacity, and subsequently capped and rehabilitated.

Once the existing landfill cell is exhausted, waste would be accepted at the site via an upgraded transfer station, where it would be sorted on-site or diverted to Cooma Landfill for landfill disposal.

5.3 Option 2: Landfill expansion

As with Option 1, under Option 2 landfill operations at the site would continue existing landfill cell until it has reached capacity, and subsequently capped and rehabilitated.

Once the existing landfill cell is exhausted, waste would be accepted at the site via an upgraded transfer station, where it would be sorted on-site or transported to the new landfill cell in the adjacent quarry area for landfill disposal.

Option 2 is further broken down into sub-options based on the various design options available for liner, capping and final landform. A preferred option was selected as part of the financial assessment based on estimated costs and airspace generated, as identified in Section 7.2.1.

5.4 Qualifications

In developing the options, the following consistencies were noted:

- For both options, the existing transfer station will be upgraded. Given the priority timeframe associated with this item, it has been designed to cater for both options. As such, for the purposes of this analysis the only difference for the transfer station operations across the options is the transfer of waste for landfill disposal. As all other components of this item are consistent regardless of the option selected, their implications have not been further analysed.
- For both options, the existing landfill would be capped and closed once it has reached capacity. Once capped, the area will be used for identical sorting and resource recovery activities under both options. As this item is consistent regardless of the option selected, their implications have not been further analysed.

6. Impacts on Cooma Landfill

6.1 General

The Cooma Landfill is the other major operating landfill owned by Council within the local government area (LGA). Under the assumption that future waste for disposal received at JRWMF would be landfilled at the new landfill cell or diverted to Cooma Landfill, both options have direct implications for this other site.

The impacts of each option on the Cooma Landfill are discussed further below, with consideration to recent work completed to update the proposed final landform and staging for the Cooma Landfill (Tonkin, 2020).

6.2 Landfill lifespan

Option 1 would reduce the landfill lifespan of Cooma Landfill as more waste is disposed than currently. An analysis of the impact each option has on the remaining life of Cooma Landfill is provided in Table 6-1 and Figure 6-1. The analysis was based on the following assumptions:

- Cooma landfill has 820,000 m^3 of remaining landfill airspace.
- Annual waste generation growth rate of 2% in Cooma with conservative consideration to recent population growth and an annual waste growth rate of 5% in Jindabyne (consistent with discussion in Section 3.3)
- Waste projections were estimated using 2018-2019 annual waste reporting data for Cooma Landfill (approximately 9,236 tonnes of landfillable waste received) and 2017-2018 annual waste reporting data for JWRMF (approximately 4,633 tonnes of landfillable waste received).
- A compaction ratio of 0.75 t/m^3 is achieved at Cooma Landfill, based on recent volumetric survey data and weighbridge records.

Where possible, the impacts of this shortened lifespan were considered within the financial assessment presented in Section 7.

Table 6-1 Impacts on landfill lifespan

Option	Impact on Cooma Landfill lifespan (years)	Remaining landfill lifespan at Cooma Landfill (years)
Option 1 (waste diversion)	15 year reduction	25
Option 2 (landfill expansion)	No impact	40

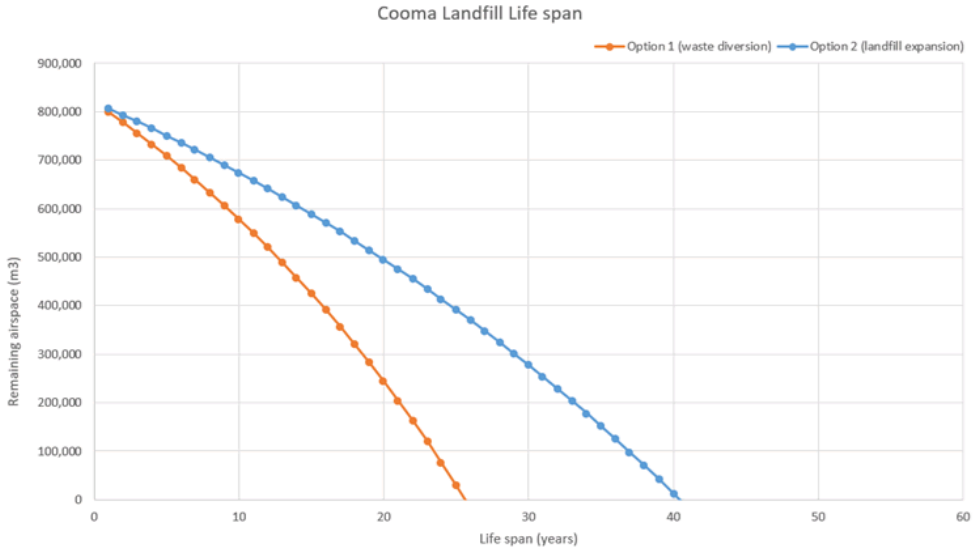

Figure 6-1 Cooma landfill life span

6.3 Landfill operations

The Cooma Landfill is an operating landfill facility with the necessary infrastructure, plant and equipment for ongoing waste receival and disposal. The increase of waste for disposal under Option 1, whilst significant, is expected to be able to be primarily managed using the existing site infrastructure with some general increases in operational expenditure, which is considered as part of the financial assessment presented in Section 7.

Tonkin (2020) does not discuss in detail specific sources for ongoing cover material needed to operate the site. Anecdotal evidence from GHD's previous involvement with the site suggests there is limited cover material available from on-site borrow sources, with cover material primarily sourced from incoming loads. If cover material could not be won in this fashion, it may need to be purchased or alternate cover materials considered. This issue may be exacerbated by the increased waste disposal required under Option 1, which would increase the cover material requirements in turn. The impacts of this potential hidden cost are considered in the sensitivity analysis for the financial assessment in Section 7.3.2.

In addition, the increased waste disposal at the site may have adverse impacts on environmental issues such as increased air and noise emissions. This is discussed further below.

6.4 Planning approvals

Tonkin (2020) does not identify if any planning approvals are required for the updated final landform for the site. The report notes that no specific maximum filling height is permitted, assumed to be in reference to consent conditions for the site. It is understood that Council is in internal discussions as to whether any planning approvals need to be considered for the updated final landform.

A high-level review was completed by GHD on the approvals status of Cooma Landfill alongside this report. The review suggested that Option 1 will increase the likelihood of the relevant regulatory authorities to require consent modifications and planning approvals due to the increased waste received for disposal at the site. The outcomes of this consent modification may require additional environmental management measures (such as for air and noise

emissions), and potentially additional requirements for installation of lining across the future landfilled areas, particularly for new areas that have not been previously landfilled, and potentially for older unlined areas that are being overtopped.

These may incur substantial financial implications, and the impacts of these potential hidden costs are considered in the sensitivity analysis for the financial assessment in Section 7.3.2. However, our review noted that there is still a high likelihood that consent modifications and planning approvals will be needed for Cooma Landfill even for Option 2 (and the associated financial implications described above), and Council should consider this further as part of their internal assessment.

7. Financial assessment

7.1 Overview

A financial assessment was undertaken for both options outlined in Section 3 noting the qualifications outlined in Section 5.4. The financial feasibility of both options was assessed using a discounted life cycle costing model. The model allows baseline financial data (costing predictions) to be entered over a desired modelling period to calculate the life cycle costing of each option. The results are meant to provide a comparative life cycle cost of each option and are summarised below with calculations provided in Appendix B.

Discounted cash flow analysis is a technique commonly used for investment and development appraisal whereby future cash inflows and outflows associated with a particular project are expressed in present-day terms via discounting. The discount rate is generally the appropriate cost of capital and may incorporate judgements of the uncertainty (risk) of the future cash flows.

This financial assessment has been prepared for comparative purposes only to assess the comparative feasibility between both options. The cost estimates are high level estimates and are not meant for budgeting purposes.

7.2 Indicative costs

7.2.1 CAPEX

Indicative capital expenditure (CAPEX) included in the financial assessment comprised:

- Design, approval, construction and progressive closure/rehabilitation of the new landfill cell (Option 2 only) and associated infrastructure
- Progressive closure/rehabilitation of the Cooma Landfill.
- Design, approval and construction of a new landfill site once both the JRWMF and Cooma Landfill are exhausted.
- Purchase of heavy plant and/or equipment.

The following assumptions were relied on to estimate CAPEX:

- CAPEX costs for the new landfill cell were estimated using high-level material quantities from the concept design and per unit material supply and installation costs. Where unit costs were not available, estimates were made via benchmarking from previous projects.
- A preferred design sub-option for the new landfill cell was determined by selecting the sub-option that airspace generated and presented the lowest construction CAPEX.
- Whilst it is assumed that both options require a new landfill site to be established once both sites are exhausted, the timing for this new landfill site differs depending on the option and hence the financial impacts differ. Therefore, this item has been included as part of the financial assessment. It should be noted that there is significant uncertainty regarding the capital cost estimation of the new landfill site. Factors such as site location, waste generation trends and technological advancements are unknown but would play a large role in determining landfill cost. For the purposes of this assessment, it was assumed that the new landfill would cost 1.5 times that of the cost to construct the quarry landfill expansion. This is considered an order of magnitude cost estimate and it is acknowledged that it contains a large degree of uncertainty. In addition, the location of the new landfill site is not known and therefore waste haulage costs to the new site are not able to be

quantified. For the purposes of this assessment it was assumed that new landfill site would be located approximately the same distance from Jindabyne to Cooma.

- Whilst both options require progressive closure and rehabilitation of the Cooma Landfill, the timing for this progressive closure differs depending on the option and hence the financial impacts differ. Therefore, this item has been included as part of the financial assessment. The capping profile has been based on typical capping requirements in NSW EPA's Environmental Guidelines: Solid Waste Landfills (2016), as per Tonkin (2020).

7.2.2 OPEX

Indicative operational expenditure (OPEX) included in the financial analysis comprised:

- Staff/labour salaries.
- Heavy plant and equipment fuel and maintenance.
- Overheads, utilities and administration.
- Waste haulage.

These were combined to develop an estimated OPEX per tonne of landfilled waste with consideration to economies of scale as the landfilled rate increases.

The following assumptions were relied on to estimate OPEX:

- OPEX cost estimates were calculated via benchmarking from information provided by Council on current operating costs and projected waste generation rates.
- Operational costs for leachate management for the new cell will be relatively low with the main item (disposal) managed using existing infrastructure, hence this has not been included.
- The difference in landfill gas operational management costs across both options is expected to be minimal, hence this has not been included.

7.3 Financial modelling

7.3.1 Key parameters

Key parameters from the financial assessment are provided in Table 7-1 and key OPEX related parameters are provided in Table 7-2.

Table 7-1 Financial assessment parameters

Parameter	Value	Notes
Real discount rate	1.3%	Local government rates provided by Council sourced from IPART (February 2020)
Nominal discount rate	3.6%	Local government rates provided by Council sourced from IPART (February 2020)
Inflation rate	2.3%	Local government rates provided by Council sourced from IPART (February 2020)
Analysis period	2022 – 2071 (50 years)	An analysis period of sufficient length to include the entire predicted life span of the new landfill cell was selected
Base year for waste generation	2018	Waste generation projections were based on the most recent data available at the time of this assessment. Waste data for JRWMF was sourced from the Annual Waste Report: Jindabyne Landfill – 20060 (NSW EPA)
Waste generation increase	5% p.a.	Assumed based on SAP projected population growth (refer Section 3.3)

Table 7-2 OPEX parameters

Parameter	Value ($/t)	Notes
JRWMF financial parameters		
Simplified OPEX rate for landfill operation	187	Benchmarked based on past financial data (calculated based on total landfillable waste and landfill operational expenditure at Jindabyne, Cooma and Bombala landfills)
Simplified OPEX rate for transfer station operation	37	Assumed 20% of OPEX rate for landfill operations
Waste haulage from Jindabyne (to Cooma cost then eventually to new landfill)	13	Based on derived waste haulage costs
Cooma Landfill financial parameters		
Simplified OPEX rate for landfill operation	187	Benchmarked based on past financial data as described above
Simplified OPEX rate for transfer station operation	37	Assumed 20% of OPEX rate for landfill operations
Waste haulage from Jindabyne (to Cooma cost then eventually to new landfill)	13	Based on derived waste haulage costs
New landfill cell		
Simplified OPEX rate for landfill operation	187	Benchmarked based on past financial data as described above

The following uncertainties should be noted and considered alongside the results of the financial analysis:

- CAPEX for the construction of the new landfill utilised material quantity estimates from the concept design. It is anticipated that further refinements to the new landfill cell design would occur during the detailed design and consequently the material quantity estimates used in this assessment may differ from actual quantities.
- OPEX parameters (refer Table 7-2) were estimated based on historic financial data and waste throughputs. The historical data available is relatively high level and future technological innovation may develop more efficient methods for waste handling that would reduce OPEX costs.
- An annual waste generation increase rate of 5% p.a. and 2% p.a. was adopted for Jindabyne and Cooma respectively in this assessment. The Jindabyne waste generation increase rate (5% p.a.) was selected based on annual population growth trends projected as part of the SAP as waste generation rates are likely to correlate closely with population size. The SAP has the potential to significantly alter population growth trends by encouraging migration and tourism into the region. Therefore the impact of the SAP on both future population growth and waste generation is not completely known at the time of this assessment. The Cooma waste generation increase rate (2% p.a.) was selected based on a review of Cooma population growth trends.
- Uncertainty in future waste generation trends – social pressure to reduce waste generation and increase higher order waste hierarchy options (reuse and recycling).

7.3.2 Sensitivity analysis

To better understand the impacts associated with the uncertainties discussed in Section 7.3.1, a sensitively analysis was undertaken. The sensitivity analysis altered some of the key parameters to determine the financial assessments robustness with respect to the identified uncertainties.

The sensitivity analysis was performed on the following parameters:

- Variance of discount rates – three scenarios using a low discount rate (0.3%), anticipated rate (1.3%) and a high rate (2.3%).
- Variance in CAPEX estimates – three scenarios using reduced (-25% decrease), predicted (0% no change) and increased (+25% increase) CAPEX estimates.
- Variance in OPEX estimates – four scenarios using significantly reduced (-50% decrease), reduced (-25% decrease), predicted (0% no change) and increased (+25% increase) OPEX estimates. The significantly reduced estimate was developed with consideration to feedback from Council on the potential range of OPEX costs based on the accuracy of the historical data.
- Variance in waste generation trends for Jindabyne and Cooma – multiple waste generation rates were modelled to gain an appreciation of the impact fluctuating waste generation rates may have on the project.
  - For Jindabyne - three scenarios using a low waste generation rate (2%), expected waste generation rate (5%) and high waste generation rate (8%) were modelled.
  - For Cooma - three scenarios using a low waste generation rate (1%), expected waste generation rate (2%) and high waste generation rate (3%) were modelled.
- Hidden cost scenario – additional scenarios considering hidden costs for Option 1 as outlined in Section 6, including:

- Purchase of cover material for additional waste received for disposal (insufficient supply from existing sources).
- Planning approvals and additional costs associated with lining requirements to meet NSW EPA's Environmental Guidelines: Solid Waste Landfills (2016) – noting the increased tonnages would push the waste receival quantities above the 20,000 t threshold in the landfill guidelines that increase lining requirements. The scenario does not consider additional piggy-back lining requirements, however this may also be needed to mitigate differential settlement due to underlying waste materials. The scenario assumes minimal impacts to landfill lifespan due to use of geosynthetic lining. Expenditure associated with additional environmental management measures have not been considered as not enough information is available to estimate these costs.

It should be noted that each of the sensitivity case was modelled independent of each other (parameter sensitivity was tested one at a time) with the exception of:

- Discount rates which was identified as a key variable and therefore tested across all sensitivity cases.
- Variance in waste generation trends and hidden costs, which were considered together in one of the scenarios as requested by Council.

7.3.3 Summary of results

Results of the financial assessment are provided in Table 7-3. Cumulative expenditure for each option is shown in Figure 7-1 alongside the low and high waste generation sensitivity analysis.

An initial iteration of the hidden cost sensitivity analysis considered the two identified hidden costs (purchase of additional cover material and Cooma landfill planning approvals costs) independently of one another. The analysis concluded that the purchase of additional cover material had a negligible impact on project NPV. Consequently, both hidden costs were combined for the revised hidden cost sensitivity analysis as presented in this report.

For the base cases, both options were generally financially equivalent when considering the level of accuracy for the analysis, with Option 2 being the least expensive option by only a slight margin. Results of the sensitivity analysis are provided in Table 7-4. The base case (refer Table 7-3) was reproduced as the first row of Table 7-4 for comparative purposes.

Option 2 had greater upfront CAPEX associated with the construction of the new landfill cell at JRWMF. However, the new landfill cell provides more available airspace which delays future CAPEX associated with lining Cooma Landfill (if required) and construction of an alternative landfill once the capacity of Cooma Landfill is exhausted. Option 1 had greater OPEX due to waste haulage costs of transferring waste from Jindabyne to Cooma.

The sensitivity analysis identified the following:

- The model was driven primarily by OPEX as demonstrated by the CAPEX and OPEX sensitivity analysis (varying CAPEX had little impact on life cycling costs while varying OPEX had a significant impact). Significantly reduced OPEX estimates result in Option 1 being the least expensive option by only a slight margin, however still being generally financially equivalent, considering the level of accuracy for the analysis.
- The model was highly sensitive to waste generation rate as observed by the low and high waste generation sensitivity analysis. This is attributed to lower waste generation rates decrease OPEX and delay CAPEX as existing landfill airspace assets last longer. As mentioned in Sections 3.3 and 6.2, the Jindabyne waste generation rate was chosen based on projected SAP population growth and the Cooma waste generation rate was chosen based on current population trends. It is acknowledged that there is significant uncertainty regarding actual waste generation rates and that the impact of varied waste generation

rates has a large impact on life cycle cost magnitude. Notwithstanding the above, the options are still generally financially equivalent for the high waste generation scenario, however Option 2 is considered more attractive in a lower waste generation scenario.

- The addition of the hidden costs improves the relative value of Option 2 in this scenario. This is particularly evident when this is combined with lower waste generation rate scenario.

As previously stated, it is noted that the liner installation may be required under both options, and Council should consider this further as part of their internal assessment. Conversely, the additional liner augmentation may be required to meet piggy-back lining requirements across the previously landfilled areas and this will in turn reduce the overall landfill lifespan of the Cooma Landfill further, improving the relative value of Option 2 in this scenario.

Table 7-3 Financial assessment summary results

Option	Life cycle costing		
Discount rate	Low (0.3%)	Anticipated (1.3%)	High (2.3%)
Option 1	-$443,375,379	-$325,191,607	-$243,741,951
Option 2	-$433,807,413	-$318,126,889	-$238,591,827

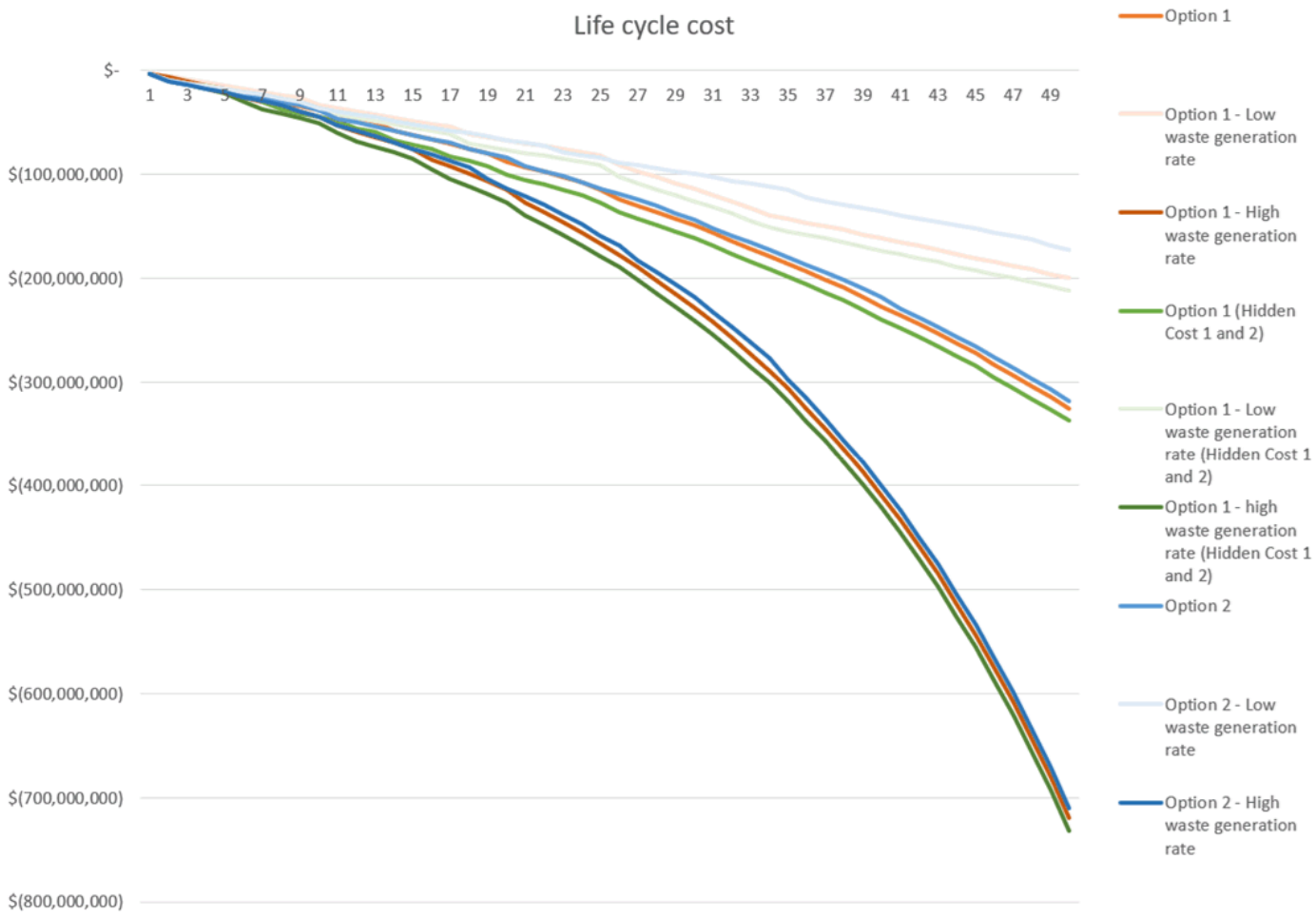

Figure 7-1 Life cycle costing comparison

Table 7-4 Sensitivity analysis summary results

Sensitivity scenario	Life cycle costing					
	Option 1			Option 2		
Discount rate	Low (0.3%)	Anticipated (1.3%)	High (2.3%)	Low (0.3%)	Anticipated (1.3%)	High (2.3%)
Base case (included for comparative purposes)	-$443,375,379	-$325,191,607	-$243,741,951	-$433,807,413	-$318,126,889	-$238,591,827
Variance in CAPEX and OPEX estimates						
Reduced CAPEX (-25% decrease)	-$438,563,318	-$321,141,254	-$240,311,475	-$424,127,517	-$310,211,580	-$232,012,517
Increased CAPEX (+25% increase)	-$448,187,440	-$329,241,960	-$247,172,426	-$443,487,308	-$326,042,198	-$245,171,137
Significantly reduced OPEX (-50% decrease)	-$166,239,137	-$127,586,172	-$99,964,145	-$167,412,084	-$129,155,770	-$101,847,411
Reduced OPEX (-25% decrease)	-$288,539,089	-$215,611,305	-$164,661,103	-$284,850,757	-$213,224,097	-$163,283,586
Increased OPEX (+25% increase)	-$630,748,006	-$456,327,078	-$337,206,689	-$614,282,051	-$443,864,144	-$327,772,133
Variance in waste generation trends						
Low waste generation rate (2% for Jindabyne and 1% for Cooma)	-$263,161,932	-$199,816,364	-$154,854,719	-$226,657,104	-$173,205,462	-$135,566,562
High waste generation rate (8% for Jindabyne and 3% for Cooma)	-$1,024,643,101	-$719,824,849	-$515,511,046	-$1,013,162,199	-$710,513,190	-$507,952,231
Hidden cost scenario (note that hidden costs only apply to Option 1)						
Hidden cost scenario 1 and 2	-$456,942,422	-$337,546,684	-$255,040,970	-$433,807,413	-$318,126,889	-$238,591,827
Combined scenarios (note that hidden costs only apply to Option 1)						
Low waste generation rate and hidden cost scenario 1 and 2	-$276,758,042	-$211,707,468	-$165,351,576	-$226,657,104	-$173,205,462	-$135,566,562
High waste generation rate and hidden cost scenario 1 and 2	-$1,038,061,199	-$732,065,965	-$526,723,153	-$1,013,162,199	-$710,513,190	-$507,952,231

8. Triple bottom line assessment

8.1 Overview

The triple bottom line (TBL) assessment evaluates the social, environmental and financial impacts of each option (both positive and negative). In undertaking the TBL assessment, environmental and social impacts for each of the options have been evaluated on a qualitative basis, whereas the financial assessment has been evaluated on a quantitative basis using calculation undertaken as part of the NPV analysis (refer Section 7).

The TBL assessment was used to evaluate the holistic feasibility of establishing a new landfill cell in a quarry area adjacent to the existing landfill cell at the site.

8.2 Methodology

The financial, environmental and social criteria for the TBL assessment is presented in Table 8-1. Rating guidance for the financial, environmental and social criteria is provided in Table 8-2.

Table 8-1 TBL financial, environmental and social criteria

Criteria	Measure
Financial	
Lowest cost option	Life cycle cost analysis
High initial capital cost	Magnitude of initial CAPEX costs
Commercial risk	Level of exposure to market variations or changed in government legislation
Environmental	
Waste management hierarchy	Most preferable option on the waste management hierarchy
Greenhouse gas (GHG) emissions (waste disposal and transportation)	Level of GHG emissions from waste disposal activities
Biodiversity	Level of impact on biodiversity
Impact on amenity (air and noise emissions and visual disamenity)	Level of air and noise emissions and visual intrusiveness
Groundwater and surface water impacts	Level of groundwater and surface water impacts
Social	
Public perception and support	Anticipated positive/negative public perception of project
Economic benefit to the community through employment opportunities	Level of economic benefit based on qualitative assessment
Infrastructure service to the community	Level of benefit to the community service based on qualitative assessment

Table 8-2 TBL rating guidance

Rating	Guidance for negative measures	Guidance for positive measures
Very good (1)	No negative impact discernible of predicted	Extreme positive impact
Good (2)	Minimal negative impact	Major positive impact
Neutral (3)	Moderate negative impact	Moderate positive impact
Poor (4)	Major negative impact	Minimal positive impact
Very poor (5)	Extreme negative impact	No positive impact discernible of predicted

8.3 Results

The financial, environmental and social results of the TBL assessment are presented in Table 8-3, Table 8-4 and Table 8-5 respectively.

Table 8-3 Financial results

Criteria	Option rating (lower number is better)		Comment
	Option 1 (Waste diversion)	Option 2 (Landfill expansion)	
Lowest cost option	3	3	Based on the life cycle cost analysis, Both options were considered equivalent
High initial capital cost	2	4	Option 2 requires higher CAPEX costs to construct the new landfill cell
Commercial risk	3	3	Both options are considered to have equal commercial risk as any change to legislation or market condition would impact both options equivalently.
Total	**8**	**10**	**Option 1 was considered more favourable from a financial perspective**

Table 8-4 Environmental results

Criteria	Option rating (lower number is better)		Comment
	Option 1 (Waste diversion)	Option 2 (Landfill expansion)	
Waste management hierarchy	3	3	Equivalent neutral rating for both options. Waste is pre-processed via the upgraded transfer station which promotes re-use and recycling of waste prior to landfill for both options.
Greenhouse gas (GHG) emissions (waste disposal and transportation)	4 (2)[3]	2	Higher GHG emissions would be emitted for Option 1 due to longer waste haulage distances. GHG emissions from waste disposal (use of heavy plant) is equivalent for both options.
Biodiversity	3	3	No biodiversity limitations were identified during the biodiversity site walkover at JRWMF. Therefore both options are considered equal.
Impact on amenity (air and noise emissions, visual disamenity and traffic generation)	3	5	Cooma Landfill is located further away from any sensitive receptors and therefore considered less likely to impact air quality, noise and visual amenity. It should be noted that the development of a new Jindabyne education campus was recently announced to neighbour JRMWF. Option 2 would likely impact amenity of the new campus depending on its location and design. Option 1 generates additional road traffic due to waste haulage truck movements.
Groundwater and surface water impacts	4	2	The new landfill cell at JRWMF will include best practice leachate containment and water management measures, whilst under the base case scenario it is assumed landfilling will continue to occur on unlined areas of the Cooma Landfill.
Total	**17 (15)[3]**	**15**	**Option 2 was considered more favourable from an environmental perspective or both options were considered equivalent if an electric fleet of waste haulage vehicles were commissioned**

[3] GHD note that a GHG rating of 2 could be achieved for Option 1 if Council was to adopt an electric fleet of waste haulage vehicles that were charged via renewable energy sources. Therefore there is potential for the original rating of 4 to decrease with future technology adoption.

Table 8-5 Social results

Criteria	Option rating (lower number is better)		Comment
	Option 1 (Waste diversion)	Option 2 (Landfill expansion)	
Public perception and support	2-4[4]	3-5[4]	The development of a neighbouring education campus makes the public perception of Option 2 highly unknown. However it is considered more likely to attract negative perception. Option 1 likely to attract negative public perception as waste is hauled a significant distance across historical council boundaries. The approach may be perceived as Jindabyne transferring the waste management burden onto Cooma.
Economic benefit to the community through employment opportunities	3	3	Equivalent neutral rating for both options. Both options create job opportunities. Option 1 creates waste transfer (truck haulage) jobs, Option 2 creates waste management (waste disposal at JRWMF) jobs.
Infrastructure service to the community	3	2	Option 2 is considered more favourable as it allow the Jindabyne community to be serviced locally rather than relying on facilities at Cooma. Additionally it involves the construction of new infrastructure (new landfill cell). Both options result in the same service providing.
Total	**8-10**	**8-10**	**Both options were considered equivalent from a social perspective**

8.4 Discussion

The TBL assessment concluded the following findings based on the evaluation criteria and adopted assumptions:

- Financially – Option 1 was considered slightly more favourable from a financial perspective, aligning with the findings of Section 7, where both options were generally financially equivalent however Option 1 required less initial capital costs. However, the scores are likely to be similar if the hidden costs identified in Section 6 are applicable alongside potential lower waste generation rates.
- Environmentally – Option 2 was considered more favourable or both options were considered equally favourable if an electric fleet of waste haulage vehicles were commissioned from an environmental perspective. The development of a new Jindabyne education campus (announced in December 2020) to neighbour JRMWF was identified as

[4] The public perception and support rating (for both options) is highly dependent on community consultation and education programs undertaken prior to and during the project. Therefore a range of possible ratings was included to account for the different levels of Council investment in community consultation and education. Total social ratings were calculated using the mean public perception and support rating.

a potential 'showstopper' with significant implications for Option 2. This impacts the available buffer zone for the new landfill cell and reduces the distance to nearby sensitive receptors.

- Socially – Both options were considered equally favourable from a social perspective, particularly when considering the public perception of transporting all of the waste from a growing SAP community across historical council boundaries to an older legacy facility, compared to a new landfill cell near future sensitive receptors (unfavourable scenarios in both instances). Based on previous experience, a strong focus on early and ongoing community consultation is required to manage these issues.

9. Conclusions and recommendations

The feasibility analysis considered the following options for future landfill disposal for waste received at the JRWMF:

- Option 1 – Waste diversion, with all future waste for landfill disposal diverted to Cooma Landfill.
- Option 2 – Landfill expansion, with a new landfill cell established in the adjacent quarry area to accept future waste for landfill disposal.

Previous concept design work completed for Option 2 confirmed the technical feasibility of this option.

Both options impact on the ongoing operations of the Cooma Landfill, with Option 1 reducing the lifespan of the site by approximately 15 years and very likely to require additional planning approvals and lining requirements. Where possible, these considerations where included as part of the feasibility analysis.

The financial assessment completed for the options using discounted life cycle cost analysis identified both options to be approximately equivalent for the base cases that were considered, however with a higher initial capital cost for Option 2. The sensitivity analysis highlighted the reliance of the model on OPEX and waste generation rates, with Option 2 considered more favourable in a lower waste generation scenario, particularly when considered alongside potential hidden costs for Option 1 associated with cover material purchase, planning approvals and piggy-back lining.

The triple bottom line assessment suggested similar feedback from a financial perspective, with comparable ratings or a slight preference for Option 2 from an environmental and social perspective, with consideration to increased greenhouse gases, traffic movements, impacts to receiving groundwater and surface water, and public perception.

Ultimately, both options are considered feasible, however the final selection of a preferred option would be defined by the weighting placed by Council of the financial, environmental and social impacts of the options. To help inform this decision, it is suggested that Council further consider the hidden costs associated with Option 1 and their likelihood, as well as likely community acceptance of each option.

These are regarded as key considerations for the final selection of the preferred option. In particular, the development of a new Jindabyne education campus to neighbour the JRMWF was identified as a potential 'showstopper' for Option 2, given it would result in a reduced buffer zone for the new landfill cell and bring it in closer proximity to sensitive receptors. It is recommended that further consultation is conducted and information gathered on this project to inform the preferred option.

10. References

AVMAP (2020). P01 and P02 – Site Survey Plan Based On Aerial & Ground Surveys Undertaken 3 March 2020 & 17 April 2019

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GHD (2020). Jindabyne Regional Waste Management Facility – Geotechnical Investigation

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PPK Environment and Infrastructure (2001). Jindabyne Regional Waste Facility Environmental Impact Statement

Purdon Associates (2005). Jindabyne Regional Waste Management Facility Statement of Environmental Effects

Tonkin (2020). Cooma Landfill – Waste Disposal Filling Plan

Appendices

Appendix A – Concept Design Sketches

LEGEND

- EXISTING CONTOURS
- LEACHATE POND
- SEDIMENT RETENTION POND
- SURFACE WATER CHANNEL

NOTES:

1. SITE CONTOURS BASED ON SURVEY COMPLETED BY AVMAP ON 17 APRIL 2019 AND 3 MARCH 2020.
2. ALL AREAS ARE APPROXIMATE.

0 20 40 60m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
B	REVISED		
A	INITIAL ISSUE	DG*	26.05.20

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY

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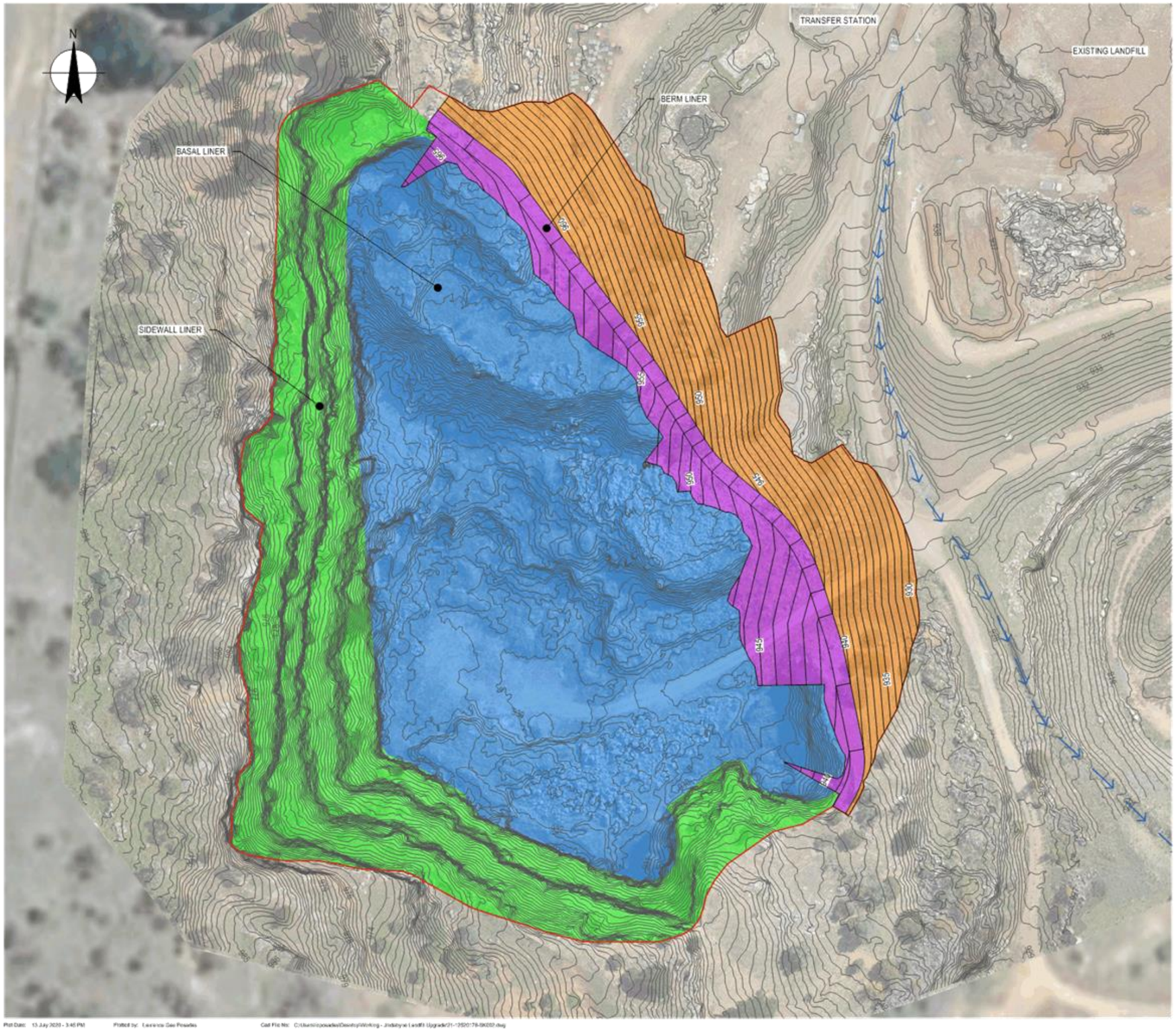
scale 1:2000 for A3 | job no. 12520178
date JULY 2020 | rev no. B

approved (PD) SK001

Plot Date: 13 July 2020 - 3:50 PM Plotted by: Lawrence Gee Rosales Cad File No: C:\Users\lrgosales\Desktop\Working - Jindabyne Landfill Upgrade\21-12520178-SK001.dwg



LEGEND

- EXISTING CONTOURS
- EASTERN PERIMETER BUND DESIGN CONTOURS
- FINAL LANDFORM BOUNDARY - OPTION 1
- APPROXIMATE EXTENT OF BASAL LINER
- APPROXIMATE EXTENT OF SIDEWALL LINER
- APPROXIMATE EXTENT OF BERM LINER
- APPROXIMATE EXTENT OF EXTERNAL BERM SURFACE
- SURFACE WATER CHANNEL

NOTES:

1. SURFACE WATER DIVERSION MEASURES AROUND LANDFILL CELL NOT SHOWN, TO BE CONFIRMED IN DETAILED DESIGN.
2. FINAL EXTENT OF LINER AREAS AND BERM GEOMETRY TO BE CONFIRMED IN DETAILED DESIGN BASED ON FINAL LANDFORM, ROCKFALL RISK MANAGEMENT STRATEGY AND LINER PROFILES.
3. ALL AREAS ARE APPROXIMATE.

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

PRELIMINARY

A	INITIAL ISSUE	DG*	26.05.20
rev	description	app'd	date

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY

NEW LANDFILL CELL GENERAL ARRANGEMENT PLAN

GHD
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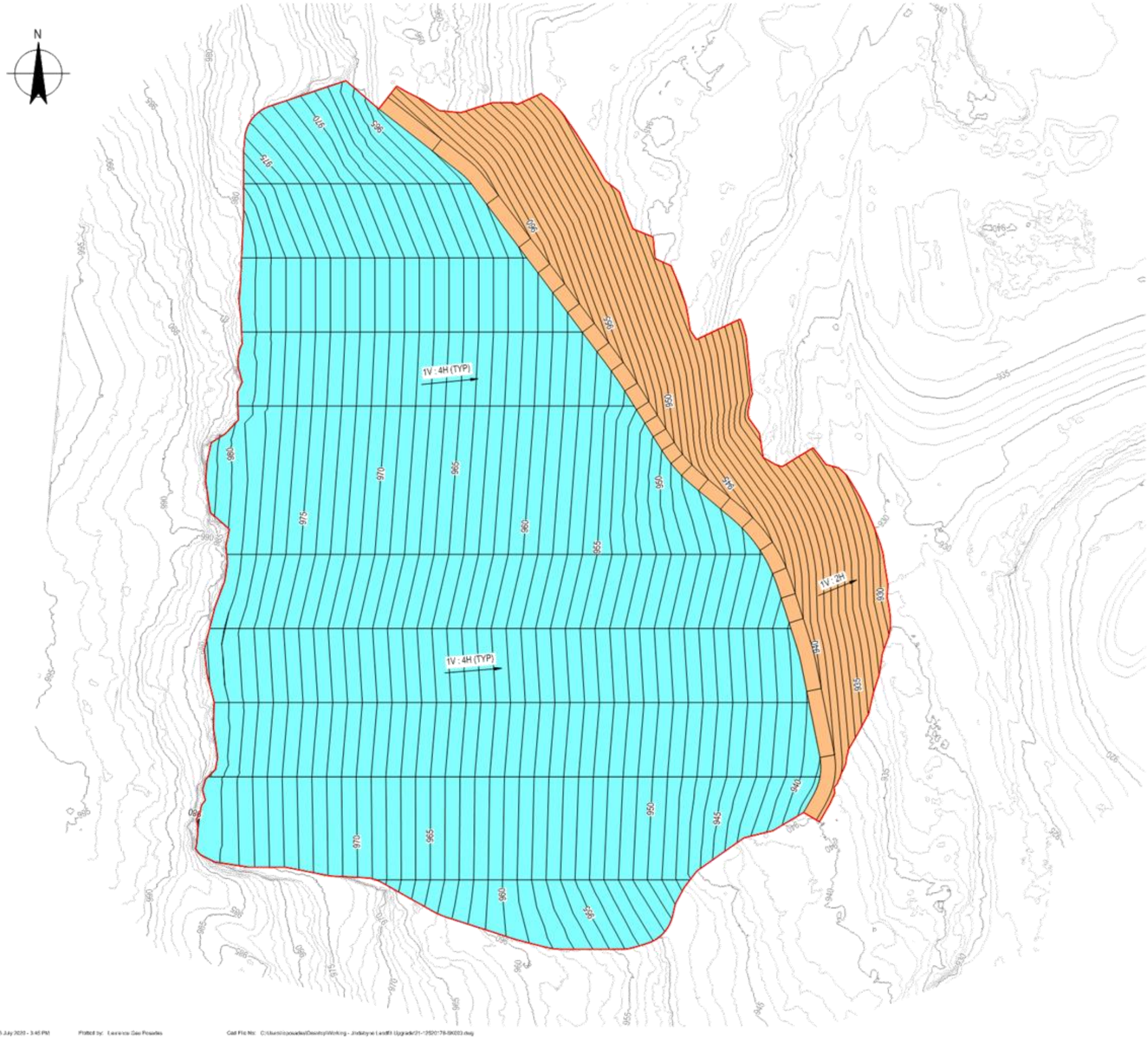
scale	1:1000 for A3	job no.	12520178
date	JULY 2020	rev no.	A

approved (PD) SK002

Plot Date: 15 July 2020 - 3:45 PM Plotted by: Lawrence Dee Posadas Cad File No: C:\Users\lcposadas\Desktop\Working - Jindabyne Landfill Upgrade\21-12520178-SK002.dwg



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- FINAL LANDFORM BOUNDARY - OPTION 1
- FINAL LANDFORM AREA
- EASTERN PERIMETER BERM AREA

NOTES:

1. SURFACE WATER DIVERSION MEASURES AROUND LANDFORM AND COLLECTION MEASURES ON LANDFORM SURFACE NOT SHOWN, TO BE CONFIRMED IN DETAILED DESIGN.
2. ALL AREAS ARE APPROXIMATE.

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
B	REVISED		
A	INITIAL ISSUE	DG*	26.05.20

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY

NEW LANDFILL CELL
FINAL LANDFORM OPTION 1

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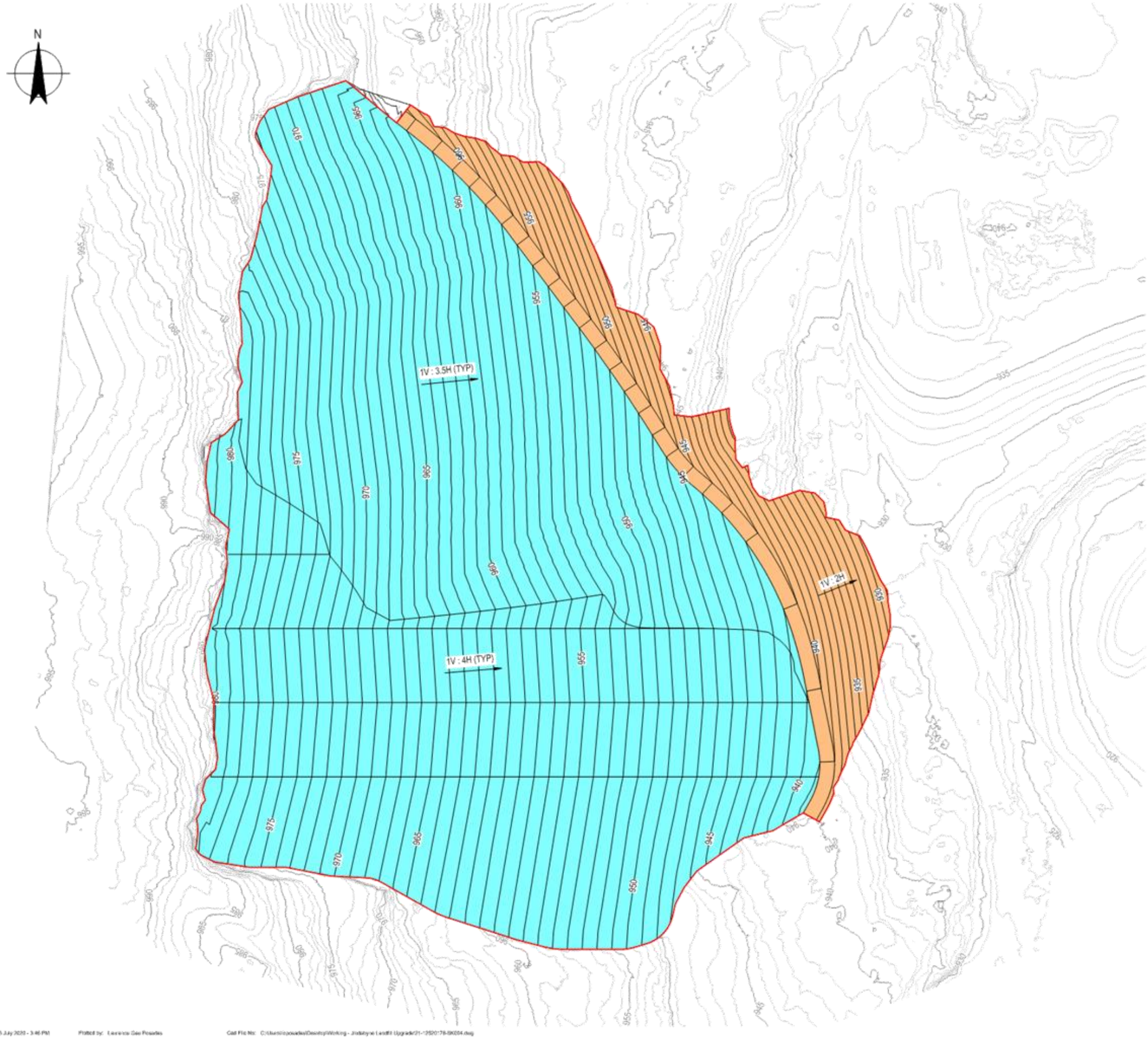
scale	1:1000 for A3	job no.	15214758
date	JULY 2020	rev no.	B

approved (PD) SK003

Plot Date: 15 July 2020 - 3:45 PM Plotted by: Lawrence Geo Rosales Cad File No: C:\Users\lrogeales\Desktop\Working - Jindabyne Landfill Upgrade\21-15201758-SK003.dwg



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- FINAL LANDFORM BOUNDARY - OPTION 2
- FINAL LANDFORM AREA
- EASTERN PERIMETER BERM AREA

NOTES:

1. SURFACE WATER DIVERSION MEASURES AROUND LANDFORM AND COLLECTION MEASURES ON LANDFORM SURFACE NOT SHOWN, TO BE CONFIRMED IN DETAILED DESIGN.
2. ALL AREAS ARE APPROXIMATE.

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
B	REVISED		
A	INITIAL ISSUE	DG*	26.05.20

SNOWY MONARO REGIONAL COUNCIL
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NEW LANDFILL CELL
FINAL LANDFORM OPTION 2

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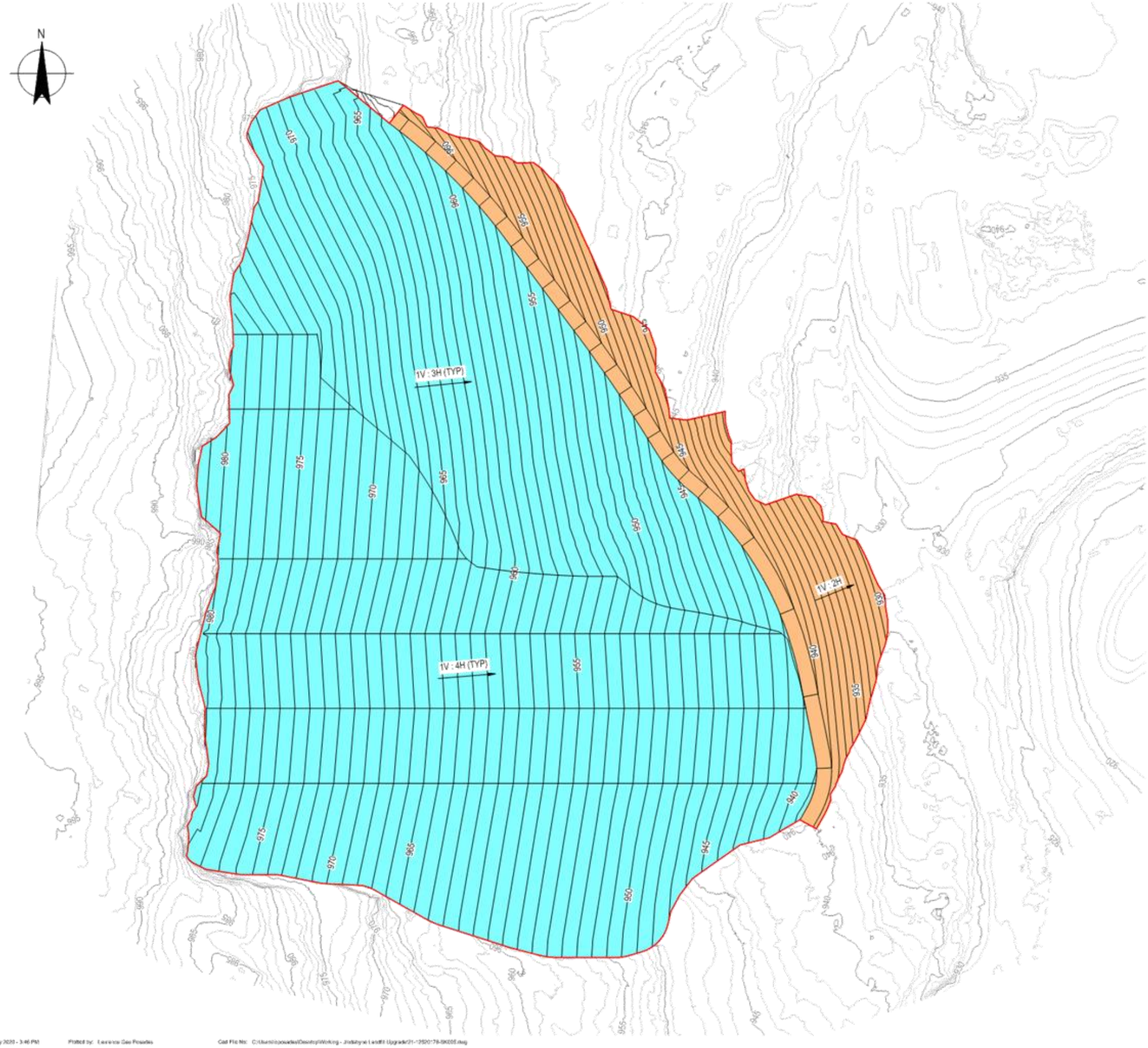
date	JULY 2020	rev no.	B

approved (PD) SK004

Plot Date: 15 July 2020 - 3:46 PM Plotted by: Lawrence Dee Posadas Cad File No: C:\Users\lcposadas\Desktop\Working - Jindabyne Landfill Upgrade\21-15201?8-SK004.dwg



LEGEND

- EXISTING CONTOURS
- DESIGN CONTOURS
- FINAL LANDFORM BOUNDARY - OPTION 3
- FINAL LANDFORM AREA
- EASTERN PERIMETER BERM AREA

NOTES:

1. SURFACE WATER DIVERSION MEASURES AROUND LANDFORM AND COLLECTION MEASURES ON LANDFORM SURFACE NOT SHOWN, TO BE CONFIRMED IN DETAILED DESIGN.
2. ALL AREAS ARE APPROXIMATE.

0 10 20 30m
SCALE 1:1000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
B	REVISED		
A	INITIAL ISSUE	DG*	26.05.20

SNOWY MONARO REGIONAL COUNCIL
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NEW LANDFILL CELL
FINAL LANDFORM OPTION 3

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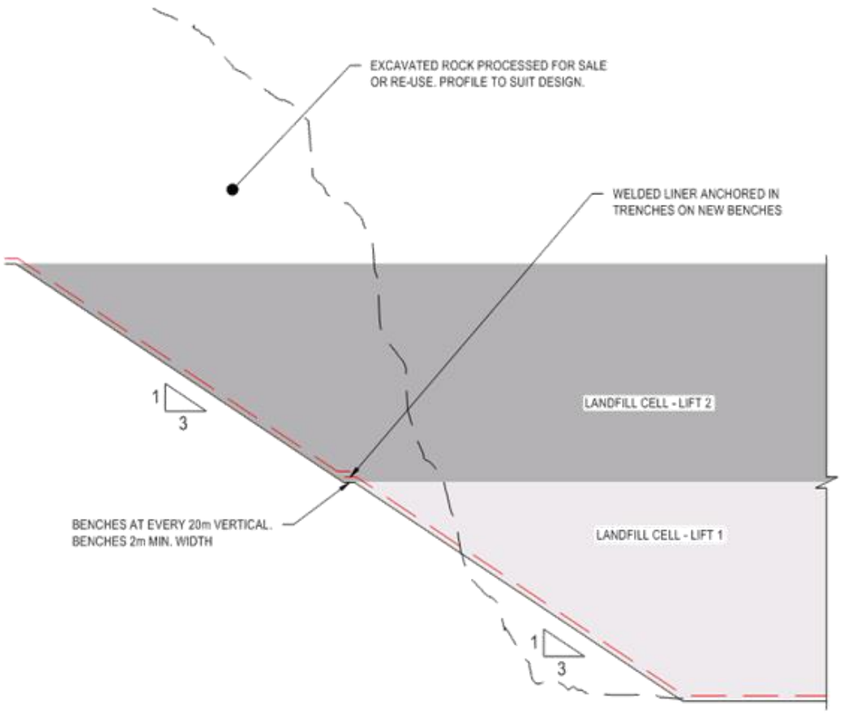
date JULY 2020 | rev no. B

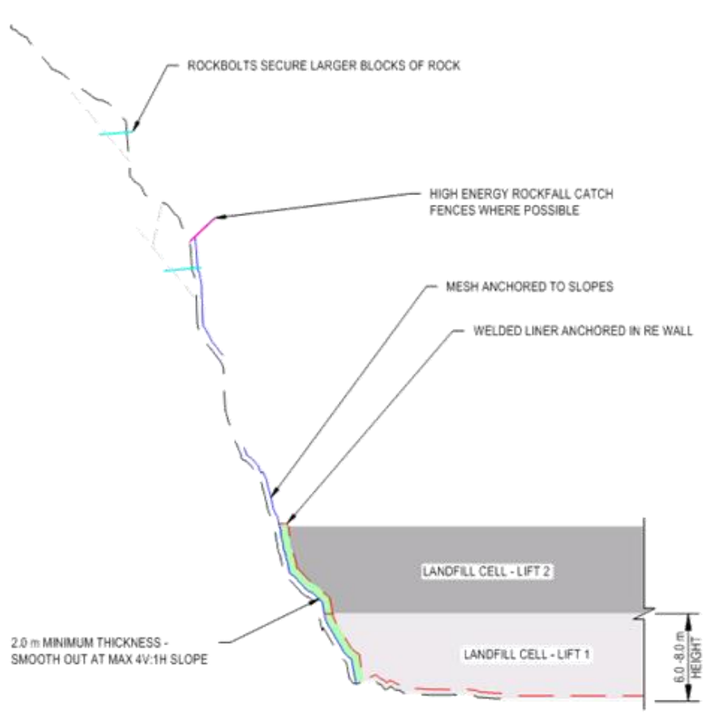
approved (PD) SK005

Plot Date: 13 July 2020 - 3:46 PM Plotted by: Lawrence Dee Posadas Cad File No: C:\Users\lposadas\Desktop\Working - Jindabyne Landfill Upgrade\21-13520178-SK005.dwg



STRATEGY 1 - BATTER BACK SLOPE WHERE POSSIBLE

SCALE 1:1000H 1:500V



STRATEGY 2 - INSTALL ROCKFALL PROTECTION

SCALE 1:1000H 1:500V

VERTICAL SCALE 1:500
AT ORIGINAL SIZE
0 5 10 15m
HORIZONTAL SCALE 1:1000
AT ORIGINAL SIZE
0 10 20 30m

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY

NEW LANDFILL CELL

ROCKFALL RISK MANAGEMENT STRATEGIES - SHEET 1 OF 2

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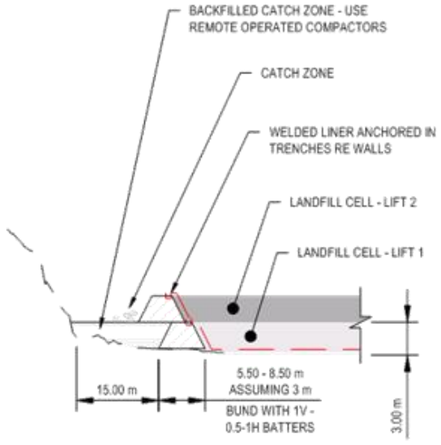
scale | SHOWN for A3 job no. | 21-12520178
date | JULY 2020 rev no. | A

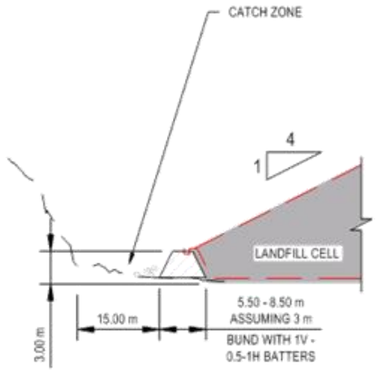
approved (PD) SK006

Plot Date: 15 July 2020 - 10:04 AM Plotted by: Lexmirra Gao Posadas Cad File No: C:\Users\lgposadas\Desktop\Working - Jindabyne Landfill Upgrade\21-12520178-SK006_007.dwg



STRATEGY 3 - ALLOW A CATCH ZONE IN CELL DESIGN

SCALE 1:1000H 1:500V



STRATEGY 4 - SET THE CELL BACK FROM THE QUARRY WALL

SCALE 1:1000H 1:500V

VERTICAL SCALE 1:500
AT ORIGINAL SIZE
0 5 10 15m
HORIZONTAL SCALE 1:1000
AT ORIGINAL SIZE
0 10 20 30m

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY
NEW LANDFILL CELL
ROCKFALL RISK MANAGEMENT STRATEGIES - SHEET 2 OF 2

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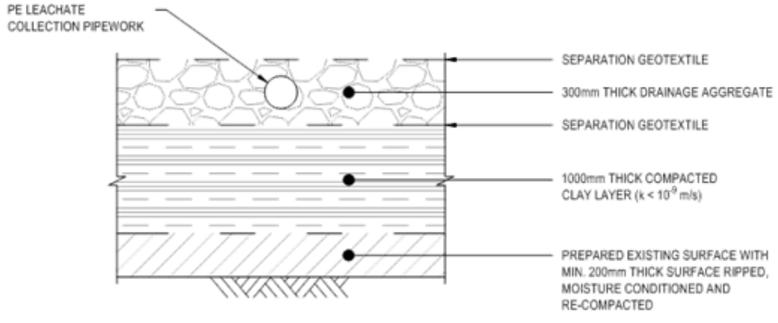
scale | SHOWN for A3 | job no. | 21-12520178
date | JULY 2020 | rev no. | A

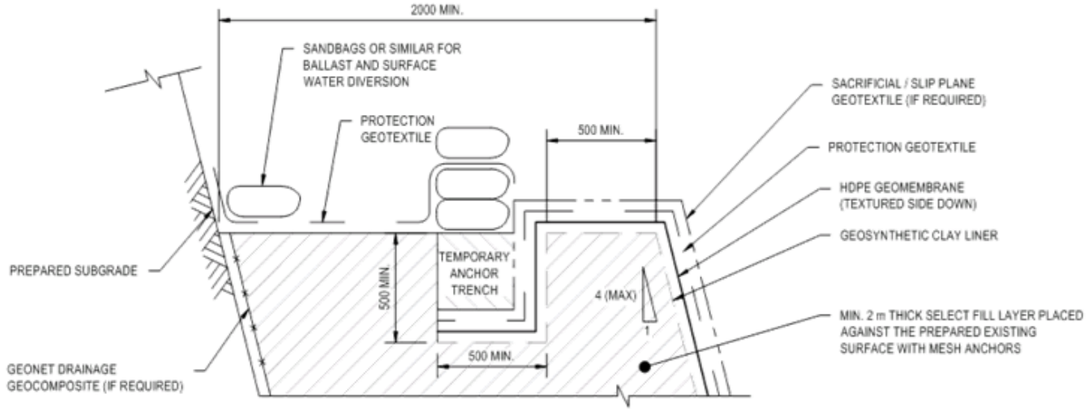
approved (PD) SK007

Plot Date: 15 July 2020 - 9:50 AM Plotted by: Lawrence Gee Posadas Cad File No: C:\Users\lcposadas\Desktop\Working - Jindabyne Landfill Upgrade\21-12520178-SK008_007.dwg



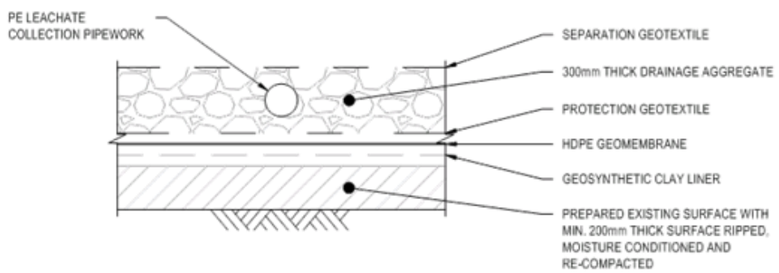
BASAL LINER OPTION 1

1A DETAIL - SCALE 1 : 25



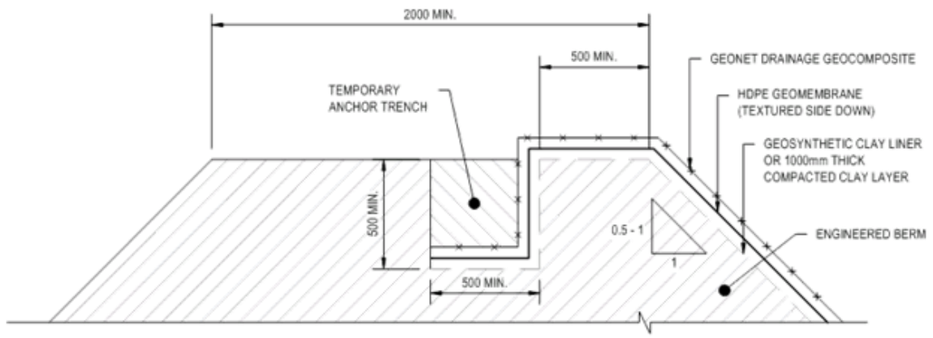
SIDEWALL LINER FOR STRATEGY 2 AND 3

2 DETAIL - SCALE 1 : 25



BASAL LINER OPTION 2

1B DETAIL - SCALE 1 : 25



BERM LINER

3 DETAIL - SCALE 1 : 25

0 250 500 750mm
SCALE 1:25 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY

NEW LANDFILL CELL
TYPICAL DETAILS - SHEET 1 OF 2

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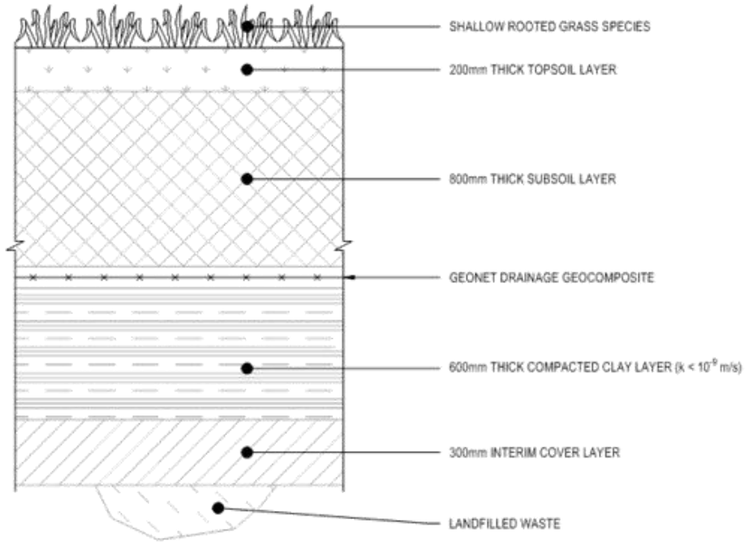
scale 1:25 for A3 job no. 21-12520178
date JULY 2020 rev no. A

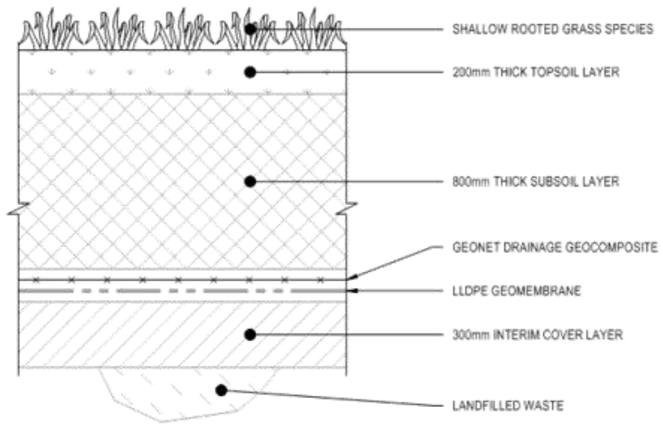
approved (PD) SK008

Plot Date: 15 July 2020 - 9:50 AM Plotted by: Lawrence Dee Posadas Cad File No: C:\Users\lcposadas\Desktop\Working - Jindabyne Landfill Upgrade\21-12520178-SK008_005.dwg



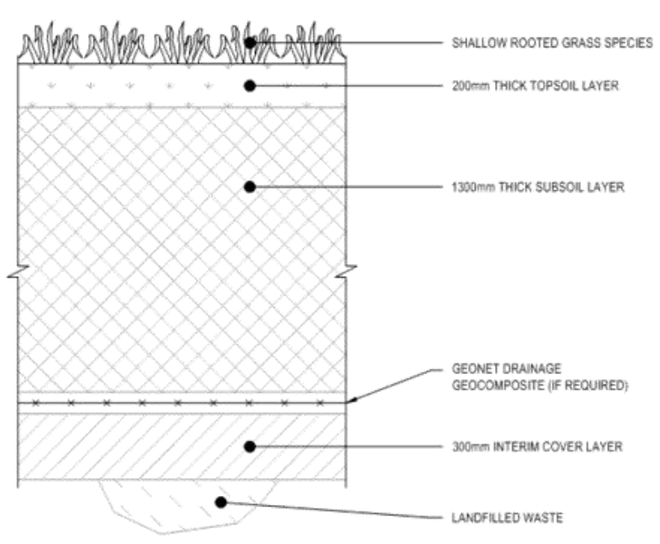
CAPPING PROFILE OPTION 1

4A DETAIL
SCALE 1 : 25



CAPPING PROFILE OPTION 2

4B DETAIL
SCALE 1 : 25



CAPPING PROFILE OPTION 3
(REFER NOTE 2)

4C DETAIL
SCALE 1 : 25

0 250 500 750mm
SCALE 1:25 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
A	INITIAL ISSUE		

SNOWY MONARO REGIONAL COUNCIL
JINDABYNE REGIONAL WASTE MANAGEMENT FACILITY

NEW LANDFILL CELL
TYPICAL DETAILS - SHEET 2 OF 2

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date JULY 2020 rev no. A

approved (PD) SK009

Plot Date: 13 July 2020 - 3:46 PM Plotted by: Lawrence Geo Rosales Cad File No: C:\Users\lrogeales\Desktop\Working - Jindabyne Landfill Upgrade\21-12520178-SK009_009.dwg

Appendix B – Life Cycle Cost Calculations

CAPEX - Master

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: CAPEX - Master

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

ID	Description	Quantity	Unit	Rate ($/unit)	Total ($)	Reference and notes
	JRWMF					
	PRELIMINARIES					
	Design and planning approvals				**$200,000.00**	
	Design and planning approval	1	item	$200,000.00	$200,000.00	GHD tender
	CONSTRUCTION WORKS					
	Rockfall strategy 2				**$6,921,000.00**	
	Supply and install earthen fill for sidewall liner	34,000	m3	$27.00	$918,000.00	
	Rockface protection measures	17,000	m2	$300.00	$5,100,000.00	Benchmark estimate
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$0.00	Minimal for bulk earthworks
	Indirects - Contractor (15%)	1	item	-	$903,000.00	
	Rockfall strategy 3				**$7,038,000.00**	
	Supply and install earthen fill for berm construction	85,000	m3	$27.00	$2,295,000.00	
	Filling - 15 m catch zone	255,000	m3	$15.00	$3,825,000.00	
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$0.00	Minimal for bulk earthworks
	Indirects - Contractor (15%)	1	item	-	$918,000.00	
	Basal liner profile - Option 1				**$1,701,000.00**	
	Surface preparation	17,000	m2	$2.00	$34,000.00	
	Supply and install 1000 mm thick compacted clay	17,000	m3	$45.00	$765,000.00	Lower end
	Supply and install separation geotextile	17,000	m2	$5.00	$85,000.00	
	Supply and install 300 mm thick drainage aggregate with PE leachate collection pipework	5,100	m3	$100.00	$510,000.00	
	Supply and install separation geotextile	17,000	m2	$5.00	$85,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$74,000.00	
	Indirects - Contractor (10%)	1	item	-	$148,000.00	
	Basal liner profile - Option 2				**$1,505,000.00**	
	Surface preparation	17,000	m2	$2.00	$34,000.00	
	Supply and install GCL	17,000	m2	$15.00	$255,000.00	
	Supply and install HDPE geomembrane	17,000	m2	$15.00	$255,000.00	
	Supply and install protection geotextile	17,000	m2	$10.00	$170,000.00	
	Supply and install 300 mm thick drainage aggregate with PE leachate collection pipework	5,100	m3	$100.00	$510,000.00	
	Supply and install separation geotextile	17,000	m2	$5.00	$85,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$65,000.00	
	Indirects - Contractor (10%)	1	item	-	$131,000.00	

	Sidewall liner profile - Strategy 2				**$1,171,250.00**	
	Supply and install GCL	21,250	m2	$15.00	$318,750.00	Increased quantity due to staged lining
	Supply and install HDPE	21,250	m2	$15.00	$318,750.00	Increased quantity due to staged lining
	Supply and install protection geotextile	21,250	m2	$10.00	$212,500.00	Increased quantity due to staged lining
	Supply and install sacrificial/slip plane geotextile	21,250	m2	$5.00	$106,250.00	Increased quantity due to staged lining
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$72,000.00	Increased rate due to staged lining
	Indirects - Contractor (15%)	1	item	-	$143,000.00	Increased rate due to staged lining
	Sidewall liner profile - Strategy 3				**$1,171,250.00**	
	Supply and install GCL	21,250	m2	$15.00	$318,750.00	Increased quantity due to staged lining
	Supply and install HDPE	21,250	m2	$15.00	$318,750.00	Increased quantity due to staged lining
	Supply and install protection geotextile	21,250	m2	$10.00	$212,500.00	Increased quantity due to staged lining
	Supply and install sacrificial/slip plane geotextile	21,250	m2	$5.00	$106,250.00	Increased quantity due to staged lining
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$72,000.00	Increased rate due to staged lining
	Indirects - Contractor (15%)	1	item	-	$143,000.00	Increased rate due to staged lining
	Berm construction and liner profile				**$1,485,000.00**	
	Supply and install earthen fill for berm construction	38,000	m3	$27.00	$1,026,000.00	
	Supply and install GCL	5,000	m2	$15.00	$75,000.00	
	Supply and install HDPE geomembrane	5,000	m2	$15.00	$75,000.00	
	Supply and install drainage geocomposite	5,000	m2	$18.00	$90,000.00	
	Supply and install sacrificial/slip plane geotextile	5,000	m2	$5.00	$25,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$65,000.00	
	Indirects - Contractor (10%)	1	item	-	$129,000.00	
	Capping profile - Option 1				**$3,032,900.00**	
	Supply and install 300 mm thick seal bearing layer	8,100	m3	$27.00	$218,700.00	
	Supply and install geonet drainage geocomposite	27,000	m2	$18.00	$486,000.00	Assume landfill gas drainage layer needed
	Supply and install LLDPE geomembrane or coated GCL	27,000	m2	$15.00	$405,000.00	
	Supply and install geonet drainage geocomposite	27,000	m2	$18.00	$486,000.00	
	Supply and install 800 mm thick subsoil layer	21,600	m3	$27.00	$583,200.00	
	Supply and install 200 mm thick topsoil layer	5,400	m3	$45.00	$243,000.00	
	Revegetation	27,000	m2	$2.00	$54,000.00	
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$186,000.00	Increased rate due to staged capping
	Indirects - Contractor (15%)	1	item	-	$371,000.00	Increased rate due to staged capping
	Capping profile - Option 2				**$3,429,900.00**	
	Supply and install 300 mm thick seal bearing layer	8,100	m3	$27.00	$218,700.00	
	Supply and install geonet drainage geocomposite	27,000	m2	$18.00	$486,000.00	Assume landfill gas drainage layer needed
	Supply and install 600 mm thick compacted clay	16,200	m3	$45.00	$729,000.00	Lower end
	Supply and install geonet drainage geocomposite	27,000	m2	$18.00	$486,000.00	
	Supply and install 800 mm thick subsoil layer	21,600	m3	$27.00	$583,200.00	
	Supply and install 200 mm thick topsoil layer	5,400	m3	$45.00	$243,000.00	
	Revegetation	27,000	m2	$2.00	$54,000.00	
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$210,000.00	Increased rate due to staged capping
	Indirects - Contractor (15%)	1	item	-	$420,000.00	Increased rate due to staged capping
	Capping profile - Option 3				**$3,199,400.00**	

	Supply and install 300 mm thick seal bearing layer	8,100	m3	$27.00	$218,700.00	
	Supply and install geonet drainage geocomposite	27,000	m2	$18.00	$486,000.00	Assume landfill gas drainage layer needed
	Supply and install 1,300 mm thick subsoil layer	35,100	m3	$27.00	$947,700.00	
	Supply and install 200 mm thick topsoil layer	5,400	m3	$45.00	$243,000.00	
	Revegetation	27,000	m2	$8.00	$216,000.00	
	Trial construction, instrumentation and implementation	1	item	$500,000.00	$500,000.00	
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$196,000.00	Increased rate due to staged capping
	Indirects - Contractor (15%)	1	item	-	$392,000.00	Increased rate due to staged capping
	Groundwater management				**$0.00**	
	N/A	1	Item	-	$0.00	Assume not required based on existing information
	Leachate management				**$120,000.00**	
	Supply and install pipework/connect to existing leachate dam	100	m	$90.00	$9,000.00	
	Pump and instrumentation	1	item	$100,000.00	$100,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$0.00	N/A
	Indirects - Contractor (10%)	1	item	-	$11,000.00	
	Surface water management				**$28,000.00**	
	Construct diversion bunds	1	item	$25,000.00	$25,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$0.00	Minimal for bulk earthworks
	Indirects - Contractor (10%)	1	item	-	$3,000.00	
	Landfill gas management				**$523,000.00**	
	Gas collection bores and manifolds	1	Item	$225,000.00	$225,000.00	Nominal based on cell dimensions
	Landfill gas flare	1	Item	$250,000.00	$250,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$0.00	N/A
	Indirects - Contractor (10%)	1	item	-	$48,000.00	
	CL					
	PRELIMINARIES					
	Design and planning approvals (hidden cost if required)				**$200,000.00**	
	Design and planning approval	1	item	$200,000.00	$200,000.00	Typical
	CONSTRUCTION WORKS					
	Capping profile - Typ.				**$18,419,500.00**	
	Supply and install 300 mm thick seal bearing layer	43,500	m3	$27.00	$1,174,500.00	
	Supply and install geonet drainage geocomposite	145,000	m2	$18.00	$2,610,000.00	Assume landfill gas drainage layer needed
	Supply and install 600 mm thick compacted clay	87,000	m3	$45.00	$3,915,000.00	Lower end
	Supply and install geonet drainage geocomposite	145,000	m2	$18.00	$2,610,000.00	
	Supply and install 800 mm thick subsoil layer	116,000	m3	$27.00	$3,132,000.00	
	Supply and install 200 mm thick topsoil layer	29,000	m3	$45.00	$1,305,000.00	
	Revegetation	145,000	m2	$2.00	$290,000.00	
	Indirects - Superintendent (7.5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (7.5%)	1	item	-	$1,128,000.00	Increased rate due to staged capping
	Indirects - Contractor (15%)	1	item	-	$2,255,000.00	Increased rate due to staged capping

	Basal liner profile - Typ. (hidden cost if required)				**$12,840,000.00**	
	Surface preparation	145,000	m2	$2.00	$290,000.00	
	Supply and install GCL	145,000	m2	$15.00	$2,175,000.00	
	Supply and install HDPE geomembrane	145,000	m2	$15.00	$2,175,000.00	
	Supply and install protection geotextile	145,000	m2	$10.00	$1,450,000.00	
	Supply and install 300 mm thick drainage aggregate with PE leachate collection pipework	43,500	m3	$100.00	$4,350,000.00	
	Supply and install separation geotextile	145,000	m2	$5.00	$725,000.00	
	Indirects - Superintendent (5%)	1	item	-	$0.00	Assume Council uses internal staff
	Indirects - CQA (5%)	1	item	-	$558,000.00	
	Indirects - Contractor (10%)	1	item	-	$1,117,000.00	
	Cover material acquisition (hidden cost if required)				**$30,409.78**	
	Supply cover material	1,126	m3	$27.00	$30,409.78	
	OTHER - NEW LANDFILL SITE					
	PRELIMINARIES					
	Design and planning approvals				**$400,000.00**	
	Design and planning approval	1	item	$400,000.00	$400,000.00	Typical
	CONSTRUCTION WORKS					
	General				**$7,500,000.00**	
	New landfill site construction	1	item		$7,500,000.00	Benchmarked to JRWMF new cell plus additional 50% for new infrastructure such as weighbridges and site offices, assume Council owned land

Life Cycle Cost Analysis - Option 1

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 1

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	5.0%
Cooma waste generation rate	2.0%

Option 1 - Waste Diversion

Jindabyne landfilling life	**0 years**
Cooma landfilling life	**25 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Period			1	2	3	4	5	6	7	8	9	10	11	12
Waste generated in Jindabyne			5631	5913	6209	6519	6845	7187	7547	7924	8320	8736	9173	9632
Waste generated in Cooma			9801	9997	10197	10401	10609	10821	11038	11259	11484	11713	11948	12187
CAPEX	Years incurred													
JRWMF														
CL														
Capping profile - Typ.	4									$ 4,604,875				
OTHER														
New landfill site construction	4													
Total CAPEX		$	-	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,604,875	$ -	$ -	$ -	$ -
OPEX														
JRWMF														
Transfer station operations		$	210,616	$ 221,147	$ 232,204	$ 243,814	$ 256,005	$ 268,805	$ 282,245	$ 296,358	$ 311,176	$ 326,734	$ 343,071	$ 360,225
Waste haulage costs		$	73,080	$ 76,734	$ 80,571	$ 84,599	$ 88,829	$ 93,271	$ 97,934	$ 102,831	$ 107,972	$ 113,371	$ 119,040	$ 124,992
CL														
Landfill operations		$	2,885,926	$ 2,975,237	$ 3,067,913	$ 3,164,102	$ 3,263,956	$ 3,367,636	$ 3,475,310	$ 3,587,153	$ 3,703,349	$ 3,824,093	$ 3,949,585	$ 4,080,037
Aftercare management														
Transfer station operations														
Waste haulage costs														
New Landfill														
Landfill operations														
Total OPEX		$	3,169,621	$ 3,273,117	$ 3,380,688	$ 3,492,516	$ 3,608,790	$ 3,729,712	$ 3,855,489	$ 3,986,341	$ 4,122,497	$ 4,264,198	$ 4,411,695	$ 4,565,253
Net Operating Costs		$	3,169,621	$ 3,273,117	$ 3,380,688	$ 3,492,516	$ 3,608,790	$ 3,729,712	$ 3,855,489	$ 3,986,341	$ 4,122,497	$ 4,264,198	$ 4,411,695	$ 4,565,253
Net Costs		$	3,169,621	$ 3,273,117	$ 3,380,688	$ 3,492,516	$ 3,608,790	$ 3,729,712	$ 3,855,489	$ 8,591,216	$ 4,122,497	$ 4,264,198	$ 4,411,695	$ 4,565,253
Present Cost (actual rate)	**1.3%**	$	3,128,945	$ 3,189,647	$ 3,252,196	$ 3,316,657	$ 3,383,097	$ 3,451,585	$ 3,522,195	$ 7,747,812	$ 3,670,079	$ 3,747,511	$ 3,827,380	$ 3,909,773
Present Cost (sensitivity rate 1)	**0.3%**	$	3,160,141	$ 3,253,567	$ 3,350,443	$ 3,450,918	$ 3,555,142	$ 3,663,276	$ 3,775,487	$ 8,387,783	$ 4,012,841	$ 4,138,358	$ 4,268,696	$ 4,404,065
Present Cost (sensitivity rate 2)	**2.3%**	$	3,098,359	$ 3,127,593	$ 3,157,753	$ 3,188,863	$ 3,220,946	$ 3,254,030	$ 3,288,138	$ 7,162,252	$ 3,359,539	$ 3,396,886	$ 3,435,370	$ 3,475,020
Life Cycle Cost Analysis														
Life Cycle Cost (actual rate)	**1.3%**	$	(325,191,607)											
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(443,375,379)											
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(243,741,951)											
Yearly cashflow		$	(3,128,945)	$ (3,189,647)	$ (3,252,196)	$ (3,316,657)	$ (3,383,097)	$ (3,451,585)	$ (3,522,195)	$ (7,747,812)	$ (3,670,079)	$ (3,747,511)	$ (3,827,380)	$ (3,909,773)
Cumulative expenditure		$	(3,128,945)	$ (6,318,593)	$ (9,570,789)	$ (12,887,446)	$ (16,270,543)	$ (19,722,128)	$ (23,244,323)	$ (30,992,135)	$ (34,662,214)	$ (38,409,725)	$ (42,237,105)	$ (46,146,878)

	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	10113	10619	11150	11707	12293	12907	13553	14230	14942	15689	16473	17297	18162	19070	20024	21025	22076	23180
	12430	12679	12933	13191	13455	13724	13999	14279	14564	14856	15153	15456	15765	16080	16402	16730	17064	17406
		$ 4,604,875						$ 4,604,875						$ 4,604,875				
													$ 1,875,000					
	$ -	$ 4,604,875	$ -	$ -	$ -	$ -	$ -	$ 4,604,875	$ -	$ -	$ -	$ -	$ 1,875,000	$ 4,604,875	$ -	$ -	$ -	$ -
	$ 378,236	$ 397,148	$ 417,005	$ 437,855	$ 459,748	$ 482,735	$ 506,872	$ 532,216	$ 558,827	$ 586,768	$ 616,106	$ 646,912	$ 679,257	$ 713,220	$ 748,881	$ 786,325	$ 825,641	$ 866,923
	$ 131,241	$ 137,803	$ 144,693	$ 151,928	$ 159,524	$ 167,501	$ 175,876	$ 184,669	$ 193,903	$ 203,598	$ 213,778	$ 224,467	$ 235,690	$ 247,475	$ 259,848	$ 272,841	$ 286,483	$ 300,807
	$ 4,215,672	$ 4,356,720	$ 4,503,427	$ 4,656,046	$ 4,814,845	$ 4,980,104	$ 5,152,117	$ 5,331,190	$ 5,517,646	$ 5,711,823	$ 5,914,075	$ 6,124,772	$ 6,344,304					
														$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
														$ 601,396	$ 613,424	$ 625,692	$ 638,206	$ 650,970
														$ 208,674	$ 212,847	$ 217,104	$ 221,446	$ 225,875
														$ 6,573,079	$ 6,811,524	$ 7,060,086	$ 7,319,237	$ 7,589,468
	$ 4,725,148	$ 4,891,671	$ 5,065,125	$ 5,245,829	$ 5,434,118	$ 5,630,341	$ 5,834,865	$ 6,048,075	$ 6,270,376	$ 6,502,189	$ 6,743,959	$ 6,996,151	$ 7,259,252	$ 8,418,843	$ 8,721,524	$ 9,037,049	$ 9,366,013	$ 9,709,043
	$ 4,725,148	$ 4,891,671	$ 5,065,125	$ 5,245,829	$ 5,434,118	$ 5,630,341	$ 5,834,865	$ 6,048,075	$ 6,270,376	$ 6,502,189	$ 6,743,959	$ 6,996,151	$ 7,259,252	$ 8,418,843	$ 8,721,524	$ 9,037,049	$ 9,366,013	$ 9,709,043
	$ 4,725,148	$ 9,496,546	$ 5,065,125	$ 5,245,829	$ 5,434,118	$ 5,630,341	$ 5,834,865	$ 10,652,950	$ 6,270,376	$ 6,502,189	$ 6,743,959	$ 6,996,151	$ 9,134,252	$ 13,023,718	$ 8,721,524	$ 9,037,049	$ 9,366,013	$ 9,709,043
	$ 3,994,778	$ 7,925,624	$ 4,173,001	$ 4,266,414	$ 4,362,832	$ 4,462,360	$ 4,565,111	$ 8,227,748	$ 4,780,741	$ 4,893,863	$ 5,010,692	$ 5,131,360	$ 6,613,584	$ 9,308,708	$ 6,153,715	$ 6,294,513	$ 6,439,926	$ 6,590,116
	$ 4,544,680	$ 9,106,524	$ 4,842,573	$ 5,000,337	$ 5,164,321	$ 5,334,797	$ 5,512,049	$ 10,033,472	$ 5,888,084	$ 6,087,501	$ 6,294,967	$ 6,510,836	$ 8,475,194	$ 12,047,883	$ 8,043,910	$ 8,309,990	$ 8,586,728	$ 8,874,593
	$ 3,515,865	$ 6,907,276	$ 3,601,270	$ 3,645,894	$ 3,691,843	$ 3,739,153	$ 3,787,859	$ 6,760,164	$ 3,889,603	$ 3,942,717	$ 3,997,379	$ 4,053,629	$ 5,173,472	$ 7,210,552	$ 4,720,090	$ 4,780,891	$ 4,843,523	$ 4,908,033
	$ (3,994,778)	$ (7,925,624)	$ (4,173,001)	$ (4,266,414)	$ (4,362,832)	$ (4,462,360)	$ (4,565,111)	$ (8,227,748)	$ (4,780,741)	$ (4,893,863)	$ (5,010,692)	$ (5,131,360)	$ (6,613,584)	$ (9,308,708)	$ (6,153,715)	$ (6,294,513)	$ (6,439,926)	$ (6,590,116)
	$ (50,141,656)	$ (58,067,280)	$ (62,240,281)	$ (66,506,695)	$ (70,869,527)	$ (75,331,888)	$ (79,896,999)	$ (88,124,747)	$ (92,905,488)	$ (97,799,351)	$ (102,810,043)	$ (107,941,402)	$ (114,554,986)	$ (123,863,694)	$ (130,017,409)	$ (136,311,922)	$ (142,751,848)	$ (149,341,964)

	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
	24339	25556	26833	28175	29584	31063	32616	34247	35959	37757	39645	41628	43709	45894	48189	50599	53128	55785
	17754	18109	18471	18840	19217	19602	19994	20393	20801	21217	21642	22075	22516	22966	23426	23894	24372	24860
		$ 1,875,000							$ 1,875,000							$ 1,875,000		
	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -
	$ 910,270	$ 955,783	$ 1,003,572	$ 1,053,751	$ 1,106,438	$ 1,161,760	$ 1,219,848	$ 1,280,841	$ 1,344,883	$ 1,412,127	$ 1,482,733	$ 1,556,870	$ 1,634,714	$ 1,716,449	$ 1,802,272	$ 1,892,385	$ 1,987,005	$ 2,086,355
	$ 315,847	$ 331,640	$ 348,222	$ 365,633	$ 383,914	$ 403,110	$ 423,266	$ 444,429	$ 466,650	$ 489,983	$ 514,482	$ 540,206	$ 567,217	$ 595,577	$ 625,356	$ 656,624	$ 689,455	$ 723,928
	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	$ 663,989	$ 677,269	$ 690,815	$ 704,631	$ 718,724	$ 733,098	$ 747,760	$ 762,715	$ 777,969	$ 793,529	$ 809,399	$ 825,587	$ 842,099	$ 858,941	$ 876,120	$ 893,642	$ 911,515	$ 929,746
	$ 230,393	$ 235,000	$ 239,700	$ 244,494	$ 249,384	$ 254,372	$ 259,459	$ 264,649	$ 269,942	$ 275,340	$ 280,847	$ 286,464	$ 292,193	$ 298,037	$ 303,998	$ 310,078	$ 316,280	$ 322,605
	$ 7,871,296	$ 8,165,262	$ 8,471,935	$ 8,791,909	$ 9,125,810	$ 9,474,292	$ 9,838,042	$ 10,217,780	$ 10,614,262	$ 11,028,280	$ 11,460,664	$ 11,912,287	$ 12,384,064	$ 12,876,952	$ 13,391,958	$ 13,930,138	$ 14,492,599	$ 15,080,502
	$ 10,066,795	$ 10,439,955	$ 10,829,244	$ 11,235,418	$ 11,659,271	$ 12,101,633	$ 12,563,376	$ 13,045,414	$ 13,548,706	$ 14,074,259	$ 14,623,126	$ 15,196,415	$ 15,795,286	$ 16,420,957	$ 17,074,704	$ 17,757,868	$ 18,471,854	$ 19,218,135
	$ 10,066,795	$ 10,439,955	$ 10,829,244	$ 11,235,418	$ 11,659,271	$ 12,101,633	$ 12,563,376	$ 13,045,414	$ 13,548,706	$ 14,074,259	$ 14,623,126	$ 15,196,415	$ 15,795,286	$ 16,420,957	$ 17,074,704	$ 17,757,868	$ 18,471,854	$ 19,218,135
	$ 10,066,795	$ 12,314,955	$ 10,829,244	$ 11,235,418	$ 11,659,271	$ 12,101,633	$ 12,563,376	$ 13,045,414	$ 15,423,706	$ 14,074,259	$ 14,623,126	$ 15,196,415	$ 15,795,286	$ 16,420,957	$ 17,074,704	$ 19,632,868	$ 18,471,854	$ 19,218,135
	$ 6,745,256	$ 8,145,740	$ 7,071,091	$ 7,242,160	$ 7,418,922	$ 7,601,581	$ 7,790,348	$ 7,985,442	$ 9,320,096	$ 8,395,522	$ 8,610,988	$ 8,833,737	$ 9,064,030	$ 9,302,140	$ 9,548,346	$ 10,838,003	$ 10,066,223	$ 10,338,508
	$ 9,174,075	$ 11,189,301	$ 9,809,962	$ 10,147,464	$ 10,498,778	$ 10,864,516	$ 11,245,320	$ 11,641,861	$ 13,723,104	$ 12,484,990	$ 12,933,080	$ 13,399,913	$ 13,886,327	$ 14,393,202	$ 14,921,456	$ 17,105,699	$ 16,045,994	$ 16,644,335
	$ 4,974,467	$ 5,948,569	$ 5,113,311	$ 5,185,823	$ 5,260,466	$ 5,337,294	$ 5,416,365	$ 5,497,735	$ 6,353,880	$ 5,667,613	$ 5,756,245	$ 5,847,423	$ 5,941,215	$ 6,037,687	$ 6,136,909	$ 6,897,705	$ 6,343,891	$ 6,451,799
	$ (6,745,256)	$ (8,145,740)	$ (7,071,091)	$ (7,242,160)	$ (7,418,922)	$ (7,601,581)	$ (7,790,348)	$ (7,985,442)	$ (9,320,096)	$ (8,395,522)	$ (8,610,988)	$ (8,833,737)	$ (9,064,030)	$ (9,302,140)	$ (9,548,346)	$ (10,838,003)	$ (10,066,223)	$ (10,338,508)
	$ (156,087,219)	$ (164,232,960)	$ (171,304,051)	$ (178,546,211)	$ (185,965,133)	$ (193,566,714)	$ (201,357,062)	$ (209,342,504)	$ (218,662,599)	$ (227,058,122)	$ (235,669,110)	$ (244,502,846)	$ (253,566,877)	$ (262,869,017)	$ (272,417,363)	$ (283,255,366)	$ (293,321,588)	$ (303,660,096)

2070	2071
49	50
58574	61503
25357	25864

$ -	$ -
$ 2,190,672	$ 2,300,206
$ 760,124	$ 798,131
$ 75,000	$ 75,000
$ 948,340	$ 967,307
$ 329,057	$ 335,638
$ 15,695,065	$ 16,337,567
$ 19,998,259	$ 20,813,849
$ 19,998,259	$ 20,813,849
$ 19,998,259	$ 20,813,849
$ 10,620,119	$ 10,911,392
$ 17,268,177	$ 17,918,669
$ 6,562,754	$ 6,676,836
$ (10,620,119)	$ (10,911,392)
$ (314,280,215)	$ (325,191,607)

Life Cycle Cost Analysis - Option 2

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 2

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	5.0%
Cooma waste generation rate	2.0%

Option 2 - Landfill Expansion

Jindabyne landfilling life	**24 years**
Cooma landfilling life	**40 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Period			1	2	3	4	5	6	7	8	9	10	11	12
Waste generated in Jindabyne			5631	5913	6209	6519	6845	7187	7547	7924	8320	8736	9173	9632
Waste generated in Cooma			9801	9997	10197	10401	10609	10821	11038	11259	11484	11713	11948	12187
CAPEX	Years incurred													
JRWMF														
Design and planning approval		$	200,000											
Progressive cell construction and closure	5													
Rockfall strategy 2	6			$ 1,153,500			$ 1,153,500				$ 1,153,500			
Basal liner profile - Option 2	1			$ 1,505,000										
Sidewall liner profile - Strategy 2	6			$ 195,208			$ 195,208				$ 195,208			
Berm construction and liner profile	1			$ 1,485,000										
Capping profile - Option 2	3											$ 1,143,300		
Groundwater management	1			$ 100,000										
Leachate management	1			$ 11,000										
Surface water management	1			$ -										
Landfill gas management	6			$ 87,167			$ 87,167				$ 87,167			
CL														
Capping profile - Typ.	4											$ 4,604,875		
OTHER														
New landfill site construction	4													
Total CAPEX		$	200,000	$ 4,536,875	$ -	$ -	$ -	$ 1,435,875	$ -	$ -	$ -	$ 1,435,875	$ 5,748,175	$ -
OPEX														
JRWMF														
Landfill operations		$	1,053,079	$ 1,105,733	$ 1,161,020	$ 1,219,071	$ 1,280,025	$ 1,344,026	$ 1,411,227	$ 1,481,788	$ 1,555,878	$ 1,633,672	$ 1,715,355	$ 1,801,123
Aftercare management														
Transfer station operations														
Waste haulage costs														
CL														
Landfill operations		$	1,832,846	$ 1,869,503	$ 1,906,893	$ 1,945,031	$ 1,983,932	$ 2,023,610	$ 2,064,083	$ 2,105,364	$ 2,147,472	$ 2,190,421	$ 2,234,229	$ 2,278,914
Aftercare management														
Transfer station operations														
Waste haulage costs														
New Landfill														
Landfill operations														
Total OPEX		$	2,885,926	$ 2,975,237	$ 3,067,913	$ 3,164,102	$ 3,263,956	$ 3,367,636	$ 3,475,310	$ 3,587,153	$ 3,703,349	$ 3,824,093	$ 3,949,585	$ 4,080,037
Net Operating Costs		$	2,885,926	$ 2,975,237	$ 3,067,913	$ 3,164,102	$ 3,263,956	$ 3,367,636	$ 3,475,310	$ 3,587,153	$ 3,703,349	$ 3,824,093	$ 3,949,585	$ 4,080,037
Net Costs		$	3,085,926	$ 7,512,112	$ 3,067,913	$ 3,164,102	$ 3,263,956	$ 4,803,511	$ 3,475,310	$ 3,587,153	$ 3,703,349	$ 5,259,968	$ 9,697,760	$ 4,080,037
Present Cost (actual rate)	**1.3%**	$	3,046,323	$ 7,320,540	$ 2,951,309	$ 3,004,780	$ 3,059,829	$ 4,445,311	$ 3,174,881	$ 3,235,000	$ 3,296,930	$ 4,622,625	$ 8,413,322	$ 3,494,224
Present Cost (sensitivity rate 1)	**0.3%**	$	3,076,696	$ 7,467,241	$ 3,040,467	$ 3,126,416	$ 3,215,435	$ 4,717,949	$ 3,403,196	$ 3,502,212	$ 3,604,842	$ 5,104,741	$ 9,383,420	$ 3,935,980
Present Cost (sensitivity rate 2)	**2.3%**	$	3,016,545	$ 7,178,121	$ 2,865,604	$ 2,889,003	$ 2,913,172	$ 4,190,878	$ 2,963,904	$ 2,990,507	$ 3,017,964	$ 4,190,123	$ 7,551,608	$ 3,105,679
Life Cycle Cost Analysis														
Life Cycle Cost (actual rate)	**1.3%**	$	(318,126,889)											
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(433,807,413)											
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(238,591,827)											
Yearly cashflow		$	(3,046,323)	$ (7,320,540)	$ (2,951,309)	$ (3,004,780)	$ (3,059,829)	$ (4,445,311)	$ (3,174,881)	$ (3,235,000)	$ (3,296,930)	$ (4,622,625)	$ (8,413,322)	$ (3,494,224)
Cumulative expenditure		$	(3,046,323)	$ (10,366,864)	$ (13,318,173)	$ (16,322,953)	$ (19,382,782)	$ (23,828,093)	$ (27,002,974)	$ (30,237,974)	$ (33,534,903)	$ (38,157,528)	$ (46,570,850)	$ (50,065,074)

2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
10113	10619	11150	11707	12293	12907	13553	14230	14942	15689	16473	17297	18162	19070	20024	21025	22076	23180
12430	12679	12933	13191	13455	13724	13999	14279	14564	14856	15153	15456	15765	16080	16402	16730	17064	17406
	$ 1,153,500				$ 1,153,500				$ 1,153,500								
	$ 195,208				$ 195,208				$ 195,208								
					$ 1,143,300							$ 1,143,300					
	$ 87,167				$ 87,167				$ 87,167								
								$ 4,604,875									
											$ 1,875,000					$ 1,875,000	
$ -	$ 1,435,875	$ -	$ -	$ -	$ 2,579,175	$ -	$ -	$ 4,604,875	$ 1,435,875	$ -	$ 1,875,000	$ 1,143,300	$ -	$ -	$ -	$ 1,875,000	$ -
$ 1,891,179	$ 1,985,738	$ 2,085,025	$ 2,189,276	$ 2,298,740	$ 2,413,677	$ 2,534,361	$ 2,661,079	$ 2,794,133	$ 2,933,840	$ 3,080,532	$ 3,234,558						
												$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
												$ 679,257	$ 713,220	$ 748,881	$ 786,325	$ 825,641	$ 866,923
												$ 235,690	$ 247,475	$ 259,848	$ 272,841	$ 286,483	$ 300,807
$ 2,324,492	$ 2,370,982	$ 2,418,402	$ 2,466,770	$ 2,516,105	$ 2,566,427	$ 2,617,756	$ 2,670,111	$ 2,723,513	$ 2,777,983	$ 2,833,543	$ 2,890,214	$ 2,948,018	$ 3,006,979	$ 3,067,118	$ 3,128,461	$ 3,191,030	$ 3,254,850
												$ 3,396,286	$ 3,566,101	$ 3,744,406	$ 3,931,626	$ 4,128,207	$ 4,334,617
$ 4,215,672	$ 4,356,720	$ 4,503,427	$ 4,656,046	$ 4,814,845	$ 4,980,104	$ 5,152,117	$ 5,331,190	$ 5,517,646	$ 5,711,823	$ 5,914,075	$ 6,124,772	$ 7,334,252	$ 7,608,774	$ 7,895,253	$ 8,194,252	$ 8,506,361	$ 8,832,198
$ 4,215,672	$ 4,356,720	$ 4,503,427	$ 4,656,046	$ 4,814,845	$ 4,980,104	$ 5,152,117	$ 5,331,190	$ 5,517,646	$ 5,711,823	$ 5,914,075	$ 6,124,772	$ 7,334,252	$ 7,608,774	$ 7,895,253	$ 8,194,252	$ 8,506,361	$ 8,832,198
$ 4,215,672	$ 5,792,595	$ 4,503,427	$ 4,656,046	$ 4,814,845	$ 7,559,279	$ 5,152,117	$ 5,331,190	$ 10,122,521	$ 7,147,698	$ 5,914,075	$ 7,999,772	$ 8,477,552	$ 7,608,774	$ 7,895,253	$ 8,194,252	$ 10,381,361	$ 8,832,198
$ 3,564,052	$ 4,834,382	$ 3,710,235	$ 3,786,746	$ 3,865,643	$ 5,991,153	$ 4,030,939	$ 4,117,516	$ 7,717,744	$ 5,379,704	$ 4,394,096	$ 5,867,471	$ 6,138,105	$ 5,438,374	$ 5,570,716	$ 5,707,486	$ 7,138,063	$ 5,994,948
$ 4,054,662	$ 5,554,694	$ 4,305,555	$ 4,438,154	$ 4,575,794	$ 7,162,483	$ 4,867,074	$ 5,021,177	$ 9,505,372	$ 6,691,842	$ 5,520,334	$ 7,444,838	$ 7,865,877	$ 7,038,667	$ 7,281,836	$ 7,534,999	$ 9,517,596	$ 8,073,109
$ 3,136,776	$ 4,213,222	$ 3,201,906	$ 3,235,990	$ 3,271,121	$ 5,020,177	$ 3,344,635	$ 3,383,074	$ 6,279,143	$ 4,334,133	$ 3,505,478	$ 4,635,135	$ 4,801,530	$ 4,212,580	$ 4,272,912	$ 4,335,025	$ 5,368,598	$ 4,464,777
$ (3,564,052)	$ (4,834,382)	$ (3,710,235)	$ (3,786,746)	$ (3,865,643)	$ (5,991,153)	$ (4,030,939)	$ (4,117,516)	$ (7,717,744)	$ (5,379,704)	$ (4,394,096)	$ (5,867,471)	$ (6,138,105)	$ (5,438,374)	$ (5,570,716)	$ (5,707,486)	$ (7,138,063)	$ (5,994,948)
$ (53,629,126)	$ (58,463,508)	$ (62,173,743)	$ (65,960,489)	$ (69,826,132)	$ (75,817,285)	$ (79,848,224)	$ (83,965,739)	$ (91,683,483)	$ (97,063,187)	$ (101,457,284)	$ (107,324,754)	$ (113,462,860)	$ (118,901,234)	$ (124,471,950)	$ (130,179,436)	$ (137,317,499)	$ (143,312,448)

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
24339	25556	26833	28175	29584	31063	32616	34247	35959	37757	39645	41628	43709	45894	48189	50599	53128	55785
17754	18109	18471	18840	19217	19602	19994	20393	20801	21217	21642	22075	22516	22966	23426	23894	24372	24860

$ 4,604,875										$ 4,604,875							
			$ 1,875,000						$ 1,875,000								
$ 4,604,875	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ 4,604,875	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
$ 910,270	$ 955,783	$ 1,003,572	$ 1,053,751	$ 1,106,438	$ 1,161,760	$ 1,219,848	$ 1,280,841	$ 1,344,883	$ 1,412,127	$ 1,482,733	$ 1,556,870	$ 1,634,714	$ 1,716,449	$ 1,802,272	$ 1,892,385	$ 1,987,005	$ 2,086,355
$ 315,847	$ 331,640	$ 348,222	$ 365,633	$ 383,914	$ 403,110	$ 423,266	$ 444,429	$ 466,650	$ 489,983	$ 514,482	$ 540,206	$ 567,217	$ 595,577	$ 625,356	$ 656,624	$ 689,455	$ 723,928
$ 3,319,947	$ 3,386,346	$ 3,454,073	$ 3,523,155	$ 3,593,618	$ 3,665,490	$ 3,738,800	$ 3,813,576	$ 3,889,847	$ 3,967,644								
										$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
										$ 809,399	$ 825,587	$ 842,099	$ 858,941	$ 876,120	$ 893,642	$ 911,515	$ 929,746
										$ 280,847	$ 286,464	$ 292,193	$ 298,037	$ 303,998	$ 310,078	$ 316,280	$ 322,605
$ 4,551,348	$ 4,778,916	$ 5,017,862	$ 5,268,755	$ 5,532,192	$ 5,808,802	$ 6,099,242	$ 6,404,204	$ 6,724,414	$ 7,060,635	$ 11,460,664	$ 11,912,287	$ 12,384,064	$ 12,876,952	$ 13,391,958	$ 13,930,138	$ 14,492,599	$ 15,080,502
$ 9,172,413	$ 9,527,685	$ 9,898,729	$ 10,286,293	$ 10,691,163	$ 11,114,163	$ 11,556,156	$ 12,018,050	$ 12,500,795	$ 13,005,389	$ 14,698,126	$ 15,271,415	$ 15,870,286	$ 16,495,957	$ 17,149,704	$ 17,832,868	$ 18,546,854	$ 19,293,135
$ 9,172,413	$ 9,527,685	$ 9,898,729	$ 10,286,293	$ 10,691,163	$ 11,114,163	$ 11,556,156	$ 12,018,050	$ 12,500,795	$ 13,005,389	$ 14,698,126	$ 15,271,415	$ 15,870,286	$ 16,495,957	$ 17,149,704	$ 17,832,868	$ 18,546,854	$ 19,293,135
$ 13,777,288	$ 9,527,685	$ 9,898,729	$ 12,161,293	$ 10,691,163	$ 11,114,163	$ 11,556,156	$ 12,018,050	$ 14,375,795	$ 13,005,389	$ 19,303,001	$ 15,271,415	$ 15,870,286	$ 16,495,957	$ 17,149,704	$ 17,832,868	$ 18,546,854	$ 19,293,135
$ 9,231,471	$ 6,302,098	$ 6,463,500	$ 7,838,963	$ 6,802,904	$ 6,981,307	$ 7,165,787	$ 7,356,565	$ 8,686,874	$ 7,757,925	$ 11,366,783	$ 8,877,334	$ 9,107,069	$ 9,344,626	$ 9,590,287	$ 9,844,342	$ 10,107,094	$ 10,378,855
$ 12,555,523	$ 8,656,803	$ 8,967,030	$ 10,983,684	$ 9,627,029	$ 9,977,992	$ 10,343,771	$ 10,725,031	$ 12,790,735	$ 11,536,818	$ 17,072,086	$ 13,466,046	$ 13,952,263	$ 14,458,940	$ 14,986,998	$ 15,537,398	$ 16,111,144	$ 16,709,291
$ 6,807,993	$ 4,602,217	$ 4,673,944	$ 5,613,170	$ 4,823,672	$ 4,901,781	$ 4,982,129	$ 5,064,772	$ 5,922,188	$ 5,237,186	$ 7,598,430	$ 5,876,283	$ 5,969,425	$ 6,065,263	$ 6,163,865	$ 6,265,303	$ 6,369,648	$ 6,476,977
$ (9,231,471)	$ (6,302,098)	$ (6,463,500)	$ (7,838,963)	$ (6,802,904)	$ (6,981,307)	$ (7,165,787)	$ (7,356,565)	$ (8,686,874)	$ (7,757,925)	$ (11,366,783)	$ (8,877,334)	$ (9,107,069)	$ (9,344,626)	$ (9,590,287)	$ (9,844,342)	$ (10,107,094)	$ (10,378,855)
$ (152,543,919)	$ (158,846,017)	$ (165,309,517)	$ (173,148,480)	$ (179,951,384)	$ (186,932,691)	$ (194,098,478)	$ (201,455,043)	$ (210,141,917)	$ (217,899,841)	$ (229,266,625)	$ (238,143,959)	$ (247,251,028)	$ (256,595,654)	$ (266,185,941)	$ (276,030,283)	$ (286,137,377)	$ (296,516,232)

2070	2071
49	50
58574	61503
25357	25864

$ -	$ -
$ 75,000	$ 75,000
$ 2,190,672	$ 2,300,206
$ 760,124	$ 798,131
$ 75,000	$ 75,000
$ 948,340	$ 967,307
$ 329,057	$ 335,638
$ 15,695,065	$ 16,337,567
$ 20,073,259	$ 20,888,849
$ 20,073,259	$ 20,888,849
$ 20,073,259	$ 20,888,849
$ 10,659,948	$ 10,950,709
$ 17,332,938	$ 17,983,237
$ 6,587,367	$ 6,700,895
$ (10,659,948)	$ (10,950,709)
$ (307,176,179)	$ (318,126,889)

Life Cycle Cost Analysis - Option 1 (Hidden costs 1 & 2)

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 1 (Hidden costs 1 & 2)

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	5.0%
Cooma waste generation rate	2.0%

Option 1 - Waste Diversion (Hidden costs 1 & 2)

Jindabyne landfilling life	**0 years**
Cooma landfilling life	**25 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Period			1	2	3	4	5	6	7	8	9	10	11
Waste generated in Jindabyne			5631	5913	6209	6519	6845	7187	7547	7924	8320	8736	9173
Waste generated in Cooma			9801	9997	10197	10401	10609	10821	11038	11259	11484	11713	11948
CAPEX	Years incurred												
JRWMF													
CL													
Capping profile - Typ.		4								$ 4,604,875			
Design and planning approvals (hidden cost if required)		1	$ 200,000										
Basal liner profile - Typ. (hidden cost if required)		4		$ 3,210,000					$ 3,210,000				
OTHER													
New landfill site construction		4											
Total CAPEX			$ 200,000	$ 3,210,000	$ -	$ -	$ -	$ -	$ 3,210,000	$ 4,604,875	$ -	$ -	$ -
OPEX													
JRWMF													
Transfer station operations			$ 210,616	$ 221,147	$ 232,204	$ 243,814	$ 256,005	$ 268,805	$ 282,245	$ 296,358	$ 311,176	$ 326,734	$ 343,071
Waste haulage costs			$ 73,080	$ 76,734	$ 80,571	$ 84,599	$ 88,829	$ 93,271	$ 97,934	$ 102,831	$ 107,972	$ 113,371	$ 119,040
CL													
Landfill operations			$ 2,885,926	$ 2,975,237	$ 3,067,913	$ 3,164,102	$ 3,263,956	$ 3,367,636	$ 3,475,310	$ 3,587,153	$ 3,703,349	$ 3,824,093	$ 3,949,585
Aftercare management													
Transfer station operations													
Waste haulage costs													
Cover material acquisition (hidden cost if required)				$ 30,410	$ 31,018	$ 31,638	$ 32,271	$ 32,917	$ 33,575	$ 34,246	$ 34,931	$ 35,630	$ 36,343
New Landfill													
Landfill operations													
Total OPEX			$ 3,169,621	$ 3,303,527	$ 3,411,706	$ 3,524,154	$ 3,641,061	$ 3,762,628	$ 3,889,064	$ 4,020,588	$ 4,157,429	$ 4,299,828	$ 4,448,038
Net Operating Costs			$ 3,169,621	$ 3,303,527	$ 3,411,706	$ 3,524,154	$ 3,641,061	$ 3,762,628	$ 3,889,064	$ 4,020,588	$ 4,157,429	$ 4,299,828	$ 4,448,038
Net Costs			$ 3,369,621	$ 6,513,527	$ 3,411,706	$ 3,524,154	$ 3,641,061	$ 3,762,628	$ 7,099,064	$ 8,625,463	$ 4,157,429	$ 4,299,828	$ 4,448,038
Present Cost (actual rate)	**1.3%**	$	3,326,379	$ 6,347,421	$ 3,282,035	$ 3,346,702	$ 3,413,350	$ 3,482,047	$ 6,485,373	$ 7,778,697	$ 3,701,176	$ 3,778,824	$ 3,858,909
Present Cost (sensitivity rate 1)	**0.3%**	$	3,359,543	$ 6,474,621	$ 3,381,184	$ 3,482,179	$ 3,586,934	$ 3,695,607	$ 6,951,757	$ 8,421,218	$ 4,046,843	$ 4,172,936	$ 4,303,861
Present Cost (sensitivity rate 2)	**2.3%**	$	3,293,863	$ 6,223,934	$ 3,186,726	$ 3,217,750	$ 3,249,749	$ 3,282,748	$ 6,054,408	$ 7,190,802	$ 3,388,005	$ 3,425,269	$ 3,463,670

Life Cycle Cost Analysis			
Life Cycle Cost (actual rate)	**1.3%**	$	(337,546,684)
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(456,942,422)
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(255,040,970)

Yearly cashflow	$	(3,326,379)	$ (6,347,421)	$ (3,282,035)	$ (3,346,702)	$ (3,413,350)	$ (3,482,047)	$ (6,485,373)	$ (7,778,697)	$ (3,701,176)	$ (3,778,824)	$ (3,858,909)
Cumulative expenditure	$	(3,326,379)	$ (9,673,800)	$ (12,955,835)	$ (16,302,537)	$ (19,715,887)	$ (23,197,935)	$ (29,683,308)	$ (37,462,004)	$ (41,163,181)	$ (44,942,005)	$ (48,800,914)

	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	9632	10113	10619	11150	11707	12293	12907	13553	14230	14942	15689	16473	17297	18162	19070	20024	21025	22076
	12187	12430	12679	12933	13191	13455	13724	13999	14279	14564	14856	15153	15456	15765	16080	16402	16730	17064
			$ 4,604,875						$ 4,604,875						$ 4,604,875			
$ 3,210,000						$ 3,210,000												
														$ 1,875,000				
$ 3,210,000	$ -	$ 4,604,875	$ -	$ -	$ 3,210,000	$ -	$ -	$ 4,604,875	$ -	$ -	$ -	$ -	$ 1,875,000	$ 4,604,875	$ -	$ -	$ -	
$ 360,225	$ 378,236	$ 397,148	$ 417,005	$ 437,855	$ 459,748	$ 482,735	$ 506,872	$ 532,216	$ 558,827	$ 586,768	$ 616,106	$ 646,912	$ 679,257	$ 713,220	$ 748,881	$ 786,325	$ 825,641	
$ 124,992	$ 131,241	$ 137,803	$ 144,693	$ 151,928	$ 159,524	$ 167,501	$ 175,876	$ 184,669	$ 193,903	$ 203,598	$ 213,778	$ 224,467	$ 235,690	$ 247,475	$ 259,848	$ 272,841	$ 286,483	
$ 4,080,037	$ 4,215,672	$ 4,356,720	$ 4,503,427	$ 4,656,046	$ 4,814,845	$ 4,980,104	$ 5,152,117	$ 5,331,190	$ 5,517,646	$ 5,711,823	$ 5,914,075	$ 6,124,772	$ 6,344,304					
														$ 75,000	$ 75,000	$ 75,000	$ 75,000	
														$ 601,396	$ 613,424	$ 625,692	$ 638,206	
														$ 208,674	$ 212,847	$ 217,104	$ 221,446	
$ 37,069	$ 37,811	$ 38,567	$ 39,338	$ 40,125	$ 40,928	$ 41,746	$ 42,581	$ 43,433	$ 44,301	$ 45,187	$ 46,091	$ 47,013	$ 47,953					
														$ 6,573,079	$ 6,811,524	$ 7,060,086	$ 7,319,237	
$ 4,602,323	$ 4,762,959	$ 4,930,238	$ 5,104,464	$ 5,285,954	$ 5,475,045	$ 5,672,087	$ 5,877,446	$ 6,091,508	$ 6,314,677	$ 6,547,376	$ 6,790,050	$ 7,043,164	$ 7,307,205	$ 8,418,843	$ 8,721,524	$ 9,037,049	$ 9,366,013	
$ 4,602,323	$ 4,762,959	$ 4,930,238	$ 5,104,464	$ 5,285,954	$ 5,475,045	$ 5,672,087	$ 5,877,446	$ 6,091,508	$ 6,314,677	$ 6,547,376	$ 6,790,050	$ 7,043,164	$ 7,307,205	$ 8,418,843	$ 8,721,524	$ 9,037,049	$ 9,366,013	
$ 7,812,323	$ 4,762,959	$ 9,535,113	$ 5,104,464	$ 5,285,954	$ 8,685,045	$ 5,672,087	$ 5,877,446	$ 10,696,383	$ 6,314,677	$ 6,547,376	$ 6,790,050	$ 7,043,164	$ 9,182,205	$ 13,023,718	$ 8,721,524	$ 9,037,049	$ 9,366,013	
$ 6,690,627	$ 4,026,744	$ 7,957,811	$ 4,205,411	$ 4,299,048	$ 6,972,869	$ 4,495,447	$ 4,598,426	$ 8,261,293	$ 4,814,518	$ 4,927,873	$ 5,044,937	$ 5,165,842	$ 6,648,304	$ 9,308,708	$ 6,153,715	$ 6,294,513	$ 6,439,926	
$ 7,536,487	$ 4,581,047	$ 9,143,507	$ 4,880,183	$ 5,038,584	$ 8,253,843	$ 5,374,351	$ 5,552,274	$ 10,074,379	$ 5,929,684	$ 6,129,807	$ 6,337,990	$ 6,554,588	$ 8,519,687	$ 12,047,883	$ 8,043,910	$ 8,309,990	$ 8,586,728	
$ 5,946,653	$ 3,543,999	$ 6,935,328	$ 3,629,239	$ 3,673,781	$ 5,900,466	$ 3,766,877	$ 3,815,501	$ 6,787,725	$ 3,917,084	$ 3,970,118	$ 4,024,699	$ 4,080,868	$ 5,200,632	$ 7,210,552	$ 4,720,090	$ 4,780,891	$ 4,843,523	
$ (6,690,627)	$ (4,026,744)	$ (7,957,811)	$ (4,205,411)	$ (4,299,048)	$ (6,972,869)	$ (4,495,447)	$ (4,598,426)	$ (8,261,293)	$ (4,814,518)	$ (4,927,873)	$ (5,044,937)	$ (5,165,842)	$ (6,648,304)	$ (9,308,708)	$ (6,153,715)	$ (6,294,513)	$ (6,439,926)	
$ (55,491,541)	$ (59,518,285)	$ (67,476,096)	$ (71,681,507)	$ (75,980,555)	$ (82,953,424)	$ (87,448,871)	$ (92,047,297)	$ (100,308,590)	$ (105,123,108)	$ (110,050,981)	$ (115,095,918)	$ (120,261,759)	$ (126,910,063)	$ (136,218,771)	$ (142,372,486)	$ (148,666,999)	$ (155,106,924)	

	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	23180	24339	25556	26833	28175	29584	31063	32616	34247	35959	37757	39645	41628	43709	45894	48189	50599	53128
	17406	17754	18109	18471	18840	19217	19602	19994	20393	20801	21217	21642	22075	22516	22966	23426	23894	24372
			$ 1,875,000							$ 1,875,000							$ 1,875,000	
	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -
	$ 866,923	$ 910,270	$ 955,783	$ 1,003,572	$ 1,053,751	$ 1,106,438	$ 1,161,760	$ 1,219,848	$ 1,280,841	$ 1,344,883	$ 1,412,127	$ 1,482,733	$ 1,556,870	$ 1,634,714	$ 1,716,449	$ 1,802,272	$ 1,892,385	$ 1,987,005
	$ 300,807	$ 315,847	$ 331,640	$ 348,222	$ 365,633	$ 383,914	$ 403,110	$ 423,266	$ 444,429	$ 466,650	$ 489,983	$ 514,482	$ 540,206	$ 567,217	$ 595,577	$ 625,356	$ 656,624	$ 689,455
	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	$ 650,970	$ 663,989	$ 677,269	$ 690,815	$ 704,631	$ 718,724	$ 733,098	$ 747,760	$ 762,715	$ 777,969	$ 793,529	$ 809,399	$ 825,587	$ 842,099	$ 858,941	$ 876,120	$ 893,642	$ 911,515
	$ 225,875	$ 230,393	$ 235,000	$ 239,700	$ 244,494	$ 249,384	$ 254,372	$ 259,459	$ 264,649	$ 269,942	$ 275,340	$ 280,847	$ 286,464	$ 292,193	$ 298,037	$ 303,998	$ 310,078	$ 316,280
	$ 7,589,468	$ 7,871,296	$ 8,165,262	$ 8,471,935	$ 8,791,909	$ 9,125,810	$ 9,474,292	$ 9,838,042	$ 10,217,780	$ 10,614,262	$ 11,028,280	$ 11,460,664	$ 11,912,287	$ 12,384,064	$ 12,876,952	$ 13,391,958	$ 13,930,138	$ 14,492,599
	$ 9,709,043	$ 10,066,795	$ 10,439,955	$ 10,829,244	$ 11,235,418	$ 11,659,271	$ 12,101,633	$ 12,563,376	$ 13,045,414	$ 13,548,706	$ 14,074,259	$ 14,623,126	$ 15,196,415	$ 15,795,286	$ 16,420,957	$ 17,074,704	$ 17,757,868	$ 18,471,854
	$ 9,709,043	$ 10,066,795	$ 10,439,955	$ 10,829,244	$ 11,235,418	$ 11,659,271	$ 12,101,633	$ 12,563,376	$ 13,045,414	$ 13,548,706	$ 14,074,259	$ 14,623,126	$ 15,196,415	$ 15,795,286	$ 16,420,957	$ 17,074,704	$ 17,757,868	$ 18,471,854
	$ 9,709,043	$ 10,066,795	$ 12,314,955	$ 10,829,244	$ 11,235,418	$ 11,659,271	$ 12,101,633	$ 12,563,376	$ 13,045,414	$ 15,423,706	$ 14,074,259	$ 14,623,126	$ 15,196,415	$ 15,795,286	$ 16,420,957	$ 17,074,704	$ 19,632,868	$ 18,471,854
	$ 6,590,116	$ 6,745,256	$ 8,145,740	$ 7,071,091	$ 7,242,160	$ 7,418,922	$ 7,601,581	$ 7,790,348	$ 7,985,442	$ 9,320,096	$ 8,395,522	$ 8,610,988	$ 8,833,737	$ 9,064,030	$ 9,302,140	$ 9,548,346	$ 10,838,003	$ 10,066,223
	$ 8,874,593	$ 9,174,075	$ 11,189,301	$ 9,809,962	$ 10,147,464	$ 10,498,778	$ 10,864,516	$ 11,245,320	$ 11,641,861	$ 13,723,104	$ 12,484,990	$ 12,933,080	$ 13,399,913	$ 13,886,327	$ 14,393,202	$ 14,921,456	$ 17,105,699	$ 16,045,994
	$ 4,908,033	$ 4,974,467	$ 5,948,569	$ 5,113,311	$ 5,185,823	$ 5,260,466	$ 5,337,294	$ 5,416,365	$ 5,497,735	$ 6,353,880	$ 5,667,613	$ 5,756,245	$ 5,847,423	$ 5,941,215	$ 6,037,687	$ 6,136,909	$ 6,897,705	$ 6,343,891
	$ (6,590,116)	$ (6,745,256)	$ (8,145,740)	$ (7,071,091)	$ (7,242,160)	$ (7,418,922)	$ (7,601,581)	$ (7,790,348)	$ (7,985,442)	$ (9,320,096)	$ (8,395,522)	$ (8,610,988)	$ (8,833,737)	$ (9,064,030)	$ (9,302,140)	$ (9,548,346)	$ (10,838,003)	$ (10,066,223)
	$ (161,697,041)	$ (168,442,296)	$ (176,588,037)	$ (183,659,128)	$ (190,901,288)	$ (198,320,210)	$ (205,921,791)	$ (213,712,139)	$ (221,697,581)	$ (231,017,676)	$ (239,413,199)	$ (248,024,186)	$ (256,857,923)	$ (265,921,954)	$ (275,224,094)	$ (284,772,440)	$ (295,610,443)	$ (305,676,665)

2069	2070	2071
48	49	50
55785	58574	61503
24860	25357	25864
$ -	$ -	$ -
$ 2,086,355	$ 2,190,672	$ 2,300,206
$ 723,928	$ 760,124	$ 798,131
$ 75,000	$ 75,000	$ 75,000
$ 929,746	$ 948,340	$ 967,307
$ 322,605	$ 329,057	$ 335,638
$ 15,080,502	$ 15,695,065	$ 16,337,567
$ 19,218,135	$ 19,998,259	$ 20,813,849
$ 19,218,135	$ 19,998,259	$ 20,813,849
$ 19,218,135	$ 19,998,259	$ 20,813,849
$ 10,338,508	$ 10,620,119	$ 10,911,392
$ 16,644,335	$ 17,268,177	$ 17,918,669
$ 6,451,799	$ 6,562,754	$ 6,676,836
$ (10,338,508)	$ (10,620,119)	$ (10,911,392)
$ (316,015,173)	$ (326,635,292)	$ (337,546,684)

Life Cycle Cost Analysis - Option 1 - Low waste generation

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 1 - Low waste generation

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	2.0%
Cooma waste generation rate	1.0%

Option 1 - Waste Diversion (low waste generation)

Jindabyne landfilling life	**0 years**
Cooma landfilling life	**33 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Period			1	2	3	4	5	6	7	8	9	10	11
Waste generated in Jindabyne			5015	5115	5218	5322	5428	5537	5648	5761	5876	5993	6113
Waste generated in Cooma			9516	9611	9707	9804	9902	10001	10101	10202	10304	10407	10511
CAPEX	Years incurred												
JRWMF													
CL													
Capping profile - Typ.		4										$ 4,604,875	
OTHER													
New landfill site construction		4											
Total CAPEX		$	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,604,875	$ -
OPEX													
JRWMF													
Transfer station operations		$	187,558	$ 191,309	$ 195,135	$ 199,038	$ 203,018	$ 207,079	$ 211,220	$ 215,445	$ 219,754	$ 224,149	$ 228,632
Waste haulage costs		$	65,079	$ 66,381	$ 67,708	$ 69,063	$ 70,444	$ 71,853	$ 73,290	$ 74,755	$ 76,251	$ 77,776	$ 79,331
CL													
Landfill operations		$	2,717,254	$ 2,753,804	$ 2,790,908	$ 2,828,573	$ 2,866,811	$ 2,905,630	$ 2,945,040	$ 2,985,052	$ 3,025,674	$ 3,066,919	$ 3,108,795
Aftercare management													
Transfer station operations													
Waste haulage costs													
New Landfill													
Landfill operations													
Total OPEX		$	2,969,890	$ 3,011,494	$ 3,053,751	$ 3,096,673	$ 3,140,273	$ 3,184,561	$ 3,229,550	$ 3,275,252	$ 3,321,679	$ 3,368,843	$ 3,416,758
Net Operating Costs		$	2,969,890	$ 3,011,494	$ 3,053,751	$ 3,096,673	$ 3,140,273	$ 3,184,561	$ 3,229,550	$ 3,275,252	$ 3,321,679	$ 3,368,843	$ 3,416,758
Net Costs		$	2,969,890	$ 3,011,494	$ 3,053,751	$ 3,096,673	$ 3,140,273	$ 3,184,561	$ 3,229,550	$ 3,275,252	$ 3,321,679	$ 7,973,718	$ 3,416,758
Present Cost (actual rate)	**1.3%**	$	2,931,777	$ 2,934,695	$ 2,937,685	$ 2,940,747	$ 2,943,881	$ 2,947,087	$ 2,950,366	$ 2,953,719	$ 2,957,145	$ 7,007,554	$ 2,964,219
Present Cost (sensitivity rate 1)	**0.3%**	$	2,961,007	$ 2,993,506	$ 3,026,431	$ 3,059,790	$ 3,093,590	$ 3,127,836	$ 3,162,536	$ 3,197,696	$ 3,233,324	$ 7,738,407	$ 3,306,009
Present Cost (sensitivity rate 2)	**2.3%**	$	2,903,119	$ 2,877,602	$ 2,852,375	$ 2,827,437	$ 2,802,782	$ 2,778,407	$ 2,754,309	$ 2,730,484	$ 2,706,929	$ 6,351,913	$ 2,660,616
Life Cycle Cost Analysis													
Life Cycle Cost (actual rate)	**1.3%**	$	(199,816,364)										
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(263,161,932)										
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(154,854,719)										
Yearly cashflow		$	(2,931,777)	$ (2,934,695)	$ (2,937,685)	$ (2,940,747)	$ (2,943,881)	$ (2,947,087)	$ (2,950,366)	$ (2,953,719)	$ (2,957,145)	$ (7,007,554)	$ (2,964,219)
Cumulative expenditure		$	(2,931,777)	$ (5,866,473)	$ (8,804,158)	$ (11,744,905)	$ (14,688,785)	$ (17,635,872)	$ (20,586,238)	$ (23,539,957)	$ (26,497,102)	$ (33,504,656)	$ (36,468,875)

	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	6235	6360	6487	6617	6749	6884	7022	7163	7306	7452	7601	7753	7908	8066	8227	8392	8560	8731
	10617	10723	10830	10938	11048	11158	11270	11382	11496	11611	11727	11845	11963	12083	12203	12325	12449	12573
							$ 4,604,875								$ 4,604,875			
$	-	$ -	$ -	$ -	$ -	$ -	$ 4,604,875	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,604,875	$ -	$ -	$ -
$	233,204	$ 237,868	$ 242,626	$ 247,478	$ 252,428	$ 257,476	$ 262,626	$ 267,878	$ 273,236	$ 278,701	$ 284,275	$ 289,960	$ 295,759	$ 301,675	$ 307,708	$ 313,862	$ 320,139	$ 326,542
$	80,918	$ 82,536	$ 84,187	$ 85,871	$ 87,588	$ 89,340	$ 91,127	$ 92,949	$ 94,808	$ 96,704	$ 98,638	$ 100,611	$ 102,623	$ 104,676	$ 106,769	$ 108,905	$ 111,083	$ 113,304
$	3,151,315	$ 3,194,488	$ 3,238,327	$ 3,282,841	$ 3,328,044	$ 3,373,945	$ 3,420,559	$ 3,467,896	$ 3,515,968	$ 3,564,790	$ 3,614,373	$ 3,664,730	$ 3,715,876	$ 3,767,822	$ 3,820,584	$ 3,874,175	$ 3,928,610	$ 3,983,903
															$ 3,820,584	$ 3,874,175	$ 3,928,610	$ 3,983,903
$	3,465,437	$ 3,514,893	$ 3,565,139	$ 3,616,190	$ 3,668,059	$ 3,720,761	$ 3,774,311	$ 3,828,723	$ 3,884,012	$ 3,940,195	$ 3,997,286	$ 4,055,301	$ 4,114,258	$ 4,174,173	$ 8,055,646	$ 8,171,118	$ 8,288,443	$ 8,407,654
$	3,465,437	$ 3,514,893	$ 3,565,139	$ 3,616,190	$ 3,668,059	$ 3,720,761	$ 3,774,311	$ 3,828,723	$ 3,884,012	$ 3,940,195	$ 3,997,286	$ 4,055,301	$ 4,114,258	$ 4,174,173	$ 8,055,646	$ 8,171,118	$ 8,288,443	$ 8,407,654
$	3,465,437	$ 3,514,893	$ 3,565,139	$ 3,616,190	$ 3,668,059	$ 3,720,761	$ 8,379,186	$ 3,828,723	$ 3,884,012	$ 3,940,195	$ 3,997,286	$ 4,055,301	$ 4,114,258	$ 4,174,173	$ 12,660,521	$ 8,171,118	$ 8,288,443	$ 8,407,654
$	2,967,869	$ 2,971,593	$ 2,975,392	$ 2,979,268	$ 2,983,220	$ 2,987,248	$ 6,640,975	$ 2,995,536	$ 2,999,796	$ 3,004,134	$ 3,008,551	$ 3,013,047	$ 3,017,622	$ 3,022,277	$ 9,049,113	$ 5,765,360	$ 5,773,092	$ 5,780,972
$	3,343,080	$ 3,380,648	$ 3,418,719	$ 3,457,301	$ 3,496,402	$ 3,536,030	$ 7,939,352	$ 3,616,898	$ 3,658,154	$ 3,699,969	$ 3,742,352	$ 3,785,312	$ 3,828,857	$ 3,872,996	$ 11,711,899	$ 7,536,267	$ 7,621,612	$ 7,708,107
$	2,637,852	$ 2,615,344	$ 2,593,090	$ 2,571,087	$ 2,549,331	$ 2,527,819	$ 5,564,683	$ 2,485,518	$ 2,464,722	$ 2,444,159	$ 2,423,825	$ 2,403,718	$ 2,383,836	$ 2,364,175	$ 7,009,469	$ 4,422,210	$ 4,384,855	$ 4,347,919
$	(2,967,869)	$ (2,971,593)	$ (2,975,392)	$ (2,979,268)	$ (2,983,220)	$ (2,987,248)	$ (6,640,975)	$ (2,995,536)	$ (2,999,796)	$ (3,004,134)	$ (3,008,551)	$ (3,013,047)	$ (3,017,622)	$ (3,022,277)	$ (9,049,113)	$ (5,765,360)	$ (5,773,092)	$ (5,780,972)
$	(39,436,743)	$ (42,408,336)	$ (45,383,729)	$ (48,362,997)	$ (51,346,216)	$ (54,333,464)	$ (60,974,438)	$ (63,969,974)	$ (66,969,770)	$ (69,973,904)	$ (72,982,455)	$ (75,995,502)	$ (79,013,124)	$ (82,035,401)	$ (91,084,514)	$ (96,849,874)	$ (102,622,966)	$ (108,403,939)

	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	8906	9084	9265	9451	9640	9833	10029	10230	10434	10643	10856	11073	11295	11520	11751	11986	12226	12470
	12699	12826	12954	13084	13215	13347	13480	13615	13751	13889	14028	14168	14309	14453	14597	14743	14891	15039
					$ 4,604,875													
				$ 1,875,000						$ 1,875,000					$ 1,875,000			
	$ -	$ -	$ -	$ 1,875,000	$ 4,604,875	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -
	$ 333,073	$ 339,735	$ 346,529	$ 353,460	$ 360,529	$ 367,740	$ 375,094	$ 382,596	$ 390,248	$ 398,053	$ 406,014	$ 414,135	$ 422,417	$ 430,866	$ 439,483	$ 448,273	$ 457,238	$ 466,383
	$ 115,570	$ 117,882	$ 120,239	$ 122,644	$ 125,097	$ 127,599	$ 130,151	$ 132,754	$ 135,409	$ 138,117	$ 140,880	$ 143,697	$ 146,571	$ 149,503	$ 152,493	$ 155,543	$ 158,653	$ 161,827
	$ 4,040,070	$ 4,097,124	$ 4,155,082	$ 4,213,959														
					$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
					$ 494,225	$ 499,168	$ 504,159	$ 509,201	$ 514,293	$ 519,436	$ 524,630	$ 529,876	$ 535,175	$ 540,527	$ 545,932	$ 551,392	$ 556,905	$ 562,475
					$ 171,487	$ 173,202	$ 174,934	$ 176,684	$ 178,450	$ 180,235	$ 182,037	$ 183,858	$ 185,696	$ 187,553	$ 189,429	$ 191,323	$ 193,236	$ 195,169
	$ 4,040,070	$ 4,097,124	$ 4,155,082	$ 4,213,959	$ 4,273,772	$ 4,334,536	$ 4,396,268	$ 4,458,986	$ 4,522,705	$ 4,587,445	$ 4,653,222	$ 4,720,055	$ 4,787,962	$ 4,856,963	$ 4,927,076	$ 4,998,320	$ 5,070,717	$ 5,144,286
	$ 8,528,783	$ 8,651,864	$ 8,776,933	$ 8,904,023	$ 5,500,111	$ 5,577,245	$ 5,655,607	$ 5,735,221	$ 5,816,106	$ 5,898,286	$ 5,981,783	$ 6,066,621	$ 6,152,822	$ 6,240,411	$ 6,329,412	$ 6,419,850	$ 6,511,750	$ 6,605,139
	$ 8,528,783	$ 8,651,864	$ 8,776,933	$ 8,904,023	$ 5,500,111	$ 5,577,245	$ 5,655,607	$ 5,735,221	$ 5,816,106	$ 5,898,286	$ 5,981,783	$ 6,066,621	$ 6,152,822	$ 6,240,411	$ 6,329,412	$ 6,419,850	$ 6,511,750	$ 6,605,139
	$ 8,528,783	$ 8,651,864	$ 8,776,933	$ 10,779,023	$ 10,104,986	$ 5,577,245	$ 5,655,607	$ 5,735,221	$ 5,816,106	$ 7,773,286	$ 5,981,783	$ 6,066,621	$ 6,152,822	$ 6,240,411	$ 8,204,412	$ 6,419,850	$ 6,511,750	$ 6,605,139
	$ 5,789,002	$ 5,797,181	$ 5,805,512	$ 7,038,299	$ 6,513,502	$ 3,548,862	$ 3,552,542	$ 3,556,318	$ 3,560,192	$ 4,697,170	$ 3,568,230	$ 3,572,396	$ 3,576,660	$ 3,581,022	$ 4,647,633	$ 3,590,045	$ 3,594,705	$ 3,599,465
	$ 7,795,771	$ 7,884,620	$ 7,974,673	$ 9,764,468	$ 9,126,494	$ 5,022,119	$ 5,077,450	$ 5,133,524	$ 5,190,353	$ 6,916,212	$ 5,306,319	$ 5,365,480	$ 5,425,443	$ 5,486,218	$ 7,191,284	$ 5,610,259	$ 5,673,549	$ 5,737,703
	$ 4,311,397	$ 4,275,285	$ 4,239,577	$ 5,089,598	$ 4,664,060	$ 2,516,358	$ 2,494,344	$ 2,472,588	$ 2,451,084	$ 3,202,248	$ 2,408,825	$ 2,388,064	$ 2,367,542	$ 2,347,259	$ 3,016,613	$ 2,307,392	$ 2,287,803	$ 2,268,439
	$ (5,789,002)	$ (5,797,181)	$ (5,805,512)	$ (7,038,299)	$ (6,513,502)	$ (3,548,862)	$ (3,552,542)	$ (3,556,318)	$ (3,560,192)	$ (4,697,170)	$ (3,568,230)	$ (3,572,396)	$ (3,576,660)	$ (3,581,022)	$ (4,647,633)	$ (3,590,045)	$ (3,594,705)	$ (3,599,465)
	$ (114,192,940)	$ (119,990,122)	$ (125,795,634)	$ (132,833,932)	$ (139,347,434)	$ (142,896,296)	$ (146,448,838)	$ (150,005,157)	$ (153,565,348)	$ (158,262,518)	$ (161,830,749)	$ (165,403,145)	$ (168,979,805)	$ (172,560,827)	$ (177,208,461)	$ (180,798,505)	$ (184,393,210)	$ (187,992,676)

	2069	2070	2071
	48	49	50
	12720	12974	13233
	15190	15342	15495
		$ 1,875,000	
	$ -	$ 1,875,000	$ -
	$ 475,710	$ 485,225	$ 494,929
	$ 165,063	$ 168,364	$ 171,732
	$ 75,000	$ 75,000	$ 75,000
	$ 568,099	$ 573,780	$ 579,518
	$ 197,120	$ 199,092	$ 201,082
	$ 5,219,048	$ 5,295,024	$ 5,372,236
	$ 6,700,041	$ 6,796,485	$ 6,894,497
	$ 6,700,041	$ 6,796,485	$ 6,894,497
	$ 6,700,041	$ 8,671,485	$ 6,894,497
	$ 3,604,326	$ 4,605,011	$ 3,614,351
	$ 5,802,735	$ 7,487,688	$ 5,935,481
	$ 2,249,298	$ 2,845,689	$ 2,211,673
	$ (3,604,326)	$ (4,605,011)	$ (3,614,351)
	$ (191,597,002)	$ (196,202,013)	$ (199,816,364)

Life Cycle Cost Analysis - Option 2 - Low waste generation

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 2 - Low waste generation

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	2.0%
Cooma waste generation rate	1.0%

Option 2 - Landfill Expansion (low waste generation)

Jindabyne landfilling life	**36 years**
Cooma landfilling life	**49 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Period			1	2	3	4	5	6	7	8	9	10	11
Waste generated in Jindabyne			5015	5115	5218	5322	5428	5537	5648	5761	5876	5993	6113
Waste generated in Cooma			9516	9611	9707	9804	9902	10001	10101	10202	10304	10407	10511
CAPEX	Years incurred												
JRWMF													
Design and planning approval		$ 200,000											
Progressive cell construction and closure	5												
Rockfall strategy 2	6			$ 1,153,500						$ 1,153,500			
Basal liner profile - Option 2	1			$ 1,505,000									
Sidewall liner profile - Strategy 2	6			$ 195,208						$ 195,208			
Berm construction and liner profile	1			$ 1,485,000									
Capping profile - Option 2	3												
Groundwater management	1			$ 100,000									
Leachate management	1			$ 11,000									
Surface water management	1			$ -									
Landfill gas management	6			$ 87,167						$ 87,167			
CL													
Capping profile - Typ.	4											$ 4,604,875	
OTHER													
New landfill site construction	4												
Total CAPEX		$ 200,000	$ 4,536,875	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,435,875	$ -	$ 4,604,875	$ -
OPEX													
JRWMF													
Landfill operations		$ 937,788	$ 956,544	$ 975,674	$ 995,188	$ 1,015,092	$ 1,035,394	$ 1,056,101	$ 1,077,223	$ 1,098,768	$ 1,120,743	$ 1,143,158	
Aftercare management													
Transfer station operations													
Waste haulage costs													
CL													
Landfill operations		$ 1,779,466	$ 1,797,260	$ 1,815,233	$ 1,833,385	$ 1,851,719	$ 1,870,236	$ 1,888,939	$ 1,907,828	$ 1,926,907	$ 1,946,176	$ 1,965,637	
Aftercare management													
Transfer station operations													
Waste haulage costs													
New Landfill													
Landfill operations													
Total OPEX		$ 2,717,254	$ 2,753,804	$ 2,790,908	$ 2,828,573	$ 2,866,811	$ 2,905,630	$ 2,945,040	$ 2,985,052	$ 3,025,674	$ 3,066,919	$ 3,108,795	
Net Operating Costs		$ 2,717,254	$ 2,753,804	$ 2,790,908	$ 2,828,573	$ 2,866,811	$ 2,905,630	$ 2,945,040	$ 2,985,052	$ 3,025,674	$ 3,066,919	$ 3,108,795	
Net Costs		$ 2,917,254	$ 7,290,679	$ 2,790,908	$ 2,828,573	$ 2,866,811	$ 2,905,630	$ 2,945,040	$ 4,420,927	$ 3,025,674	$ 7,671,794	$ 3,108,795	
Present Cost (actual rate)	**1.3%**	$ 2,879,816	$ 7,104,755	$ 2,684,832	$ 2,686,146	$ 2,687,521	$ 2,688,956	$ 2,690,451	$ 3,986,922	$ 2,693,625	$ 6,742,213	$ 2,697,045	
Present Cost (sensitivity rate 1)	**0.3%**	$ 2,908,528	$ 7,247,131	$ 2,765,939	$ 2,794,884	$ 2,824,193	$ 2,853,873	$ 2,883,930	$ 4,316,243	$ 2,945,193	$ 7,445,392	$ 3,008,028	
Present Cost (sensitivity rate 2)	**2.3%**	$ 2,851,665	$ 6,966,533	$ 2,606,865	$ 2,582,646	$ 2,558,709	$ 2,535,050	$ 2,511,665	$ 3,685,600	$ 2,465,707	$ 6,111,398	$ 2,420,807	
Life Cycle Cost Analysis													
Life Cycle Cost (actual rate)	**1.3%**	$ (173,205,462)											
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$ (226,657,104)											
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$ (135,566,562)											
Yearly cashflow		$ (2,879,816)	$ (7,104,755)	$ (2,684,832)	$ (2,686,146)	$ (2,687,521)	$ (2,688,956)	$ (2,690,451)	$ (3,986,922)	$ (2,693,625)	$ (6,742,213)	$ (2,697,045)	
Cumulative expenditure		$ (2,879,816)	$ (9,984,571)	$ (12,669,403)	$ (15,355,549)	$ (18,043,070)	$ (20,732,026)	$ (23,422,477)	$ (27,409,399)	$ (30,103,024)	$ (36,845,237)	$ (39,542,283)	

2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
6235	6360	6487	6617	6749	6884	7022	7163	7306	7452	7601	7753	7908	8066	8227	8392	8560	8731
10617	10723	10830	10938	11048	11158	11270	11382	11496	11611	11727	11845	11963	12083	12203	12325	12449	12573
	$ 1,153,500							$ 1,153,500						$ 1,153,500			
	$ 195,208							$ 195,208						$ 195,208			
			$ 1,143,300											$ 1,143,300			
	$ 87,167							$ 87,167						$ 87,167			
											$ 4,604,875						
$ -	$ -	$ 1,435,875	$ -	$ 1,143,300	$ -	$ -	$ -	$ 1,435,875	$ -	$ -	$ 4,604,875	$ -	$ -	$ 2,579,175	$ -	$ -	$ -
$ 1,166,021	$ 1,189,342	$ 1,213,129	$ 1,237,391	$ 1,262,139	$ 1,287,382	$ 1,313,129	$ 1,339,392	$ 1,366,180	$ 1,393,503	$ 1,421,373	$ 1,449,801	$ 1,478,797	$ 1,508,373	$ 1,538,540	$ 1,569,311	$ 1,600,697	$ 1,632,711
$ 1,985,294	$ 2,005,147	$ 2,025,198	$ 2,045,450	$ 2,065,905	$ 2,086,564	$ 2,107,429	$ 2,128,504	$ 2,149,789	$ 2,171,286	$ 2,192,999	$ 2,214,929	$ 2,237,079	$ 2,259,449	$ 2,282,044	$ 2,304,864	$ 2,327,913	$ 2,351,192
$ 3,151,315	$ 3,194,488	$ 3,238,327	$ 3,282,841	$ 3,328,044	$ 3,373,945	$ 3,420,559	$ 3,467,896	$ 3,515,968	$ 3,564,790	$ 3,614,373	$ 3,664,730	$ 3,715,876	$ 3,767,822	$ 3,820,584	$ 3,874,175	$ 3,928,610	$ 3,983,903
$ 3,151,315	$ 3,194,488	$ 3,238,327	$ 3,282,841	$ 3,328,044	$ 3,373,945	$ 3,420,559	$ 3,467,896	$ 3,515,968	$ 3,564,790	$ 3,614,373	$ 3,664,730	$ 3,715,876	$ 3,767,822	$ 3,820,584	$ 3,874,175	$ 3,928,610	$ 3,983,903
$ 3,151,315	$ 3,194,488	$ 4,674,202	$ 3,282,841	$ 4,471,344	$ 3,373,945	$ 3,420,559	$ 3,467,896	$ 4,951,843	$ 3,564,790	$ 3,614,373	$ 8,269,605	$ 3,715,876	$ 3,767,822	$ 6,399,759	$ 3,874,175	$ 3,928,610	$ 3,983,903
$ 2,698,848	$ 2,700,714	$ 3,900,993	$ 2,704,632	$ 3,636,528	$ 2,708,803	$ 2,710,984	$ 2,713,230	$ 3,824,529	$ 2,717,913	$ 2,720,352	$ 6,144,231	$ 2,725,427	$ 2,728,062	$ 4,574,231	$ 2,733,533	$ 2,736,368	$ 2,739,270
$ 3,040,049	$ 3,072,481	$ 4,482,233	$ 3,138,599	$ 4,262,095	$ 3,206,433	$ 3,241,009	$ 3,276,033	$ 4,663,889	$ 3,347,452	$ 3,383,860	$ 7,719,041	$ 3,458,110	$ 3,495,965	$ 5,920,241	$ 3,573,173	$ 3,612,541	$ 3,652,429
$ 2,398,746	$ 2,376,939	$ 3,399,762	$ 2,334,078	$ 3,107,620	$ 2,292,199	$ 2,271,620	$ 2,251,277	$ 3,142,348	$ 2,211,290	$ 2,191,639	$ 4,901,683	$ 2,153,010	$ 2,134,025	$ 3,543,212	$ 2,096,704	$ 2,078,362	$ 2,060,229
$ (2,698,848)	$ (2,700,714)	$ (3,900,993)	$ (2,704,632)	$ (3,636,528)	$ (2,708,803)	$ (2,710,984)	$ (2,713,230)	$ (3,824,529)	$ (2,717,913)	$ (2,720,352)	$ (6,144,231)	$ (2,725,427)	$ (2,728,062)	$ (4,574,231)	$ (2,733,533)	$ (2,736,368)	$ (2,739,270)
$ (42,241,131)	$ (44,941,844)	$ (48,842,838)	$ (51,547,470)	$ (55,183,998)	$ (57,892,801)	$ (60,603,785)	$ (63,317,015)	$ (67,141,544)	$ (69,859,457)	$ (72,579,810)	$ (78,724,041)	$ (81,449,467)	$ (84,177,529)	$ (88,751,760)	$ (91,485,293)	$ (94,221,661)	$ (96,960,931)

2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
8906	9084	9265	9451	9640	9833	10029	10230	10434	10643	10856	11073	11295	11520	11751	11986	12226	12470
12699	12826	12954	13084	13215	13347	13480	13615	13751	13889	14028	14168	14309	14453	14597	14743	14891	15039
	$ 1,153,500				$ 1,153,500												
	$ 195,208				$ 195,208												
							$ 1,143,300										
	$ 87,167				$ 87,167												
					$ 4,604,875												
					$ 1,875,000											$ 1,875,000	
$ -	$ -	$ 1,435,875	$ -	$ -	$ -	$ 7,915,750	$ 1,143,300	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ 1,875,000	$ -
$ 1,665,366	$ 1,698,673	$ 1,732,646	$ 1,767,299	$ 1,802,645	$ 1,838,698	$ 1,875,472											
							$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
							$ 382,596	$ 390,248	$ 398,053	$ 406,014	$ 414,135	$ 422,417	$ 430,866	$ 439,483	$ 448,273	$ 457,238	$ 466,383
							$ 132,754	$ 135,409	$ 138,117	$ 140,880	$ 143,697	$ 146,571	$ 149,503	$ 152,493	$ 155,543	$ 158,653	$ 161,827
$ 2,374,704	$ 2,398,451	$ 2,422,436	$ 2,446,660	$ 2,471,127	$ 2,495,838	$ 2,520,796	$ 2,546,004	$ 2,571,464	$ 2,597,179	$ 2,623,151	$ 2,649,382	$ 2,675,876	$ 2,702,635	$ 2,729,661	$ 2,756,958	$ 2,784,527	$ 2,812,373
							$ 1,912,982	$ 1,951,241	$ 1,990,266	$ 2,030,071	$ 2,070,673	$ 2,112,086	$ 2,154,328	$ 2,197,414	$ 2,241,363	$ 2,286,190	$ 2,331,914
$ 4,040,070	$ 4,097,124	$ 4,155,082	$ 4,213,959	$ 4,273,772	$ 4,334,536	$ 4,396,268	$ 5,049,336	$ 5,123,363	$ 5,198,615	$ 5,275,116	$ 5,352,887	$ 5,431,951	$ 5,512,331	$ 5,594,051	$ 5,677,136	$ 5,761,609	$ 5,847,496
$ 4,040,070	$ 4,097,124	$ 4,155,082	$ 4,213,959	$ 4,273,772	$ 4,334,536	$ 4,396,268	$ 5,049,336	$ 5,123,363	$ 5,198,615	$ 5,275,116	$ 5,352,887	$ 5,431,951	$ 5,512,331	$ 5,594,051	$ 5,677,136	$ 5,761,609	$ 5,847,496
$ 4,040,070	$ 4,097,124	$ 5,590,957	$ 4,213,959	$ 4,273,772	$ 4,334,536	$ 12,312,018	$ 6,192,636	$ 5,123,363	$ 5,198,615	$ 5,275,116	$ 7,227,887	$ 5,431,951	$ 5,512,331	$ 5,594,051	$ 5,677,136	$ 7,636,609	$ 5,847,496
$ 2,742,240	$ 2,745,278	$ 3,698,145	$ 2,751,558	$ 2,754,801	$ 2,758,113	$ 7,733,734	$ 3,839,955	$ 3,136,145	$ 3,141,372	$ 3,146,692	$ 4,256,220	$ 3,157,615	$ 3,163,218	$ 3,168,917	$ 3,174,711	$ 4,215,665	$ 3,186,588
$ 3,692,843	$ 3,733,792	$ 5,079,913	$ 3,817,329	$ 3,859,932	$ 3,903,102	$ 11,053,394	$ 5,542,951	$ 4,572,141	$ 4,625,421	$ 4,679,449	$ 6,392,535	$ 4,789,792	$ 4,846,131	$ 4,903,265	$ 4,961,206	$ 6,653,614	$ 5,079,560
$ 2,042,301	$ 2,024,578	$ 2,700,635	$ 1,989,731	$ 1,972,603	$ 1,955,669	$ 5,430,083	$ 2,669,790	$ 2,159,141	$ 2,141,598	$ 2,124,255	$ 2,845,184	$ 2,090,158	$ 2,073,400	$ 2,056,831	$ 2,040,449	$ 2,683,004	$ 2,008,238
$ (2,742,240)	$ (2,745,278)	$ (3,698,145)	$ (2,751,558)	$ (2,754,801)	$ (2,758,113)	$ (7,733,734)	$ (3,839,955)	$ (3,136,145)	$ (3,141,372)	$ (3,146,692)	$ (4,256,220)	$ (3,157,615)	$ (3,163,218)	$ (3,168,917)	$ (3,174,711)	$ (4,215,665)	$ (3,186,588)
$ (99,703,171)	$ (102,448,449)	$ (106,146,594)	$ (108,898,151)	$ (111,652,952)	$ (114,411,065)	$ (122,144,799)	$ (125,984,753)	$ (129,120,898)	$ (132,262,270)	$ (135,408,962)	$ (139,665,182)	$ (142,822,796)	$ (145,986,014)	$ (149,154,931)	$ (152,329,642)	$ (156,545,307)	$ (159,731,895)

2069	2070	2071
48	49	50
12720	12974	13233
15190	15342	15495

	$ 4,604,875	
		$ 1,875,000
$ -	$ 4,604,875	$ 1,875,000
$ 75,000	$ 75,000	$ 75,000
$ 475,710	$ 485,225	$ 494,929
$ 165,063	$ 168,364	$ 171,732
$ 2,840,496	$ 2,868,901	
		$ 75,000
		$ 579,518
		$ 201,082
$ 2,378,552	$ 2,426,123	$ 5,372,236
$ 5,934,822	$ 6,023,613	$ 6,969,497
$ 5,934,822	$ 6,023,613	$ 6,969,497
$ 5,934,822	$ 10,628,488	$ 8,844,497
$ 3,192,672	$ 5,644,282	$ 4,636,613
$ 5,139,997	$ 9,177,529	$ 7,614,239
$ 1,992,403	$ 3,487,911	$ 2,837,210
$ (3,192,672)	$ (5,644,282)	$ (4,636,613)
$ (162,924,567)	$ (168,568,849)	$ (173,205,462)

Life Cycle Cost Analysis - Option 1 - High waste generation

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 1 - High waste generation

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	8.0%
Cooma waste generation rate	3.0%

Option 1 - Waste Diversion (high waste generation)

Jindabyne landfilling life	**0 years**
Cooma landfilling life	**20 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Period			1	2	3	4	5	6	7	8	9	10	11
Waste generated in Jindabyne			6303	6807	7352	7940	8575	9261	10002	10802	11667	12600	13608
Waste generated in Cooma			10092	10395	10707	11028	11359	11700	12051	12412	12785	13168	13563
CAPEX	Years incurred												
JRWMF													
CL													
Capping profile - Typ.	4							$ 4,604,875					$ 4,604,875
OTHER													
New landfill site construction	4												
Total CAPEX		$	-	$ -	$ -	$ -	$ -	$ 4,604,875	$ -	$ -	$ -	$ -	$ 4,604,875
OPEX													
JRWMF													
Transfer station operations		$	235,738	$ 254,597	$ 274,964	$ 296,962	$ 320,718	$ 346,376	$ 374,086	$ 404,013	$ 436,334	$ 471,241	$ 508,940
Waste haulage costs		$	81,797	$ 88,341	$ 95,408	$ 103,040	$ 111,284	$ 120,186	$ 129,801	$ 140,185	$ 151,400	$ 163,512	$ 176,593
CL													
Landfill operations		$	3,065,972	$ 3,216,886	$ 3,377,041	$ 3,547,094	$ 3,727,747	$ 3,919,759	$ 4,123,946	$ 4,341,185	$ 4,572,424	$ 4,818,680	$ 5,081,051
Aftercare management													
Transfer station operations													
Waste haulage costs													
New Landfill													
Landfill operations													
Total OPEX		$	3,383,506	$ 3,559,823	$ 3,747,413	$ 3,947,095	$ 4,159,749	$ 4,386,321	$ 4,627,833	$ 4,885,384	$ 5,160,158	$ 5,453,433	$ 5,766,584
Net Operating Costs		$	3,383,506	$ 3,559,823	$ 3,747,413	$ 3,947,095	$ 4,159,749	$ 4,386,321	$ 4,627,833	$ 4,885,384	$ 5,160,158	$ 5,453,433	$ 5,766,584
Net Costs		$	3,383,506	$ 3,559,823	$ 3,747,413	$ 3,947,095	$ 4,159,749	$ 8,991,196	$ 4,627,833	$ 4,885,384	$ 5,160,158	$ 5,453,433	$ 10,371,459
Present Cost (actual rate)	**1.3%**	$	3,340,085	$ 3,469,041	$ 3,604,983	$ 3,748,348	$ 3,899,598	$ 8,320,718	$ 4,227,772	$ 4,405,783	$ 4,593,863	$ 4,792,648	$ 8,997,792
Present Cost (sensitivity rate 1)	**0.3%**	$	3,373,386	$ 3,538,559	$ 3,713,888	$ 3,900,083	$ 4,097,910	$ 8,831,040	$ 4,531,804	$ 4,769,702	$ 5,022,901	$ 5,292,497	$ 10,035,282
Present Cost (sensitivity rate 2)	**2.3%**	$	3,307,435	$ 3,401,552	$ 3,500,295	$ 3,603,920	$ 3,712,692	$ 7,844,471	$ 3,946,828	$ 4,072,805	$ 4,205,158	$ 4,344,238	$ 8,076,215
Life Cycle Cost Analysis													
Life Cycle Cost (actual rate)	**1.3%**	$	(719,824,849)										
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(1,024,643,101)										
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(515,511,046)										
Yearly cashflow		$	(3,340,085)	$ (3,469,041)	$ (3,604,983)	$ (3,748,348)	$ (3,899,598)	$ (8,320,718)	$ (4,227,772)	$ (4,405,783)	$ (4,593,863)	$ (4,792,648)	$ (8,997,792)
Cumulative expenditure		$	(3,340,085)	$ (6,809,127)	$ (10,414,110)	$ (14,162,457)	$ (18,062,056)	$ (26,382,774)	$ (30,610,545)	$ (35,016,328)	$ (39,610,191)	$ (44,402,839)	$ (53,400,631)

	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	14697	15872	17142	18514	19995	21594	23322	25187	27202	29379	31729	34267	37009	39969	43167	46620	50350	54378
	13970	14389	14821	15266	15724	16195	16681	17182	17697	18228	18775	19338	19918	20516	21131	21765	22418	23091
					$ 4,604,875					$ 4,604,875								
									$ 1,875,000								$ 1,875,000	
	$ -	$ -	$ -	$ -	$ 4,604,875	$ -	$ -	$ -	$ 1,875,000	$ 4,604,875	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -
	$ 549,655	$ 593,627	$ 641,118	$ 692,407	$ 747,800	$ 807,624	$ 872,234	$ 942,012	$ 1,017,373	$ 1,098,763	$ 1,186,664	$ 1,281,597	$ 1,384,125	$ 1,494,855	$ 1,614,443	$ 1,743,599	$ 1,883,087	$ 2,033,734
	$ 190,721	$ 205,978	$ 222,456	$ 240,253	$ 259,473	$ 280,231	$ 302,650	$ 326,861	$ 353,010	$ 381,251	$ 411,751	$ 444,691	$ 480,267	$ 518,688	$ 560,183	$ 604,998	$ 653,398	$ 705,669
	$ 5,360,717	$ 5,658,953	$ 5,977,128	$ 6,316,721	$ 6,679,325	$ 7,066,655	$ 7,480,560	$ 7,923,035	$ 8,396,229									
										$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
										$ 681,729	$ 702,181	$ 723,246	$ 744,944	$ 767,292	$ 790,311	$ 814,020	$ 838,441	$ 863,594
										$ 236,548	$ 243,644	$ 250,954	$ 258,482	$ 266,237	$ 274,224	$ 282,450	$ 290,924	$ 299,652
										$ 8,902,460	$ 9,444,224	$ 10,024,217	$ 10,645,343	$ 11,310,734	$ 12,023,770	$ 12,788,094	$ 13,607,636	$ 14,486,637
	$ 6,101,093	$ 6,458,558	$ 6,840,702	$ 7,249,381	$ 7,686,598	$ 8,154,509	$ 8,655,443	$ 9,191,909	$ 9,766,613	$ 11,375,750	$ 12,063,464	$ 12,799,705	$ 13,588,160	$ 14,432,806	$ 15,337,931	$ 16,308,161	$ 17,348,485	$ 18,464,286
	$ 6,101,093	$ 6,458,558	$ 6,840,702	$ 7,249,381	$ 7,686,598	$ 8,154,509	$ 8,655,443	$ 9,191,909	$ 9,766,613	$ 11,375,750	$ 12,063,464	$ 12,799,705	$ 13,588,160	$ 14,432,806	$ 15,337,931	$ 16,308,161	$ 17,348,485	$ 18,464,286
	$ 6,101,093	$ 6,458,558	$ 6,840,702	$ 7,249,381	$ 12,291,473	$ 8,154,509	$ 8,655,443	$ 9,191,909	$ 11,641,613	$ 15,980,625	$ 12,063,464	$ 12,799,705	$ 13,588,160	$ 14,432,806	$ 15,337,931	$ 16,308,161	$ 19,223,485	$ 18,464,286
	$ 5,225,096	$ 5,460,253	$ 5,709,111	$ 5,972,543	$ 9,996,611	$ 6,546,923	$ 6,859,924	$ 7,191,612	$ 8,991,336	$ 12,184,155	$ 9,079,548	$ 9,510,048	$ 9,966,300	$ 10,449,960	$ 10,962,792	$ 11,506,678	$ 13,389,602	$ 12,695,757
	$ 5,885,677	$ 6,211,886	$ 6,559,755	$ 6,930,857	$ 11,716,260	$ 7,749,648	$ 8,201,108	$ 8,683,364	$ 10,964,643	$ 15,006,319	$ 11,294,097	$ 11,947,540	$ 12,645,566	$ 13,391,445	$ 14,188,697	$ 15,041,107	$ 17,676,896	$ 16,927,992
	$ 4,644,084	$ 4,805,652	$ 4,975,558	$ 5,154,261	$ 8,542,673	$ 5,540,029	$ 5,748,147	$ 5,967,174	$ 7,387,551	$ 9,913,008	$ 7,314,895	$ 7,586,831	$ 7,873,094	$ 8,174,476	$ 8,491,811	$ 8,825,979	$ 10,169,846	$ 9,548,587
	$ (5,225,096)	$ (5,460,253)	$ (5,709,111)	$ (5,972,543)	$ (9,996,611)	$ (6,546,923)	$ (6,859,924)	$ (7,191,612)	$ (8,991,336)	$ (12,184,155)	$ (9,079,548)	$ (9,510,048)	$ (9,966,300)	$ (10,449,960)	$ (10,962,792)	$ (11,506,678)	$ (13,389,602)	$ (12,695,757)
	$ (58,625,728)	$ (64,085,981)	$ (69,795,092)	$ (75,767,634)	$ (85,764,245)	$ (92,311,169)	$ (99,171,092)	$ (106,362,705)	$ (115,354,041)	$ (127,538,196)	$ (136,617,744)	$ (146,127,793)	$ (156,094,093)	$ (166,544,053)	$ (177,506,845)	$ (189,013,523)	$ (202,403,125)	$ (215,098,882)

	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	58728	63426	68501	73981	79899	86291	93194	100650	108702	117398	126790	136933	147887	159718	172496	186296	201199	217295
	23783	24497	25232	25989	26768	27572	28399	29251	30128	31032	31963	32922	33910	34927	35975	37054	38165	39310
							$ 1,875,000								$ 1,875,000			
	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -
	$ 2,196,432	$ 2,372,147	$ 2,561,919	$ 2,766,872	$ 2,988,222	$ 3,227,280	$ 3,485,462	$ 3,764,299	$ 4,065,443	$ 4,390,678	$ 4,741,933	$ 5,121,287	$ 5,530,990	$ 5,973,470	$ 6,451,347	$ 6,967,455	$ 7,524,851	$ 8,126,839
	$ 762,123	$ 823,093	$ 888,940	$ 960,055	$ 1,036,860	$ 1,119,809	$ 1,209,393	$ 1,306,145	$ 1,410,636	$ 1,523,487	$ 1,645,366	$ 1,776,996	$ 1,919,155	$ 2,072,688	$ 2,238,503	$ 2,417,583	$ 2,610,990	$ 2,819,869
	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	$ 889,502	$ 916,187	$ 943,672	$ 971,982	$ 1,001,142	$ 1,031,176	$ 1,062,111	$ 1,093,975	$ 1,126,794	$ 1,160,598	$ 1,195,416	$ 1,231,278	$ 1,268,217	$ 1,306,263	$ 1,345,451	$ 1,385,814	$ 1,427,389	$ 1,470,211
	$ 308,641	$ 317,900	$ 327,437	$ 337,261	$ 347,378	$ 357,800	$ 368,534	$ 379,590	$ 390,977	$ 402,707	$ 414,788	$ 427,232	$ 440,049	$ 453,250	$ 466,848	$ 480,853	$ 495,279	$ 510,137
	$ 15,429,670	$ 16,441,668	$ 17,527,955	$ 18,694,273	$ 19,946,819	$ 21,292,279	$ 22,737,868	$ 24,291,369	$ 25,961,185	$ 27,756,381	$ 29,686,742	$ 31,762,828	$ 33,996,034	$ 36,398,663	$ 38,983,990	$ 41,766,347	$ 44,761,201	$ 47,985,250
	$ 19,661,368	$ 20,945,995	$ 22,324,923	$ 23,805,444	$ 25,395,421	$ 27,103,343	$ 28,938,368	$ 30,910,377	$ 33,030,036	$ 35,308,852	$ 37,759,245	$ 40,394,620	$ 43,229,445	$ 46,279,333	$ 49,561,139	$ 53,093,052	$ 56,894,709	$ 60,987,305
	$ 19,661,368	$ 20,945,995	$ 22,324,923	$ 23,805,444	$ 25,395,421	$ 27,103,343	$ 28,938,368	$ 30,910,377	$ 33,030,036	$ 35,308,852	$ 37,759,245	$ 40,394,620	$ 43,229,445	$ 46,279,333	$ 49,561,139	$ 53,093,052	$ 56,894,709	$ 60,987,305
	$ 19,661,368	$ 20,945,995	$ 22,324,923	$ 23,805,444	$ 25,395,421	$ 27,103,343	$ 30,813,368	$ 30,910,377	$ 33,030,036	$ 35,308,852	$ 37,759,245	$ 40,394,620	$ 43,229,445	$ 46,279,333	$ 51,436,139	$ 53,093,052	$ 56,894,709	$ 60,987,305
	$ 13,345,362	$ 14,034,863	$ 14,766,845	$ 15,544,064	$ 16,369,457	$ 17,246,155	$ 19,355,266	$ 19,167,030	$ 20,218,555	$ 21,336,109	$ 22,523,998	$ 23,786,814	$ 25,129,448	$ 26,557,118	$ 29,137,532	$ 29,690,168	$ 31,407,791	$ 33,234,987
	$ 17,971,558	$ 19,088,512	$ 20,284,304	$ 21,564,803	$ 22,936,318	$ 24,405,641	$ 27,663,402	$ 27,667,492	$ 29,476,342	$ 31,415,734	$ 33,495,463	$ 35,726,073	$ 38,118,910	$ 40,686,185	$ 45,084,505	$ 46,397,620	$ 49,571,146	$ 52,978,004
	$ 9,939,046	$ 10,350,381	$ 10,783,747	$ 11,240,364	$ 11,721,518	$ 12,228,570	$ 13,589,903	$ 13,326,186	$ 13,919,863	$ 14,545,675	$ 15,205,404	$ 15,900,931	$ 16,634,243	$ 17,407,437	$ 18,912,131	$ 19,082,452	$ 19,989,077	$ 20,945,207
	$ (13,345,362)	$ (14,034,863)	$ (14,766,845)	$ (15,544,064)	$ (16,369,457)	$ (17,246,155)	$ (19,355,266)	$ (19,167,030)	$ (20,218,555)	$ (21,336,109)	$ (22,523,998)	$ (23,786,814)	$ (25,129,448)	$ (26,557,118)	$ (29,137,532)	$ (29,690,168)	$ (31,407,791)	$ (33,234,987)
	$ (228,444,244)	$ (242,479,107)	$ (257,245,952)	$ (272,790,017)	$ (289,159,474)	$ (306,405,629)	$ (325,760,894)	$ (344,927,925)	$ (365,146,480)	$ (386,482,589)	$ (409,006,587)	$ (432,793,401)	$ (457,922,850)	$ (484,479,968)	$ (513,617,500)	$ (543,307,667)	$ (574,715,458)	$ (607,950,445)

	2069	2070	2071
	48	49	50
	234679	253453	273729
	40490	41704	42956

Life Cycle Cost Analysis - Option 2 - High waste generation

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 2 - High waste generation

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	8.0%
Cooma waste generation rate	3.0%

Option 2 - Landfill Expansion (high waste generation)

Jindabyne landfilling life	**19 years**
Cooma landfilling life	**34 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Period			1	2	3	4	5	6	7	8	9	10	11
Waste generated in Jindabyne			6303	6807	7352	7940	8575	9261	10002	10802	11667	12600	13608
Waste generated in Cooma			10092	10395	10707	11028	11359	11700	12051	12412	12785	13168	13563
CAPEX	Years incurred												
JRWMF													
Design and planning approval		$ 200,000											
Progressive cell construction and closure	5												
Rockfall strategy 2	6		$ 1,153,500				$ 1,153,500			$ 1,153,500			
Basal liner profile - Option 2	1		$ 1,505,000										
Sidewall liner profile - Strategy 2	6		$ 195,208				$ 195,208			$ 195,208			
Berm construction and liner profile	1		$ 1,485,000										
Capping profile - Option 2	3									$ 1,143,300			
Groundwater management	1		$ 100,000										
Leachate management	1		$ 11,000										
Surface water management	1		$ -										
Landfill gas management	6		$ 87,167				$ 87,167			$ 87,167			
CL													
Capping profile - Typ.	4											$ 4,604,875	
OTHER													
New landfill site construction	4												
Total CAPEX		$ 200,000	$ 4,536,875	$ -	$ -	$ -	$ 1,435,875	$ -	$ -	$ 2,579,175	$ -	$ 4,604,875	
OPEX													
JRWMF													
Landfill operations		$ 1,178,688	$ 1,272,983	$ 1,374,822	$ 1,484,808	$ 1,603,592	$ 1,731,880	$ 1,870,430	$ 2,020,064	$ 2,181,670	$ 2,356,203	$ 2,544,699	
Aftercare management													
Transfer station operations													
Waste haulage costs													
CL													
Landfill operations		$ 1,887,284	$ 1,943,902	$ 2,002,219	$ 2,062,286	$ 2,124,155	$ 2,187,879	$ 2,253,516	$ 2,321,121	$ 2,390,755	$ 2,462,477	$ 2,536,352	
Aftercare management													
Transfer station operations													
Waste haulage costs													
New Landfill													
Landfill operations													
Total OPEX		$ 3,065,972	$ 3,216,886	$ 3,377,041	$ 3,547,094	$ 3,727,747	$ 3,919,759	$ 4,123,946	$ 4,341,185	$ 4,572,424	$ 4,818,680	$ 5,081,051	
Net Operating Costs		$ 3,065,972	$ 3,216,886	$ 3,377,041	$ 3,547,094	$ 3,727,747	$ 3,919,759	$ 4,123,946	$ 4,341,185	$ 4,572,424	$ 4,818,680	$ 5,081,051	
Net Costs		$ 3,265,972	$ 7,753,761	$ 3,377,041	$ 3,547,094	$ 3,727,747	$ 5,355,634	$ 4,123,946	$ 4,341,185	$ 7,151,599	$ 4,818,680	$ 9,685,926	
Present Cost (actual rate)	**1.3%**	$ 3,224,059	$ 7,556,027	$ 3,248,688	$ 3,368,487	$ 3,494,614	$ 4,956,261	$ 3,767,444	$ 3,915,009	$ 6,366,755	$ 4,234,807	$ 8,403,056	
Present Cost (sensitivity rate 1)	**0.3%**	$ 3,256,203	$ 7,707,446	$ 3,346,829	$ 3,504,846	$ 3,672,330	$ 5,260,237	$ 4,038,373	$ 4,238,390	$ 6,961,371	$ 4,676,477	$ 9,371,970	
Present Cost (sensitivity rate 2)	**2.3%**	$ 3,192,543	$ 7,409,026	$ 3,154,347	$ 3,238,695	$ 3,327,118	$ 4,672,583	$ 3,517,090	$ 3,619,122	$ 5,828,039	$ 3,838,590	$ 7,542,393	
Life Cycle Cost Analysis													
Life Cycle Cost (actual rate)	**1.3%**	$ (710,513,190)											
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$ (1,013,162,199)											
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$ (507,952,231)											
Yearly cashflow		$ (3,224,059)	$ (7,556,027)	$ (3,248,688)	$ (3,368,487)	$ (3,494,614)	$ (4,956,261)	$ (3,767,444)	$ (3,915,009)	$ (6,366,755)	$ (4,234,807)	$ (8,403,056)	
Cumulative expenditure		$ (3,224,059)	$ (10,780,086)	$ (14,028,774)	$ (17,397,261)	$ (20,891,875)	$ (25,848,136)	$ (29,615,580)	$ (33,530,589)	$ (39,897,344)	$ (44,132,152)	$ (52,535,208)	

	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	14697	15872	17142	18514	19995	21594	23322	25187	27202	29379	31729	34267	37009	39969	43167	46620	50350	54378
	13970	14389	14821	15266	15724	16195	16681	17182	17697	18228	18775	19338	19918	20516	21131	21765	22418	23091
	$ 1,153,500			$ 1,153,500			$ 1,153,500											
	$ 195,208			$ 195,208			$ 195,208											
			$ 1,143,300						$ 1,143,300									
	$ 87,167			$ 87,167			$ 87,167											
								$ 4,604,875								$ 4,604,875		
								$ 1,875,000								$ 1,875,000		
	$ 1,435,875	$ -	$ 1,143,300	$ 1,435,875	$ -	$ -	$ 1,435,875	$ 6,479,875	$ 1,143,300	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ 4,604,875	$ -	$ -
	$ 2,748,275	$ 2,968,137	$ 3,205,588	$ 3,462,035	$ 3,738,998	$ 4,038,118	$ 4,361,168	$ 4,710,061										
									$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
									$ 1,017,373	$ 1,098,763	$ 1,186,664	$ 1,281,597	$ 1,384,125	$ 1,494,855	$ 1,614,443	$ 1,743,599	$ 1,883,087	$ 2,033,734
									$ 353,010	$ 381,251	$ 411,751	$ 444,691	$ 480,267	$ 518,688	$ 560,183	$ 604,998	$ 653,398	$ 705,669
	$ 2,612,442	$ 2,690,815	$ 2,771,540	$ 2,854,686	$ 2,940,327	$ 3,028,536	$ 3,119,393	$ 3,212,974	$ 3,309,364	$ 3,408,644	$ 3,510,904	$ 3,616,231	$ 3,724,718	$ 3,836,459	$ 3,951,553	$ 4,070,100	$ 4,192,203	$ 4,317,969
									$ 5,086,866	$ 5,493,815	$ 5,933,320	$ 6,407,986	$ 6,920,625	$ 7,474,275	$ 8,072,217	$ 8,717,994	$ 9,415,434	$ 10,168,668
	$ 5,360,717	$ 5,658,953	$ 5,977,128	$ 6,316,721	$ 6,679,325	$ 7,066,655	$ 7,480,560	$ 7,923,035	$ 9,841,613	$ 10,457,474	$ 11,117,639	$ 11,825,505	$ 12,584,734	$ 13,399,277	$ 14,273,396	$ 15,211,690	$ 16,219,121	$ 17,301,040
	$ 5,360,717	$ 5,658,953	$ 5,977,128	$ 6,316,721	$ 6,679,325	$ 7,066,655	$ 7,480,560	$ 7,923,035	$ 9,841,613	$ 10,457,474	$ 11,117,639	$ 11,825,505	$ 12,584,734	$ 13,399,277	$ 14,273,396	$ 15,211,690	$ 16,219,121	$ 17,301,040
	$ 6,796,592	$ 5,658,953	$ 7,120,428	$ 7,752,596	$ 6,679,325	$ 7,066,655	$ 8,916,435	$ 14,402,910	$ 10,984,913	$ 10,457,474	$ 11,117,639	$ 11,825,505	$ 12,584,734	$ 15,274,277	$ 14,273,396	$ 19,816,565	$ 16,219,121	$ 17,301,040
	$ 5,820,736	$ 4,784,244	$ 5,942,564	$ 6,387,126	$ 5,432,271	$ 5,673,529	$ 7,066,775	$ 11,268,622	$ 8,484,138	$ 7,973,122	$ 8,367,675	$ 8,786,228	$ 9,230,333	$ 11,059,221	$ 10,201,916	$ 13,982,131	$ 11,296,992	$ 11,895,927
	$ 6,556,620	$ 5,442,820	$ 6,827,993	$ 7,411,962	$ 6,366,748	$ 6,715,804	$ 8,448,400	$ 13,606,065	$ 10,346,131	$ 9,819,903	$ 10,408,594	$ 11,038,200	$ 11,711,746	$ 14,172,202	$ 13,203,926	$ 18,276,928	$ 14,914,242	$ 15,861,533
	$ 5,173,490	$ 4,210,686	$ 5,179,016	$ 5,512,044	$ 4,642,185	$ 4,800,960	$ 5,921,474	$ 9,350,035	$ 6,970,821	$ 6,486,919	$ 6,741,377	$ 7,009,389	$ 7,291,701	$ 8,651,070	$ 7,902,433	$ 10,724,728	$ 8,580,440	$ 8,947,029
	$ (5,820,736)	$ (4,784,244)	$ (5,942,564)	$ (6,387,126)	$ (5,432,271)	$ (5,673,529)	$ (7,066,775)	$ (11,268,622)	$ (8,484,138)	$ (7,973,122)	$ (8,367,675)	$ (8,786,228)	$ (9,230,333)	$ (11,059,221)	$ (10,201,916)	$ (13,982,131)	$ (11,296,992)	$ (11,895,927)
	$ (58,355,943)	$ (63,140,187)	$ (69,082,751)	$ (75,469,877)	$ (80,902,148)	$ (86,575,678)	$ (93,642,452)	$ (104,911,074)	$ (113,395,211)	$ (121,368,334)	$ (129,736,008)	$ (138,522,236)	$ (147,752,569)	$ (158,811,790)	$ (169,013,706)	$ (182,995,837)	$ (194,292,829)	$ (206,188,757)

2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
58728	63426	68501	73981	79899	86291	93194	100650	108702	117398	126790	136933	147887	159718	172496	186296	201199	217295
23783	24497	25232	25989	26768	27572	28399	29251	30128	31032	31963	32922	33910	34927	35975	37054	38165	39310

					$ 4,604,875												
	$ 1,875,000								$ 1,875,000								
$ -	$ 1,875,000	$ -	$ -	$ -	$ 4,604,875	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
$ 2,196,432	$ 2,372,147	$ 2,561,919	$ 2,766,872	$ 2,988,222	$ 3,227,280	$ 3,485,462	$ 3,764,299	$ 4,065,443	$ 4,390,678	$ 4,741,933	$ 5,121,287	$ 5,530,990	$ 5,973,470	$ 6,451,347	$ 6,967,455	$ 7,524,851	$ 8,126,839
$ 762,123	$ 823,093	$ 888,940	$ 960,055	$ 1,036,860	$ 1,119,809	$ 1,209,393	$ 1,306,145	$ 1,410,636	$ 1,523,487	$ 1,645,366	$ 1,776,996	$ 1,919,155	$ 2,072,688	$ 2,238,503	$ 2,417,583	$ 2,610,990	$ 2,819,869
$ 4,447,508	$ 4,580,933	$ 4,718,361	$ 4,859,912	$ 5,005,709													
					$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
					$ 1,031,176	$ 1,062,111	$ 1,093,975	$ 1,126,794	$ 1,160,598	$ 1,195,416	$ 1,231,278	$ 1,268,217	$ 1,306,263	$ 1,345,451	$ 1,385,814	$ 1,427,389	$ 1,470,211
					$ 357,800	$ 368,534	$ 379,590	$ 390,977	$ 402,707	$ 414,788	$ 427,232	$ 440,049	$ 453,250	$ 466,848	$ 480,853	$ 495,279	$ 510,137
$ 10,982,162	$ 11,860,735	$ 12,809,594	$ 13,834,361	$ 14,941,110	$ 21,292,279	$ 22,737,868	$ 24,291,369	$ 25,961,185	$ 27,756,381	$ 29,686,742	$ 31,762,828	$ 33,996,034	$ 36,398,663	$ 38,983,990	$ 41,766,347	$ 44,761,201	$ 47,985,250
$ 18,463,225	$ 19,711,908	$ 21,053,814	$ 22,496,201	$ 24,046,901	$ 27,178,343	$ 29,013,368	$ 30,985,377	$ 33,105,036	$ 35,383,852	$ 37,834,245	$ 40,469,620	$ 43,304,445	$ 46,354,333	$ 49,636,139	$ 53,168,052	$ 56,969,709	$ 61,062,305
$ 18,463,225	$ 19,711,908	$ 21,053,814	$ 22,496,201	$ 24,046,901	$ 27,178,343	$ 29,013,368	$ 30,985,377	$ 33,105,036	$ 35,383,852	$ 37,834,245	$ 40,469,620	$ 43,304,445	$ 46,354,333	$ 49,636,139	$ 53,168,052	$ 56,969,709	$ 61,062,305
$ 18,463,225	$ 21,586,908	$ 21,053,814	$ 22,496,201	$ 24,046,901	$ 31,783,218	$ 29,013,368	$ 32,860,377	$ 33,105,036	$ 35,383,852	$ 37,834,245	$ 40,469,620	$ 43,304,445	$ 46,354,333	$ 49,636,139	$ 53,168,052	$ 56,969,709	$ 61,062,305
$ 12,532,110	$ 14,464,307	$ 13,926,068	$ 14,689,177	$ 15,500,224	$ 20,224,011	$ 18,224,605	$ 20,376,194	$ 20,264,465	$ 21,381,429	$ 22,568,737	$ 23,830,978	$ 25,173,046	$ 26,600,156	$ 28,117,868	$ 29,732,108	$ 31,449,194	$ 33,275,858
$ 16,876,391	$ 19,672,589	$ 19,129,381	$ 20,378,790	$ 21,718,378	$ 28,619,709	$ 26,047,411	$ 29,412,912	$ 29,543,273	$ 31,482,464	$ 33,561,994	$ 35,792,405	$ 38,185,044	$ 40,752,121	$ 43,506,779	$ 46,463,162	$ 49,636,492	$ 53,043,155
$ 9,333,371	$ 10,667,086	$ 10,169,755	$ 10,622,170	$ 11,099,095	$ 14,340,051	$ 12,796,033	$ 14,166,876	$ 13,951,470	$ 14,576,572	$ 15,235,606	$ 15,930,454	$ 16,663,102	$ 17,435,648	$ 18,250,304	$ 19,109,408	$ 20,015,427	$ 20,970,965
$ (12,532,110)	$ (14,464,307)	$ (13,926,068)	$ (14,689,177)	$ (15,500,224)	$ (20,224,011)	$ (18,224,605)	$ (20,376,194)	$ (20,264,465)	$ (21,381,429)	$ (22,568,737)	$ (23,830,978)	$ (25,173,046)	$ (26,600,156)	$ (28,117,868)	$ (29,732,108)	$ (31,449,194)	$ (33,275,858)
$ (218,720,867)	$ (233,185,173)	$ (247,111,242)	$ (261,800,419)	$ (277,300,643)	$ (297,524,654)	$ (315,749,258)	$ (336,125,453)	$ (356,389,917)	$ (377,771,347)	$ (400,340,084)	$ (424,171,062)	$ (449,344,108)	$ (475,944,265)	$ (504,062,133)	$ (533,794,241)	$ (565,243,435)	$ (598,519,293)

2069	2070	2071
48	49	50
234679	253453	273729
40490	41704	42956
$ -	$ -	$ -
$ 75,000	$ 75,000	$ 75,000
$ 8,776,987	$ 9,479,145	$ 10,237,477
$ 3,045,458	$ 3,289,095	$ 3,552,222
$ 75,000	$ 75,000	$ 75,000
$ 1,514,317	$ 1,559,746	$ 1,606,539
$ 525,441	$ 541,204	$ 557,440
$ 51,456,517	$ 55,194,459	$ 59,220,079
$ 65,468,720	$ 70,213,650	$ 75,323,758
$ 65,468,720	$ 70,213,650	$ 75,323,758
$ 65,468,720	$ 70,213,650	$ 75,323,758
$ 35,219,280	$ 37,287,110	$ 39,487,507
$ 56,700,784	$ 60,628,362	$ 64,846,319
$ 21,978,772	$ 23,041,752	$ 24,162,969
$ (35,219,280)	$ (37,287,110)	$ (39,487,507)
$ (633,738,573)	$ (671,025,683)	$ (710,513,190)

Life Cycle Cost Analysis - Option 1 - Low waste generation and Hidden costs 1&2

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 1 - Low waste generation and Hidden costs 1&2

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	2.0%
Cooma waste generation rate	1.0%

Option 1 - Waste Diversion (low waste generation and Hidden costs 1 & 2)

Jindabyne landfilling life	**0 years**
Cooma landfilling life	**33 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Period			1	2	3	4	5	6	7	8	9
Waste generated in Jindabyne			5015	5115	5218	5322	5428	5537	5648	5761	5876
Waste generated in Cooma			9516	9611	9707	9804	9902	10001	10101	10202	10304
CAPEX	Years incurred										
JRWMF											
CL											
Capping profile - Typ.	4										
Design and planning approvals (hidden cost if required)	1	$	200,000								
Basal liner profile - Typ. (hidden cost if required)	4			$ 3,210,000							
OTHER											
New landfill site construction	4										
Total CAPEX		$	200,000	$ 3,210,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
OPEX											
JRWMF											
Transfer station operations		$	187,558	$ 191,309	$ 195,135	$ 199,038	$ 203,018	$ 207,079	$ 211,220	$ 215,445	$ 219,754
Waste haulage costs		$	65,079	$ 66,381	$ 67,708	$ 69,063	$ 70,444	$ 71,853	$ 73,290	$ 74,755	$ 76,251
CL											
Landfill operations		$	2,717,254	$ 2,753,804	$ 2,790,908	$ 2,828,573	$ 2,866,811	$ 2,905,630	$ 2,945,040	$ 2,985,052	$ 3,025,674
Aftercare management											
Transfer station operations											
Waste haulage costs											
Cover material acquisition (hidden cost if required)				$ 30,410	$ 30,714	$ 31,021	$ 31,331	$ 31,645	$ 31,961	$ 32,281	$ 32,603
New Landfill											
Landfill operations											
Total OPEX		$	2,969,890	$ 3,041,903	$ 3,084,465	$ 3,127,694	$ 3,171,604	$ 3,216,206	$ 3,261,511	$ 3,307,532	$ 3,354,282
Net Operating Costs		$	2,969,890	$ 3,041,903	$ 3,084,465	$ 3,127,694	$ 3,171,604	$ 3,216,206	$ 3,261,511	$ 3,307,532	$ 3,354,282
Net Costs		$	3,169,890	$ 6,251,903	$ 3,084,465	$ 3,127,694	$ 3,171,604	$ 3,216,206	$ 3,261,511	$ 3,307,532	$ 3,354,282
Present Cost (actual rate)	**1.3%**	$	3,129,211	$ 6,092,469	$ 2,967,232	$ 2,970,206	$ 2,973,252	$ 2,976,372	$ 2,979,564	$ 2,982,830	$ 2,986,170
Present Cost (sensitivity rate 1)	**0.3%**	$	3,160,409	$ 6,214,560	$ 3,056,870	$ 3,090,442	$ 3,124,455	$ 3,158,917	$ 3,193,834	$ 3,229,213	$ 3,265,060
Present Cost (sensitivity rate 2)	**2.3%**	$	3,098,622	$ 5,973,942	$ 2,881,064	$ 2,855,761	$ 2,830,746	$ 2,806,015	$ 2,781,566	$ 2,757,395	$ 2,733,499
Life Cycle Cost Analysis											
Life Cycle Cost (actual rate)	**1.3%**	$	(211,707,468)								
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(276,758,042)								
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(165,351,576)								
Yearly cashflow		$	(3,129,211)	$ (6,092,469)	$ (2,967,232)	$ (2,970,206)	$ (2,973,252)	$ (2,976,372)	$ (2,979,564)	$ (2,982,830)	$ (2,986,170)
Cumulative expenditure		$	(3,129,211)	$ (9,221,680)	$ (12,188,912)	$ (15,159,118)	$ (18,132,370)	$ (21,108,742)	$ (24,088,306)	$ (27,071,136)	$ (30,057,306)

	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	5993	6113	6235	6360	6487	6617	6749	6884	7022	7163	7306	7452	7601	7753	7908	8066	8227	8392
	10407	10511	10617	10723	10830	10938	11048	11158	11270	11382	11496	11611	11727	11845	11963	12083	12203	12325
	$ 4,604,875								$ 4,604,875								$ 4,604,875	
	$ 3,210,000								$ 3,210,000								$ 3,210,000	
	$ 7,814,875	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,814,875	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,814,875	$ -
	$ 224,149	$ 228,632	$ 233,204	$ 237,868	$ 242,626	$ 247,478	$ 252,428	$ 257,476	$ 262,626	$ 267,878	$ 273,236	$ 278,701	$ 284,275	$ 289,960	$ 295,759	$ 301,675	$ 307,708	$ 313,862
	$ 77,776	$ 79,331	$ 80,918	$ 82,536	$ 84,187	$ 85,871	$ 87,588	$ 89,340	$ 91,127	$ 92,949	$ 94,808	$ 96,704	$ 98,638	$ 100,611	$ 102,623	$ 104,676	$ 106,769	$ 108,905
	$ 3,066,919	$ 3,108,795	$ 3,151,315	$ 3,194,488	$ 3,238,327	$ 3,282,841	$ 3,328,044	$ 3,373,945	$ 3,420,559	$ 3,467,896	$ 3,515,968	$ 3,564,790	$ 3,614,373	$ 3,664,730	$ 3,715,876	$ 3,767,822	$ 3,820,584	$ 3,874,175
	$ 32,929	$ 33,259	$ 33,591	$ 33,927	$ 34,266	$ 34,609	$ 34,955	$ 35,305	$ 35,658	$ 36,014	$ 36,375	$ 36,738	$ 37,106	$ 37,477	$ 37,852	$ 38,230	$ 38,612	$ 38,998
																	$ 3,820,584	$ 3,874,175
	$ 3,401,773	$ 3,450,017	$ 3,499,028	$ 3,548,820	$ 3,599,406	$ 3,650,799	$ 3,703,015	$ 3,756,066	$ 3,809,969	$ 3,864,737	$ 3,920,387	$ 3,976,933	$ 4,034,391	$ 4,092,778	$ 4,152,110	$ 4,212,403	$ 8,094,258	$ 8,210,116
	$ 3,401,773	$ 3,450,017	$ 3,499,028	$ 3,548,820	$ 3,599,406	$ 3,650,799	$ 3,703,015	$ 3,756,066	$ 3,809,969	$ 3,864,737	$ 3,920,387	$ 3,976,933	$ 4,034,391	$ 4,092,778	$ 4,152,110	$ 4,212,403	$ 8,094,258	$ 8,210,116
	$ 11,216,648	$ 3,450,017	$ 3,499,028	$ 3,548,820	$ 3,599,406	$ 3,650,799	$ 3,703,015	$ 3,756,066	$ 11,624,844	$ 3,864,737	$ 3,920,387	$ 3,976,933	$ 4,034,391	$ 4,092,778	$ 4,152,110	$ 4,212,403	$ 15,909,133	$ 8,210,116
	$ 9,857,542	$ 2,993,073	$ 2,996,637	$ 3,000,276	$ 3,003,991	$ 3,007,781	$ 3,011,649	$ 3,015,593	$ 9,213,340	$ 3,023,713	$ 3,027,890	$ 3,032,145	$ 3,036,479	$ 3,040,892	$ 3,045,385	$ 3,049,957	$ 11,371,060	$ 5,792,877
	$ 10,885,634	$ 3,338,189	$ 3,375,486	$ 3,413,279	$ 3,451,578	$ 3,490,390	$ 3,529,722	$ 3,569,582	$ 11,014,641	$ 3,650,920	$ 3,692,413	$ 3,734,468	$ 3,777,092	$ 3,820,294	$ 3,864,083	$ 3,908,468	$ 14,717,101	$ 7,572,236
	$ 8,935,251	$ 2,686,515	$ 2,663,421	$ 2,640,589	$ 2,618,014	$ 2,595,694	$ 2,573,625	$ 2,551,805	$ 7,720,150	$ 2,508,898	$ 2,487,805	$ 2,466,948	$ 2,446,325	$ 2,425,932	$ 2,405,767	$ 2,385,827	$ 8,808,055	$ 4,443,316
	$ (9,857,542)	$ (2,993,073)	$ (2,996,637)	$ (3,000,276)	$ (3,003,991)	$ (3,007,781)	$ (3,011,649)	$ (3,015,593)	$ (9,213,340)	$ (3,023,713)	$ (3,027,890)	$ (3,032,145)	$ (3,036,479)	$ (3,040,892)	$ (3,045,385)	$ (3,049,957)	$ (11,371,060)	$ (5,792,877)
	$ (39,914,848)	$ (42,907,921)	$ (45,904,558)	$ (48,904,834)	$ (51,908,824)	$ (54,916,606)	$ (57,928,254)	$ (60,943,847)	$ (70,157,187)	$ (73,180,900)	$ (76,208,789)	$ (79,240,934)	$ (82,277,413)	$ (85,318,305)	$ (88,363,689)	$ (91,413,646)	$ (102,784,706)	$ (108,577,583)

	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066
	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	8560	8731	8906	9084	9265	9451	9640	9833	10029	10230	10434	10643	10856	11073	11295	11520	11751	11986
	12449	12573	12699	12826	12954	13084	13215	13347	13480	13615	13751	13889	14028	14168	14309	14453	14597	14743
							$ 4,604,875											
						$ 1,875,000						$ 1,875,000					$ 1,875,000	
	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ 4,604,875	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ 1,875,000	$ -
	$ 320,139	$ 326,542	$ 333,073	$ 339,735	$ 346,529	$ 353,460	$ 360,529	$ 367,740	$ 375,094	$ 382,596	$ 390,248	$ 398,053	$ 406,014	$ 414,135	$ 422,417	$ 430,866	$ 439,483	$ 448,273
	$ 111,083	$ 113,304	$ 115,570	$ 117,882	$ 120,239	$ 122,644	$ 125,097	$ 127,599	$ 130,151	$ 132,754	$ 135,409	$ 138,117	$ 140,880	$ 143,697	$ 146,571	$ 149,503	$ 152,493	$ 155,543
	$ 3,928,610	$ 3,983,903	$ 4,040,070	$ 4,097,124	$ 4,155,082	$ 4,213,959												
							$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
							$ 494,225	$ 499,168	$ 504,159	$ 509,201	$ 514,293	$ 519,436	$ 524,630	$ 529,876	$ 535,175	$ 540,527	$ 545,932	$ 551,392
							$ 171,487	$ 173,202	$ 174,934	$ 176,684	$ 178,450	$ 180,235	$ 182,037	$ 183,858	$ 185,696	$ 187,553	$ 189,429	$ 191,323
	$ 39,388	$ 39,782	$ 40,180	$ 40,582	$ 40,988	$ 41,398												
	$ 3,928,610	$ 3,983,903	$ 4,040,070	$ 4,097,124	$ 4,155,082	$ 4,213,959	$ 4,273,772	$ 4,334,536	$ 4,396,268	$ 4,458,986	$ 4,522,705	$ 4,587,445	$ 4,653,222	$ 4,720,055	$ 4,787,962	$ 4,856,963	$ 4,927,076	$ 4,998,320
	$ 8,327,831	$ 8,447,436	$ 8,568,963	$ 8,692,446	$ 8,817,920	$ 8,945,420	$ 5,500,111	$ 5,577,245	$ 5,655,607	$ 5,735,221	$ 5,816,106	$ 5,898,286	$ 5,981,783	$ 6,066,621	$ 6,152,822	$ 6,240,411	$ 6,329,412	$ 6,419,850
	$ 8,327,831	$ 8,447,436	$ 8,568,963	$ 8,692,446	$ 8,817,920	$ 8,945,420	$ 5,500,111	$ 5,577,245	$ 5,655,607	$ 5,735,221	$ 5,816,106	$ 5,898,286	$ 5,981,783	$ 6,066,621	$ 6,152,822	$ 6,240,411	$ 6,329,412	$ 6,419,850
	$ 8,327,831	$ 8,447,436	$ 8,568,963	$ 8,692,446	$ 8,817,920	$ 10,820,420	$ 10,104,986	$ 5,577,245	$ 5,655,607	$ 5,735,221	$ 5,816,106	$ 7,773,286	$ 5,981,783	$ 6,066,621	$ 6,152,822	$ 6,240,411	$ 8,204,412	$ 6,419,850
	$ 5,800,527	$ 5,808,326	$ 5,816,275	$ 5,824,373	$ 5,832,623	$ 7,065,330	$ 6,513,502	$ 3,548,862	$ 3,552,542	$ 3,556,318	$ 3,560,192	$ 4,697,170	$ 3,568,230	$ 3,572,396	$ 3,576,660	$ 3,581,022	$ 4,647,633	$ 3,590,045
	$ 7,657,831	$ 7,744,580	$ 7,832,498	$ 7,921,603	$ 8,011,915	$ 9,801,969	$ 9,126,494	$ 5,022,119	$ 5,077,450	$ 5,133,524	$ 5,190,353	$ 6,916,212	$ 5,306,319	$ 5,365,480	$ 5,425,443	$ 5,486,218	$ 7,191,284	$ 5,610,259
	$ 4,405,692	$ 4,368,492	$ 4,331,709	$ 4,295,338	$ 4,259,375	$ 5,109,145	$ 4,664,060	$ 2,516,358	$ 2,494,344	$ 2,472,588	$ 2,451,084	$ 3,202,248	$ 2,408,825	$ 2,388,064	$ 2,367,542	$ 2,347,259	$ 3,016,613	$ 2,307,392
	$ (5,800,527)	$ (5,808,326)	$ (5,816,275)	$ (5,824,373)	$ (5,832,623)	$ (7,065,330)	$ (6,513,502)	$ (3,548,862)	$ (3,552,542)	$ (3,556,318)	$ (3,560,192)	$ (4,697,170)	$ (3,568,230)	$ (3,572,396)	$ (3,576,660)	$ (3,581,022)	$ (4,647,633)	$ (3,590,045)
	$ (114,378,110)	$ (120,186,436)	$ (126,002,710)	$ (131,827,084)	$ (137,659,707)	$ (144,725,037)	$ (151,238,539)	$ (154,787,401)	$ (158,339,942)	$ (161,896,261)	$ (165,456,453)	$ (170,153,623)	$ (173,721,853)	$ (177,294,249)	$ (180,870,909)	$ (184,451,932)	$ (189,099,565)	$ (192,689,610)

	2067	2068	2069	2070	2071
	46	47	48	49	50
	12226	12470	12720	12974	13233
	14891	15039	15190	15342	15495
				$ 1,875,000	
	$ -	$ -	$ -	$ 1,875,000	$ -
	$ 457,238	$ 466,383	$ 475,710	$ 485,225	$ 494,929
	$ 158,653	$ 161,827	$ 165,063	$ 168,364	$ 171,732
	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	$ 556,905	$ 562,475	$ 568,099	$ 573,780	$ 579,518
	$ 193,236	$ 195,169	$ 197,120	$ 199,092	$ 201,082
	$ 5,070,717	$ 5,144,286	$ 5,219,048	$ 5,295,024	$ 5,372,236
	$ 6,511,750	$ 6,605,139	$ 6,700,041	$ 6,796,485	$ 6,894,497
	$ 6,511,750	$ 6,605,139	$ 6,700,041	$ 6,796,485	$ 6,894,497
	$ 6,511,750	$ 6,605,139	$ 6,700,041	$ 8,671,485	$ 6,894,497
	$ 3,594,705	$ 3,599,465	$ 3,604,326	$ 4,605,011	$ 3,614,351
	$ 5,673,549	$ 5,737,703	$ 5,802,735	$ 7,487,688	$ 5,935,481
	$ 2,287,803	$ 2,268,439	$ 2,249,298	$ 2,845,689	$ 2,211,673
	$ (3,594,705)	$ (3,599,465)	$ (3,604,326)	$ (4,605,011)	$ (3,614,351)
	$ (196,284,315)	$ (199,883,780)	$ (203,488,107)	$ (208,093,117)	$ (211,707,468)

Life Cycle Cost Analysis - Option 1 - High waste generation and Hidden costs 1&2

Client: Snowy Monaro Regional Council
Project: Jindabyne Regional Waste Management Facility Upgrade
Subject: Life Cycle Cost Analysis - Option 1 - High waste generation and Hidden costs 1&2

Project Number: 12520178
Prepared by: N Spurrett
Checked by: C Nivison-Smith

Revision: A
Date of issue: 11-Dec-20

CAPEX sensitivity	0.0%
OPEX sensitivity	0.0%
Jindabyne waste generation rate	8.0%
Cooma waste generation rate	3.0%

Option 1 - Waste Diversion (high waste generation and Hidden costs 1 & 2)

Jindabyne landfilling life	**0 years**
Cooma landfilling life	**20 years**

Year			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Period			1	2	3	4	5	6	7	8	9
Waste generated in Jindabyne			6303	6807	7352	7940	8575	9261	10002	10802	11667
Waste generated in Cooma			10092	10395	10707	11028	11359	11700	12051	12412	12785
CAPEX	Years incurred										
JRWMF											
CL											
Capping profile - Typ.	4							$ 4,604,875			
Design and planning approvals (hidden cost if required)	1	$	200,000								
Basal liner profile - Typ. (hidden cost if required)	4			$ 3,210,000					$ 3,210,000		
OTHER											
New landfill site construction	4										
Total CAPEX		$	200,000	$ 3,210,000	$ -	$ -	$ -	$ 4,604,875	$ 3,210,000	$ -	$ -
OPEX											
JRWMF											
Transfer station operations		$	235,738	$ 254,597	$ 274,964	$ 296,962	$ 320,718	$ 346,376	$ 374,086	$ 404,013	$ 436,334
Waste haulage costs		$	81,797	$ 88,341	$ 95,408	$ 103,040	$ 111,284	$ 120,186	$ 129,801	$ 140,185	$ 151,400
CL											
Landfill operations		$	3,065,972	$ 3,216,886	$ 3,377,041	$ 3,547,094	$ 3,727,747	$ 3,919,759	$ 4,123,946	$ 4,341,185	$ 4,572,424
Aftercare management											
Transfer station operations											
Waste haulage costs											
Cover material acquisition (hidden cost if required)				$ 30,410	$ 31,322	$ 32,262	$ 33,230	$ 34,226	$ 35,253	$ 36,311	$ 37,400
New Landfill											
Landfill operations											
Total OPEX		$	3,383,506	$ 3,590,232	$ 3,778,735	$ 3,979,357	$ 4,192,978	$ 4,420,547	$ 4,663,086	$ 4,921,694	$ 5,197,558
Net Operating Costs		$	3,383,506	$ 3,590,232	$ 3,778,735	$ 3,979,357	$ 4,192,978	$ 4,420,547	$ 4,663,086	$ 4,921,694	$ 5,197,558
Net Costs		$	3,583,506	$ 6,800,232	$ 3,778,735	$ 3,979,357	$ 4,192,978	$ 9,025,422	$ 7,873,086	$ 4,921,694	$ 5,197,558
Present Cost (actual rate)	**1.3%**	$	3,537,519	$ 6,626,815	$ 3,635,115	$ 3,778,985	$ 3,930,750	$ 8,352,392	$ 7,192,484	$ 4,438,529	$ 4,627,158
Present Cost (sensitivity rate 1)	**0.3%**	$	3,572,788	$ 6,759,614	$ 3,744,930	$ 3,931,961	$ 4,130,646	$ 8,864,657	$ 7,709,717	$ 4,805,153	$ 5,059,306
Present Cost (sensitivity rate 2)	**2.3%**	$	3,502,939	$ 6,497,892	$ 3,529,552	$ 3,633,376	$ 3,742,350	$ 7,874,332	$ 6,714,529	$ 4,103,076	$ 4,235,636
Life Cycle Cost Analysis											
Life Cycle Cost (actual rate)	**1.3%**	$	(732,065,965)								
Life Cycle Cost (sensitivity rate 1)	**0.3%**	$	(1,038,061,199)								
Life Cycle Cost (sensitivity rate 2)	**2.3%**	$	(526,723,153)								
Yearly cashflow		$	(3,537,519)	$ (6,626,815)	$ (3,635,115)	$ (3,778,985)	$ (3,930,750)	$ (8,352,392)	$ (7,192,484)	$ (4,438,529)	$ (4,627,158)
Cumulative expenditure		$	(3,537,519)	$ (10,164,334)	$ (13,799,449)	$ (17,578,434)	$ (21,509,183)	$ (29,861,575)	$ (37,054,059)	$ (41,492,588)	$ (46,119,747)

	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	12600	13608	14697	15872	17142	18514	19995	21594	23322	25187	27202	29379	31729	34267	37009	39969	43167	46620
	13168	13563	13970	14389	14821	15266	15724	16195	16681	17182	17697	18228	18775	19338	19918	20516	21131	21765
		$ 4,604,875					$ 4,604,875					$ 4,604,875						
			$ 3,210,000					$ 3,210,000										
											$ 1,875,000							
	$ -	$ 4,604,875	$ 3,210,000	$ -	$ -	$ -	$ 4,604,875	$ 3,210,000	$ -	$ -	$ 1,875,000	$ 4,604,875	$ -	$ -	$ -	$ -	$ -	$ -
	$ 471,241	$ 508,940	$ 549,655	$ 593,627	$ 641,118	$ 692,407	$ 747,800	$ 807,624	$ 872,234	$ 942,012	$ 1,017,373	$ 1,098,763	$ 1,186,664	$ 1,281,597	$ 1,384,125	$ 1,494,855	$ 1,614,443	$ 1,743,599
	$ 163,512	$ 176,593	$ 190,721	$ 205,978	$ 222,456	$ 240,253	$ 259,473	$ 280,231	$ 302,650	$ 326,861	$ 353,010	$ 381,251	$ 411,751	$ 444,691	$ 480,267	$ 518,688	$ 560,183	$ 604,998
	$ 4,818,680	$ 5,081,051	$ 5,360,717	$ 5,658,953	$ 5,977,128	$ 6,316,721	$ 6,679,325	$ 7,066,655	$ 7,480,560	$ 7,923,035	$ 8,396,229							
												$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
												$ 681,729	$ 702,181	$ 723,246	$ 744,944	$ 767,292	$ 790,311	$ 814,020
												$ 236,548	$ 243,644	$ 250,954	$ 258,482	$ 266,237	$ 274,224	$ 282,450
	$ 38,522	$ 39,678	$ 40,868	$ 42,094	$ 43,357	$ 44,658	$ 45,998	$ 47,377	$ 48,799	$ 50,263	$ 51,771							
												$ 8,902,460	$ 9,444,224	$ 10,024,217	$ 10,645,343	$ 11,310,734	$ 12,023,770	$ 12,788,094
	$ 5,491,955	$ 5,806,262	$ 6,141,961	$ 6,500,653	$ 6,884,059	$ 7,294,039	$ 7,732,595	$ 8,201,887	$ 8,704,242	$ 9,242,172	$ 9,818,384	$ 11,375,750	$ 12,063,464	$ 12,799,705	$ 13,588,160	$ 14,432,806	$ 15,337,931	$ 16,308,161
	$ 5,491,955	$ 5,806,262	$ 6,141,961	$ 6,500,653	$ 6,884,059	$ 7,294,039	$ 7,732,595	$ 8,201,887	$ 8,704,242	$ 9,242,172	$ 9,818,384	$ 11,375,750	$ 12,063,464	$ 12,799,705	$ 13,588,160	$ 14,432,806	$ 15,337,931	$ 16,308,161
	$ 5,491,955	$ 10,411,137	$ 9,351,961	$ 6,500,653	$ 6,884,059	$ 7,294,039	$ 12,337,470	$ 11,411,887	$ 8,704,242	$ 9,242,172	$ 11,693,384	$ 15,980,625	$ 12,063,464	$ 12,799,705	$ 13,588,160	$ 14,432,806	$ 15,337,931	$ 16,308,161
	$ 4,826,503	$ 9,032,215	$ 8,009,204	$ 5,495,841	$ 5,745,296	$ 6,009,335	$ 10,034,021	$ 9,162,139	$ 6,898,600	$ 7,230,937	$ 9,031,321	$ 12,184,155	$ 9,079,548	$ 9,510,048	$ 9,966,300	$ 10,449,960	$ 10,962,792	$ 11,506,678
	$ 5,329,883	$ 10,073,674	$ 9,021,765	$ 6,252,372	$ 6,601,332	$ 6,973,553	$ 11,760,105	$ 10,845,300	$ 8,247,345	$ 8,730,845	$ 11,013,403	$ 15,006,319	$ 11,294,097	$ 11,947,540	$ 12,645,566	$ 13,391,445	$ 14,188,697	$ 15,041,107
	$ 4,374,925	$ 8,107,112	$ 7,118,608	$ 4,836,974	$ 5,007,094	$ 5,186,013	$ 8,574,642	$ 7,753,034	$ 5,780,555	$ 5,999,803	$ 7,420,403	$ 9,913,008	$ 7,314,895	$ 7,586,831	$ 7,873,094	$ 8,174,476	$ 8,491,811	$ 8,825,979
	$ (4,826,503)	$ (9,032,215)	$ (8,009,204)	$ (5,495,841)	$ (5,745,296)	$ (6,009,335)	$ (10,034,021)	$ (9,162,139)	$ (6,898,600)	$ (7,230,937)	$ (9,031,321)	$ (12,184,155)	$ (9,079,548)	$ (9,510,048)	$ (9,966,300)	$ (10,449,960)	$ (10,962,792)	$ (11,506,678)
	$ (50,946,249)	$ (59,978,464)	$ (67,987,668)	$ (73,483,509)	$ (79,228,805)	$ (85,238,140)	$ (95,272,160)	$ (104,434,299)	$ (111,332,899)	$ (118,563,836)	$ (127,595,157)	$ (139,779,312)	$ (148,858,860)	$ (158,368,909)	$ (168,335,209)	$ (178,785,169)	$ (189,747,961)	$ (201,254,639)

	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066
	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
	50350	54378	58728	63426	68501	73981	79899	86291	93194	100650	108702	117398	126790	136933	147887	159718	172496	186296
	22418	23091	23783	24497	25232	25989	26768	27572	28399	29251	30128	31032	31963	32922	33910	34927	35975	37054
	$ 1,875,000								$ 1,875,000								$ 1,875,000	
	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,875,000	$ -
	$ 1,883,087	$ 2,033,734	$ 2,196,432	$ 2,372,147	$ 2,561,919	$ 2,766,872	$ 2,988,222	$ 3,227,280	$ 3,485,462	$ 3,764,299	$ 4,065,443	$ 4,390,678	$ 4,741,933	$ 5,121,287	$ 5,530,990	$ 5,973,470	$ 6,451,347	$ 6,967,455
	$ 653,398	$ 705,669	$ 762,123	$ 823,093	$ 888,940	$ 960,055	$ 1,036,860	$ 1,119,809	$ 1,209,393	$ 1,306,145	$ 1,410,636	$ 1,523,487	$ 1,645,366	$ 1,776,996	$ 1,919,155	$ 2,072,688	$ 2,238,503	$ 2,417,583
	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	$ 838,441	$ 863,594	$ 889,502	$ 916,187	$ 943,672	$ 971,982	$ 1,001,142	$ 1,031,176	$ 1,062,111	$ 1,093,975	$ 1,126,794	$ 1,160,598	$ 1,195,416	$ 1,231,278	$ 1,268,217	$ 1,306,263	$ 1,345,451	$ 1,385,814
	$ 290,924	$ 299,652	$ 308,641	$ 317,900	$ 327,437	$ 337,261	$ 347,378	$ 357,800	$ 368,534	$ 379,590	$ 390,977	$ 402,707	$ 414,788	$ 427,232	$ 440,049	$ 453,250	$ 466,848	$ 480,853
	$ 13,607,636	$ 14,486,637	$ 15,429,670	$ 16,441,668	$ 17,527,955	$ 18,694,273	$ 19,946,819	$ 21,292,279	$ 22,737,868	$ 24,291,369	$ 25,961,185	$ 27,756,381	$ 29,686,742	$ 31,762,828	$ 33,996,034	$ 36,398,663	$ 38,983,990	$ 41,766,347
	$ 17,348,485	$ 18,464,286	$ 19,661,368	$ 20,945,995	$ 22,324,923	$ 23,805,444	$ 25,395,421	$ 27,103,343	$ 28,938,368	$ 30,910,377	$ 33,030,036	$ 35,308,852	$ 37,759,245	$ 40,394,620	$ 43,229,445	$ 46,279,333	$ 49,561,139	$ 53,093,052
	$ 17,348,485	$ 18,464,286	$ 19,661,368	$ 20,945,995	$ 22,324,923	$ 23,805,444	$ 25,395,421	$ 27,103,343	$ 28,938,368	$ 30,910,377	$ 33,030,036	$ 35,308,852	$ 37,759,245	$ 40,394,620	$ 43,229,445	$ 46,279,333	$ 49,561,139	$ 53,093,052
	$ 19,223,485	$ 18,464,286	$ 19,661,368	$ 20,945,995	$ 22,324,923	$ 23,805,444	$ 25,395,421	$ 27,103,343	$ 30,813,368	$ 30,910,377	$ 33,030,036	$ 35,308,852	$ 37,759,245	$ 40,394,620	$ 43,229,445	$ 46,279,333	$ 51,436,139	$ 53,093,052
	$ 13,389,602	$ 12,695,757	$ 13,345,362	$ 14,034,863	$ 14,766,845	$ 15,544,064	$ 16,369,457	$ 17,246,155	$ 19,355,266	$ 19,167,030	$ 20,218,555	$ 21,336,109	$ 22,523,998	$ 23,786,814	$ 25,129,448	$ 26,557,118	$ 29,137,532	$ 29,690,168
	$ 17,676,896	$ 16,927,992	$ 17,971,558	$ 19,088,512	$ 20,284,304	$ 21,564,803	$ 22,936,318	$ 24,405,641	$ 27,663,402	$ 27,667,492	$ 29,476,342	$ 31,415,734	$ 33,495,463	$ 35,726,073	$ 38,118,910	$ 40,686,185	$ 45,084,505	$ 46,397,620
	$ 10,169,846	$ 9,548,587	$ 9,939,046	$ 10,350,381	$ 10,783,747	$ 11,240,364	$ 11,721,518	$ 12,228,570	$ 13,589,903	$ 13,326,186	$ 13,919,863	$ 14,545,675	$ 15,205,404	$ 15,900,931	$ 16,634,243	$ 17,407,437	$ 18,912,131	$ 19,082,452
	$ (13,389,602)	$ (12,695,757)	$ (13,345,362)	$ (14,034,863)	$ (14,766,845)	$ (15,544,064)	$ (16,369,457)	$ (17,246,155)	$ (19,355,266)	$ (19,167,030)	$ (20,218,555)	$ (21,336,109)	$ (22,523,998)	$ (23,786,814)	$ (25,129,448)	$ (26,557,118)	$ (29,137,532)	$ (29,690,168)
	$ (214,644,241)	$ (227,339,998)	$ (240,685,360)	$ (254,720,223)	$ (269,487,068)	$ (285,031,132)	$ (301,400,589)	$ (318,646,744)	$ (338,002,010)	$ (357,169,040)	$ (377,387,596)	$ (398,723,705)	$ (421,247,703)	$ (445,034,517)	$ (470,163,965)	$ (496,721,083)	$ (525,858,615)	$ (555,548,783)

	2067	2068	2069	2070	2071
	46	47	48	49	50
	201199	217295	234679	253453	273729
	38165	39310	40490	41704	42956
	$ -	$ -	$ -	$ -	$ -
	$ 7,524,851	$ 8,126,839	$ 8,776,987	$ 9,479,145	$ 10,237,477
	$ 2,610,990	$ 2,819,869	$ 3,045,458	$ 3,289,095	$ 3,552,222
	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
	$ 1,427,389	$ 1,470,211	$ 1,514,317	$ 1,559,746	$ 1,606,539
	$ 495,279	$ 510,137	$ 525,441	$ 541,204	$ 557,440
	$ 44,761,201	$ 47,985,250	$ 51,456,517	$ 55,194,459	$ 59,220,079
	$ 56,894,709	$ 60,987,305	$ 65,393,720	$ 70,138,650	$ 75,248,758
	$ 56,894,709	$ 60,987,305	$ 65,393,720	$ 70,138,650	$ 75,248,758
	$ 56,894,709	$ 60,987,305	$ 65,393,720	$ 70,138,650	$ 75,248,758
	$ 31,407,791	$ 33,234,987	$ 35,178,933	$ 37,247,281	$ 39,448,189
	$ 49,571,146	$ 52,978,004	$ 56,635,828	$ 60,563,600	$ 64,781,751
	$ 19,989,077	$ 20,945,207	$ 21,953,594	$ 23,017,140	$ 24,138,910
	$ (31,407,791)	$ (33,234,987)	$ (35,178,933)	$ (37,247,281)	$ (39,448,189)
	$ (586,956,574)	$ (620,191,561)	$ (655,370,494)	$ (692,617,776)	$ (732,065,965)

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12520178-59227-56/https://projectsportal.ghd.com/sites/pp15_03/jindabynelandfillupg/ProjectDocs/12520178-REP_JRWMF - Feasibility Analysis - New Landfill Cell.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	N. Spurrett	C. Nivison-Smith / D. Gamble		D. Gamble		22.12.20
0	N. Spurrett	C. Nivison-Smith / D. Gamble		D. Gamble		11.12.20

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Risk Type	Risk Class (Nature of Risk)	Identified Risks (What Can Go Wrong?)	Risk Analysis				Risk Treatment/ Controls (What/ When/ Where/ How)	Hierarchy of Controls	Residual Risk Evaluation			
			L	C	Score	Risk Rating			L	C	Score	Risk Rating
Operational	Asset Management	Vandilism of bank of bins rendering bins inoperational	3	2	6	MEDIUM			3	2	6	MEDIUM
Operational		Vandilism of bank of bins rendering bins still operational	4	1	4	MEDIUM			4	1	4	MEDIUM
Operational	Economic Activity	Increase in waste management costs to residents from closure of transfer stations	2	1	2	LOW			2	1	2	LOW
Operational	Environmental Security	Offsite pollution of surface water at Cooma Landfill due to inadequately designed surface water controls	2	4	8	MEDIUM	Upgrading of surface water controls	3	2	4	-7	LOW
Operational		Pollution of groundwater in area surrounding the Cooma Landfill	4	4	16	HIGH	Installation of a landfill liner Review and upgrade of groundwater monitoring program	3	4	4	1	LOW
Operational		Illegal dumping of general solid waste around bank of bins	3	1	3	LOW	Regular incpection of site. Signs to deter illegal dumping. Procedure around compliance of illegal dumping	2	3	1	-7	LOW
Operational		Illegal dumping of hazarous or special waste around bank of bins	1	5	5	MEDIUM	Regular incpection of site. Signs to deter illegal dumping. Procedure around compliance of illegal dumping	2	1	5	-5	LOW
Operational		Increase in illegal dumping of general solid waste due to closure of transfer stations	4	1	4	MEDIUM	Illegal dumping campaign to allign with closure of transfer stations	2	4	1	-6	LOW
Operational	External Political Environment	Expansion of Jindabyne Landfill into quarry going against the goals and views of the Snowy Mountains Special Activation Precinct	4	4	16	HIGH	Landfill expansion in Jindabyne not proceeded	6	4	4	-14	LOW
Operational		Failure to meet National Waste Policy Targets	5	2	10	HIGH	Implement action items of waste strategy	2	5	2	0	LOW
Operational		Failure to meet State Government waste targets	5	2	10	HIGH	Implement action items of waste strategy	2	5	2	0	LOW
Strategic	Financial Sustainability	Introduction of a carbon tax in the strategy action plan period	3	4	12	HIGH	Consolidate landfill disposal to a single site to allow the introduction of landfill gas capture technologies	3	3	4	-3	LOW
Strategic		Introduction a landfill levy in the strategy action plan period	2	5	10	HIGH	Design sites and services to encourage reduction of waste to landfill	3	2	5	-5	LOW
Operational		Operating cost of transfer stations exceeding revenue of transfer stations	5	3	15	HIGH	Replace drop off service with collection services	5	5	3	-10	LOW
Operational		Operating cost of Bombala Landfill exceeding revenue	5	3	15	HIGH	Convert Bombala into a transfer station	5	5	3	-10	LOW
Operational		Revenue geneated by the resource and waste department unable to cover costs	3	4	12	HIGH	Replace ineffecient services such as trasnfer station with more efficient collection services	5	3	4	-13	LOW
Operational	Health and Safety	Bank of bins provide a vector for vermin	3	2	6	MEDIUM	Cleaning schedule for bins Pes control through spraying when required	2	3	2	-4	LOW
Operational		Injury of public while using bank of bin	3	2	6	MEDIUM	Design incoporate safety devices eg removing pinch point	3	3	2	-9	LOW
Operational		Illness of residents or staff using bin	2	2	4	MEDIUM	Cleaning schedule for bins	2	2	2	-6	LOW
Operational		Staff exposure to general solid waste	5	2	10	HIGH	PPE such as gloves and sainitiser in collection trucks	1	5	2	5	MEDIUM
Strategic		Staff injury at remote waste site	2	5	10	HIGH	Clousre of the transfer station sites Larger sites to have more than one employee on site at all times	6	2	5	-20	LOW
Operational	Legislative, Government and Compliance	Prosecution under Part 5.3 of the POEO Act	3	4	12	HIGH	Improvements to water management controls	3	3	4	-3	LOW
Operational		Prosecution under Part 5.4 of the POEO Act	2	3	6	MEDIUM	PIRMP and LEMP in place	2	2	3	-4	LOW
Operational		Prosecution under Part 5.5 of the POEO Act	2	3	6	MEDIUM	Appropriate buffer distances in place	3	2	3	-9	LOW
Operational		Prosectution under Part 5.6 of the POEO Act	1	3	3	LOW			1	3	3	LOW
Operational		Breach of Work Health and Safety Act	3	3	9	HIGH	Safety in design of new transfer stations	3	3	3	-6	LOW
Strategic	Reputation and Image	Negative public attentention due a a landfill expansion next to site that is proposed for school and recreation expansion	4	4	16	HIGH	Landfill expansion in Jindabyne not proceeded	6	4	4	-14	LOW
Operational		Negative preception of the preceived reduction in service level due to closure of transfer stations	5	3	15	HIGH	Clear and concise messaging around the additional services provided during the exbition period Communications procedure to be followed by all staff	2	5	3	5	MEDIUM