



Yea Resource Recovery Centre Redevelopment

Business Case



Prepared for Murrindindi Shire Council

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1 Introduction

Talis Consultants Pty Ltd (Talis) was commissioned by Murrindindi Shire Council (Council) to prepare a business case for the upgrade or redevelopment of the Yea Resource Recovery Centre (RRC) focussing on two sites namely; the existing Yea RRC located at 617 Ghin Road (Ghin Ghin), or an alternative site located at 10 Flat Lead Road (Yea). The project aims to provide details regarding the options available to Council with regards to the development of a modern RRC to service the Yea township area, by determining whether the current site, the alternative site, or a staged process to move from one to the other, maximises recycling, promotes circular economy outcomes and provides the best value to Council and its residents.

1.1 Background

Council has undertaken, with the support of the Goulburn Valley Waste and Resource Recovery Group (GVWRRG), a process to consider the optimisation of the RRC network for the Murrindindi Shire. That work identified challenges to the continued operation of the existing Yea RRC site related to the need to rehabilitate the former landfill, and recommended that the growing community of Yea could be better served by a more modern facility located closer to the township. The primary alternative site recommended was Council owned land located at 10 Flat Lead Road, Yea. A series of projects have been undertaken to determine the suitability of the alternative site for the development of a new modern RRC. Works included a conceptual design (Golder 2018), desktop town planning review (SMEC, 2020), a due diligence assessment (SMEC, 2020) and a design review (Talis Consultants, 2020). These projects focused on a parcel of land at the northern end of the 300 hectare block due to visual amenity issues associated with the southern end.

During this time, the Victorian State Government has introduced several significant legislative and policy changes. In particular, the *Environment Protection Act 2017* (The Act) took effect from 1 July 2021 along with the *Environment Protection Regulations 2021* (the Regulations) which introduced environmental protections and the general environmental duty (GED). As a result, RRCs may now require a licence, permit or registrations depending on the size, scale and type of material received.

In 2020 the Victorian State Government released its 10-year policy for waste and recycling, *Recycling Victoria: A new economy (2020)*, focusing on the circular economy and diversion from landfill. In light of the recent legislative and policy changes, Council is now considering how best to establish a RRC for the community of Yea that delivers better practice, maintains compliance and achieves landfill diversion and circular economy targets.

1.2 Project Objective

To develop a business case that assesses the suitability and compares the financial, social and environmental viability of establishing a modern RRC at the existing Yea RRC location versus the alternative site located at 10 Flat Lead Road.

1.3 Scope

To achieve the objective outlined above, this report will consider the following:

- Current situation and characteristics of each site;

- Background information review including previous reports for both sites;
- Legislative Policy and Guidance Frameworks;
- Scenario development including capacity modelling for future use;
- Concept design development;
- Financial modelling including capital and operational costs;
- Recommendations based on the preferred scenario.

2 Background Information Review

The following section provides a brief summary of the studies that have been completed regarding either the existing Yea RRC or the alternative site.

2.1 Existing Yea RRC Studies

The existing Yea RRC is located at 617 Ghin Ghin Road (Ghin Ghin) and is situated on a former landfill. The site has been subject to multiple studies including the following most relevant to the Project:

- Resource Recovery Centre Options Analysis (Reincarnate, REC & Golder 2019); and
- Closed Yea Landfill Site Investigation report (Mackenzie Environmental, 2020).

2.1.1 Resource Recovery Centre Options Analysis (Reincarnate, REC & Golder 2019)

Reincarnate Consulting, Golder Associates Pty Ltd and Randell Environmental Consulting undertook an analysis on behalf of Goulburn Valley Waste and Resource Recovery Group (GVWWRG) to optimise the RRC network for Council. The study focused on advancing the performance of the RRCs across the Council area, recognising that the quality of some RRC assets were sub-optimal and poorly suited to meeting future demand. The study also identified, shortlisted, and assessed potential new RRC locations for the communities of Alexandra, Eildon, Kinglake, Marysville, Taggerty and Yea based on their alignment with a defined siting criterion agreed with Council.

Focusing on the Yea elements of the study, a mapping and siting assessment exercise was undertaken, which identified three potential RRC sites for Yea including the current site, the Yea Wastewater Treatment Plan (WWTP) site and the proposed Alternative Site. These three sites were assessed to determine their potential to support the Yea community long-term. The results of the assessment are shown in the following excerpt from the report.

	Ownership	Zoning	Road Accessibility	Future Proof Capacity	Capacity for Grade Separation	Access - 5 minute commute	Fire Hazard (BMO)	Buffers – Proximity to Residential Areas >200m	Buffers – Proximity to named waterways	Buffers – Proximity to Environmental Significant	Buffers – Proximity to Heritage Areas	Score
Yea												
Upgrade existing RRC	2	0	2	0	1	0	2	2	0	2	2	13
Flat Lead Road	2	0	2	2	2	2	2	2	2	2	2	22
Yea WWTP	1	2	2	0	1	2	2	1	0	1	0	12

Diagram 2-1: Yea Site Selection Study Assessment Results

(Source: Reincarnate, REC & Golder, 2019)

It can be seen that the current RRC site did not score as well as the Alternative Site within the assessment. The current RRC site scored poorly against Zoning, Future Proof Capacity, Access and Buffers. As a result, the Alternative Site was preferred and the first concept design for a new RRC was developed located in the southern section of the site.

The study ultimately resulted in the removal of the current Yea RRC site as a long-term option for a RRC for the community of Yea.

2.1.2 Closed Yea Landfill Site Investigation report (Mackenzie Environmental, 2020)

Council engaged Mackenzie Environmental to undertake a detailed site investigation of the current Yea RRC site due to it being constructed on a former landfill. The study sought to understand the existing extent of landfilling and rehabilitation at the site and what further works were required to appropriately rehabilitate the site. The study also re-evaluated risks identified within a previous report titled “GVWRRG closed landfill risk assessment Murrindindi summary” (REC, 2018) prepared by Randell Environmental Consulting dated 3 December 2018, using the confirmed site data obtained through the onsite investigations. The study including site investigations undertook the following tasks:

- Test pit investigation to assess the extent of the landfilling at the site and the profile and extent of the existing landfill cap;
- Undertake groundwater monitoring of three existing groundwater bores;
- Undertake surface water monitoring at three surface water locations;
- Assess groundwater/surface impacts to the beneficial uses of water;
- Undertaking aerial survey of the site; and
- Re-evaluate the site-specific risks identified within the REC risk assessment report (REC, 2018) using confirmed site data from intrusive investigation and groundwater/surface water monitoring results.

The study found the current RRC site presents a low to medium risk to the environment due to the following:

- The age of the waste;
- Results of groundwater and surface water monitoring;
- Presence of an engineered cap over a portion of the landfilled area; and
- Existing stormwater management infrastructure at the site.

Based on the results of the study, a detailed rehabilitation plan was prepared and is shown in summary below.

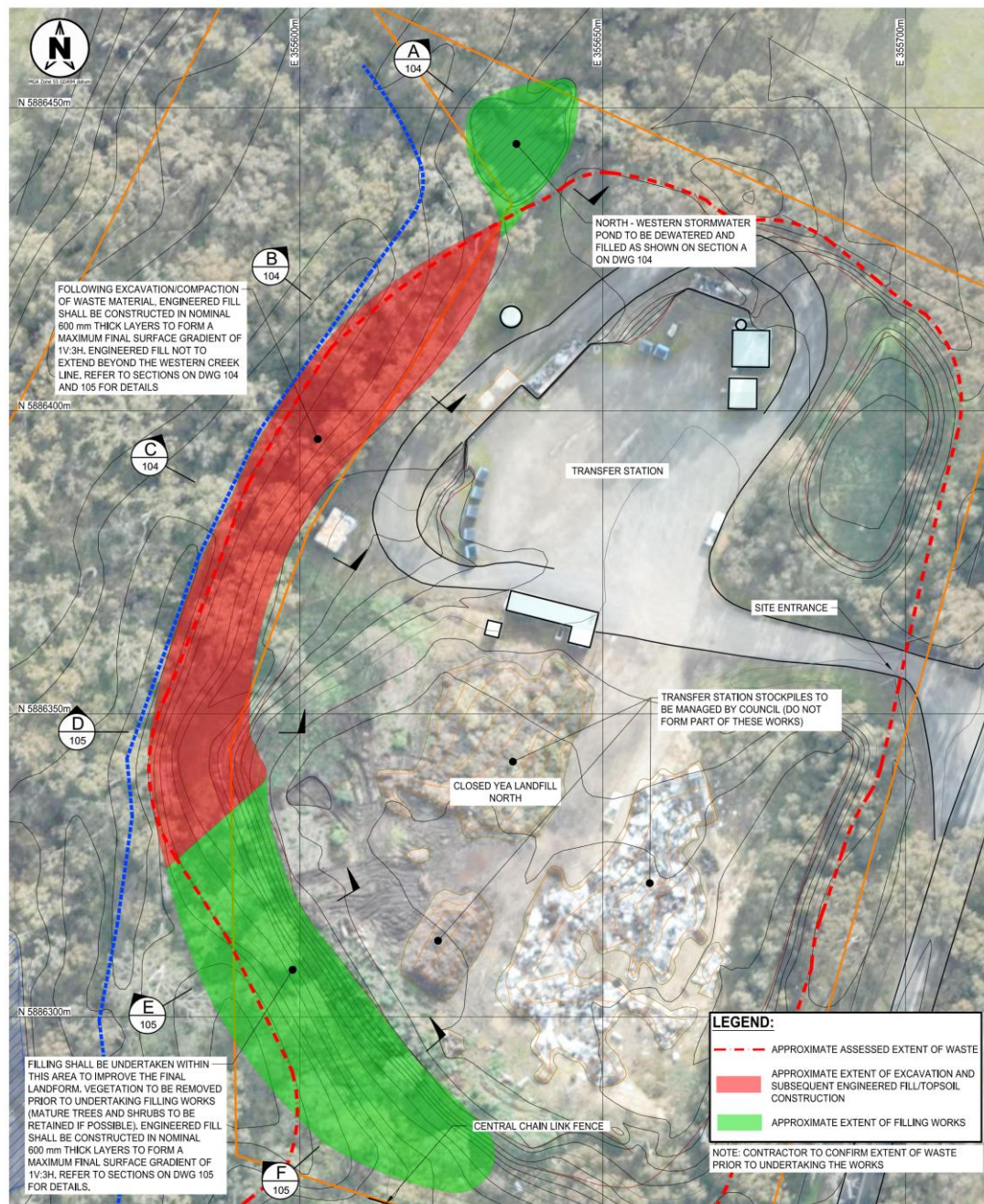


Diagram 2-2: Yea Landfill Rehabilitation Plan

(Source: Mackenzie Environmental, 2020)

Council is currently in the early stages of implementing the Landfill Rehabilitation Plan with earthworks commencing onsite in January 2022.

2.2 Alternative Site Studies

The Alternate Site located at 10 Flat Lead Road, Yea also been subject to multiple studies including the following most relevant to the Project:

- Updated Concept Design and Technical Memorandum (Golder, 2019);
- Stage 1 Due Diligence Assessment (SMEC, 2020); and
- Concept Design Review (Talis Consultants, 2020).

2.2.1 Updated Concept Design and Technical Memorandum (Golder, 2019)

As part of the site selection study completed during the Resource Recovery Centre Options Analysis (Reincarnate, REC & Golder 2019), it was concluded that the Alternative Site was preferred based on the following:

- Protection from future encroachment;
- Cost to purchase (already Council owned);
- Flexibility in design and operation;
- Ease of development; and
- Ease of access.

Following on from the study conducted by Reincarnate, REC & Golder regarding the Resource Recovery Centre Options Analysis on behalf of GVVRRG, Council engaged Golder to update the concept design. The Site was originally to be located at the southern end of 10 Flat Lead Road, a large land parcel of approximately 300 hectares. This proposal was rejected by Councillors due to the impact on visual amenity, especially for road traffic entering Yea along the Whittlesea-Yea Road. The Site was subsequently relocated to the northern end of the block, which was approved by the Councillors due to the partial screening and shielding by vegetation along the roadside. The updated concept design is shown in the following diagram.

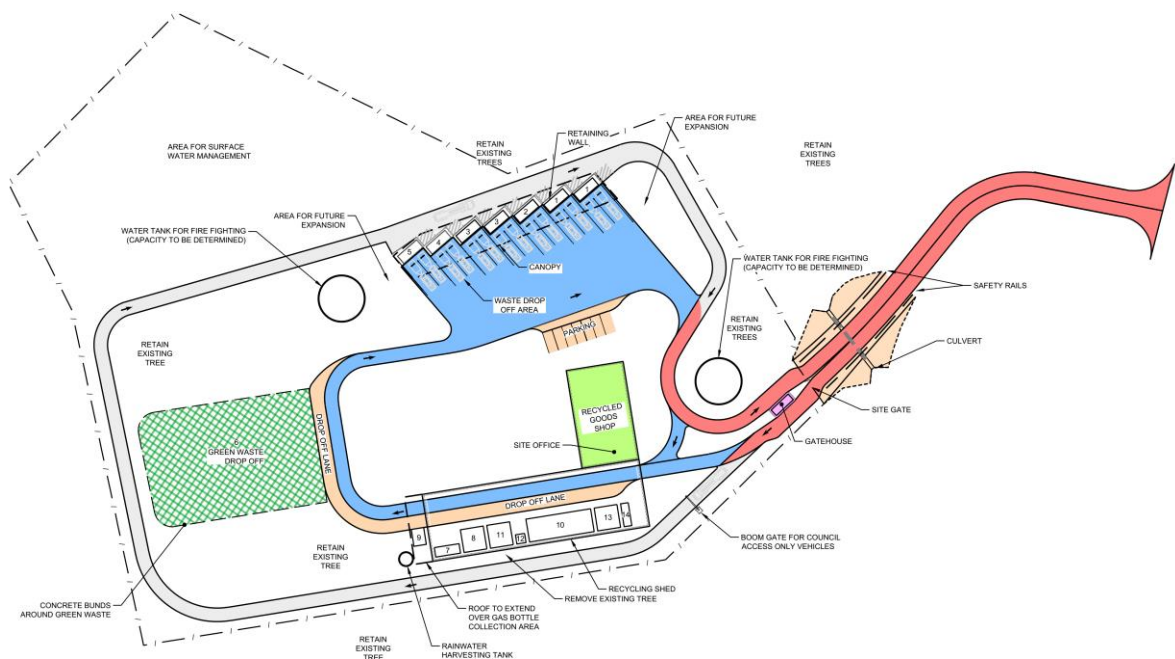


Diagram 2-3: Updated Concept Design for Alternate Site

(Source: Golder, 2019)

The Reincarnate, REC & Golder study, the Councillor decision and the updated concept plan initiated the investigations of the northern location as a new RRC for the Yea township.

2.2.2 Stage 1 Due Diligence Assessment (SMEC, 2020)

In 2020, Council engaged SMEC Australia Pty Ltd to conduct a Due Diligence Study to assess the suitability of the Alternative Site for the construction of a new RRC. The Study undertook a desktop environmental review of the site, and produced a summary of findings of additional investigations conducted including a flora and fauna assessment, geotechnical investigation, traffic impact assessment and cultural heritage assessment.

The study included the following key components to provide Council sufficient information regarding the Alternative Sites' environmental characteristics:

- Review of historical aerial photographs and maps;
- Review of site identification details including Site boundaries, zoning and overlays;
- Review of surrounding land uses, potentially sensitive receptors and climatic records;
- Review of EPA records for the Site and surrounding area;
- Review of geological maps;
- Review of maps for Acid Sulphate Soil;
- Review of previous site investigations work conducted by others; and
- Review of regional groundwater conditions.

The SMEC Due Diligence Study identifies the following key constraints and management requirements associated with development of a RRC at the Alternative Site, as shown in the tables from the SMEC report (Diagram 2-4 and Diagram 2-5).

Identified Constraints	Management
Planning Phase	
The concept design includes a number of unknowns, such as tank sizes.	A detailed design is required to confirm the required footings and pavements for the RRC as detailed in the Geotechnical Investigation (refer Appendix E).
Soil contamination and associated soil management.	Complete an intrusive soil investigation for identified CoPC to identify any potential soil contamination at the Site which may impact on construction and/or occupation of the Site. The investigation should be conducted with reference to the <i>National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)</i> If soil contamination is identified, further assessment works such as groundwater, surface water and/or vapour investigations may be required to inform suitability of the Site. Mitigation measures would need to be incorporated within the site-specific CEMP prior to the commencement of construction works. The investigation should also inform soil classification in accordance with IWRG 621 <i>Soil Hazard Categorisation and Management</i>, as required for offsite disposal.
Approximately 0.43 ha of native vegetation and 18 scattered trees were recorded within the study site. The extent of native vegetation removal will be determined following detailed design.	Avoid impacts to native vegetation during design phase wherever practicable, prioritising preservation of large trees. Secure offsets prior to the removal of native vegetation. Upon finalisation of design, determine if a planning permit application under the P&E Act is required.
Adjustments to the design are required to satisfy town planning in relation to Traffic and Transport requirements.	Update the layout to accommodate: 1 disabled parking space in accordance with <i>AS2890-2009 Part 6 – Off-street parking for people with disabilities</i>. - The road will need to be sealed to the proposed development access in order to accommodate turning truck movements
The proposed works are high impact and are located within an area of cultural heritage sensitivity.	A CHMP is required to occur during the planning stage and will likely include all three levels of assessment (Desktop, Standard, and Complex Assessments)
Construction Phase	
Encounter unexpected subsurface conditions	An experienced geotechnical engineer is required to supervise the construction of any footings or piles.

Diagram 2-4: Site Constraints and Management Requirements (1 or 2)

(Source: Table 8-1 Stage 1 Due Diligence Assessment (SMEC, 2020)

Identified Constraints	Management
Conservation of native vegetation.	As detailed in the LMP fencing of retained native vegetation is required prior to the commencement of construction works. Council is responsible for implementing appropriate management practices which prevent the introduction and spread of declared noxious weeds and pest animals within the study site during all stages of construction.
The removal of native vegetation which is the habitat of native fauna.	Engage a suitably qualified and licenced ecologist to assist with fauna capture and relocation during works in accordance with the <i>Wildlife Act 1975</i> and CEMP, as required.
Soil and erosion management during construction.	The site-specific CEMP should identify mitigation and management measures for soil and stormwater management during construction.
Encountering unexpected finds (odorous soils, constructability) during construction works.	The site-specific CEMP should identify mitigation and management measures for encountering unexpected finds during construction works.
Operation Phase	
Biodiversity diminished on site based on the proposed use.	Continue to follow the Land Management Works Plan as detailed in the LMP.

Diagram 2-5: Site Constraints and Management Requirements (2 of 2)

(Source: Table 8-1 Stage 1 Due Diligence Assessment (SMEC, 2020)

From Diagram 2-4 it can be seen that several planning phase constraints relate to the design of the RRC and are therefore relevant and considered as part of this Project.

2.2.3 Concept Design Review (Talis, 2020)

Talis was commissioned by Council to undertake a review of the updated concept design for the Alternative Site prepared by Golder (2019). A major component of the review was to assess the design against recent developments in waste policy that may affect the design and role of the RRC. Following the approved relocation and concept design of the Alternative Site in 2019, the Victorian State Government released its 10-year policy for waste and recycling, *Recycling Victoria: A new economy (2020)*. In light of the new policy, Council considered closing the nearby Alexandra landfill and instead proposed that the Yea RRC may operate as a regional transfer station with bulk haulage capabilities, which would require an expansion of the infrastructure and services proposed for the site. Therefore, Talis considered the Golder concept design in accordance with the policy change and Council's current and future waste management and resource recovery requirements and opportunities for the Alternative Site.

Based on the review, Talis recommended the following to maximise the potential of the Alternative Site as a new RRC for the Yea community:

1. Investigate the feasibility and requirements of:
 - i) Establishing a concrete and C&D processing activity onsite;
 - ii) Establishing a timber and green waste processing activity onsite;
 - iii) Establishing a single-phase power connection/generator onsite to facilitate a greater number of activities, services and/or processes at the Site;
 - iv) Establishing baling activities onsite for a range of plastics; and

- v) Establishing a water connection onsite to facilitate the development of the truck wash facility.
2. Redesign of the facility to incorporate:
- i) Activities determined to be feasible as outlined in Recommendation 1;
 - ii) Improved fire safety design;
 - iii) Surface water and leachate ponds;
 - iv) Optimisation of available space onsite, including the relocation of the recycled goods shop and Site gate to deter dumping activity;
 - v) Inclusion of a future weighbridge;
 - vi) Investigate kerbside vehicle unloading at the saw-tooth drop-off area to facilitate small scale bulk haul capability;
 - vii) Inclusion of recyclables within the goods shed.
3. Undertake additional studies as part of the redesign works, including:
- i) Flood modelling to ensure infrastructure is not impacted by the creek at the northern end of the Site;
 - ii) Carefully consider the impacts of closing Alexandra Landfill and review of the RRC layout to ensure it allows for long-term expansion; and
 - iii) Review of measures to reduce the impact on visual amenity particularly if the design progresses closer to Yea Whittlesea Road.

It can be seen from the recommendations in the 2020 Concept Design Review, that several aspects are relevant to this project and will be considered during the development of the new concept designs for the Alternative Site. It should also be noted that Council will not be closing the Alexandra Landfill and therefore elements this study related to its impact on the Yea RRC development will be disregarded for this Project.

3 Legislation, Policy and Strategic Framework

The following section provides an outline of the key pieces of legislation, policy and guiding documentation that are relevant to this Project.

3.1 Legislation

This section discusses the laws that all businesses need to adhere to in taking a proactive approach to manage the risk of harm from pollution and waste, to human health and the environment.

3.1.1 Environment Protection Act 2017

The *Environment Protection Act 2017* (The Act) took effect from 1 July 2021 along with the *Environment Protection Regulations 2021* (the Regulations) which introduced environmental protections and the general environmental duty (GED).

The Act provides the EPA tools and powers to prevent and minimise the risk of harm to human health and the environment from pollution and waste and gives the EPA the ability to sanction and penalise polluters. In particular, the Act allows for the following:

- Provides for the EPA, its governance structure and specifies that EPA's objective is to protect human health and the environment;
- Sets out 11 principles of environment protection which include:
 - Integration of environmental, social and economic considerations;
 - Proportionality;
 - Primacy of prevention;
 - Shared responsibility;
 - Polluter pays;
 - Waste management hierarchy;
 - Evidence-based decision making;
 - Precautionary principle;
 - Equity;
 - Accountability;
 - Conservation;
- Sets out the legislative framework for the protection of human health and the environment from pollution and waste;
- Provides for the GED;
- Establishes a permissions scheme that enables EPA to issue or grant development licences, operating licences, pilot project licences, permits and registrations;
- Provides a framework for the management of waste;
- Enables the EPA to ensure compliance with the Act;
- Provides for a system of criminal and civil penalties; and
- Provides for a system of civil remedies and compensation orders available to the Court.

3.1.1.1 Environment Protection Regulations 2021

The Environment Protection Regulations 2021 (Regulations) support the EPA Act by providing the following:

- Imposes obligations in relation to environmental protection, pollution incidents, contaminated land and waste;
- Provides for activities and other matters for the purposes of permissions under the Act;
- Specifies matters in relation to litter, water, the atmosphere, land, noise and vehicle emissions;
- Encourages retailers and consumers to reduce the overall use of plastic bags that often enter the environment as litter, by banning thin, single-use plastic shopping bags;
- Sets out additional matters in relation to the environmental audit system;
- Prescribes activities in respect of which the environment protection levy or the waste levy is payable, or when EPA may require a financial assurance;
- Prescribes the form and manner of certain applications;
- Prescribes infringement offences and infringement penalties;
- Provides for exemptions from certain provisions of the Act and the Regulations;
- Prescribes the fees payable under the Act;
- Provides for transitional arrangements; and
- Prescribes other matters necessary to give effect to the Act.

3.1.1.2 General Environmental Duty (GED)

The general environmental duty (GED) is at the centre of the Act, and it applies to all Victorians. Everyone must reduce the risk of harm from their activities:

- To human health and the environment; and
- From pollution or waste.

Councils already managing their environmental risks, the GED generally means little to no change to how they operate. Most Councils already follow good management practices. The GED just makes it clear your responsibility is to reduce risk to the environment.

In particular, some common waste related risks, Councils should manage include:

- Activities that produce noise, odour or runoff to stormwater;
- The storage, use and disposal of liquids and chemicals; and
- Management of wastes and the choice of transporter or receiver of wastes.

It should be noted that under the GED, it does not matter whether an adverse impact to people and/or the environment has or has not occurred. The GED is breached whenever there is a *risk* of harm not being proportionally managed.

3.1.1.3 Waste Duties

There are three key stages for Council (duty holder) to manage industrial waste under the Act and the Regulations which are as follows:

1. Classification of the waste;
2. Transportation of the waste;
3. Lawful place for disposal/treatment of the waste.

These three stages assist with compliance with the GED and are shown in Diagram 3-1.



Diagram 3-1: Overview of Waste Framework

(Source: Summary of waste framework Publication 1756.2 May 2021)

For each waste type (industrial, priority or reportable priority), there is a set of duties and controls that apply and accumulate. For example, reportable priority waste must be managed in accordance with the industrial, priority and applicable reportable priority waste duties as shown in Diagram 3-2.

Which duties apply?

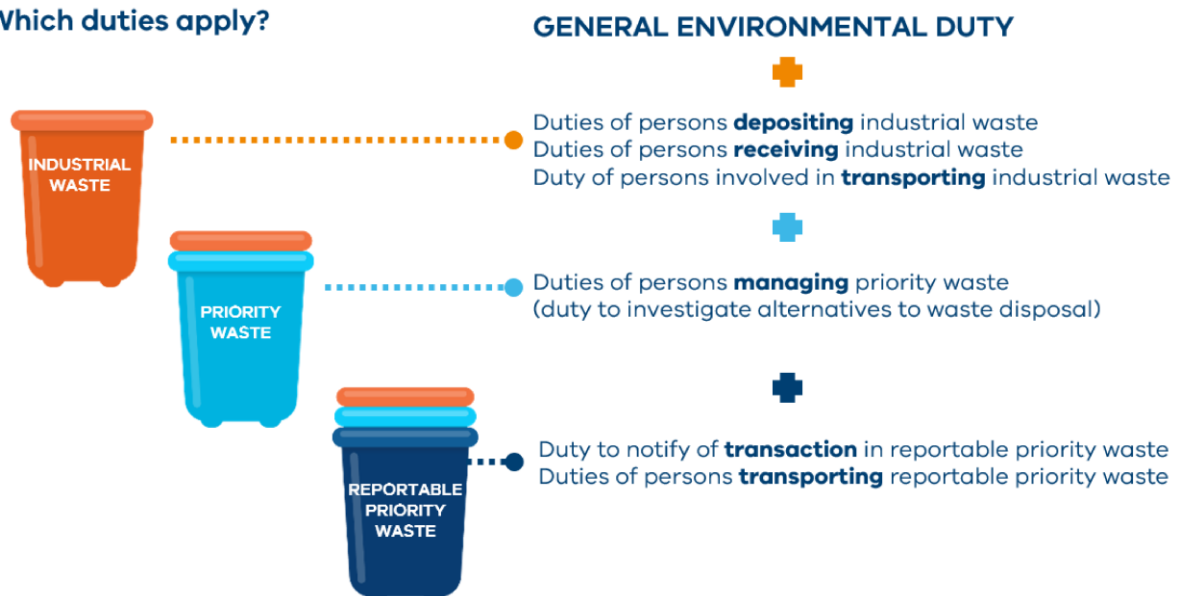


Diagram 3-2: Duties apply to different waste types

(Source: Summary of waste framework Publication 1756.2 May 2021)

3.1.1.4 Permissions

Under the Act and Regulations, the EPA issues licences, permits and registrations. These are referred to as permissions and work with the GED. The permissions ensure certain standards and conditions are adhered to and allow the legal receipt of waste and recycling materials at Council facilities.

The nature and risk of the activity determines whether a permission is required, and the level of control placed upon that facility. Permissions are set by the Regulations with a brief overview of the level of control placed on each permission type shown in the diagram below.



Diagram 3-3: Permissions, risk and level of control

(Source: Publication 1825 – Waste and Recycling, Guide to Preventing Harm to people and the environment, EPA 2021)

From the diagram it can be seen that Licences are for prescribed activities that need the highest level of regulatory control. Permits are for prescribed activities that are moderate to high risk but low complexity. Registrations are for low risk prescribed activities with between 5m³ and 5,000m³ of any waste stored onsite at any time.

3.1.2 Circular Economy (Waste Reduction and Recycling) Bill 2021

The *Circular Economy (Waste Reduction and Recycling) Bill 2021* provides for regulation of the state's waste and recycling sector including enabling laws for the new container deposit scheme and new state-wide four-stream household waste and recycling system (waste, commingled recycling, FOGO and glass).

The Bill will see the establishment on 1 July 2022 of Recycling Victoria, a dedicated government business unit to oversee and provide strategic leadership for the waste and recycling sector. Recycling Victoria will deliver state-wide stewardship, planning, regulatory and market oversight functions.

3.2 Waste, Resource Recovery and Circular Strategies

A key feature of the RRC is to fulfill the waste needs of Council's community, in addition to fulfilling the aims outlined by the Victoria State Government. The sections below outline the key policy and guidance documents from these governing bodies that may affect the aims and role of the RRC.

3.2.1 Victoria's Circular Economy Policy

In February 2020, the Victoria State Government released its 10-year policy paper on the circular economy: *Recycling Victoria: A New Economy* (Department of Environment, Land, Water and Planning, Victoria State Government, 2020). It focuses on the need to increase resource recovery and achieve reform within the waste and recycling system.

This policy outlined four main goals to facilitate Victoria's transformation to a circular economy, and a number of targets to measure the progress towards achieving these goals:

1. Divert 80% of waste from landfill by 2030 and an interim target of 72% by 2025;
2. Cut total waste generation by 15% per capita by 2030;
3. Halve the volume of organic material going to landfill between 2020 and 2030, with an interim target of 20% reduction by 2025; and
4. Ensure every Victorian household has access to food and garden organic waste recycling services or local composting by 2030.

This policy also outlines a significant increase in the landfill levy over the next 2 years, nearly doubling by 2022/23. The aim of this increase is to stop the importing of waste from other states into Victoria, in addition to creating a strong incentive to increase resource recovery rates and invest in resource recovery technologies. Additional levies are planned for long-term stockpiling of recovered materials which have not yet found markets for use. A container deposit scheme will also be introduced by 2022/23 to assist with the creation of higher-value, clean waste streams that can more readily be utilised by industry.

Funding schemes are also outlined in the policy statement. There are two key funding schemes relevant to Council:

- A fund for local councils to identify and implement local services and solutions that enable their community to participate in a circular economy; and
- A fund focusing on the creation of recycling infrastructure, specifically targeting infrastructure capable of sorting and processing organics, plastics, paper, cardboard, glass, textiles, and tyre wastes into high-value material streams.

3.2.2 Goulburn Valley Implementation Plan

The GV Implementation Plan was developed in 2017 to be a key guiding document for waste and resource recovery for member councils over 10 years.

The plan outlines key strategic objectives, aiming to effectively manage the regional network of waste and recovery infrastructure to achieve landfill diversion and resource recovery at scales suitable for maximising economic outcomes.

The plan also outlined key regional priorities for wastes with no current regional processing infrastructure, such as e-waste, tyres, textiles, food and garden organics (FOGO) and industrial waste and wastes where there is further opportunity for increased recovery or processing, such as glass, wood and timber, plastics, and Construction and Demolition (C&D) wastes.

3.2.3 Murrindindi Waste Strategy

The Waste and Resource Recovery Strategy for Council was adopted in 2017 and outlines a framework of priorities for improving waste diversion and recycling practices.

This strategy document outlines some key priorities for RRCs in the region, including:

- Ensuring efficient and cost-effective operation;
- Ensuring RRCs are operated and improved in line with best practice standards;
- Increasing the range of materials available to be recycled at RRCs;
- Introducing opportunities for direct re-use;
- Ensuring fees and charges reflect the cost of operation;
- Investigating the viability of re-use shops whilst maintaining income and Occupational Health and Safety (OH&S);
- Introducing electronic data recording; and
- Improving the management of organics, including the creation of a higher quality mulch.

3.2.3.1 Regional Context

To ensure the proposed RRC is fit for purpose, waste management services provided by Council and the greater Goulburn Valley Region should be thoroughly understood. *The Murrindindi Shire Council Waste and Resource Recovery Strategy 2014-2019* (Murrindindi Waste Strategy) and the *Goulburn Valley Waste and Resource Recovery Implementation Plan 2017* (GV Implementation Plan) both provide insight into the available waste services in the region.

Council currently operates a kerbside collection service for municipal solid waste (MSW) and comingled recyclables, which is offered to approximately 80% of homes and businesses. This process is managed by a contractor, with an additional contract in place for the transport of recyclables to Melbourne for further processing. In 2012-13, 41.5% of the waste collected at the kerbside was diverted to Melbourne, whilst the remainder was landfilled at the Alexandra Landfill.

There are five other RRCs within the Council area, located at Marysville, Kinglake West, Yea, Eildon, and Alexandra. Council has provided waste data showing the annual average waste generation from 2017/18 to 2019/20 was approximately 13,575 tonnes per annum, of which an average of 8,690 was landfilled and 4,885 was recycled or recovered, either through composting facilities or by transport to facilities in the Melbourne Metropolitan Area. Of the total waste generation, approximately 5,252 tonnes were collected through the RRCs with 808 tonnes coming from the current Yea RRC. It was noted in the Murrindindi Waste Strategy that wastes such as timber, concrete, silage wrap, and batteries are currently going to landfill. Materials currently collected at RRCs within the Council area include:

- Comingled Recyclables;
- Metals;
- White goods;
- Automotive batteries;
- Waste motor oil;

- Drum-must containers;
- Tyres;
- Fluorescent lamps;
- Mattresses (all sites except Marysville);
- Couches (all sites except Marysville); and
- Televisions and Computers (all sites except Marysville).

In the greater Goulburn Valley Waste and Resource Recovery Region (GVWRRG Region), Council represents the second smallest municipality by population and accounts for approximately 3.5% of the total waste generated in the region. There were 5 licensed landfills and 39 standalone RRCs within the region in 2013/14, with an additional 3 facilities that manage aggregate and masonry, 5 facilities that manage plastics, 4 facilities that manage food and garden organics, and 12 facilities that manage wood and other organic waste. There was a single material recovery facility (MRF) located within the greater region, however, Council is serviced by a MRF in the closer Melbourne metropolitan area.

3.3 Resource Recovery Design

To help achieve the aim of developing and operating a best-practise RRC, several guidelines exist, which are discussed below.

3.3.1 Better Practice at Resource Recovery Centres

The *Guide to Better Practice at Resource Recovery Centres*, developed by Sustainability Victoria and revised in 2019, outlines the best practice approach to developing, managing, and operating RRCs. These guidelines cover considerations for better practice during the siting, design, development and operation of a RRC, and outline a number of documents and methods that can be developed to ensure the Site can manage risks, meet stakeholder needs, be financially sustainable and future proofed.

3.3.2 Storage of Combustibles

Publication 1667.3 *Management and Storage of Combustible Recyclable and Waste Materials – Guideline* was published by the Victoria EPA in 2021 and governs the management of materials received at the RRC. It outlines the requirement for a Council operating a RRC to:

- Understand the fire hazards associated with their activities;
- Take steps to reduce the risk of fire from these hazards so far as reasonably practicable;
- Conduct and document a fire risk assessment;
- Store and manage combustible recyclable and waste materials (CRWM) in a manner that minimises the risk of harm to human health and the environment so far as reasonably practicable;
- Prepare an emergency management plan.

This guideline will be utilised in the development of the concept plans for the green fields Alternative Site.

3.3.3 GV RRC Storage of Combustibles

The GVVRRG commissioned My Emergency Management Pty Ltd to develop a fire risk assessment template and fire and emergency management plan template for established RRCs in the Goulburn Valley. In addition, My Emergency Management Pty Ltd assessed the fire risks at 36 RRCs across the region. These region-specific risks and controls were also considered when assessing the best-practice nature of the RRC designs.

The My Emergency Management Pty Ltd template will be utilised in the development of the concept plans for the Current Yea RRC site.

3.3.4 Separation Distances

Publication 1518 *Recommended separation distances for industrial residual air emissions* was published by the Victoria EPA in 2013 and provides the recommended minimum separation distances between odour or dust-emitting industrial land uses and sensitive land uses. The recommended separation distance for a RRC which is classified as a Transfer Station within the guideline, is 250m.

4 Each Site's Characteristics

The following section outlines the characteristics of each site including the operations at the Current Yea RRC. In addition, this section identifies any potential constraints, issues or risks identified as part of the Project associated with each site.

4.1 Current RRC Site

4.1.1 Location and Access

The existing Yea RRC is located approximately 8km northwest of Yea at 617 Ghin Ghin Road, Ghin Ghin. Ghin Ghin Road provides sealed access to the site however, the remoteness of the site makes it inconvenient for Yea residents and difficult to secure. At times, queue lengths present issues with traffic along Ghin Ghin Road.

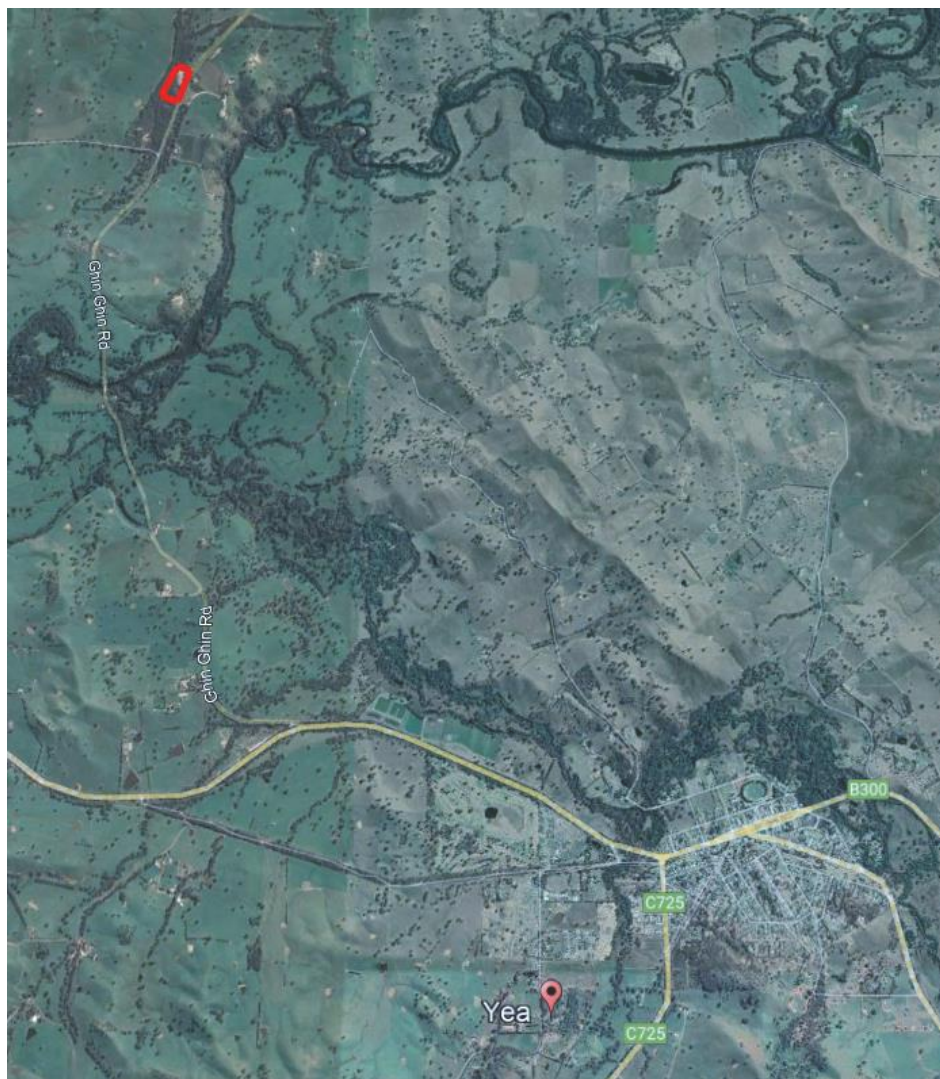


Figure 4-1: Location of the Current RRC Site

4.1.2 Site Description

The Yea RRC site is Council owned on parcel number 2001\PP5316 covering an area of 1.8ha. The site is unsealed and stockpiling of steel and green waste occurs on the ground. The RRC was built on the former Yea landfill, with the extent of the fill covering most of the site with stable ground areas for construction limited.

4.1.3 Traffic Flow

Traffic enters the site from Ghin Ghin Road and approaches a centrally located gatehouse where the attendant provides direction to either head in a southerly direction to the e-waste shed, metal and/or green waste stockpiles. If vehicles do not have these material types, they are directed to the north where cardboard, general waste, tyres, and oil can be unloaded. If vehicles have materials which are unloaded in both the southern and northern sections of the site, then they must navigate around the queueing area for the gatehouse to do so. This presents a traffic conflict and risk of accident during busier periods.

4.1.4 Topography

The site is constrained by the topography produced by its location on top of a former landfill, which also presents challenges for expansion and compliance with the tightening regulatory regime. The former landfill has been partially rehabilitated, with further rehabilitation works commenced. However, the site has suitable topography for grade separation which can facilitate additional split-level infrastructure and suitable surface water management.

4.1.5 Surrounding Land Use

The boundary of the site borders a creek to the west and the Ghin Ghin G115 bushland reserve to the south. The Site, and the land surrounding the Site, is currently zoned as FZ – Farming Zone under the Murrindindi Planning Scheme.

Victoria Environment Protection Authority's (EPA) *Publication 1518: Recommended Separation Distances for Industrial Residual Air Emissions* states that a minimum separation distance of 250m is recommended between waste transfer stations and sensitive land uses. A sensitive land use is defined as a land use which requires particular focus on protecting the beneficial uses of the air environment relating to human health and wellbeing, local amenity, and aesthetic enjoyment. There are no sensitive land uses within a 250m radius of the RRC, though there are two homes within 500m of the edge of the lot. **Table 4-3** shows the separation distances to the nearest six homes of the lot boundary.

Table 4-1: Separation Distances to Homes

Sensitive Receptor	Shortest Distance from Lot Boundary	Direction
Home	350m	East
Home	420m	Southeast
Home	500m	North
Home	510m	Southeast
Home	520m	Northeast

Home	550m	South
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4.1.6 Registration Conditions

The site is classified as a prescribed permission activity: A13c (Waste and resource recovery - small). The conditions within the registration for the site are presented in the following table.

Table 4-2: Registration Conditions

Condition Number	Description
REG_G1	A copy of this registration must be kept at the activity site and be easily accessible to persons who are engaging in an activity conducted at the activity site. Information regarding the requirements of the registration and the Act duties must be included in site induction and training information
REG_G2	You must immediately notify the Authority by calling 1300 EPA VIC (1300 372 842) in the event of a discharge, emission or deposit which gives rise to, or may give rise to, actual or potential harm to human health or the environment
REG_G3	You must: a) notify the Authority of any change to your name or address (including your registered address or activity site address as applicable); and b) update the EPA Interaction Portal if any other administrative details relevant to this registration change
REG_WM1	For all wastes of a type listed in Appendix 1, you must keep records detailing: a) incoming and outgoing movements of waste; b) the current location of waste at your activity site; and c) the waste type of any waste located at your activity site. These records must be retained for five years and be made available to the Authority on request
REG_WM2	All plant and equipment must be maintained and operated in proper working condition, in accordance with the manufacturer's specifications
REG_WM3.1	You must ensure that: a) Only waste of a type shown in Appendix 1 of this registration is accepted at the activity site, except where waste is received in accordance with a permission, determination or designation issued by the Authority under the Environment Protection Act 2017 or regulations made pursuant to that Act; and b) if any waste is received at the activity site that is not in accordance with a) (above), that this waste is placed in a designated and clearly sign-posted temporary storage area and is transported to a site which is authorised to receive this waste within 21 days of the date it was received
REG_WM4	You must store waste in a manner which minimises the risk of fires
REG_WR1	You must immediately notify the Authority by calling 1300 EPA VIC (1300 372 842), if the volume of waste stored on the activity site exceeds 4,500m ³ at any time

The registration also outlines the types of waste that can be accepted at the site.

4.1.7 Identified Issues and/or Risks

A site inspection was conducted with Council staff to understand the site layout and operations at the current RRC site. Any issues and/or risks identified as part of the site inspection are categorised and described within the following sub-sections. Please note this was not a formal audit of the site and observations were utilised for the purpose of identifying possible areas for improvement.

4.1.7.1 Health and Safety Issues

The main safety issue relates to traffic flow and conflicts and as detailed within Section 4.1.7.4. There did not appear to be any significant health issues identified during the site visit. Other typical health and safety risks associated with waste management and resource recovery facilities to consider include manual handling risks, falls from height or exposure to a foreign substance. These types of risks did not appear to be any more present at the site compared with any similar size waste management operation.

4.1.7.2 Environmental Risks

Council has commenced significant rehabilitation of the former landfill in accordance with the *Closed Yea Landfill Site Investigation report (Mackenzie Environmental, 2020)*. This will reduce the potential for environmental impact at the site, in particular for landfill gas, leachate and surface water risks.

Other environmental or amenity risks include odour, noise and dust impact to neighbouring properties. Odour can be managed through proper stockpile management of green waste and by closing bins daily at the end of operations. Dust can be managed through using a water cart on unsealed areas or by sealing the highly trafficked areas of the site. These risk mitigation strategies will be considered during the development of the concept designs for the site (Section 6).

4.1.7.3 Operational / Materials Handling Inefficiencies

The site currently operates using a combination of loose uncontained stockpiles and hook-lift bins to manage and handle waste types. Metals, green waste (raw and shredded) and tyres are stockpiled. E-waste, commingled recycling, cardboard/paper, general waste and oil is accepted directly into a receptacle.

The use of loose stockpiles tends to be an inefficient approach to managing waste streams particularly in confined areas such as the current Yea RRC site. A stockpiling approach also results in double handling when stockpiles need to be removed from site.

The preferred approach, where possible, is to utilise the split-level saw-tooth approach for the acceptance of more types of materials. For example, the saw-could be extended to accept metals and/or tyres. By taking this approach, an increase in materials handling efficiencies will occur however, this may be offset by a greater number of hook-lift bin movements.

In addition, material storage bunkers provide an opportunity to stockpile more material into a confined space using the vertical height of the bunker walls. Bunkers also act as a greater fire break between materials and present a tidier option which allows for better litter management. However, like uncontained stockpiles, bunkers do not eliminate double.

It was noted that Council is having issues scraping up stockpiles and damaging the underlying hardstand. In order to rectify this issue, Council will need to seal the surface using a bitumen seal or concrete. The sealed hardstand could be implemented in combinations with the bunkers to increase materials handling and operational efficiencies.

4.1.7.4 Traffic Flows and Conflicts

As previously identified, the current Yea RRC has issues associated with its traffic flow and vehicle conflicts. It is preferred, where possible, to promote traffic flows in one direction which ensures that vehicle conflicts are minimised however, at the current RRC site vehicles travel in different directions resulting in potential risks of accidents, vehicle flow blockages or conflict with other vehicles. In addition, in busy periods of use, queuing of vehicles results in traffic on Ghin Ghin Road as the queue length is not sufficient to prevent this.

In the first instance, the central location of the gatehouse/office for the RRC makes it difficult to promote one directional traffic or prevent the blockage that occurs between the northern and southern areas of the site. Its location also restricts the available area for queuing. Its position should be reviewed to find a more suitable location which allows for one directional traffic flow and to increase the queue length.

In addition, when queue lengths reach Ghin Ghin Road, this presents a significant safety issue with vehicles stopped in the 100km/hr speed zone, near a crest to the south and a bend to the north. This may require road widening, turning lanes or a reduction in the speed limit to mitigate some of the risks however, maximising the queue length should be considered as the first priority within the concept design.

4.2 Alternative Site

4.2.1 Location and Access

The Site is located on 10 Flat Lead Road, approximately 2km south-west of Yea along the Whittlesea-Yea Road. Access to the Site will likely be from Flat Lead Road, with a new internal road built with a culvert to enable the crossing of the stream to the facility. Figure 2-1 shows the location of the Site.

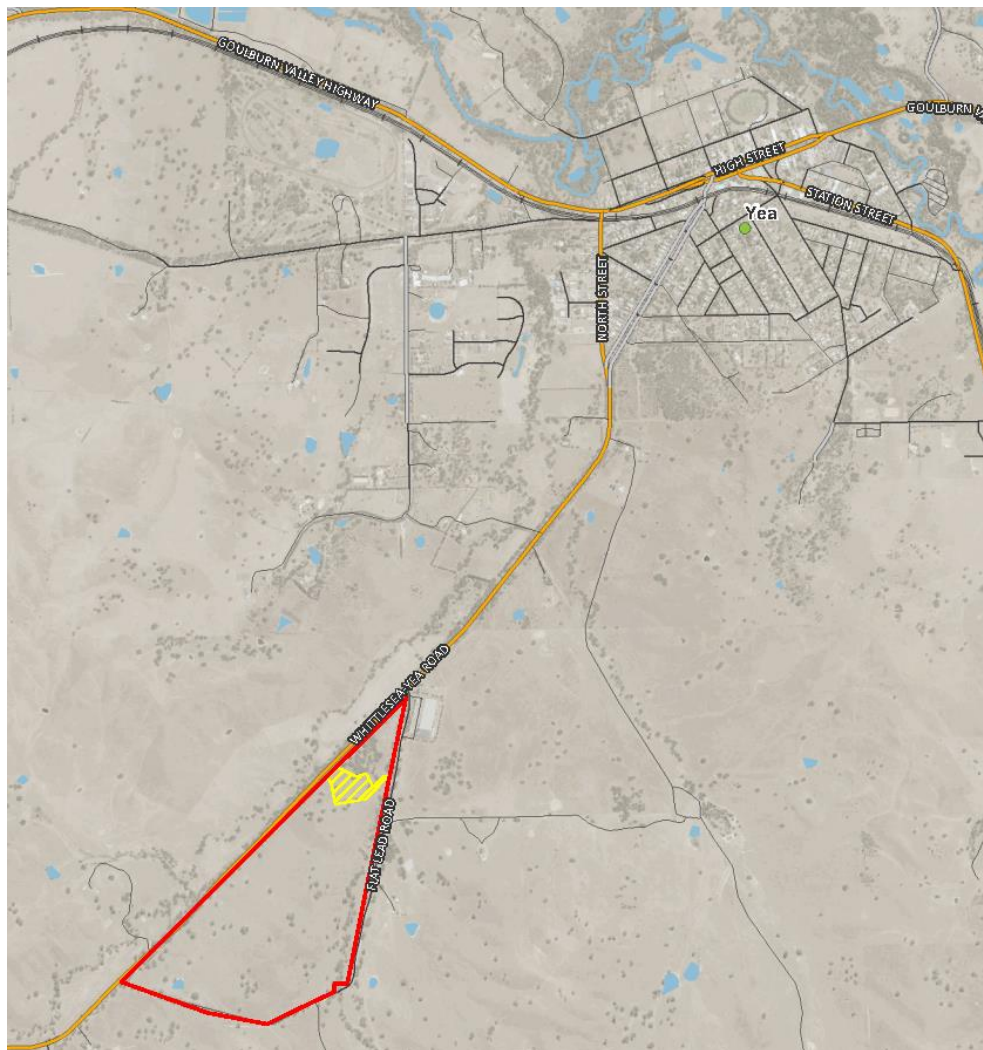


Figure 4-2: Location of the Alternative Site

4.2.2 Site Description

The Alternative Site has traditionally been utilised for farming and has no existing infrastructure established. The Site is largely cleared with a scattering of large native trees, some being hollow baring kept for fauna habitat. The site has no existing internal roads, no water supply nor has it a power supply.

4.2.3 Topography

Topography at the Alternative Site is undulating, with a series of small valleys running the length of the 300-hectare block. Topography at the north end of the site has a gradual gradient, with a creek running across the width of the site.

4.2.4 Surrounding Land Use

The Alternative Site, and the land surrounding the Site, is currently zoned as FZ – Farming Zone under the Murrindindi Planning Scheme. The closest receptor is the Yea Saleyards, located across Flat Lead Road at the northernmost end of the Site.

There are no sensitive land uses within a 250m radius of the proposed location for the RRC at the Alternative Site, though there are three homes within 500m of the edge of the lot. Table 4-3 shows the separation distances to homes within a 1km radius of the lot boundary.

Table 4-3: Separation Distances to Homes

Sensitive Receptor	Shortest Distance from Lot Boundary	Direction
Home	360m	South
Home	405m	West
Home	420m	North
Home	450m	East
Home	670m	North-West
Home	800m	North-West
Home	935m	South-West

4.2.5 Identified Issues and/or Risks

A site inspection was conducted with Council staff to understand the characteristics of the Alternative Site. Any issues and/or risks identified as part of the site inspection are categorised and described within the following sub-sections.

Please note that the Alternative Site is a green fields site without any prior development. Therefore, there is only minor issues or risks that can be identified at this stage that require consideration during the development of the concept designs for the site.

4.2.5.1 Health and Safety Issues

There did not appear to be any significant health or safety issues identified during the site visit. Typical health and safety risks associated with waste management and resource recovery facilities will be considered during the development of the concept design. In particular, Talis will refer to the *Guide to Better Practice at Resource Recovery Centres*, developed by Sustainability Victoria 2019 and the *Publication 1667.3 Management and Storage of Combustible Recyclable and Waste Materials – Guideline*, for guidance regarding the mitigation of Health and Safety risks.

4.2.5.2 Environmental Risks

The *Stage 1 Due Diligence Assessment (SMEC, 2020)* identified a number of environmental constraints associated with the development of a RRC at the Alternative Site. These constraints included the following:

- Soil contamination potential;

- Native vegetation:
 - Removal;
 - Conservation;
 - Impact on flora and fauna;
- Unexpected subsurface conditions; and
- Erosion.

In addition, the Alternative Site has a small creek running through it which at times may contain water (during the site visits it did not). This waterway has the potential to be impacted by operations of the RRC either through contaminated surface water or leachate.

The identified environmental risks and constraints will be considered during the development of the new concept designs for the Alternative Site.

4.2.5.3 Operational / Materials Handling Inefficiencies

Since the site is not a current operating facility, there are no operational or materials handling inefficiencies. However, in order to ensure an efficient site operation, the *Guide to Better Practice at Resource Recovery Centres* will be utilised along with the *Concept Design Review (Talis, 2020)* and Talis' industry experience to prepare a concept design that optimises site operations.

4.2.5.4 Traffic Flows and Conflicts

The Alternative Site has potential access from either Flat Lead Road as proposed in the current concept design (Golder, 2019) or from Yea-Whittlesea Road. Both options should be considered as both will have positives and negatives. For example, Flat Lead Road is less busy and a slower speed limit however, it is unsealed and will require the construction of a large culvert to access the site across the waterway. Yea-Whittlesea Road is a main road with a faster speed limit and will likely require dedicated turning lanes and road widening to cater for an entrance however, it is sealed and will not require the culvert to be constructed as the entrance is away from the waterway. These options will be tested and highlighted within the conceptualisation of the design at the Alternative Site.

In addition, again Talis will utilise the *Guide to Better Practice at Resource Recovery Centres* will be utilised along with the *Concept Design Review (Talis, 2020)* and Talis' industry experience to prepare a concept design that limits any traffic or vehicle conflicts where possible.

5 Scenario Development

In order to develop comprehensive and well considered scenarios, Talis undertook a staged approach to understand the future requirements of the Yea RRC. The following sections consider information that facilitates the development of the scenarios for each site.

5.1 Design Principles and Considerations

The design was developed in accordance with Sustainability Victoria's Guide to Better Practice at Resource Recovery Centres (2019), Council's desired long-term use of the site and the My Emergency Management preferred separation distances for the storage of combustible materials. The following design principles were utilised:

- Identification of barriers or constraints on or surrounding the site in relation to the siting of the RRC;
- Identification of all current and potential future uses of the site;
- Determining actual processing activities that are planned to be undertaken at the RRC prior to consolidation of waste streams for haulage to recycling markets;
- Determining location and associated infrastructure;
- Ensuring stockpiles have been separated using the following distances:
 - 10m between stockpiles consisting of tyres;
 - 6m between other stockpiles;
- Implementing one-directional traffic flow to minimise confusion (where possible);
- Separating community (light) and service (heavy) vehicles (where practical);
- Ensuring efficient use of resources for supervisory purposes (1 staff on site);
- Positioning site office to be access point for all vehicles (except service vehicles); and
- Separating front and back of house (where practical).

5.2 Future Uses

The long-term Yea RRC location needs to provide future-proofed services and infrastructure for the growing community of Yea. Therefore, as part of the development of design scenarios for each site, the following was considered necessary for the successful longevity of the site:

- Infrastructure:
 - Site Office;
 - Reuse Shop;
 - Resource Recovery Shed;
 - Receptacles and containers;
 - Processing activities and service areas;
 - Storage/stockpile areas;
 - Saw-tooth and consolidation options (WTS);
 - Fire-fighting equipment (water tanks);
 - Surface water management;
 - Leachate management;
- Accepted materials including:
 - Residential residual waste;
 - Commercial waste;
 - Steel;
 - Agricultural plastic;
 - Agricultural waste;

- Green waste;
- Co-mingled recyclables;
- Separated glass;
- Tyres;
- Gas bottles;
- Mattresses/couches;
- White goods;
- Batteries;
- Oil; and
- E-waste.

The future use of the preferred site must accommodate the abovementioned items in order to provide a better practice service for the community of Yea.

5.3 Waste Projections and Capacity Modelling

5.3.1 Projections

Waste density conversion factors and a summary of the volumes of wastes received at the Yea RRC from part of 2021-22 were provided by Council as the basis for the forecast model and extrapolated to a full year's worth of data. A growth rate of 2.5% was adopted for modelling future waste tonnages. **Table 5-1** shows the estimated annual waste tonnages the Site is anticipated to process by 2041-42.

Table 5-1: Waste Projections for Yea RRC

Material Type	Unit	2021-22	2026-27	2031-32	2036-37	2041-42
General Municipal Waste	t	269	304	344	389	440
General commercial waste	t	5	5	6	7	7
Green waste	t	207	235	266	301	340
Comingled Recyclables	t	62	70	79	90	102
Steel/Scrap metal	t	565	640	724	819	926
White Goods (other)	t	1	1	2	2	2
Fridge/Freezers	t	4	5	6	6	7
Mattresses / couches	t	13	15	17	19	22
Gas bottles	t	0	0	0	1	1
Lead acid batteries	t	2	2	2	3	3
E-waste NTCRS	t	1	1	1	2	2
E-waste - other	t	8	9	10	11	12
Fluoro tubes	t	0	0	0	0	1
Motor oil	t	4	4	5	5	6
Tyres	t	2	3	3	3	4
Total	t	1,144	1,294	1,464	1,657	1,874

It can be seen from **Table 5-1** that over the next 20 years, waste is expected to grow approximately 61% using the adopted growth rate of 2.5%. It is anticipated that either site would be able to cater for these volumes.

5.3.2 Capacity Modelling

Capacity modelling has been undertaken to determine the available storage for general/commercial waste (in the 30m³ hook-lift bins at the saw-tooth), green waste and steel/scrap metal and the anticipated frequency in which materials may require removal from each RRC site.

In addition, the capacity modelling was undertaken based on a conservative business as usual (BAU) approach utilising the anticipated maximum volume of waste entering the RRCs now and into the future. However, it is likely that State led investment in recycling and resource recovery infrastructure, combined with available grant funding will increase recovery rates and hence decrease the amount of general municipal waste going to the saw-tooth. Therefore, it is hoped that less general waste capacity is required and more recycling/stockpiling is needed to account for waste being diverted from the landfill stream to the recycling streams.

Table 5-2 presents the capacity modelling inputs including waste material type, required capacity and the anticipated collection frequency.



Table 5-2: Capacity Modelling 2021-22

Waste Material	Tonnes per annum	Conversion Factor (t/m³)	Annual Capacity Needed			Bin Capacity m³	Approx. Stockpile Dimensions (Length x width)		Collection Frequencies per monthly period				
			Volume (m³) per annum		Stockpile Area (m²)		Length	Width	1 month	3 months	6 months	9 months	12 months
General Waste + Commercial	273	0.25	1093			60*			1.5	4.6	9.1	13.7	18.2
Green Waste – Raw	207	0.15	1383	3	461		30	15	0.3	0.8	1.5	2.3	3.0
Green Waste - Mulched			692	3	231		30	8	0.3	0.8	1.5	2.3	3.0
Steel/Scrap Metal	565	0.9	628			30*			1.7	5.2	10.5	15.7	20.9

* Combined total hook-lift bin capacity

Collection frequencies less than one imply the capacity of the stockpile has not been reached in the timeframe. For example, an annual collection frequency of 0.3 means that only 30% of the stockpile area has been utilised in the time period. A stockpile does not require collection until it reaches a value of one (or 100%).

From Table 5-2 it can be seen that the tonnes per annum have been converted into cubic metres and the stockpiled area requirement calculated for raw and mulched green waste. In addition, 30m³ hook-lift bin volumes have been utilised to show the total combined capacity for the general waste and the steel/scrap metal. Utilising these sizes, the collection frequencies were calculated based on five different time scale; 1, 3, 6, 9 and 12 months.

In order to calculate the collection frequency, the annual volume of waste received was divided by the available stockpile area or bin capacity. The results effectively show how many times the bin or stockpile areas reach capacity (full capacity equals a value of 1), therefore determining how often a collection is required. This was again undertaken for the 2041-42 financial year using projected annual waste volumes which provided the following collection frequencies (Table 5-3). In 2021-22, for general waste and steel/scrap metal, where consolidation occurs within hook-lift bins, collection frequency is more often than for the stockpile areas due to smaller capacity and more material being brought to site. For green waste, the calculated collection frequency is typically between 3 to 6 months. In 2041-42, general waste requires the collection of both 30m³ bins 2.5 times a month and approximately 30 times throughout the year. Based on the allocated stockpiled area size, green waste collections in 2041-42 are undertake approximately 5 times in order for there to be sufficient available areas for green waste to continue being accepted.

Table 5-3: Capacity Modelling 2041-42 (Summary)

Material Type	Collection Frequencies per monthly period				
	1 month	3 months	6 months	9 months	12 months
General Waste + Commercial	2.5	7.5	14.9	22.4	29.9
Green Waste – Raw	0.4	1.2	2.5	3.7	4.9
Green Waste - Mulched	0.4	1.2	2.5	3.7	4.9
Steel/Scrap Metal	2.9	8.6	17.2	25.7	34.3

Therefore, considering the waste (population) growth, it can be seen that in 2041-42 the annual collection frequency increases considerably as expected.

In addition, the improvement of the infrastructure and services at each RRC to align with better practice, will facilitate greater reuse and resource recovery rates by accepting, sorting, consolidating and managing a greater range of reusable and recyclable materials. Which requires the holding capacities of other material accepted at the site to have spare or contingent capacity available into the future.

5.4 Infrastructure Sizing and Land Use Requirements

Based on the tonnages calculated in the Capacity Modelling works, the land use requirements were determined. The land use requirements were based on a variety of key aspects including:

- Facilities' footprint sizes (including waste acceptance, processing and product storage areas);
- Siting requirements – front or back of house;
- Road network and traffic flows;
- Reuse (tip) shop;
- Parking; and
- Material flows across the Site.

Sizing for all infrastructure has been outlined in Section 6.

5.5 Infrastructure Placement

The initial phase of the RRC concept designs for the RRCs involved identifying a suitable location on each site. A range of tasks were undertaken as part of these works including:

- Site visits;
- Determine sizing and footprint requirements;
- Identifying barriers or constraints on or surrounding the site in relation to the siting of the RRC infrastructure;
- Identifying all current and potential future uses of the site including any existing permanent infrastructure;
- Determine actual processing activities that are planned to be undertaken at the RRC prior to consolidation of waste streams for haulage to recycling markets to recover materials;
- Placement of facilities to encourage greater source separation and adoption disposal options higher up in the waste hierarchy;
- Consideration of inclusion of Reuse/Resale Centres (Tip Shops);
- Outlining the recommended location and associated infrastructure; and
- A traffic plan based on the preferred infrastructure locations.

In obtaining a thorough understanding of each site and associated constraints, the conceptual designs were prepared.



6 Design Conceptualisations

6.1 Conceptualisation

Based on the agreed preferred location of the RRC on each site, the following tasks were undertaken as part of the design conceptualisation and preparation:

- Access and egress requirements;
- Building and equipment sizing including:
 - Office;
 - Reuse shop;
 - Resource Recovery Shed;
 - Receptacles and containers;
 - Processing activities and areas;
 - Storage/stockpile areas;
- Operating models to ensure:
 - Safe and efficient disposal of material for customers;
 - Improving operational efficiency and minimising the onsite material handling requirements;
 - Minimising operational costs; and
 - Appropriate storage and handling for waste types.
- Saw-tooth and consolidation options; and
- High and low cost options.

The conceptual design for each of the RRCs individually as described in the following sections, along with design choices for high and low cost options at the site.

6.2 Current RRC Site

The current site has been modified to provide the infrastructure facilitating collection of additional waste streams. In addition, a key objective was to improve traffic flow across the site to encourage one way traffic only where possible.

The following section provides a description of the RRF Conceptual Design and its key design elements.

6.2.1 Entrance and Access Control Gatehouse

Entrance to the RRF is provided via Mt Pleasant Rd on the east of the site. Vehicles will enter and turn south via an access control gatehouse for inspection prior to proceeding straight and entering the southern loop around the RRF. The layout of the entrance road allows for queuing space between Mt Pleasant Rd and the gatehouse.

The access control gatehouse will also house an office space for staff onsite and adjoin to toilet facilities for the site. Parking has been provided alongside the gatehouse building for staff and visitors.

Infrastructure	Sizing	Operating Model
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Office/Gatehouse and Toilet Facilities	6m x 6m demountable building 3 x parking spaces	-
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6.2.2 Cardboard/Paper/Commingled Recycling Drop Off

Immediately following the access control gatehouse on the right side of the road loop is the recycling drop off area. This area consists of a hardstand area on which front lift bins will be placed for the acceptance of materials such as cardboard, paper and comingled plastic recycling. A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off lane for access to the recycling drop off area.

Front lift bins will be serviced after hours with the use of front lift trucks (FLT). FLT will enter via the access road, and turn onto the loop via the access gate house. Following servicing of the bins, FLT will then continue around the southern loop and exit through the centre of the site to the access road.

Infrastructure	Sizing/Features	Operating Model
Cardboard/Paper/Commingled Recycling Drop Off	3.5m x 16m hard stand 7 x 4.5m³ front lift bins - Drop off lane	Receptacles will be serviced via a front lift truck when at capacity

6.2.3 Recycling Shed

Directly across for the access control gate on the left of the road loop is the recycling shed. The recycling shed is an adaptable area to collect and store accepted waste materials at the site. Materials will be stored in receptacles such as bins and cages, or pallets to allow for efficient storage and collection. Materials stored in this area include, but are not limited to the following:

- E-waste;
- Fluorescent light bulbs;
- Appliances;
- Batteries; and
- Electronics.

Customers will pull into the cleared area in front of the shed or into the parking bays to the south of the shed for access.

Waste material will be collected on an as needed basis via the roller doors at the front of the shed.

Infrastructure	Sizing/Features	Operating Model
Recycle Shed	17m x 9m shed 8 x car parking bays 2 x trailer parking bays	Receptacles will be serviced when at capacity

		Waste collection will be facilitated with the use of a forklift
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6.2.4 Drum Drop Off

Immediately following the recycle shed on the left side of the road loop is the drum drop off. This area consists of a bunded hardstand area on which oil drums will be accepted and stored for collection. A cleared area in front and parking bays south of the drum drop off allow customers access to drop off materials as needed.

Drums will be collected as needed via a flatbed truck. A cleared area in front will allow service vehicles to deviate from the internal road loop and pull into an adjacent drop off area for access to the drum drop off area.

Infrastructure	Sizing/Features	Operating Model
Drum Drop Off Area	6m x 6m bunded hard stand 7 x 4.5m³ front lift bins - Drop off lane	- Drum waste will be collected via flatbed truck - Loading will be facilitated by a forklift

6.2.5 Tyre and C&D Bunkers

Following on from the drum drop off on the left side of the road loop are the Tyre and Construction and Demolition (C&D) bunkers. This area consists of a hardstand area with push walls on three sides to form bunkers in which tyres and C&D waste can be stored. A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off area for access bunkers. This will ensure close and easy access for customers to dispose of their heavy materials.

Material will be periodically removed via a front end loader and loaded into haulage vehicles for collection. Collection of tyres and C&D materials will be scheduled after operating hours to minimise interaction between plant, heavy vehicles and light vehicles.

Infrastructure	Sizing/Features	Operating Model
Tyre and C&D Bunkers	12.5m x 6m tyre bunker 12.5m x 6m C&D bunker - Concrete push walls	Receptacles will be serviced via front end loader to haulage vehicles

6.2.6 Mattress Drop Off

Continuing along the road loop on the left side is the mattress drop off area. This area consists of a hardstand area with cage for containment of the mattresses. A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off lane for access to the mattress drop off. This will ensure close and easy access for customers to dispose of their heavy materials.

Mattresses will be collected with the aid of a forklift or excavator with grapple attachment. Haulage vehicles will pull up along side the mattress drop off on the road loop. Servicing will be scheduled

outside of operating hours to minimise interaction between plant, heavy vehicles and light vehicles, and minimise any delays for customers on site.

Infrastructure	Sizing/Features	Operating Model
Mattress Drop Off	25m x 3m hardstand - Cage for mattress containment with cover for weather protection	Mattresses will be collected with the use of an excavator with grapple attachment or forklift

6.2.7 Green Waste Area

Following on from the Tyre and Construction and Demolition (C&D) bunkers on the left of the road loop is the green waste drop off area. Customers will pull into a cleared area to the south of the green waste area to unload materials. Green waste will be transferred to the raw green waste stockpiles with the use of a front end loader. The raw green waste will then be mulched with the use of a wood chipper prior to being stored on the mulch stockpile for collection. A 6m buffer will be maintained between stockpiles and adjacent waste drop off areas to provide a fire break, as well as sufficient space for manoeuvring the front end loader.

Collection of mulch material will be undertaken outside of operating hours. Haulage vehicles will pull up along side the green waste area on the road loop, and will be loaded with aid of the front end loader.

Infrastructure	Sizing/Features	Operating Model
Green Waste	30m x 15m raw green waste stockpile 30m x 8m mulch stockpile	- Management of green waste will be facilitated with a front end loader - Green waste will be mulched with a wood chipper - A front end loader will load mulch to haulage vehicles for collection

6.2.8 Metal and General Waste Drop Off

Prior to accessing the Metal and General Waste Drop Off, customers have the opportunity to exit the site through the centre of the site to the access road. Customers choosing to continue on to the Metal and General Waste Drop Off area will take the left road to the multitiered drop off facility.

The Metal and General Waste Drop Off Area consists of an elevated saw tooth arrangement which contains two bays to deposit general waste and one bay to deposit metal. An additional bay has been provided to store full bins as required prior to collection. The 30m³ hook lift bins are located in the sawtooth bays against the retaining wall at a lower level to facilitate ease of loading. The hook lift bins will have a temporary cover which can be deployed to provide protection from the weather.

Each bin is accessible to the community from an elevated platform on which vehicles will reverse up to and unload mixed waste into the hook lift bins below. A concrete wheel stop and guardrail will be installed to ensure the safety of the community and vehicle when reversing and depositing materials into the hook lift bins.

Hook lift bins will be serviced via hook lift trucks. The service vehicles will enter via the main site access and travel through the centre of the site to the service road positioned alongside the lower level of the multi tiered drop off.

Infrastructure	Sizing/Features	Operating Model
Multi Tier Drop Off	1 x 30m³ metal hook lift bins 2 x 30m³ general waste hook lift bins 1 x 30m³ hook lift bin extra - Tiered drop off with retaining wall 11 x reverse parking drop off bays	Receptacles will be collected and replaced via a hook lift truck via service road

6.2.9 Oil Drop Off

Adjacent to the multi tiered drop off facility is the oil drop off. This area consists of a bunded hardstand area with oil tank and pouring hopper, as well as a canopy to shield to area from inclement weather. Customers will pull into the cleared area in front to allow customers access to dispose of oil as needed.

The oil tank will be pumped out periodically as capacity is reached. Servicing vehicles will pull alongside the oil tank, in the customer drop off area, to pump out oil from the facility. This will be undertaken outside of operational hours to minimise interaction between service and customer vehicles.

Infrastructure	Sizing/Features	Operating Model
Oil Drop Off Area	5m x 5m bunded hard stand - Oil tank with hopper - Canopy over hardstand	Oil will be pumped out with an oil tanker periodically as capacity is reached

6.3 Alternative Site

The current proposed RRC will feature a two-road system, with the inner ring being used by the public to drop wastes off, whilst the outer ring will be utilised by council vehicles to remove waste streams from the facility. Due to the steep contours in areas of the site, areas with a more gradual incline where favoured for the placement of infrastructure with large foot prints. An additional consideration was the conservation of trees on the site where possible.

Waste disposal options have been provided in order of importance in the waste hierarchy, with reuse and recycling options provided before disposal options to encourage greater source separation at the site. In addition, sufficient space has been provided to expand operations for additional capacity or to provide further waste collection facilities.

A gatehouse manages site access, with a semi-enclosed shed as the dedicated drop-off point for co-mingled recyclables, tyres, gas bottles, mattresses and couches, white goods, batteries, oil, and e-waste. A large outdoor bunded area will be used for the drop-off and processing of green wastes and a sawtooth collection area with a canopy will be used for large recoverable items such as agricultural

drums and metals, in addition to residual commercial and residential wastes. The Recycled goods shop will be located in the centre of the Site, with parking spaces available onsite.

The following section provides a description of the RRF Conceptual Design and its key design elements.

6.3.1 Entrance and Access Control Gatehouse

Entrance to the RRF is provided via Flat Lead Rd on the east of the site. Vehicles will pass over the stream and turn south onto the internal public ring via an access control gatehouse for inspection. Vehicles will then have the opportunity to continue on to drop off areas or pull into the parking area. The layout of the entrance road allows for queuing space between Flat Lead Rd and the gatehouse.

The access control gatehouse will be attached to the reuse shop to allow for economies in staffing if required.

Infrastructure	Sizing	Operating Model
Access Control Gatehouse	2.5m x 2.5m demountable building	-

6.3.2 Reuse Shop

Adjoining the access control gate on the right of the road loop is the reuse shed. The reuse shed is an adaptable area for the collection and reselling appropriate materials at the site. Customers can deviate from the internal road loop and pull into an adjacent drop off lane to drop off bulky items. Customers choosing to browse the wares at the reuse shop will be able to pull into the parking bays at the centre of the site.

Infrastructure	Sizing/Features	Operating Model
Reuse Shop	15m x 20m reuse shed 23 x car parking bays 9 x trailer parking bays	- Customers will drop off materials via the drop off lane - Materials will be managed with the aid of a forklift for heavy materials

6.3.3 Mattress Drop Off

Directly opposite the access control gate house on the left side of the road ring is the mattress drop off area. This area consists of a hardstand area with cage for containment of the mattresses. A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off lane for access to the mattress drop off. This will ensure close and easy access for customers to dispose of their heavy materials.

Haulage vehicles will have access via the service road along the outer ring of the site. Vehicles will reverse up to the mattresses storage receptacles and loaded with the aid of a forklift or excavator with grapple attachment.

Infrastructure	Sizing/Features	Operating Model
Mattress Drop Off	25m x 4m hardstand - Cage for mattress containment with protective cover for inclement weather	- Mattresses will be collected with the use of an excavator with grapple attachment or forklift - Haulage vehicles will be loaded via the service lane

6.3.4 Cardboard/Paper/Commingle Recycling Drop Off

Immediately following the mattress drop off on the left side of the road loop is the recycling drop off area. This area consists of a hardstand area on which front lift bins will be placed for the acceptance of materials such as cardboard, paper and commingled plastic recycling. A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off lane for access to the recycling drop off area.

Front lift bins will be serviced after hours with the use of front lift trucks FLT's. FLT's will enter via the access road, and turn onto the internal public ring road. Following servicing of the bins, FLT's will then continue around the internal road and exit via the site access road.

Infrastructure	Sizing/Features	Operating Model
Cardboard/Paper/Commingled Recycling Drop Off	3.5m x 16m hard stand 7 x 4.5m³ front lift bins - Drop off lane	Receptacles will be serviced via a front lift truck when at capacity

6.3.5 Recycling Shed

Directly across for the access control gate on the left of the road loop is the recycling shed. The recycling shed is an adaptable area to collect and store accepted waste materials at the site. Materials will be stored in receptacles such as bins and cages, or pallets to allow for efficient storage and collection. Materials stored in this area include, but are not limited to the following:

- E-waste;
- Fluorescent light bulbs;
- Appliances;
- Batteries; and
- Electronics.

A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off lane for access to the recycling shed. Waste material will be collected on an as needed basis via the roller doors at the back of the shed from the service road.

Infrastructure	Sizing/Features	Operating Model
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Recycle Shed	25m x 35m shed	- Receptacles will be serviced when at capacity via roller doors at the back of the shed from the service road - Waste collection will be facilitated with the use of a forklift
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6.3.6 Gas and Fire Extinguisher Drop Off

Immediately following the recycle shed on the left side of the road loop is the gas and fire extinguisher drop off. This area consists of a bunded hardstand area with cages for containment of the gas bottles and fire extinguishers. A drop off lane allows customers access to divert from traffic and safely drop off materials as needed.

Drums will be collected as needed via a flatbed truck. Service vehicles will enter via the access road, turn onto the internal public ring road and pull up alongside the drop off area.

Infrastructure	Sizing/Features	Operating Model
Gas and Fire Extinguisher Drop Off Area	10m x 20m bunded hard stand 4.5m x 5m cage for gas bottles 4.5m x 5m cage for fire extinguisher - Drop off lane	- Drum waste will be collected via flatbed truck along public ring road - Loading will be facilitated by a forklift

6.3.7 Tyre and C&D Bunkers

Following on from the recycle shed on the left side of the road loop are the Tyre and Construction and Demolition (C&D) bunkers. This area consists of a hardstand area with push walls on three sides to form bunkers in which tyres and C&D waste can be stored. A bypass lane will allow customers to deviate from the internal road loop and pull into an adjacent drop off area for access bunkers. This will ensure close and easy access for customers to dispose of their heavy materials.

Material will be periodically removed via a front end loader and loaded into haulage vehicles for collection. Haulage vehicles will enter via the service road and pull up along side the bunkers into position for loading. Collection of tyres and C&D materials will be scheduled after operating hours to minimise interaction between plant, heavy vehicles and light vehicles.

Infrastructure	Sizing/Features	Operating Model
Tyre and C&D Bunkers	15m x 6m tyre bunker 15m x 6m C&D bunker - Concrete push walls	Receptacles will be serviced via front end loader to haulage vehicles

6.3.8 Drum and Oil Drop Off

Adjacent to the gas and fire extinguisher drop off on the right of the ring road is the oil and drum drop off. This area consists of a bunded hardstand area with oil tank and pouring hopper, as well as a canopy to shield to area from inclement weather. Customers will pull into the cleared area in front to provide access to dispose of oil and drums as needed as needed.

The oil tank will be pumped out periodically as capacity is reached. Servicing vehicles will pull alongside the oil tank, via the internal public road, to pump out oil from the facility. Drums will be collected as needed via a flatbed truck. Service vehicles will utilise the internal public road to access the drum drop off area for loading with the use of a forklift.

Servicing will be undertaken outside of operational hours to minimise interaction between service and customer vehicles.

Infrastructure	Sizing/Features	Operating Model
Oil and Drum Drop Off Area	20m x 10m bunded hard stand - Oil tank with hopper - Canopy over oil 5m x 5m drum drop off pad	- Oil will be pumped out with a tanker periodically as capacity is reached via public road - Drum waste will be collected via flatbed truck facilitated by a forklift

6.3.9 Green Waste Area

Following on from the Tyre and Construction and Demolition (C&D) bunkers on the left of the road loop is the green waste drop off area. Customers will pull into a cleared area to the east of the green waste area to unload materials. Green waste will be transferred to the raw green waste stockpiles with the use of a front end loader. The raw green waste will then be mulched with the use of a wood chipper prior to being stored on the mulch stockpile for collection. A 6m buffer will be maintained between stockpiles and adjacent waste drop off areas to provide a fire break, as well as sufficient space for manoeuvring the front end loader.

Haulage vehicles will pull up along side the green waste area on the service road loop to collect mulch material. Haulage vehicles will be loaded with aid of the front end loader.

Infrastructure	Sizing/Features	Operating Model
Green Waste	30m x 15m raw green waste stockpile 30m x 8m mulch stockpile	- Management of green waste will be facilitated with a front end loader - Green waste will be mulched with a wood chipper - A front end loader will load mulch to haulage vehicles for collection

6.3.10 Metal and General Waste Drop Off

Prior to accessing the Metal and General Waste Drop Off, customers have the opportunity to exit the site through the centre of the site to the access road. Customers choosing to continue on to the Metal and General Waste Drop Off area will take the left road to the multitiered drop off facility.

The Metal and General Waste Drop Off Area consists of an elevated saw tooth arrangement which contains five bays for the depositing of metal and general waste. The 30m³ hook lift bins are located in the sawtooth bays against the retaining wall at a lower level to facilitate ease of loading. A canopy over the hook lift bins and unloading areas protect the waste and customers from inclement water.

Each bin is accessible to the community from an elevated platform on which vehicles will reverse up to and unload mixed waste into the hook lift bins below. A concrete wheel stop and guardrail will be installed to ensure the safety of the community and vehicle when reversing and depositing materials into the hook lift bins.

Hook lift bins will be serviced via hook lift trucks. The service vehicles will enter via the service road positioned alongside the lower level of the multi tiered drop off. Bins will then be loaded and replaced with with empty ones.

Infrastructure	Sizing/Features	Operating Model
Multi Tier Drop Off	5 x 30m³ metal and general waste hook lift bins - Tiered drop off with retaining wall 10 x reverse parking drop off bays	Receptacles will be collected and replaced using a hook lift truck via service road



7 Financial Modelling

High and low cost models were created for each site based on the base concept designs developed. Key areas for cost savings were as follows:

- Surfacing materials for roads and hardstands;
- Demarcation of areas; and
- Minimisation of structural elements (such as canopies and sheds).

Table 7-1 below outlines the key components for cost savings for both RRC sites.

Table 7-1: Key differences in high and low cost models

Site	Component	Low Cost Model	High Cost Model	Comments
Current Site and Alternative Site	Roads	• Unsealed with signs and recycled materials demarcating areas as required	• Sealed with signs and lines	• Sealed surfaces will require less frequent maintenance and will be less susceptible to wear. • Line marking will provide clearer instruction to drivers utilising the site
	Hardstands	• Unsealed, compacted hardstand	• Concrete hardstand	• The concrete hardstand will be less susceptible to wear and damage from waste management activities.
Alternative Site	Recycling Shed	• Expanded Recycling Shed incorporating mattresses and comingled recyclables collection	• Separate external mattress and comingled recyclables collection on hardstand area, allowing for future expansion	• External recycling drop off areas provide more visibility for customers who have few recyclables to dispose of. This will promote greater source separation.
	Multi-tier Drop Off	• Tarp cover over hook-lifts to be deployed in inclement weather	• Canopy over hook-lift bins and drop off area	• A permanent canopy will provide protection to waste receptacles as well as customers. Tarps will provide good coverage to waste receptacles but will cause an obstruction to customers using these in inclement weather.

7.1 Summary of Cost Estimates

Four cost estimates were developed, applying the above savings to the RRC design for the current and alternative sites to produce a high and low cost model for each site. A summary of the cost estimates have been provided in Table 7-2 and Table 7-3 below. A detailed breakdown of the cost estimates have been provided in the Appendix B.

Table 7-2: Current RRC site cost estimate

Item	Description	Amount (\$ Excl. GST)	
		Low Cost Option	High Cost Option
1	Preliminaries	\$ 18,433	\$ 30,900
2	Site Clearance and Earthworks	\$ 8,000	\$ 8,000
3	Roadworks and Surfacing	\$ 105,000	\$ 221,000
4	Buildings and Infrastructure	\$ 71,325	\$ 80,000
6	Miscellaneous	\$ -	\$ -
	Sub-Total	\$ 202,758	\$ 339,900
	Total	\$ 239,254	\$ 401,082

Table 7-3: Alternative RRC site cost estimate

Item	Description	Amount (\$ Excl. GST)	
		Low Cost Option	High Cost Option
1	Preliminaries	\$ 139,927	\$ 163,500
2	Site Clearance and Earthworks	\$ 236,000	\$ 236,000
3	Roadworks and Surfacing	\$ 191,000	\$ 398,000
4	Buildings and Infrastructure	\$ 972,274	\$ 1,001,000
6	Miscellaneous	\$ 96,000	\$ 96,000
	Sub-Total	\$ 1,635,201	\$ 1,894,500
	Total	\$ 1,929,538	\$ 2,235,510

8 Conclusions and Recommendations

Talis prepared concept designs for the upgrade or redevelopment of the Yea RRC focussing on two sites namely; the existing (current) Yea RRC site and an alternative site located at 10 Flat Lead Road. The project aimed to provide the options available to Council with regards to the development of a modern RRC to service the Yea township area, by determining whether the current site, the alternative site, or a staged process to move from one to the other, maximises recycling, promotes circular economy outcomes and provides the best value to Council and its residents.

Throughout the above process, some key benefits and disadvantages in upgrading the current site and developing the alternative site have been identified.

- Upgrading the Current Site:
 - Removing the central touch point and providing one way access through the site promotes recycling and other separation activities prior to encountering a general rubbish disposal point.
 - Relocating the gatehouse to the entrance of the site at the drivers side window will limit customer confusion when navigating the site.
 - Lower capital investment (**\$401,082** for the higher cost option) to provide an expanded recycling service, which includes increasing capacity for mattress, tyre, C&D, drum and general waste collection as well as improved facilities for staff.
 - Limited opportunities to expand for future growth or to provide collection/management services for other waste streams, such as a reuse shop.
 - Due to site constraints, steep slopes to the west of the site, there are limited opportunities to separate service/heavy vehicles and public vehicles. This is a key principle in best practice design of community waste transfer stations. This additionally limits the hours in which waste can be safely collected for downstream processing.
- Developing the Alternative Site:
 - With no constraints provided by existing infrastructure, the facility's design can better adhere to better practice design principles including separation of service and public vehicles, and promoting reuse and recycling disposal options across the site.
 - Higher capital investment (**\$2,235,510** for the higher cost option) to provide additional resource management services at the site including a reuse shop facility.
 - Due to additional space at the site, the recycling shed can be expanded to incorporate the previously external recycling collection points (including mattress, cardboard and comingled recycling collection), this has been included in the lower cost option for this site. The benefit of maintaining these as external collection points as they are more easily visible, and provide easier access for customers not needing to enter the shed for smaller recycling streams, therefore encouraging recycling of these materials.
 - The desirability to conserve significant flora on the site where feasible. This design requires removing only one tree at the alternative site.
 - The configuration and expanse of the site allows for additional further waste stream collection points or expansion of existing ones.
- Material and infrastructure cost savings:

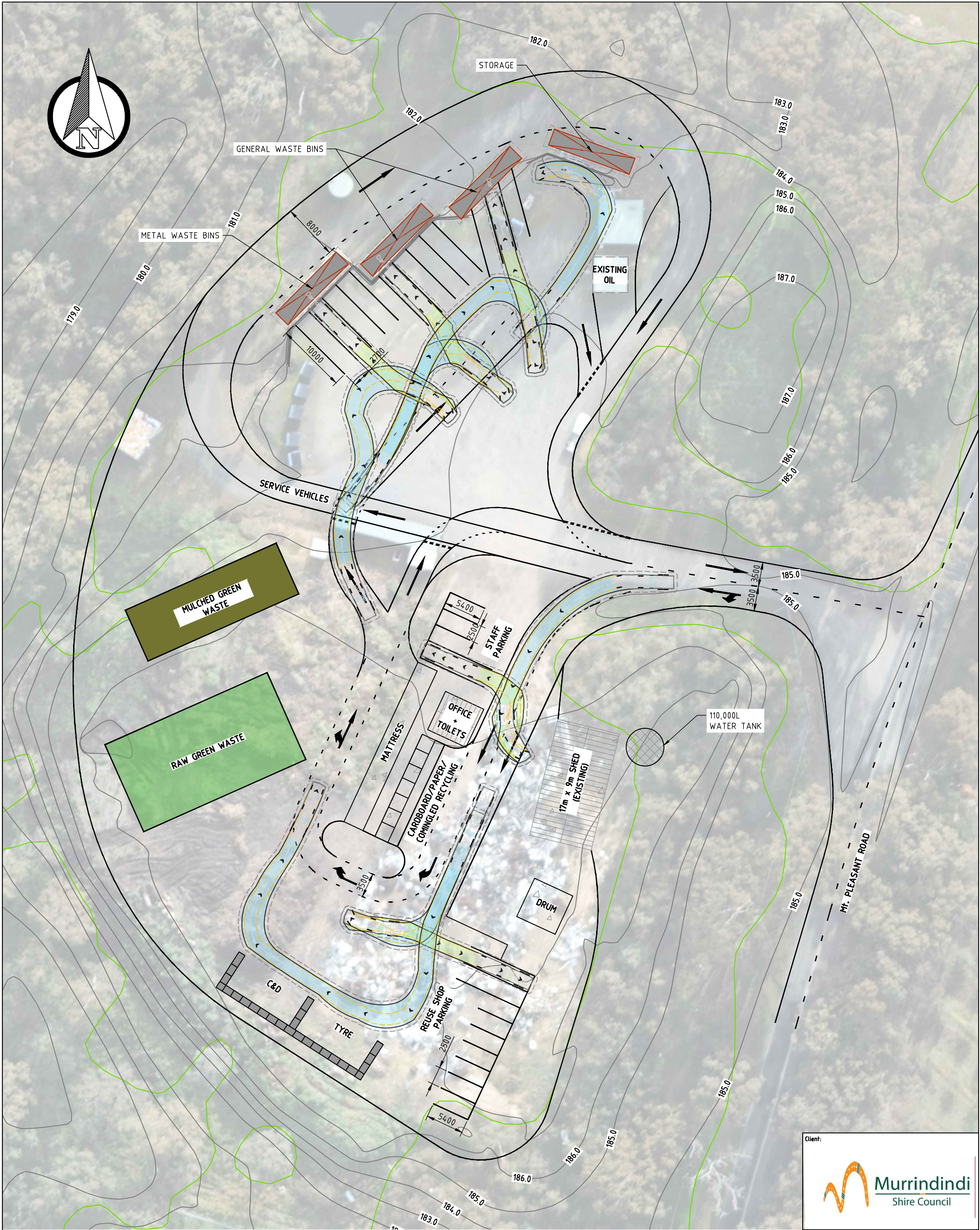


- Sealed surfaces will require less frequent maintenance and will be less susceptible to wear than the lower cost compacted subgrade options.
- The concrete hardstand will be less susceptible to wear and damage from waste management activities, such as servicing front-lift bins and material collection cages.
- Permanent canopies over the multi-tiered drop off area will provide protection to both waste receptacles as well as customers. The lower cost option utilising tarps to provide coverage to waste receptacles however, will cause an obstruction to customers using these in inclement weather.



APPENDIX A

Conceptual Design Drawings



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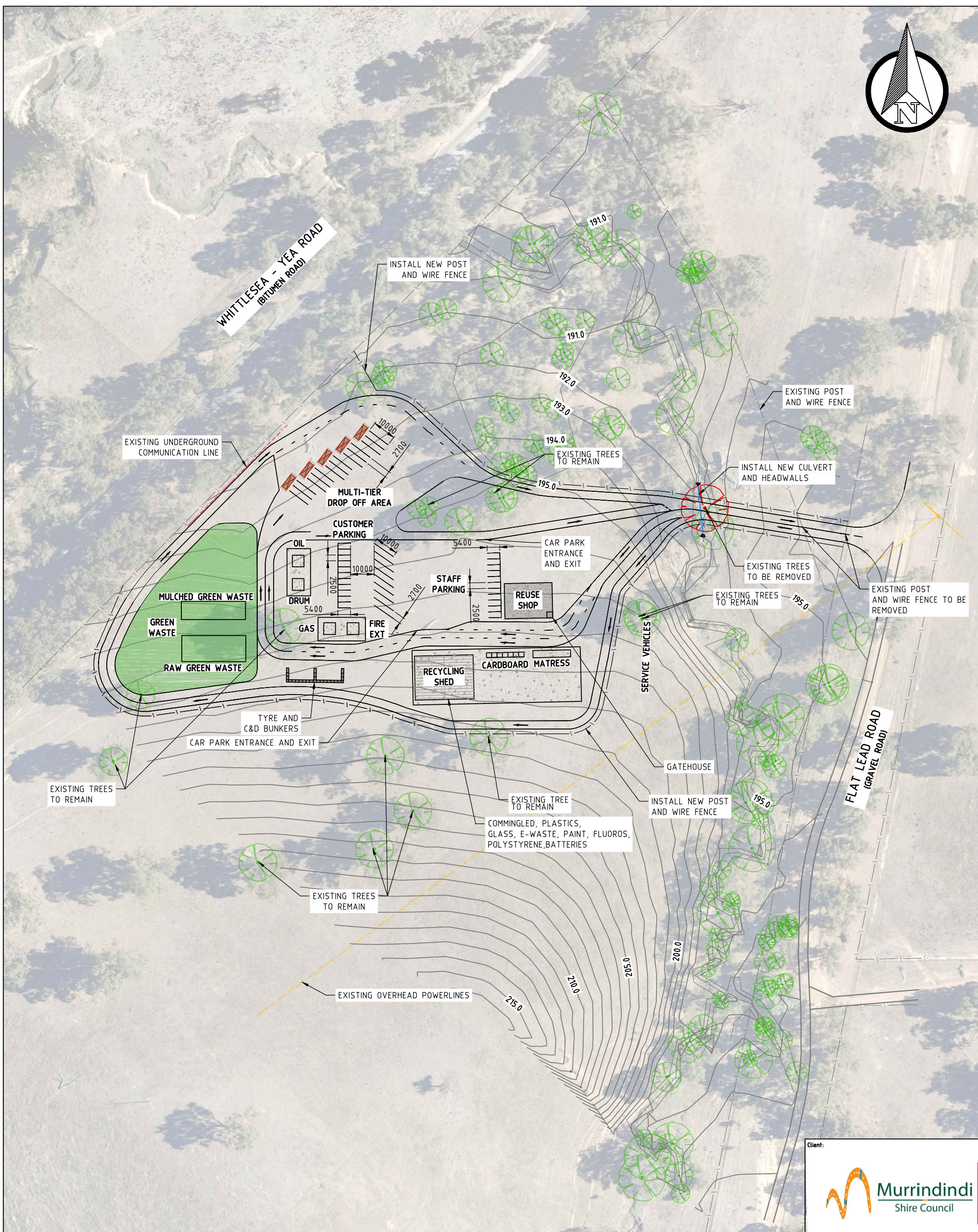
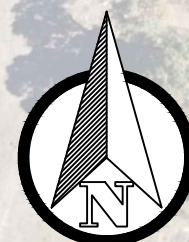
Client:			
Project:			
MURRINDINDI YEA RRC			
Drawn by:	YJ	Job No:	TW21167
Checked by:	AB	File No:	TW21167-C-101
Approved by:		Drg. No:	Rev:
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Date:	09.02.2022		



ASSET
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ENVIRONMENT
NOISE
SPATIAL
WASTE
604 Newcastle Street,
Leederville WA 6007
PO Box 454, Leederville WA 6903

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No.	Date	Drawn By	Amendment / Issue
A	09.02.2022	YJ	PRELIMINARY ISSUE
No.	Date	Drawn By	Amendment / Issue

Title:
CONCEPT SITE LAYOUT - EXISTING SITE



PRELIMINARY ONLY
NOT FOR CONSTRUCTION

Client:



Murrindindi
Shire Council

Project:

MURRINDINDI YEA RRC

Drawn by:	YJ	Job No:	TW21167	
Checked by:	AB	File No:	TW21167-C-101	
Approved by:		Drg. No:	Rev:	
Scale:	1:1/500 @A3	C-101		A
Date:	09.02.2022			



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No.	Date	Drawn By	Amendment / Issue	App.

Title:	
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CONCEPT SITE LAYOUT - NEW SITE



APPENDIX B

Detailed Cost Estimate

Table 1 - Cost Estimate - Current Site

				Low Cost Option	
Item	Description	Unit	Rate	Quantity	Amount (\$ excl. GST)
1	Preliminaries				
1.1	Preliminaries incl. insurance, setting out, plant and scaffolding, supervision, temporary services and facilities, cleaning and handover, maintenance etc	Item	10% CAPEX	1	\$ 18,432.50
			Sub-total		\$ 18,432.50
2	Site Clearance and Earthworks				
2.1	Site clearance of medium to low vegetation				
	Low to medium vegetation	m2	\$ 2.00	505	\$ 2,000.00
	Large vegetation	no	\$ 187.00	-	\$ -
2.2	Site earthworks				
	Cut and fill across the site	m ³	\$ 9.75	600	\$ 6,000.00
2.3	Multi tier drop off area				
	Fill from stockpile	m3	\$ 14.20	-	\$ -
			Sub-total		\$ 8,000.00
3	Roadworks and Surfacing				
3.1	Internal Public Road				
	Subgrade preparation	m2	\$ 1.95	2,010	\$ 4,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -
	Compacted gravel basecourse	m2	\$ 18.10	2,010	\$ 37,000.00
3.2	Service Roads				
	Subgrade preparation	m2	\$ 1.95	1,250	\$ 3,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -
	Compacted gravel basecourse	m2	\$ 18.10	1,250	\$ 23,000.00
3.3	Multi-tier drop off area				
	Subgrade preparation	m2	\$ 1.95	1,315	\$ 3,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -
	Compacted gravel basecourse	m2	\$ 18.10	1,315	\$ 24,000.00
3.4	Parking				
	Subgrade preparation	m2	\$ 1.95	320	\$ 1,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -
	Compacted gravel basecourse	m2	\$ 18.10	320	\$ 6,000.00
3.5	Miscellaneous				
	Bollards	no	\$ 74.35	8	\$ 1,000.00
	Precast wheel stops	no	\$ 186.90	-	\$ -
	Line marking	Item	\$ 6,000.00	-	\$ -
	Signage	Item	\$ 3,000.00	1	\$ 3,000.00
			Sub-total		\$ 105,000.00
4	Buildings and Infrastructure				
4.1	Gatehouse, Office and Toilet Facilities				
	Proprietary demountable	m ²	\$ 2,540.00	36	\$ 92,000.00
	ATU	no	\$ 3,800.00	1	\$ 4,000.00
4.2	Recycling drop off area				
	Subgrade preparation	m ²	\$ 1.95	56	\$ 1,000.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	56	\$ 2,000.00
	Concrete hardstand	m ²	\$ 150.00	-	\$ -
4.3	Recycling Shed				
	Subgrade preparation	m2	\$ 1.95	-	\$ -
	Shed (Agricultural with concrete hardstand)	m2	\$ 250.00	-	\$ -
	Additional roller doors	no	\$ 12,250.00	-	\$ -
4.4	Gas and Fire Extinguisher Drop Off				
	Subgrade preparation	m ²	\$ 1.95	36	\$ 1,000.00
	Concrete hardstand	m ²	\$ 21.35	36	\$ 1,000.00
	Edge bund	m	\$ 120.00	24	\$ 2,880.00
4.5	Tyre and C&D Bunkers				
	Subgrade preparation	m ²	\$ 1.95	150	\$ 293.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	150	\$ 3,203.00
	Pushwalls	m	\$ 400.00	43	\$ 17,200.00
4.6	Mattress Drop Off				

Concept Cost Estimate

	Subgrade preparation	m ²	\$ 1.95	75	\$ 147.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	75	\$ 1,602.00
	Concrete hardstand	m2	\$ 150.00	-	\$ -
4.7	Green Waste Area				
	Subgrade preparation	m2	\$ 1.95	1,722	\$ 4,000.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	1722	\$ 37,000.00
	Concrete hardstand	m2	\$ 150.00	-	\$ -
4.8	Multi-tier drop off facility				
	Subgrade preparation	m2	\$ 1.95	-	\$ -
	Concrete retaining wall	m2	\$ 400.00	-	\$ -
	200 slab on grade	m2	\$ 100.00	-	\$ -
	Canopy	m2	\$ 195.00	-	\$ -
	Safety barrier	m	\$ 335.00	-	\$ -
4.9	Drum and Oil Drop Off				
	Subgrade preparation	m2	\$ 1.95	-	\$ -
	Concrete hardstand	m2	\$ 21.35	-	\$ -
	Edge bund	m	\$ 120.00	-	\$ -
	Canopy	m2	\$ 195.00	-	\$ -
			Sub-total		\$ 71,325.00
6	Miscellaneous				
6.1	Utility Services				
	Site electrical supply	Item	\$ 25,000.00	-	\$ -
	Water supply	Item	\$ 10,000.00	-	\$ -
6.2	Security				
	Perimeter fence - 1.8m mesh fence	m	\$ 55.00	-	\$ -
	1.8m Double gate (5m wide with 2 posts, braces, fittings)	No	\$ 1,160.00	-	\$ -
6.3	OH&S				
	CCTV	Item	\$ 20,000.00	-	\$ -
	External lighting - solar masts	No	\$ 8,000.00	-	\$ -
	Fire services - water tank	Item	\$ 12,000.00	-	\$ -
			Sub-total		\$ -
	Sub Total				\$ 202,757.50
	Local Loading	5%			\$ 10,137.88
	Contingency	5%			\$ 10,137.88
	Professional Services	8%			\$ 16,220.60
	TOTAL				\$ 239,253.85

Table 1 - Cost Estimate - Alternate Site

				Low Cost Option		High Cost Option	
Item	Description	Unit	Rate	Quantity	Amount (\$ excl. GST)	Quantity	Amount (\$ excl. GST)
1 Preliminaries							
1.1	Preliminaries incl. insurance, setting out, plant and scaffolding, supervision, temporary services and facilities, cleaning and handover, maintenance etc	Item	10% CAPEX	1	\$ 139,927.40	1	\$ 163,500.00
							\$ -
			Sub-total		\$ 139,927.40		\$ 163,500.00
2 Site Clearance and Earthworks							
2.1	Site clearance of medium to low vegetation						
	Low to medium vegetation	m2	\$ 2.00	24,800	\$ 50,000.00	24,800	\$ 50,000.00
	Large vegetation	no	\$ 187.00	1	\$ 1,000.00	1	\$ 1,000.00
2.2	Site earthworks						\$ -
	Cut and fill across the site	m ³	\$ 9.75	17360	\$ 170,000.00	17360	\$ 170,000.00
2.3	Multi tier drop off area						\$ -
	Fill from stockpile	m3	\$ 14.20	1,000	\$ 15,000.00	1,000	\$ 15,000.00
			Sub-total		\$ 236,000.00		\$ 236,000.00
3 Roadworks and Surfacing							
3.1	Internal Public Road						
	Subgrade preparation	m2	\$ 1.95	3,560	\$ 7,000.00	3,560	\$ 7,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -	3,560	\$ 141,000.00
	Compacted gravel basecourse	m2	\$ 18.10	3,560	\$ 65,000.00	-	\$ -
3.2	Service Roads						
	Subgrade preparation	m2	\$ 1.95	2,188	\$ 5,000.00	2,188	\$ 5,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -	2,188	\$ 87,000.00
	Compacted gravel basecourse	m2	\$ 18.10	2,188	\$ 40,000.00	-	\$ -
3.3	Multi-tier drop off area						
	Subgrade preparation	m2	\$ 1.95	2,000	\$ 4,000.00	2,000	\$ 4,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -	2,000	\$ 79,000.00
	Compacted gravel basecourse	m2	\$ 18.10	2,000	\$ 37,000.00	-	\$ -
3.4	Parking						
	Subgrade preparation	m2	\$ 1.95	1,470	\$ 3,000.00	1,470	\$ 3,000.00
	Subbase, basecourse and seal	m2	\$ 39.45	-	\$ -	1,470	\$ 58,000.00
	Compacted gravel basecourse	m2	\$ 18.10	1,470	\$ 27,000.00	-	\$ -
3.5	Miscellaneous						
	Bollards	no	\$ 74.35	12	\$ 1,000.00	12	\$ 1,000.00
	Precast wheel stops	no	\$ 186.90	-	\$ -	42	\$ 8,000.00
	Line marking	Item	\$ 3,000.00	-	\$ -	1	\$ 3,000.00
	Signage	Item	\$ 2,000.00	1	\$ 2,000.00	1	\$ 2,000.00
							\$ -
			Sub-total		\$ 191,000.00		\$ 398,000.00
4 Buildings and Infrastructure							
4.1	Reuse Shop and gatehouse						
	Reuse Shop building	m2	\$ 800.00	300	\$ 240,000.00	300	\$ 240,000.00
4.2	Recycling drop off area						
	Subgrade preparation	m ²	\$ 1.95	-	\$ -	56	\$ 1,000.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	-	\$ -	-	\$ -
	Concrete hardstand	m ²	\$ 150.00	-	\$ -	56	\$ 9,000.00
4.3	Recycling Shed						
	Subgrade preparation	m2	\$ 1.95	1,138	\$ 3,000.00	875	\$ 2,000.00
	Shed (Agricultural with concrete hardstand)	m2	\$ 250.00	1,138	\$ 285,000.00	875	\$ 219,000.00
	Additional roller doors	no	\$ 12,250.00	3	\$ 37,000.00	3	\$ 37,000.00
4.4	Drum Drop Off						
	Subgrade preparation	m ²	\$ 1.95	36	\$ 1,000.00	36	\$ 1,000.00
	Concrete hardstand	m ²	\$ 21.35	36	\$ 1,000.00	36	\$ 1,000.00
	Edge bund	m	\$ 120.00	24	\$ 2,880.00	24	\$ 3,000.00
4.5	Tyre and C&D Bunkers						
	Subgrade preparation	m ²	\$ 1.95	180	\$ 351.00	180	\$ 1,000.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	180	\$ 3,843.00	180	\$ 4,000.00
	Pushwalls	m	\$ 400.00	48	\$ 19,200.00	48	\$ 20,000.00
4.6	Mattress Drop Off						
	Subgrade preparation	m ²	\$ 1.95	-	\$ -	100	\$ 1,000.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	-	\$ -	-	\$ -
	Concrete hardstand	m2	\$ 150.00	-	\$ -	100	\$ 15,000.00
4.7	Green Waste Area						
	Subgrade preparation	m2	\$ 1.95	1,722	\$ 4,000.00	1,722	\$ 4,000.00
	Compacted , unsealed hardstand	m ²	\$ 21.35	-	\$ -	-	\$ -
	Concrete hardstand	m2	\$ 150.00	1,722	\$ 259,000.00	1722	\$ 259,000.00
4.8	Multi-tier drop off facility						
	Subgrade preparation	m2	\$ 1.95	-	\$ -	-	\$ -
	Concrete retaining wall	m2	\$ 400.00	144	\$ 58,000.00	144	\$ 58,000.00
	200 slab on grade	m2	\$ 100.00	191	\$ 20,000.00	191	\$ 20,000.00
	Canopy	m2	\$ 195.00	-	\$ -	344	\$ 68,000.00
	Safety barrier	m	\$ 335.00	55	\$ 19,000.00	55	\$ 19,000.00
4.9	Oil Drop Off						
	Subgrade preparation	m2	\$ 1.95	200	\$ 1,000.00	200	\$ 1,000.00
	Concrete hardstand	m2	\$ 21.35	200	\$ 5,000.00	200	\$ 5,000.00
	Edge bund	m	\$ 120.00	60	\$ 8,000.00	60	\$ 8,000.00
	Canopy	m2	\$ 195.00	25	\$ 5,000.00	25	\$ 5,000.00
			Sub-total		\$ 972,274.00		\$ 1,001,000.00
5 Miscellaneous							
5.1	Utility Services						
	Site electrical supply	Item	\$ 25,000.00	1	\$ 25,000.00	1	\$ 25,000.00

	Water supply	Item	\$ 10,000.00	1	\$ 10,000.00	1	\$ 10,000.00
5.2	Security						
	Perimeter fence - 1.8m mesh fence	m	\$ 55.00	825	\$ 46,000.00	825	\$ 46,000.00
	1.8m Double gate (5m wide with 2 posts, braces, fittings)	No	\$ 1,160.00	2	\$ 3,000.00	2	\$ 3,000.00
5.3	OH&S						
	CCTV	Item	\$ 20,000.00	-	\$ -	-	\$ -
	External lighting - solar masts	No	\$ 8,000.00	-	\$ -	-	\$ -
	Fire services - water tank	Item	\$ 12,000.00	1	\$ 12,000.00	1	\$ 12,000.00
		Sub-total			\$ 96,000.00		\$ 96,000.00
	Sub Total				\$ 1,635,201.40		\$ 1,894,500.00
	Local Loading	5%			\$ 81,760.07		\$ 94,725.00
	Contingency	5%			\$ 81,760.07		\$ 94,725.00
	Professional Services	8%			\$ 130,816.11		\$ 151,560.00
	TOTAL				\$ 1,929,537.65		\$ 2,235,510.00



Assets | Engineering | Environment | Noise | Spatial | Waste

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