BUSINESS CASE:

OPTIONS FOR THE DISPOSAL OF LANDFILL WASTE IN THE SHORT TO MEDIUM TERM

MUNICIPAL WASTE MANAGEMENT STRATEGY REVIEW

February 2015

MORNINGTON PENINSULA Shire

COMMITTED TO A SUSTAINABLE PENINSULA

Executive Summary

Purpose

The purpose of this report is to outline the business case for the management of the Mornington Peninsula Shire's municipal waste stream in the short to medium term.

The Need

The Mornington Peninsula Shire presently disposes of its municipal waste to the Rye landfill, located in Truemans Road, Rye. The current tipping cell is expected to be full in 35 months, by the end of 2017. A decision is needed now on the future disposal method to allow adequate lead time for the approvals processes and construction.

The present Municipal Waste Management Strategy identifies the Shire's preferred option as the establishment of an Alternative Waste Treatment (AWT) facility. If an AWT is not yet available, the contingency plan is to further develop the Rye landfill.

The Metropolitan Waste and Resource Recovery Group advise that the development of an AWT that can deal with mixed municipal waste is at least seven to nine years away. Therefore, implementation of a contingency plan needs to occur. As a consequence, in 2013, the Shire commenced the review of its Municipal Waste Management Strategy to inform the development of the contingency plan.

Options

The first three options being considered in the contingency plan all have a limited life and are summarised in Table 1. Option 1 (see page 23), 2 (see page 24) and 3 (see page 25). At the end of these three options, waste will need to be transported off the peninsula as per Option 4 (see page 27) using a bulk haul facility.

Table 1: Summary of Options for the Management of Landfill Waste

Option	Name	Description	Life of Option
1	Full Development of Rye Landfill	Full development of the Rye landfill	24 years (2041)
2	Partial Development of Rye Landfill – Western Portion	Limit the development of the Rye landfill to the western portion of the site only.	15 years (2032)
3	Partial Development of Rye Landfill – Eastern Portion	Limit the development of the Rye landfill to the eastern portion of the site only.	11 years (2028)
4	Take Waste Off the Peninsula with a facility located at: **Option 4A:** Rye **Option 4B**: Mornington **Option 4C:** Tyabb **Option 4D:** centrally located (Dromana)	Take the waste to a bulk haul facility located on the Peninsula and transport the waste off the Peninsula.	Unlimited

Process

A three-phase analysis was undertaken to help inform the Business Case:

- Phase one: A qualitative analysis was carried out across three environmental/social impacts: visual amenity, traffic and vegetation, to ensure there were no fatal flaws in the option and that each option could be taken through to the second phase. (see page 29);
- Phase two: A quantitative analysis was applied to each option to determine the costs and economic impacts, and benefits were identified. (see page 36) and
- Phase three: A multi-criteria analysis was applied to the quantified data from phase two to identify the preferred option. (see page 45)

The analysis and the assumptions (see Appendix 2) underpinning the financial modelling were then reviewed by an independent third party, consultants, GHD (see Appendix 4). A visual representation of the process has been provided in Figure 1 below.

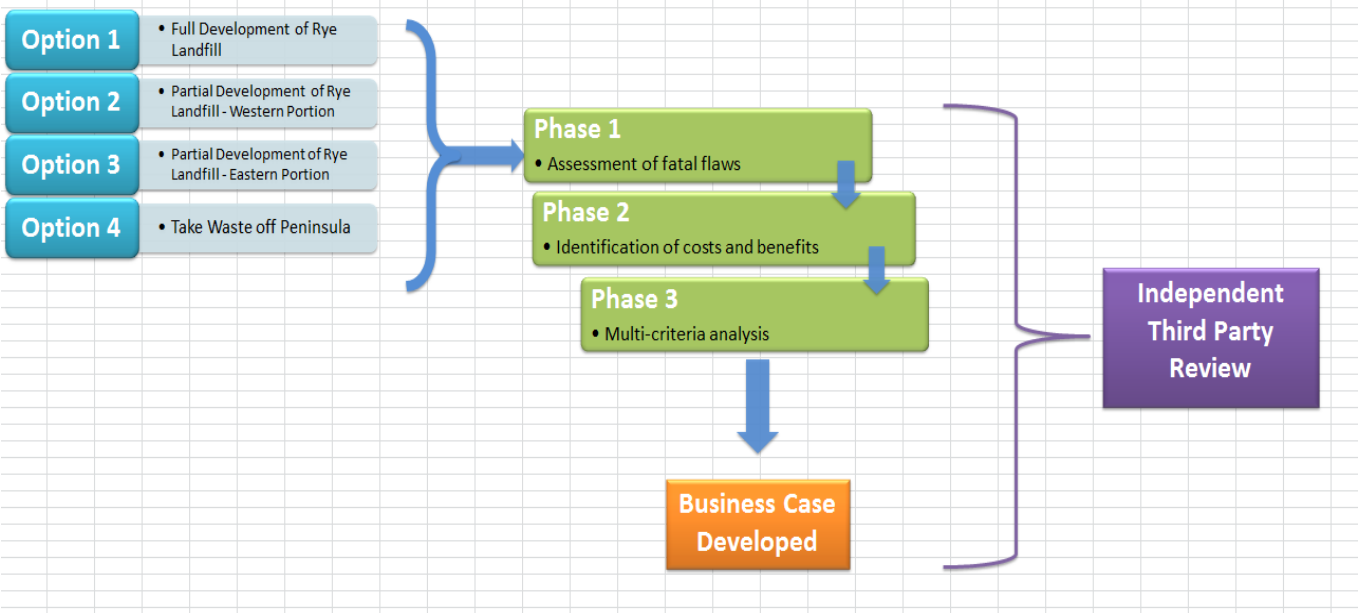

Figure 1 Process Map

Preferred Option

The preferred option for the short-term management of the Shire's waste is **Option 2, Partial Development of the Rye landfill – Western Portion**. In the longer term the preferred option, if the EPA approves a larger size cell, is **Option 1, Full Development of the Rye Landfill**.

Option 2 is the first stage of Option 1. Therefore it is recommended that Option 2 be implemented in a staged manner and a hold point be placed in year 13 to determine whether or not the Shire should transition to Option 1, an AWT facility or continue with Option 2.

Comparison of Each Option on Rates per Household and Total Costs

Options	Full Development of Rye Landfill	Partial Development of Rye - Western Portion	Partial Development of Rye - Eastern Portion	Take Waste Off Peninsula			
				Rye	Mornington	Tyabb	Stand alone (Dromana)
	1	2	3	4A	4B	4C	4D
15 year timeframe							
Average Rate Increase per household	$36.44	$28.04	$47.66	$55.88	$53.48	$53.34	$58.36
Total cost in 2015 dollars (M)	$34.52	$28.69	$44.02	$50.10	$47.57	$47.57	$51.39
30 year timeframe							
Average Rate Increase per household	$42.41	$42.20	$52.01	$55.88	$53.48	$53.34	$58.36
Total cost in 2015 dollars (M)	$51.17	$47.32	$62.77	$67.79	$64.56	$64.38	$69.79

Community Support

The Shire hosted a face-to-face deliberative forum for the community. 61% of the attendees supported the further development of the Rye landfill and 39% supported taking the waste off the Peninsula (for further information see page 53).

Preliminary Recommendation

The community and Council have shown a continued desire for supporting an alternative to landfill. Until an AWT facility is available, the preferred option for the short to medium term management of the Shire's waste is **Option 2, Partial Development of the Rye landfill – Western Portion**. A staged approach to development would occur, allowing for flexibility and a transition to an AWT facility should one become available. In addition, a hold point will be implemented in year 13 to confirm if the Shire should transition to **Option 1 – Full Development of the Rye Landfill** in the longer term, or continue with Option 2 and take the waste off the peninsula.

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AHD	Australian Height Datum
AWT	Alternative Waste Treatment
BPEM	Best Practice Environmental Management
CFA	Country Fire Authority
DBFO	Design, Build, Finance and Operate
EPA	Environment Protection Authority
FTE	Full time equivalent
GHD	Consultants
Greenfield site	Site which has not previously been developed
MPS	Mornington Peninsula Shire
NPV	Net present value
RemPlan	An economic analysis tool
SEPP	State Environmental Protection Policy
SMEC	Consulting firm
vpd	Vehicles per day

1. Overview

1.1 Purpose

The purpose of this report is to outline the business case for the options, for the management of the Mornington Peninsula Shire's municipal waste stream in the short to medium term.

1.2 The Need

The Mornington Peninsula Shire presently disposes of its Municipal Waste to the Rye landfill, located in Truemans Road, Rye. The present tipping cell is expected to be full by the end of 2017. Based on the present volumes received at the site, there is approximately 20 years of additional airspace available at the site (1.4 million m^3 of airspace).

The present Municipal Waste Management Strategy identifies the Shire's preferred option for ongoing management of municipal waste as the establishment of an Alternative Waste Treatment (AWT) facility. The contingency is further development of the Rye landfill. As the Shire requires lead time to prepare the additional area for tipping, with no AWT facility presently accessible, or likely, implementation of a contingency plan needs to occur.

In 2013 the Shire commenced the review of its Municipal Waste Management Strategy to help inform the preferred contingency plan and a number of other decisions.

The Shire presently disposes of 30,000 tonnes of kerbside municipal waste annually at the Rye landfill in addition to receiving approximately 8,000 tonnes of commercial waste.

1.3 Options

The Shire has two medium term options for the management of its municipal waste; further development of the Rye landfill or taking the waste off the Peninsula.

1.3.1 Further Development of Rye Landfill

The Shire presently has a works approval for the Rye site which permits the further development of the site. This approval was granted in 1986 and remains current.

The regulatory requirements around the development of the additional area require EPA's approval for any cell design and a planning permit is also required. Best-practice operation of a landfill presently requires the development of independent cells that take no more than 2 years to fill. Therefore the Shire would stage the development of the additional area. The additional area can be developed under three options:

1. Full development of the Rye Landfill (Option 1 – Full Development of Rye

Landfill)
2. Development of the western section of the Rye Landfill, maintaining the present infrastructure at the site (Option 2 – Partial Development of Rye Landfill – Western Portion)
3. Development of the eastern section of the site, maintaining the western dune system (Option 3 – Partial Development of Rye Landfill – Eastern Portion)

The development may be undertaken by the Shire or by a private operator through a Design, Build, Finance and Operate contract.

1.3.2 Take Waste off the Peninsula

This option (Option 4 – Take Waste off the Peninsula) requires the consolidation of the Shire's waste at a facility on the Peninsula and transporting it outside the municipality to a receiving facility.

The consolidation facility may be owned and operated by the Shire or a private operator. Consideration has been given to co-locating this facility with the Shire's Resource Recovery Centres at Rye, Mornington and or Tyabb. Consideration has also been given to a fourth option, a stand-alone Bulk Haul facility located centrally on the Peninsula.

Under this option the waste may be transported to a receiving facility in the South East of Melbourne or in the West of Melbourne.

A summary of the options being considered is provided in Table 2.

1.4 Process

A three phase analysis was undertaken to help inform the Business Case:

- Phase one: A qualitative analysis was carried out across three environmental/social impacts: visual amenity, traffic and vegetation, to ensure there were no fatal flaws in the option and that each option could be further considered;
- Phase two: A quantitative analysis was applied to each option to determine the costs and economic impacts, and benefits were identified; and
- Phase three: A multi-criteria analysis was applied to the quantified data from phase two to identify the preferred option.

The analysis and the assumptions underpinning the financial modelling were then reviewed by an independent third party, consultants, GHD. A visual representation of the process has been provided in Figure 2.

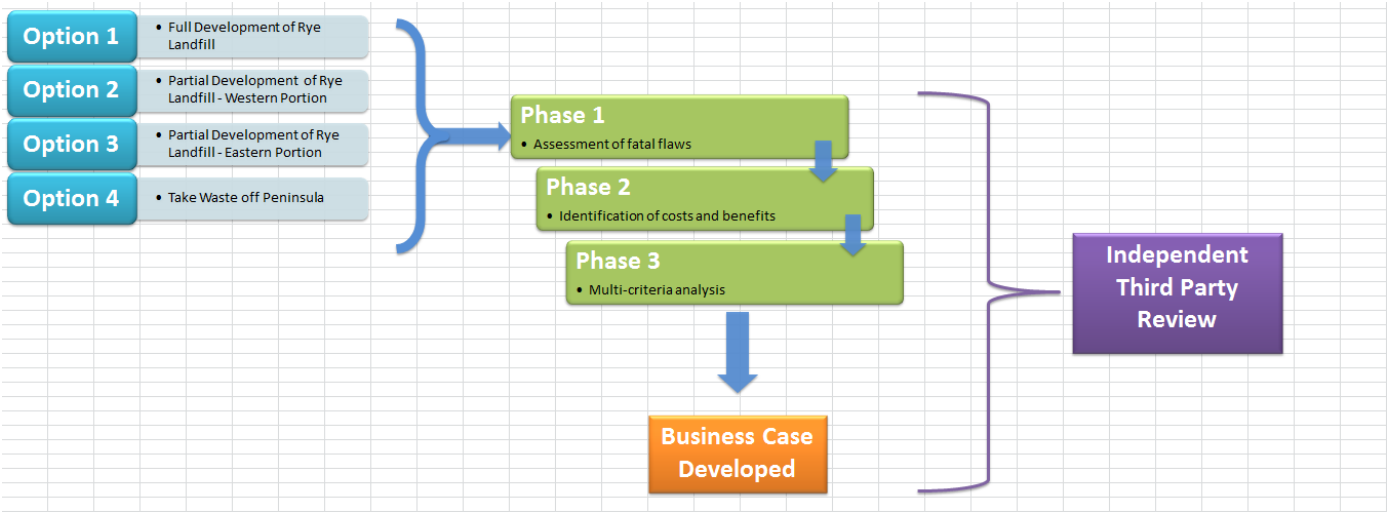

Figure 2 Process Map

1.5 Business Case Timeframes

The Business Case for each option has been considered over a 15 and 30 year timeframe. The longer timeframe allows for the complete development of the Rye landfill and aligns with the Metropolitan Waste and Resource Recovery Group Strategic Plan timeframe.

Table 2: Summary of Options

Option	Name	Description	Life of Option
1	Full Development of Rye Landfill	Full development of the Rye landfill	24 years (2041)
2	Partial Development of Rye Landfill – Western Portion	Limit the development of the Rye landfill to the western portion of the site only. Maintain the present location of the Green Waste Processing Facility and Resource Recovery Centre at the Rye site.	15 years (2031)
3	Partial Development of Rye Landfill – Eastern Portion	Limit the development of the Rye landfill to the eastern portion of the site only. Maintain the western dune at the Rye site.	11 years (2028)
4	Take Waste Off the Peninsula **Option 4A:** Bulk haul facility collocated at Rye Resource Recovery Centre **Option 4B**: Bulk haul facility collocated at Mornington Resource Recovery Centre **Option 4C:** Bulk haul facility collocated at Tyabb Resource Recovery Centre **Option 4D:** Stand-alone bulk haul	Take the waste to a bulk haul facility located on the Peninsula and transport the waste off the Peninsula.	Unlimited

	facility located centrally on the Peninsula		

1.6 Assumptions

The following key assumptions have been made for the purposes of this Business Case. More detailed information can be found throughout the report and in Appendix 2.

- Household numbers, 88,000.
- Municipal waste volumes, 30,000 tonnes per annum.
- Commercial waste volumes included under each option, 8,000 tonnes per annum.
- The income for receiving commercial waste, $196 per tonne.
- Interest Rate for financing, 6% per annum.
- Landfill levy, $58.50 per tonne.
- Gate fee at West Melbourne Facility, $100 per tonne
- Gate fee at South East Melbourne Facility, $118 per tonne
- Cost to offset greenhouse gas emissions, $8 per tonne
- Contingency on infrastructure costs, 30%
- Contingency on gate fee rates, 10%

1.7 Work to Date

The following reports inform the development of this business case assessment:

1. *Municipal Waste Management Strategy Review – Rye Landfill Site, Traffic Impact Analysis,* April 2014
2. *Possible Rye Landfill Development Preliminary Visual Impact Assessment – Technical Report,* Tract Consulting, June 2014
3. *Rye Landfill Flora and Fauna Assessment, SMEC, November 2014*
4. *Let's Talk Waste,* Chit Chat, July 2014
5. *Waste Management Facilities Preliminary Options Costing Assessment*, GHD, January 2015,
6. Independent Review of Business Case, GHD, December 2014

1.7.1 Traffic Impact Analysis

The Traffic Impact Analysis was undertaken by the Shire Traffic and Road Safety team. The report analyses the potential impact on the surrounding road network from further developing the landfill. Consideration is given to current and potential future impacts. It also considers road safety concerns for the adjacent road network to understand the safety impacts due to traffic generated from the site.

1.7.2 Visual Impact Assessment

The report, completed by Tract Consulting provides a preliminary technical evaluation of the potential visual effects associated with the possible development of the Rye landfill. The visual assessment deals with the potential effects on the setting from changes in views, people's response to likely changes and the overall effect on

visual amenity.

1.7.3 Flora and Fauna Assessment

An independent flora and fauna assessment was undertaken for the Rye landfill site by SMEC. The report includes an assessment of the flora and fauna values at the site including potential habitat for threatened species under the *Environment Protection and Biodiversity Conservation Act* 1999 and the *Flora and Fauna Guarantee Act* 1988. The assessment focused on the remnant native vegetation at the site.

1.7.4 Community Engagement Report

The Shire undertook a Community Engagement Program – *Let's Talk Waste* to inform the review of the Municipal Waste Management Strategy. The outcomes from the engagement process, which occurred between March and June 2014, are summarised in this report.

1.7.5 Waste Management Facilities Options Costing

GHD has prepared a report that examines the feasibility, legislative constraints and associated costs of constructing and rehabilitating the last cell of three at the Rye landfill; relocating the Rye Resource Recovery Centre to the Shire's Browns Road Property; constructing a bulk haul facility and establishing a new modern, in-vessel, organic processing facility at the Tyabb site that has the capacity to process both food and green waste.

1.7.6 Independent Review of Business Case

GHD has reviewed the Business Case analysis and report: A copy of the Statement of Review can be found in Appendix 4.

2. Background

2.1 Alternative Waste Technologies

Alternate Waste Technologies (AWT) is a generic term provided for any technology that handles waste in an alternative manner than by simple disposal to landfill. As landfills become a less desirable disposal option due to environmental and social impacts, AWTs are becoming more critical. The challenge in Victoria has been the development of AWTs for disposal of waste collected through the kerbside rubbish bin (municipal waste). There are presently no AWTs operating in Victoria for this waste stream.

The Shire has an ongoing commitment to investigating AWTs for the management of municipal waste. In line with this commitment, the Shire has led advocacy activities and a number of strategic discussions with other Local Governments and State Government Authorities to advance the development of AWTs for this waste stream in Victoria.

It is unclear when an AWT for this waste stream will become accessible for the Shire in the near future. Recent discussions with the Metropolitan Waste and Resource Recovery Group indicate that as part of its process to develop the Metropolitan Waste and Resource Recovery Implementation Plan they will be undertaking a market assessment for additional resource recovery and landfill capacity. Through this process, which will occur in the first half of 2015, the market may put forward options for alternatives to landfill.

For the purposes of this business case it is important that for any option that is recommended, consideration is given to transitional arrangements to an AWT should one become accessible.

2.2 Further Development of Rye Landfill

2.2.1 Site

The Rye landfill site is located at 280 Truemans Road, Rye. The site presently includes a landfill, Green Waste Processing Facility and Resource Recovery Centre, refer to Figure 8 (in Appendix 1).

The landfill has been developed to maintain a 15m buffer distance between the tipping area and the site boundary.

2.2.2 Landfill Activities

Landfilling has occurred at the site since 1988. The northern end of the site, approximately 6.5Ha, was landfilled between 1988 and 1999, capped and successfully revegetated with indigenous plant species. The final surface area is 32 m AHD. This area is referred to as Cell 1.

The southern end of the site is presently being landfilled. This area is referred to as Cell 2. This cell is being filled in stages with Stage 4, the final stage, expected to be filled by the end of 2017. The final surface level for this cell is expected to be 37m AHD.

2.2.3 Landfill Performance

The performance of the Rye landfill is monitored in line with the site's Environmental Monitoring Plan, subject to the Environment Protection Authority's (EPA) licence requirements. The Plan and monitoring results are audited by a third party EPA appointed auditor and the outcomes are captured in the annual Audit Report.

A site inspection undertaken by EPA in September 2014 noted that no non-compliances were observed at the site.

Odour

Over the past 5 years the Shire has received one odour complaint associated with the Rye Landfill. The 2013 Audit Report for the site assessed odour as a low risk.

Dust

No dust complaints have been received by the Shire in regard to the landfill operations in the past 5 years. The 2013 Audit Report for the site noted that no dust was observed beyond the landfill boundary.

Landfill Gas

A landfill liner and a landfill gas capture system is used to help contain the landfill gas and safely remove the gas from the landfill site.

Landfill gas captured on site is used to generate enough electricity to power 800 homes annually.

The Shire has installed 22 landfill gas monitoring bores at the site to monitor the level of landfill gas present. A Landfill Gas Risk Assessment completed for the site concluded that all identified landfill gas hazards presented an acceptable risk level.

Groundwater

To help protect groundwater a landfill liner and leachate collection system is in place at the Rye landfill. (Leachate is water that has mixed with the waste and is considered contaminated.)

At the Rye landfill leachate is collected at the bottom of the cell and pumped to a leachate collection tank prior to being transported by tanker to the Boneo Waste Water Treatment Facility. The Shire is presently negotiating a direct connection to sewer for the management of leachate.

The groundwater beneath the site is segment A2 quality, as defined by the *State Environmental Protection Policy (SEPP) for Groundwater in Victoria*. The quality rating informs what purposes groundwater can be used for and therefore what purposes need to be protected.

Within regions of segment A groundwater, the EPA requires that municipal (kerbside) waste is placed in landfill 2 metres above the surrounding water table.

Groundwater in the Rye landfill vicinity varies between depths of approximately 4.4 m to 24 m below ground level. The present landfill cell goes to a depth of approximately 4 m above ground water level.

Twenty-two groundwater bores are in place at the landfill to monitor groundwater. These bores are sampled quarterly.

Segment A2 quality groundwater can be used for a number of purposes. These purposes are known as beneficial uses, all beneficial uses must be protected.

The risk the landfill poses to these beneficial uses is assessed annually by an Environmental Auditor, based on the groundwater monitoring undertaken.

The outcomes from the 2013 audit process are summarised in Table 3 and indicate that the landfill presents a low risk to the groundwater.

Table 3: The risk rating against groundwater uses at the Rye landfill site

Beneficial Use	Risk Rating
Maintenance of Ecosystems	Low
Potable Water Supply	Low
Agriculture, Parks and Gardens	Low
Stock Watering	Low
Industrial Water Use	Low
Primary Contact Recreation	Low
Buildings and Structures	Low

Source: GHD, Rye Landfill Environmental Audit Report, 2013

Litter

Litter is managed on site by the use of litter nets, placement of sand over the waste each day and a Litter Management Plan. New litter nets have recently been placed on the southern end of the current landfill cell. Five (5) complaints have been received over the past 5 years with regards to litter management; these are described in Table 4. The overall risk of litter posed by the site is low.

Table 4: Litter complaints associated with the Rye landfill site

Year of Complaint	Description
2009	Litter along Truemans Road – Resource Recovery vicinity
2010	General litter along Browns Road

	Litter dropped on property by birds
2011	Dumped rubbish along Truemans Road – assumed to be from Resource Recovery Centre visitors
2013	Litter along Truemans Road

Noise

Landfills involve the use of equipment that can impact on the amenity of surrounding areas. Sources of noise at the site can include trucks (body, engine and exhaust noise), reversing “beepers”, mobile machinery and equipment used for resource recovery.

No complaints have been received by the Council or the Environment Protection Authority in the past 5 years regarding any noise associated with the Rye Landfill.

During the 2012-13 audit process, the allowable noise level at the site was noted to be exceeded. Consequently, the risk of noise impacting on residents in the local area was elevated to medium.

Further testing of noise has been undertaken to ensure no further breaches and the site procedure for noise management was altered.

Fire Management

It is important for the risk associated with fire to be managed at any landfill site.

Landfill fires can cause impacts on local air quality and can spread outside the landfill triggering a grass or bushfire.

Fire risk is managed at the site through a Fire Management Plan.

According to Council records, the CFA has attended only 1 fire at the site in the last 5 years, however the fire was not associated with the landfill.

The fire occurred at the Resource Recovery Centre in the push pit where hard waste is placed by residents. The source of the fire was unknown, although it is thought to have been associated with hot ash.

Traffic

Description of Truemans Road, Rye

The access to the Rye landfill is presently located on Truemans Road approximately 500m north of Browns Road.

Truemans Road is a Council controlled Local Arterial Road extending approximately 4km between Point Nepean Road and Browns Road in a north-south direction.

Truemans Road is reclassified to a Collector Road south of Browns road which extends for approximately 5km south to Gunnamatta Surf Beach.

The carriageway in the vicinity of the subject site is 8.8m (approx) which carries a single lane of traffic in each direction. A right turn lane exists for vehicles entering the site from the north.

Truemans Road is subject to an 80km/h speed limit in the vicinity of the subject site. Further north in the residential zone the speed limit is reduced to 60km/h.

A description of Browns Road, Rye

If the Rye landfill is further developed then the location of the Resource Recovery Centre at the site will need to be moved. One potential new location is the Shire's adjoining land at 266 Browns Rd, Rye.

Browns Road is a Council controlled Local Arterial Road extending between Rye and Main Ridge in an east-west direction. In the vicinity of the subject site, Browns Road is constructed with an 8.6m (approx) carriageway, carrying a single lane of traffic in each direction. In the vicinity of the subject site, Browns Road has recently been reduced to a 90km/h speed limit.

Traffic Volume

The traffic volumes on the road network surrounding the sites (Truemans and Browns Rd) were obtained through traffic count data. As the Mornington Peninsula is a popular tourist destination, the traffic on Mornington Peninsula varies greatly by season. Because of this a peak and off-peak period were analysed. Data from January was chosen to analyse peak traffic flow and May to analyse off-peak traffic flow.

Table 5: Summary of Current Traffic Flow Data 2013/14

Location	Period	Traffic Flow, Vpd (Vehicles Per Day)
Truemans Road – North of Browns Road	Peak – January	5,029
	Off-Peak – May	3,172
Truemans Road – South of Browns Road	Peak – January	3,437
	Off-Peak – May	1,642
Browns Road – East of Truemans Road	Peak – January	13,887
	Off-Peak – May	*7,847
Browns Road – West of Truemans Road	Peak – January	11,489
	Off-Peak – May	5,455

*No traffic count data available in May. Similar off-peak period of August used as a substitute.

Site Users

During the peak period (January) approximately 365 vehicles use the site a day, and approximately 5,000 vehicles use Truemans Rd, therefore the traffic associated with

the site is approximately 7%. The percentage is similar during the off-peak period (May), refer to Table 2.

Visitors to the site utilise the Resource Recovery Centre, the Green Waste Processing area or the landfill. Access to the landfill is limited to commercial vehicles, these represent approximately 9% of vehicles that enter the site daily.

Table 6: Summary of Current Traffic Impacts

Period of Year	Peak – January 2014	Off-peak – May 2013
Truemans Road Traffic, vpd	5,029	3,172
Site Users, vpd	364	217
Proportion of Site Users to Truemans Road Traffic, %	7.24 %	6.85 %

There is significantly more traffic on Browns Road compared to Truemans Road. This is due to there only being two direct routes travelling to the southern end of the Peninsula, Browns Road and Point Nepean Road. This means that although the subject site is adjacent to Browns Road, the site isn't the major generator of traffic along Browns Road.

Visual Impact

The landfill has been established since 1988. On that basis, the visual effects of the development and off site vehicle movement patterns are likely to pre-date most of the land uses which have established within the surrounding area. Current visual impacts are therefore likely to form a part of the visual baseline for most land users.

The site is located within a landscape type which generally has a moderate to high scenic quality rating, but the rating applying to individual locations is likely to be influenced by site specific factors such as land clearing, landform and elevation. The area surrounding the site has been extensively modified over time.

Present Visual Condition

There are views of the existing site (both the southern and northern ends) from surrounding ridgelines and elevated areas to the west, north-west and south-west, but site specific views are partly controlled by existing vegetation which reduces the overall impact of the existing site.

Much of the existing site visibility relates to the colour contrast that exists between the sand / clay surfaces of the landfill site and the colour of surrounding vegetation. The long, continuous nature of the landfill clearing makes this visual contrast more prominent from distant viewpoints.

The existing landfill site is not seen from surrounding roads because of the low elevation of the viewing point, existing vegetation and planted bunds surrounding the operational area.

Overall, the landfill has a visual presence in the landscape surrounding the site, but that impact is relatively low as a result of the screening effects of vegetation at the site and in viewing locations and the orientation of views to the narrow end of the site (angled views).

The most significant views are from the ridgeline west of the site (Hilltonia Homestead B & B) which has a foreground view that is perpendicular to the landfill. These views are partly screened by vegetation at the viewpoint.

Visual condition at the end of the present cell life

The Shire is presently placing waste in Stage 4 of landfill cell number 2 (refer to Map 1 in Appendix 1). This stage is expected to be completed by 2017.

Once completed the overall pattern of viewing will be similar to the present visual condition. This is due to the fact the eastern limits of cell 2 has already been completed. However it is likely the completion of stage 4 will have a greater visual presence in the landscape with locations to the south west of the landfill having an increased visual impact. Areas with current views of the landfill are likely to be most affected by the change in conditions, with Hilltonia Homestead likely to experience the greatest level of visual impact.

2.3 Taking Waste Off the Peninsula

Hauling waste outside of a municipality is a common option employed by many Councils within the Greater Melbourne area. Only a few other Councils within metropolitan Melbourne own and operate their own landfill. In some cases municipalities transport their waste over distances of more than 150 kilometres for disposal at landfill. The closest alternative landfill that would accept the Shire's municipal waste is owned by Sita and located in Hampton Park.

Prior to hauling, the waste should be consolidated at a facility referred to as a Bulk Haul facility. The Shire does not presently own or operate a Bulk Haul facility.

Should Option 4 be chosen it is envisaged that the Shire would go out to the market to determine the most efficient and effective way to deliver it.

2.3.1 Bulk Haul Facility Sites

For the purposes of this Business Case four scenarios have been considered under this option. Three of the scenarios look at collocating the bulk haul facility at the Shire's Resource Recovery Centre sites. These locations have been selected to explore the potential efficiencies associated with collocating these types of facilities.

The fourth scenario considers a stand-alone bulk haul facility, located centrally on

the Peninsula.

The Shire's Resource Recovery Centre's are located at the following addresses:

1. Rye Resource Recovery Centre: 280 Truemans Road, Rye
2. Mornington Resource Recovery Centre: 134 Watt Road, Mornington
3. Tyabb Resource Recovery Centre: 21 McKirdys Road, Tyabb

A description of each site is provided below.

Rye Resource Recovery Centre

The Rye Resource Recovery Centre was established in 1988. The facility includes:

- Gatehouse
- Weighbridge
- Maintenance Shed
- Site Office
- A push-pit
- Skips for resource recovery
- A concrete hardstand for greenwaste drop off

Mornington Resource Recovery Centre

The Mornington Resource Recovery Centre was established in 1989. The facility presently includes:

- Gatehouse
- Undercover area for recycled goods collection
- A push-pit
- Undercover skips for resource recovery
- A gravel area for greenwaste drop off
- Recycle Goods Store

Tyabb Resource Recovery Centre

The Tyabb Resource Recovery Centre was established in 1999. The facility includes:

- Gatehouse
- Skips for waste management and resource recovery
- A gravel area for greenwaste collection

Standalone Facility

The fourth scenario assumes the Bulk Haul facility is a standalone facility located centrally on the Peninsula at a greenfield site. Safety Beach is approximately the Centre of Density (with regards to population) on the Peninsula. It is assumed the

facility is located in an industrial zone as close to Safety Beach as possible, which is the Dromana Industrial Estate, in Brasser Avenue, Dromana.

2.3.2 Performance of Potential Bulk Haul Facility Sites

Three of the potential Bulk Haul Facility Sites presently operate as Resource Recovery Centers. A desktop review was undertaken to assess their present performance. A five year history of the complaints associated with the three sites is provided in Table 7.

Table 7 Number of Complaints associated with the Shire's Resource Recovery Centres from 2009-2014

Site	Number of complaints				
	Litter	Noise	Odour	Dust	Other
Rye	1	0	0	0	1
Mornington	0	0	0	1	0
Tyabb	0	1	0	0	0

Source: MPS MERIT System

An initial assessment of the three sites indicates that they all have the space for a bulk haul facility.

3. Options Detail

3.1 Option 1: Full Development of Rye Landfill

3.1.1 Option Description

The whole capacity of the site is developed under this option, as depicted in Figure 9 and Figure 10, in Appendix 1. A staged approach would be employed to link Cell 1 and Cell 2 landforms. Staging will commence with Stage 5 being developed, with a link into Stage 4 of Cell 2, followed by stage 6, etc. Depending on the size and shape of the cells, this option has the potential to provide the Shire with up to 24 years additional tipping capacity.

Once the development is complete, between 2038 and 2041, depending on the size of the cells, the Shire can start to bulk haul its waste off the Peninsula.

3.1.2 Cell Dimensions

Two potential cell sizes were considered for this option. Under option 1A it is assumed that the stages are as large as possible resulting in 4 stages. Under option 1B they are assumed to have a 3 year life, resulting in 7 stages.

Under both options, the height of the cells following capping will be 37 m AHD in the centre with a ridgeline to the south, to meet the top of Cell 2, also 37 m AHD and decreasing to north to 32 m AHD to meet the top of Cell 1.

3.1.1 Infrastructure

The Green Waste Processing Facility and Resource Recovery Centre located at the Rye site, would both be impacted by this option.

Before the completion of Stage 6, under Option 1A and Stage 8, under Option 1B, the Green Waste Processing Facility would need to be closed. The green waste would be taken to the Shire's Tyabb Green Waste Processing Facility which would be upgraded to an in-vessel composting facility with its capacity expanded. Before the completion of Stage 7, under Option 1A and Stage 9, under Option 1B, the Rye Resource Recovery Centre would also need to be relocated. A potential new location is the Shire's adjacent land at 266 Browns Road, Fingal. The new facility would have drop off bays surrounding a concrete push pit and skips for resource recovery, housed in a warehouse. An undercover area would also be provided for recyclable goods and a recycle shop facility (similar to the one at the Mornington Resource Recovery Centre).

Between 2038 and 2041 a bulk haul facility will need to be developed. The Shire's waste will be consolidated at this facility and hauled off the Peninsula. The exact location of the bulk haul facility will be determined closer to the date of closure of the Rye landfill. For the purposes of this Business Case the average cost and haulage distance associated with the scenarios considered under Option 4 have been applied.

Table 8: Summary of Cell Dimensions for Option 1

Option	Stage	Total Airspace (m^3)	Cell Life (yrs)	Years of operation	Cell top of batter area (m^2)	Assumed cap Dimensions (m^2)
1A	5	514,035	9	2018-2026	27,200	36,559
	6	386,183	6	2027-2032	22,100	29,704
	7	288,071	5	2033-2037	20,800	27,957
	8	223,618	4	2038-2041	16,800	22,580
	Total	**1.41 million**	**24**			
1B	5	202,175	3	2018-2020	17,000	23,638
	6	200,845	3	2021-2023	17,000	23,638
	7	189,865	3	2024-2026	15,600	21,691
	8	181,000	3	2027-2029	14,400	20,023
	9	197,872	3	2030-2032	6,667	9,270
	10	197,872	3	2033-2035	6,667	9,270
	11	197,872	3	2036-2038	6,667	9,270
	Total	**1.37 million**	**21**			

3.2 Option 2: Partial Development of Rye Landfill - Western Portion

3.2.1 Option Description

Option 2 includes development of the western portion of the Rye Landfill site, maintaining the location of the Resource Recovery Centre and Green Waste Processing Facility.

As depicted in Appendix 1, Figure 11 and Figure 12 the landfill development incorporates stages 5 and 6 of Option 1A and stages 5-9 of Option 1B. Depending on the size and shape of the cells, Option 2 has the potential to provide the Shire with up to 15 years additional tipping capacity.

3.2.2 Cell Dimensions

Two potential cell sizes were considered for this option, refer to Table 9. Under option 2A it is assumed that the stages are as large as possible resulting in 2 stages. Under option 2B the stages are assumed to have a 3 year life, resulting in 5 stages.

Under both options, the height of the cells following capping will be 37 m AHD in the centre with a ridgeline to the south, to meet the top of Cell 2, also 37 m AHD and

decreasing to north to 32 m AHD to meet the top of Cell 1.

Once the development is complete, in 2032, the Shire will start to bulk haul its waste off the Peninsula.

Table 9: Summary of Cell Dimensions for Option 2

Option	Stage	Total Airspace (m^3)	Cell Life (yrs)	Years of operation	Cell top of batter area (m^2)	Assumed cap Dimensions (m^2)
2A	5	514,035	9	2018-2026	27,200	32,221
	6	386,183	6	2027-2032	22,100	26,179
	Total	**0.9 million**	**15**			
2B	5	202,175	3	2018-2020	17,000	18,124
	6	200,845	3	2021-2023	17,000	20,138
	7	162,400	3	2024-2026	5,667	6,713
	8	162,400	3	2027-2029	5,667	6,713
	9	162,400	3	2030-2032	5,667	6,713
	Total	**0.89 million**	**15**			

3.2.3 Infrastructure

The Green Waste Processing Facility and Resource Recovery Centre located at the Rye site would be maintained under this option.

In 2032 a bulk haul facility will need to be developed. The Shire's waste will be consolidated at this facility and hauled off the Peninsula. The exact location of the bulk haul facility will be determined closer to the date of closure of the Rye landfill. For the purposes of this Business Case the average cost and haulage distance associated with the scenarios considered under Option 4 have been applied.

3.3 Option 3: Partial Development of Rye Landfill - Eastern Portion

3.3.1 Option Description

The eastern portion of the site is developed under this option, with the western dune maintained. Similar to the other options a staged approach would be employed, as depicted in Appendix 1, Figure 13 and Figure 14with the initial stage, stage 5 being developed, followed by stage 6, etc. This option has the potential to provide the Shire with up to 11 years additional tipping capacity.

3.3.2 Cell Dimensions

Two potential cell sizes were considered for this option. Under option 3A it is assumed that the stages are as large as possible, resulting in 3 stages. Under option 3B the stages are assumed to have a 3 year life, resulting in 4 stages.

Table 10: Summary of Cell Dimensions for Option 3

Option	Stage	Total Airspace (m^3)	Cell Life (years)	Years of operation	Cell top of batter area (m^2)	Assumed cap Dimensions (m^2)
3A	5	251,960	4	2018-2021	18,000	26,786
	6	197,050	3	2022-2024	16,200	24,107
	7	261,950	4	2025-2028	16,200	24,107
	Total	**0.7 million**	**11**			
3B	5	190,632	3	2018-2020	16,200	22,172
	6	197,042	3	2021-2023	16,200	22,172
	7	183,889	3	2024-2026	14,400	19,708
	8	139,400	2	2027-2028	8,000	10,949
	Total	**0.7 million**	**11**			

3.3.3 Infrastructure

The Green Waste Processing Facility and Resource Recovery Centre located at the Rye site, would both be impacted by this option.

Under both scenarios, before works could commence for Stage 5, the Green Waste Processing Facility would need to be closed. The green waste would be taken to the Shire's Tyabb Green Waste Processing Facility which would be upgraded to an in-vessel composting facility with its capacity expanded. Before the completion of Stage 6, under Option 3A and Stage 7 under Option 3B, the Rye Resource Recovery Centre would need to be relocated. A potential new location is the Shire's adjacent land at 266 Browns Road, Fingal. The new facility would have drop off bays surrounding a concrete push pit and skips for resource recovery, housed in a warehouse. An undercover area would also be provided for recyclable goods and a recycle shop facility (similar to the one at the Mornington Resource Recovery Centre).

Prior to 2028 a bulk haul facility will need to be developed. The Shire's waste will be consolidated at this facility and hauled off the Peninsula to a receiving facility (eg. landfill). The exact location of the bulk haul facility and the receiving facility will be determined closer to the date of closure of the Rye landfill. For the purposes of this

Business Case the average cost and haulage distance associated with the scenarios considered under Option 4 have been applied.

3.4 Option 4: Take Waste Off the Peninsula

3.4.1 Option Description

This option (Option 4) requires the consolidation of the Shire's waste at a facility referred to as a Bulk Haul facility on the Peninsula and transporting it outside the municipality to a receiving facility.

There are many potential scenarios associated with a Bulk Haul facility ranging from it being owned and operated by the Shire, on Shire land, to full privatisation of the service.

For the purposes of the Business Case, consideration has been given to co-locating this facility at each of the Shire' s three Resource Recovery Centres located at Rye, Mornington and Tyabb and locating a standalone facility centrally on the Peninsula.

Under this option the waste may be transported to a receiving facility in the South East of Melbourne or in the West of Melbourne.

A summary of the scenarios considered is provided in Table 11.

3.4.2 Infrastructure

Under the options where the Bulk Haul facility is collocated with a Resource Recovery Centre (Rye, Mornington or Tyabb) it is assumed that the Resource Recovery Centre would be upgraded to meet best practice and the facilities would share a dual weighbridge, an enclosed push pit, site office and maintenance shed.

The Resource Recovery Centre would include a roofed area for resource recovery skips, an undercover area for recyclable goods, a recycle shop and a hard stand area for greenwaste receival.

For Option 4D, it is assumed the Bulk Haul facility is standalone. The facility would be fully enclosed with a pushpit and include a site office, weighbridge and small maintenance area. To ensure this option is comparable to the other bulk haul scenarios, i.e. creates the same outcomes, costing for the upgrade of one of the Resource Recovery Centres to meet best practice has been included in the overall cost for this option.

Table 11: Summary of the Possible Scenarios under Option 4

Option	Name	Location of Bulk Haul Facility	Location of Waste Receiving Facility
4A(i)	Rye – South East	280 Truemans Road, Rye.	Hampton Park

4A(ii)	Rye – Western	280 Truemans Road, Rye.	Werribee
4B(i)	Mornington - South East	134 Watt Road, Mornington	Hampton Park
4B(ii)	Mornington – Western	134 Watt Road, Mornington	Werribee
4C(i)	Tyabb – South East	21 McKirdys Road, Tyabb	Hampton Park
4C(ii)	Tyabb - Western	21 McKirdys Road, Tyabb	Werribee
4D(i)	Standalone – South East	Brasser Avenue, Dromana	Hampton Park
4D(ii)	Standalone - Western	Brasser Avenue, Dromana	Werribee

4. Phase One: Assessment for Fatal Flaws

Various environmental and social impacts have been considered for each option to determine the presence of any high level impacts. High level impacts are considered a 'fatal flaw' in the option and would prevent the option from being further considered.

4.1 Option 1: Full Development of Rye Landfill

4.1.1 Visual Impact

The Visual Impact Assessment Report described the overall visual impact of this option as relatively low, on the scenic quality of the setting. This is because of the nature of the existing landfill and existing views of the operation and the fragmented nature of views to the site, all site views are currently partially mitigated by vegetation at the viewpoint.

Areas with views of the current landfill are likely to be most affected because they will continue to view future operations. All viewpoints surrounding the site had their visual impact assessed as low with the exception of Hilltonia Homestead B & B and Lahinch Drive, were the impact was considered moderate. The overall change in views is likely to relate to the magnitude (combination of scale, extent and duration of an effect) of the impact rather than the nature of the impact.

It is unlikely that there will be any new views affected by the potential development.

In comparison to Option 2 & 3, Option 1 is considered likely to have the highest visual impact.

Minimising the Visual Impact

The Visual impact of this option could be reduced by:

- Varying the height of the additional landfill area;
- Progressively rehabilitating subsequent landfill areas;
- Further revegetation at key viewing locations; and
- Maintaining existing vegetated landforms within the landfill site to provide a visual buffer to external areas.

4.1.2 Flora and Fauna Impact

This option will result in the removal of approximately 2.6 ha of remnant vegetation and 2.3 ha of re-vegetated areas.

An initial assessment of the quality of the remnant vegetation noted that overall it was high quality consisting primarily of Coastal Alkaline Scrub which is threatened under the *Flora and Fauna Guarantee Act* 1988. It includes some significant patches of orchids but no Leafy Greenhood or Coast Helmet-orchid has been sighted. A feature which is uncommon throughout the coastal alkaline scrub of the Nepean

Peninsula is that it is not diminished by coastal tea-tree but is dominated by other canopy species such as Moonah. There are some high threat weeds within the site.

The re-vegetated areas, which are located on the old landfill cells are considered good quality with a low presence of weeds and high survival of planted trees.

The site was assessed as low quality habitat for native fauna and no significant fauna has been sited.

Minimising the Impact on Vegetation

Remnant vegetation removed at the site would be "off-set" (an equivalent planted elsewhere) in line with the Government's Native Vegetation Framework. In addition, all re-vegetated areas would be re-established.

4.1.3 Traffic Impact

The percentage of traffic, along Truemans Road, associated with the site is presently approximately 7%. By 2017, the percentage is expected to drop to 6%, and further to approximately 4% by 2025.

Under this option the Resource Recovery Centre will need to be moved. One potential location is the Shire's land located adjacent to the present landfill at 266 Browns Road, Fingal. The earliest this would occur is 2025. The proportion of traffic along Browns Rd that would use the site is expected to be approximately 2% in 2025; this drops to approximately 1% in 2033.

Table 12: Summary of Traffic Impacts for Option 1

Period of Year	Peak (January)	Off-peak (May)
2017 – Proportion of Site Users to Truemans Road Traffic, %	6.26 %	5.65 %
2025 – Proportion of Site Users to Browns Road Traffic, %	1.22 %	2.46 %
2033 – Proportion of Site Users to Browns Road Traffic, %	0.70 %	1.78 %

Managing the Traffic Impact

To help manage the traffic along Browns Rd a traffic treatment would be introduced such as a turning lane.

4.1.4 Assessment for Fatal Flaws for Option 1

A summary of the environmental/social impacts associated with Option 1 is provided in Table 13. There were no high level impacts associated with Option 1, and therefore no fatal flaws. This option has been carried forward into Phase two.

Table 13 Summary of the Assessment for Fatal Flaws for Option 1

Impact	Rating
Visual Impact	Low/Moderate
Traffic Impact	Low
Vegetation Impact	Low
Fatal Flaw	**No**

4.2 Option 2: Partial Development of Rye Landfill – Western Portion

4.2.1 Visual Impact

The Visual Impact Assessment Report concludes that the visual impacts of Option 2 are likely to be similar to Option 1, as it still involves excavating the existing vegetated ridge line to the west of the site. However the impact will be relatively lower when compared to Option 1 because it is a smaller footprint, but higher than Option 3.

Areas with views of the current landfill are likely to be most affected because they will continue to view future operations. All viewpoints surrounding the site had their visual impact assessed as low with the exception of Hilltonia Homestead B & B and Lahinch Drive, where the impact was considered moderate. The overall change in these locations is likely to relate to the magnitude (combination of scale, extent and duration of an effect) of the impact rather than the nature of the impact. It should also be noted that all site views are currently partially mitigated by vegetation at the viewpoints.

It is unlikely that there will be any new views affected by the potential development.

Minimising the Visual Impact

The Visual impact of this option could be reduced by:

- Varying the height of the additional landfill area;
- Progressively rehabilitating subsequent landfill areas;
- Additional revegetation at key viewing locations; and
- Maintaining existing vegetated landforms within the landfill site to provide a visual buffer to external areas.

4.2.2 Vegetation Impact

This option will result in the removal of approximately 2.2 ha of remnant vegetation and 1.2 ha of re-vegetated areas.

An initial assessment of the quality of the remnant vegetation noted that overall it was high quality consisting primarily of Coastal Alkaline Scrub which is threatened

under the *Flora and Fauna Guarantee Act* 1988. It includes some significant patches of orchids but no Leafy Greenhood or Coast Helmet-orchid has been sighted. A feature which is uncommon throughout the coastal alkaline scrub of the Nepean Peninsula is that it is not diminished by coastal tea-tree but is dominated by other canopy species such as Moonah. There are some high threat weeds within the site.

The re-vegetated areas, which are located on the old landfill cells are considered good quality with a low presence of weeds and high survival of planted trees.

The site was assessed as low quality habitat for native fauna and no significant fauna has been sited.

Minimising the Impact on Vegetation

Remnant vegetation removed at the site would be "off-set" (an equivalent planted elsewhere) in line with the Government's Native Vegetation Framework. In addition, all re-vegetated areas would be re-established.

4.2.3 Traffic Impact

The percentage of traffic, along Truemans Road, associated with the site is presently approximately 7%. By 2017, the percentage is expected to drop to 6%, and further to approximately 4% by 2025 and 2.7% by 2033.

Table 14 Summary of Traffic Impacts for Option 2

Period of Year	Peak (January)	Off-peak (May)
2017 – Proportion of Site Users to Truemans Road Traffic, %	6.26 %	5.65 %
2025 – Proportion of Site Users to Truemans Road Traffic, %	4.25 %	3.84 %
2033 – Proportion of Site Users to Truemans Road Traffic, %	2.89 %	2.61 %

4.2.4 Assessment for Fatal Flaws for Option 2

A summary of the environmental/social impacts associated with Option 2 is provided in Table 15. There were no high level impacts associated with Option 2, and therefore no fatal flaws. This option has been carried forward into Phase two.

Table 15 Summary of the Assessment for Fatal Flaws for Option 2

Impact	Rating
Visual Impact	Low/Moderate
Traffic Impact	Low
Vegetation Impact	Low
Fatal Flaw	**No**

4.3 Option 3: Partial Development of Rye Landfill – Eastern Portion

4.3.1 Visual Impact

The Visual Impact Assessment Report described the overall visual impact of this option as marginally lower than the other options because of the smaller landfill footprint and the lower height of the development at the centre of the site.

All viewpoints surrounding the site had their visual impact assessed as low with the exception of Hilltonia Homestead B & B and Lahinch Drive, were the impact was considered moderate. Areas with views of the current landfill are likely to be most affected because they will continue to view future operations, although all site views are currently partially mitigated by vegetation at the viewpoint. The overall change in these locations is likely to relate to the magnitude (combination of scale, extent and duration of an effect) of the impact rather than the nature of the impact.

It is unlikely that there will be any new views affected by the potential development.

Minimising the Visual Impact

The Visual impact of this option could be reduced by:

- Varying the height of the additional landfill area;
- Progressively rehabilitating subsequent landfill areas;
- Further revegetation at key viewing locations; and
- Maintaining existing vegetated landforms within the landfill site to provide a visual buffer to external areas.

4.3.2 Flora and Fauna Impact

This option will result in the removal of 1.1 ha of remnant vegetation and 1.9 ha of re-vegetated areas.

An initial assessment of the quality of the remnant vegetation noted that overall it was high quality consisting primarily of Coastal Alkaline Scrub which is threatened under the *Flora and Fauna Guarantee Act* 1988. It includes some significant patches of orchids but no Leafy Greenhood or Coast Helmet-orchid has been sighted. A feature which is uncommon throughout the coastal alkaline scrub of the Nepean Peninsula is that it is not diminished by coastal tea-tree but is dominated by other canopy species such as Moonah. There are some high threat weeds within the site.

The re-vegetated areas, which are located on the old landfill cells are considered good quality with a low presence of weeds and high survival of planted trees.

The site was assessed as low quality habitat for native fauna and no significant fauna has been sited.

Minimising the Impact on Vegetation

Remnant vegetation removed at the site would be "off-set" (an equivalent planted elsewhere) in line with the Government's Native Vegetation Framework. In addition, all re-vegetated areas would be re-established.

4.3.3 Traffic Impact

The percentage of traffic, along Truemans Road, associated with the site is presently approximately 7%. By 2017, the percentage is expected to drop to 6%., and further to approximately 4% by 2025.

Under this option the Resource Recovery Centre will need to be moved. One potential location is the Shire's land located adjacent to the present landfill at 266 Browns Road, Fingal. The earliest this would occur under this option is 2022. The proportion of traffic along Browns Rd that would use the site is expected to be approximately 2% in 2025; this drops to approximately 1% in 2033.

Table 16: Summary of Traffic Impacts for Option 3

Period of Year	Peak (January)	Off-peak (May)
2017 – Proportion of Site Users to Truemans Road Traffic, %	6.26 %	5.65 %
2025 – Proportion of Site Users to Browns Road Traffic, %	1.22 %	2.46 %
2033 – Proportion of Site Users to Browns Road Traffic, %	0.70 %	1.78 %

Managing the Traffic Impact

To help manage the traffic along Browns Rd a traffic treatment would be introduced such as a turning lane.

4.3.4 Assessment for Fatal Flaws for Option 3

The results of the fatal flaw assessment for Option 3 are provided in

Table 17. For Option 3, there were no high level impacts, therefore no fatal flaws. Option 3 has been carried forward to Phase two.

Table 17 Summary of the Assessment for Fatal Flaws for Option 3

Impact	Rating
Visual Impact	Low/Moderate
Traffic Impact	Low
Vegetation Impact	Low
Fatal Flaw	**No**

4.4 Option 4: Take Waste Off the Peninsula

If Council chose to use one of its Resource Recovery Centres, from a planning perspective a bulk haul facility is a permitted use at each of the sites. A 250 m separation distance is recommended between the facility and sensitive receptors to minimise the risks of potential amenity impacts in cases of upset conditions.

The Shire would have to access the appropriate land use, building and works permits that apply to the chosen site. Through the planning process consideration will be given to potential odor, noise, traffic and visual amenity issues. Therefore, any fatal flaws would be designed out of the proposal.

Any third party facility selected to receive the waste for disposal would be selected in line with Council procurement policies.

5. Phase Two: Costs and Benefits

5.1 Context

Costs

For the purpose of determining the potential costs for each option, a number of assumptions were developed, refer to Appendix 2.

Two key indicators were considered for cost, the net present value (NPV) and annual cost per household. The NPV represents cash flows related to the implementation of the option, discounted to the present at a rate of 6% per annum. The lower the NPV, the more efficient the option is in terms of cost. Annual cost per household represents each household's burden to implement each option.

Note the cost estimates are indicative only, based on present market conditions. The costs include infrastructure, operating, maintenance, transportation, gate fees and rehabilitation costs associated with each option. Income is also included.

Carbon Neutrality

Due to the Shire's commitment to carbon neutrality, consideration was also given to the greenhouse gas emissions associated with each option and the cost to off-set the emissions.

Greenhouse gas emissions are associated with the disposal of waste to landfill and the transportation of waste. As every option includes the collection and disposal of waste to landfill, consideration was only given to the additional greenhouse gas emissions associated with the transportation of waste.

Economic Impact

RemPlan was used to identify the economic impact of each option. Consideration was given to the additional number of full time job equivalents (FTE) created by each option. The economic impact figures include the impact on goods and services and wages and salaries created in response to the change in the economy.

Other Benefits

Other qualitative benefits associated with each option were also identified.

5.2 Option 1: Full Development of Rye Landfill

5.2.1 Cost Implications

The costs associated with Option 1 are summarised in Table 18.

Table 18 Summary of Costs Associated with Option 1

Timeframe	15 Years		30 Years	
Option	Annual cost per Household ($)	Net Present Value ($m)	Annual cost per Household ($)	Net Present Value ($m)
1A	$36.66	$30.15	$40.60	$46.83
1B	$36.44	$34.52	$42.41	$51.16

5.2.2 Greenhouse Gas Emissions

The greenhouse gas emissions associated with this option are captured in Table 19.

Under this option the Shire's waste will be deposited within the municipality until approximately 2040, at which point it will be consolidated at a facility on the Peninsula and hauled off. The exact location of the consolidation facility and receiving facility is unknown. The average greenhouse gas emissions associated with Option 4 – Take Waste off the Peninsula, have been applied to this option.

Table 19 Greenhouse Gas Emissions Associated with Option 1

Timeframe	15 years	30 years
Option	GHG emissions (tonnes)	GHG emissions (tonnes)
1A	0	4,401
1B	0	5,658

5.2.3 Carbon Neutrality costs

The greenhouse gas emissions from transporting the waste off the Peninsula could be offset through activities such as tree planting at a cost of approximately $8 per tonne. The cost associated with Option 1 is summarised in Table 20.

Table 20 Cost of Greenhouse Gas Emission Offsets for Option 1

Timeframe	15 Years	30 Years
Option	Cost ($)	Cost ($)
1A	0	35,204
1B	0	45,263

5.2.4 Economic Impact

This option maintains the 4 FTE's presently employed to manage and operate the Rye landfill. Additional FTE's are only created when a bulk haul facility is established and waste is hauled off the Peninsula. A summary of the economic impact associated with this option is provided in Table 21.

Table 21 Economic Impact Associated with Option 1

Timeframe	15 Years	30 Years
Option	**Economic Impact ($)**	**Economic Impact ($)**
1A	0	7,172
1B	0	10,758

5.2.5 Benefits

The benefits of fully developing the site include:

- **Additional time provided to identify an AWT** – the Shire has a strong commitment to identifying an alternative to landfill. This option provides up to 23 additional years to allow for the development of an alternative for the Shire to access.
- **Maintain control over waste management** – the Shire continues to have direct control over the management of its waste and the potential environmental and social impacts associated with it.
- **Minimal Greenhouse Gas Emissions** – as the Shire's waste will be deposited within the municipality no additional greenhouse gas emissions associated with transportation will be generated until the waste is taken off the Peninsula in approximately 2040.

5.3 Option 2: Partial Development of Rye Landfill – Western portion

5.3.1 Cost Implications

The cost implications for Option 2 are summarised in Table 22.

Table 22 Summary of Costs associated with Option 2

Timeframe	15 Years		30 Years	
Option	**Annual cost per Household ($)**	**Net Present Value ($m)**	**Annual cost per Household ($)**	**Net Present Value ($m)**
2A	$29.91	$28.60	$43.13	$47.80
2B	$28.04	$28.69	$42.20	$47.32

5.3.2 Greenhouse Gas Emissions

Under this option the Shire's waste will be deposited within the municipality until approximately 2030, at which point it will be consolidated at a facility on the Peninsula and hauled off. The exact location of the consolidation facility and receiving facility is unknown. Therefore, the average greenhouse gas emissions associated with Option 4 – Take Waste off the Peninsula, have been applied, refer to Table 23.

Table 23 Transport Greenhouse Gas Emissions Associated with Option 2

Timeframe	15 years	30 years
Option	GHG emissions (tonnes)	GHG emissions (tonnes)
2A	629	10,058
2B	1,886	11,316

5.3.3 Carbon Neutrality Costs

The greenhouse gas emissions from transporting the waste off the Peninsula could be offset through activities such as tree planting at a cost of approximately $8 per tonne. The potential costs for each scenario is presented in Table 24.

Table 24 Cost to Offset Greenhouse Gas Emissions for Option 2

Timeframe	15 Years	30 Years
Option	Cost ($)	Cost ($)
2A	5,029	80,467
2B	15,088	90,526

5.3.1 Economic Impact

This option maintains the 4 FTE's presently employed to manage and operate the Rye landfill. Additional FTE's are only created when a bulk haul facility is established and waste is hauled off the Peninsula. A summary of the economic impact associated with this option is provided in Table 25.

Table 25 Economic Impact Associated with Option 2

Timeframe	15 Years	30 Years
Option	Economic Impact ($)	Economic Impact ($)
2A	0	17,931
2B	0	17,931

5.3.2 Benefits

The benefits of partially developing the western portion of the Rye landfill include:

- **Additional time provided to identify an AWT** – the Shire has a strong commitment to identifying an alternative to landfill. This option provides up to 14 additional years to allow for the development of an alternative for the Shire to access.
- **Maintain control over waste management** – the Shire continues to have direct control over the management of its waste for an extended period of time and the potential environmental and social impacts associated with it.

5.4 Option 3: Partial Development of Rye Landfill – Eastern portion

5.4.1 Cost Implications

The cost implications of Option 3 are summarised in Table 26.

Table 26 Summary of Costs associated with Option 3

Timeframe	15 Years		30 Years	
Option	Annual cost per Household ($)	Net Present Value ($m)	Annual cost per Household ($)	Net Present Value ($m)
3A	$47.68	$44.05	$52.01	$62.77
3B	$47.98	$46.04	$52.16	$64.56

5.4.2 Greenhouse Gas Emissions

Under this option the Shire's waste will be deposited within the municipality until approximately 2028, at which point it will be consolidated at a facility on the Peninsula and hauled off. The exact location of the consolidation facility and receiving facility is unknown. Therefore, the average greenhouse gas emissions associated with Option 4 – Take Waste off the Peninsula have been applied. Refer to Table 27.

Table 27 Transport Greenhouse Gas Emissions Associated with Option 3

Timeframe	15 years	30 years
Option	GHG emissions (tonnes)	GHG emissions (tonnes)
3A	2,515	11,944
3B	2,515	11,944

5.4.3 Carbon Neutrality Costs

The greenhouse gas emissions from transporting the waste off the Peninsula could be offset through activities such as tree planting at a cost of approximately $8 per tonne. The total cost for this option is depicted in Table 28.

Table 28 Offset Costs for Transport Greenhouse Gas Emissions for Option 3

Timeframe	15 Years	30 Years
Option	Cost ($)	Cost ($)
3A	20,117	95,555
3B	20,117	95,555

5.4.4 Economic Impact

This option maintains the 4 FTE's presently employed to manage and operate the Rye landfill. Additional FTE's are only created when a bulk haul facility is established and waste is hauled off the Peninsula. A summary of the economic impact associated with this option is provided in Table 29.

Table 29 Economic Impact Associated with Option 3

Timeframe	15 Years	30 Years
Option	Economic Impact ($)	Economic Impact ($)
3A	4,782	22,712
3B	4,782	22,712

5.4.5 Benefits

The benefits of partially developing the eastern portion of the site include:

- **Additional time provided to identify an AWT** – the Shire has a strong commitment to identifying an alternative to landfill. This option provides up to 9 additional years to allow for the development of an alternative for the Shire to access.
- **Maintain control over waste management** – the Shire continues to have direct control over the management of its waste for an extended period of time and the potential environmental and social impacts associated with it.

5.5 Option 4: Take Waste Off the Peninsula

5.5.1 Cost Implications

The cost implications of Option 4 are summarised in Table 30.

Table 30 Summary of Costs Associated with Option 4

Timeframe	15 Years		30 Years	
Option	Annual cost per household ($)	Net Present Value ($m)	Annual cost per household ($)	Net Present Value ($m)
4A (i)	$58.38	$52.24	$58.38	$70.83
4A (ii)	$55.88	$50.10	$55.88	$67.79
4B (i)	$56.24	$49.94	$56.24	$67.91
4B (ii)	$53.48	$47.57	$53.48	$64.56
4C (i)	$55.45	$49.38	$55.45	$66.93
4C (ii)	$53.34	$47.57	$53.34	$64.38
4D (i)	$58.36	$51.39	$58.36	$69.79
4D (ii)	$59.70	$52.53	$59.70	$71.41

5.5.2 Greenhouse Gas Emissions

The amount of greenhouse gas emissions associated with this option will vary depending on the location of the Bulk Haul Facility and the receiving facility. A summary of the annual potential transportation emissions for each scenario is provided in Table 31.

Table 31 Option 4 Annual Transportation Greenhouse Gas Emissions

Option	Distance (km)	Annual Transport Greenhouse Gas Emissions (tonnes)	Total Greenhouse Gas Emissions over 15 years (tonnes)	Total Greenhouse Gas Emissions over 30 years (tonnes)
4A (i)	140	504	7,560	15,120
4A (ii)	320	1,152	17,280	34,560
4B (i)	80	288	4,320	8,640
4B (ii)	220	792	11,880	23,760
4C (i)	65	234	3,510	7,020
4C (ii)	200	720	10,800	21,600
4D (i)	116	418	6,264	12,528
4D (ii)	256	922	13,824	27,648

5.5.3 Carbon Neutrality Costs

The greenhouse gas emissions from transporting the waste off the Peninsula could be offset through activities such as tree planting at a cost of approximately $8 per tonne. The total cost for this option would depend on the scenario, as indicated in Table 32.

Table 32 Cost to Offset Transport Greenhouse Gas Emissions for Option 4

Option	Cost over 15 years ($)	Cost over 30 years ($)
4A (i)	60,480	120,960
4A (ii)	138,240	276,480
4B (i)	34,560	69,120
4B (ii)	95,040	190,080
4C (i)	28,080	56,160
4C (ii)	86,400	172,800
4D (i)	50,112	100,224
4D (ii)	110,592	221,184

5.5.4 Economic Impacts

Each Bulk Haul scenario creates different employment opportunities depending on the distance the waste has to be hauled to the receiving facility. A summary of the additional FTEs created by each scenario is provided in Table 33.

Table 33 Additional Full Time Equivalents created by Option 4

Option	Additional FTEs Created
4A (i)	2
4A (ii)	3
4B (i)	1.5
4B (ii)	2.7
4C (i)	1.3
4C (ii)	2.59
4D (i)	1.6
4D (ii)	2.8

Source: Solo (Mornington Peninsula Shire Kerbside Collection Contractor)

The economic impact associated with the additional employment is provided in Table 34.

Table 34 Economic Impact Associated with Option 4

Option	Economic Impact over 15 years ($'000)	Economic Impact over 30 years ($'000)
4A (i)	16,350	32,700
4A (ii)	24,510	49,020
4B (i)	12,270	24,540
4B (ii)	22,050	44,100
4C (i)	10,620	21,240
4C (ii)	21,165	42,330
4D (i)	13,545	27,090
4D (ii)	22,936	45,871

5.5.5 Benefits

The benefit of taking the waste off the Peninsula is:

- **Remove risks associated with landfill management** – there are inherent risks associated with management of a landfill. By removing the waste from the Peninsula the Shire reduces its exposure to these risks.

6. Phase 3: Multi Criteria Analysis

6.1 Approach

A summary of the quantified costs and economic impacts associated with each option is presented in Table 35. This data was used to create a multi-criteria analysis.

Table 35 Summary of Quantified Costs and Economic Impacts for each Option

Options		Full Development of Rye Landfill		Partial Development of Rye - Western Portion		Partial Development of Rye - Eastern Portion		Take Waste Off Peninsula							
								Rye		Mornington		Tyabb)		Stand alone	
		1A	1B	2A	2B	3A	3B	4A(i)	4A(ii)	4B(i)	4B(ii)	4C(i)	4C(ii)	4D(i)	4D(ii)
15 year timeframe															
Annual cost per household	$	$36.66	$36.44	$29.91	$28.04	$47.66	$47.97	$58.38	$55.88	$56.24	$53.48	$55.45	$53.34	$58.36	$59.70
Net present Value	$m	$30.15	$34.52	$28.60	$28.69	$44.02	$46.01	$52.24	$50.10	$49.94	$47.57	$49.38	$47.57	51.39	52.53
Economic Impact	$'000	0	0	0	0	4,782	4,782	16,350	24,510	12,270	22,050	10,620	21,165	13,545	22,936
Cost to offset Greenhouse Gas Emissions	$'000	0.00	0.00	5.03	15.09	20.12	20.12	60.48	138.24	34.56	95.04	28.08	86.40	50.11	110.59
30 year timeframe															
Annual cost per household	$	$40.60	$42.41	$43.13	$42.20	$52.01	$52.16	$58.38	$55.88	$56.24	$53.48	$55.45	$53.34	$58.36	$59.70
Net present Value	$m	$46.83	$51.16	$47.80	$47.32	$62.77	$64.56	$70.83	$67.79	$67.91	$64.56	$66.93	$64.38	$69.79	$71.41
Economic Impact	$'000	7,172	10,758	17,931	17,931	22,712	22,712	32,700	49,020	24,540	44,100	21,240	42,330	27,090	45,871
Cost to offset Greenhouse Gas Emissions	$'000	35.20	45.26	80.47	90.53	95.55	95.55	120.96	276.48	69.12	190.08	56.16	172.8	100.22	221.18

Table 36 Outcomes from the Multi-Criteria Analysis of all Options

		Full Development of Rye Landfill		Partial Development of Rye - Western Portion		Partial Development of Rye - Eastern Portion		Take Waste Off Peninsula							
								Rye		Mornington		Tyabb		Standalone	
Options		**1A**	**1B**	**2A**	**2B**	**3A**	**3B**	**4A(i)**	**4A(ii)**	**4B(i)**	**4B(ii)**	**4C(i)**	**4C(ii)**	**4D(i)**	**4D(ii)**
	Weighting Factor	**15 year timeframe**													
Annual cost per household	45	27.6	27.5	22.5	21.1	35.9	36.2	44.0	42.1	42.4	40.3	41.8	40.2	44.0	45.0
Net present Value	25	14.3	16.4	13.6	13.6	21.0	21.9	24.9	23.8	23.8	22.6	23.5	22.6	24.5	25.0
Economic Impact	15	0.0	0.0	0.0	0.0	-2.9	-2.9	-10.0	-15.0	-7.5	-13.5	-6.5	-13.0	-8.3	-14.0
Cost to offset Greenhouse Gas Emissions	15	0.0	0.0	0.5	1.6	2.2	2.2	6.6	15.0	3.8	10.3	3.0	9.4	5.4	12.0
	Weighting Score	42.0	43.9	36.7	36.4	56.1	57.3	65.4	66.0	62.4	59.8	61.8	59.3	65.6	68.0
	Weighting Factor	**30 year timeframe**													
Annual cost per household	45	30.6	32.0	32.5	31.8	39.2	39.3	44.0	42.1	42.4	40.3	41.8	40.2	44.0	45.0
Net present Value	25	16.4	17.9	16.7	16.6	22.0	22.6	24.8	23.7	23.8	22.6	23.4	22.5	24.4	25.0
Economic Impact	15	-2.2	-3.3	-5.5	-5.5	-6.9	-6.9	-10.0	-15.0	-7.5	-13.5	-6.5	-13.0	-8.3	-14.0
Cost to offset Greenhouse Gas Emissions	15	1.9	2.5	4.4	4.9	5.2	5.2	6.6	15.0	3.8	10.3	3.0	9.4	5.4	12.0
	Weighting Score	46.7	49.0	48.1	47.8	59.4	60.2	65.4	65.9	62.4	59.7	61.8	59.2	65.6	68.0

Table 37 Options Ranking

	Full Development of Rye Landfill		Partial Development of Rye - Western Portion		Partial Development of Rye - Eastern Portion		Take Waste Off Peninsula							
Location of Bulk Haul Facility							Rye		Mornington		Tyabb		Stand alone	
Options	1A	1B	2A	2B	3A	3B	4A(i)	4A(ii)	4B(i)	4B(ii)	4C(i)	4C(ii)	4D(i)	4D(ii)
15 year timeframe	3	4	2	1	5	6	11	13	10	8	9	7	12	14
30 Year timeframe	1	4	3	2	6	8	11	13	10	7	9	5	12	14

Each of the four variables was given a weighting, according to the importance each variable plays in the overall decision process. Weightings were recommended by consultants GHD and are based on GHD's prior project experience.

The weightings were:

- Annual cost per household: 45%
- Net present value: 25%
- Economic Impact: 15%
- Carbon neutrality costs: 15%

The weighting factors were applied against each of the variables to develop a weighted average multi criteria index. The highest figure for each variable is assigned the full weighting score, with the others proportionally allocated. For example under the 15 year timeframe, for Annual cost per household, Option 4D (ii), has the highest figure, $59.70 and therefore is allocated the full weighting score of 45. The scores for the other options are proportional to this.

The option with the lowest weighted average score generates the optimal outcome (i.e. a lower score is favourable). The weighting score for each of the cost variables (Annual cost per household, NPV and carbon neutrality costs) were added together. Economic Impact is considered a benefit; therefore, it was subtracted from the other weighting scores to add favorability.

6.2 Outcome

The results from the multi-criteria analysis are presented in Table 37.

Over a 15 year period, Option 2B and 2A, Partial Development of the Rye Landfill – Western Portion, are deemed to offer the optimal solution, as within the 15 year time frame there is no requirement to relocate the Resource Recovery Centre or the Green Waste Processing Facility.

Over a 30 year period, Option 1A (Full Development of the Rye Landfill) has the greatest benefit, if the EPA approves larger landfill cells, otherwise Option 2B is more beneficial.

6.3 Recommendation

The MCA supports Option 2 in the short term and Option 1A in the longer term, assuming large cells are approved by the EPA, otherwise, Option 2B is more beneficial in the longer term. Option 2 is the first stage of Option 1. The MCA scores for Option 1 and 2 are very close. Therefore it is recommended that Option 2 be implemented and a hold point be placed in year 13 to determine whether or not the Shire should transition to Option 1 or continue with Option 2.

6.4 Sensitivity Analysis

To test the accuracy of the overall options ranking a sensitivity analysis was undertaken on capital expenditure. Consideration was given to the impact on the cost to households and the NPV.

6.4.1 Household Cost

Overall option ranking is impacted by the accuracy and timing of capital expenditure. Overall option ranking could be sensitive to capital expenditure adjustments if the resulting pricing structure was likely to impact on demand, or adjusted cash flows due to related debt and loan repayment schedules. The results in Table 38 illustrate that the options in this business case are not sensitive to changes in capital expenditure (a sensitivity index of greater than 10% is considered significant). The main reason for this is that the demand under each scenario is constant and the capital expenditure across each scenario is similar.

6.4.2 Net Present Value

Consideration was also given to whether or not changes in capital expenditure impact on the option ranking based on Net Present Value. Table 39 illustrates that the sensitivity to capital expenditure changes is minimal. This is because the analysis assumes that total capital expenditure for each implementation stage will occur as a single expenditure item in the first year of each stage, or in the case of Option 4, in the first year of the option.

6.4.3 Benchmarking Transportation Rates

Further consideration was also given to the transportation rates used to haul the waste from the Bulk Haul Facility to the external Receiving Facility. The rates used in the model were provided by the Shire's present Kerbside Collection contractor Solo and are provided in Table 49 in Appendix 2. The figures were tested by GHD. GHD's models (which have been developed over three States) have verified that the contractor rates per tonne are reasonable when calculated on a variable speed basis (vehicles travel at faster average speeds over longer distances). A constant speed scenario was also modelled by GHD. This assumes that the transport vehicles are travelling at 60 km/hr at all distances. Naturally, the cost of transportation increases as logistics of slow moving vehicles increases operation costs. The results are presented in Figure 3.

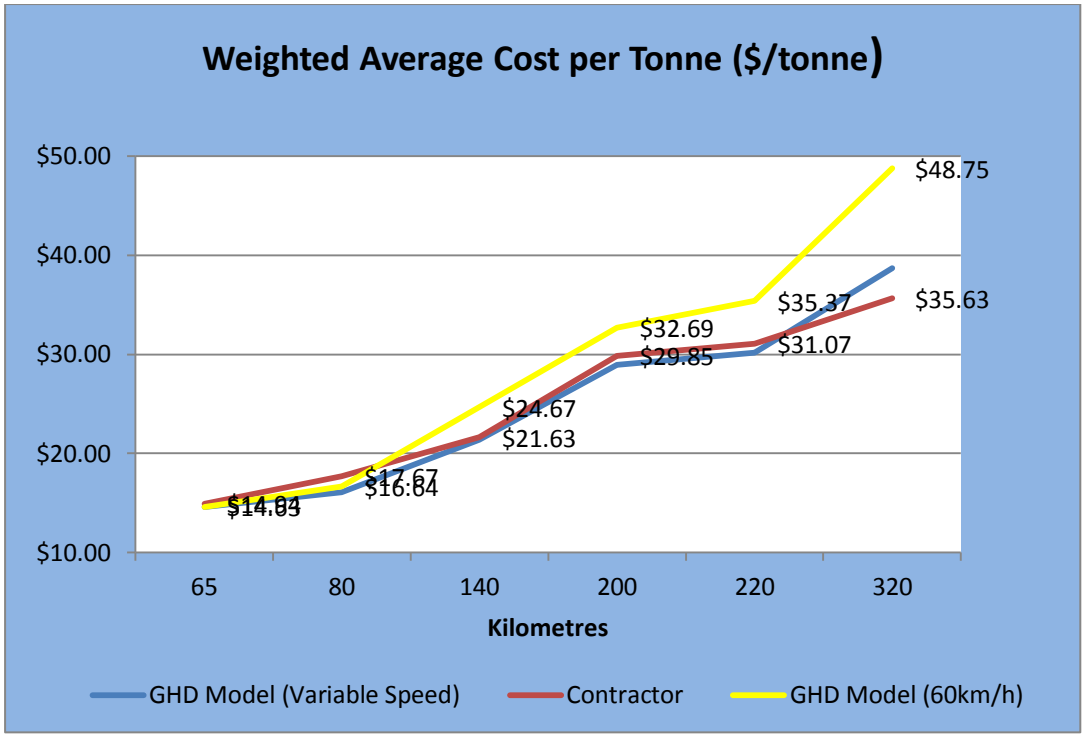

Figure 3 Verification of Transportation Costs

Table 38 Results from the Capital Expenditure Sensitivity Analysis for Household Cost

	Full Development of Rye Landfill		Partial Development of Rye - Western Portion		Partial Development of Rye - Eastern Portion		Take Waste Off Peninsula							
	Option 1		Option 2		Option 3		Option 4							
Location of Bulk Haul Facility							Rye		Mornington		Tyabb		Standalone	
	1A	1B	2A	2B	3A	3B	4A (i)	4A (ii)	4B (i)	4B (ii)	4C (i)	4C (ii)	4D (i)	4D (ii)
Cost per Household - 30 years														
Capex - 10%	$39.32	$41.26	$42.40	$41.56	$50.84	$50.98	$57.76	$55.25	$55.66	$52.90	$54.83	$52.72	$57.68	$59.02
Capex - Base	$40.60	$42.41	$43.13	$42.20	$52.01	$52.16	$58.38	$55.88	$56.24	$53.48	$55.45	$53.34	$58.36	$59.70
Capex +10%	$41.88	$43.57	$43.86	$42.83	$53.18	$53.34	$59.01	$56.51	$56.83	$54.07	$56.07	$53.96	$59.04	$60.37
Sensitivity Index														
Capex - 10%	0.968	0.973	0.983	0.985	0.978	0.977	0.989	0.989	0.990	0.989	0.989	0.988	0.988	0.989
Capex - Base	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Capex +10%	1.032	1.027	1.017	1.015	1.022	1.023	1.011	1.011	1.010	1.011	1.011	1.012	1.012	1.011
Percentage Change in Capex														
	3.2%	**2.7%**	**1.7%**	**1.5%**	**2.2%**	**2.3%**	**1.1%**	**1.1%**	**1.0%**	**1.1%**	**1.1%**	**1.2%**	**1.2%**	**1.1%**

Table 39 Results from the Capital Expenditure Sensitivity Analysis for Net Present Value

Location of Bulk Haul Facility	Full Development of Rye Landfill		Partial Development of Rye - Western Portion		Partial Development of Rye - Eastern Portion		Option 4							
	Option 1		Option 2		Option 3									
							Rye		Mornington		Tyabb		Standalone	
	1A	1B	2A	2B	3A	3B	4A (i)	4A (ii)	4B (i)	4B (ii)	4C (i)	4C (ii)	4D (i)	4D (ii)
Net Present Value $m														
Capex - 10%	$45.19	$49.47	$46.59	$46.22	$60.99	$62.64	$70.09	$67.06	$67.23	$63.88	$66.20	$63.65	$69.06	$70.68
Capex - Base	$46.83	$51.16	$47.80	$47.32	$62.77	$64.56	$70.83	$67.79	$67.91	$64.56	$66.93	$64.38	$69.79	$71.41
Capex +10%	$48.46	$52.85	$49.00	$48.43	$64.54	$66.49	$71.56	$68.53	$68.60	$65.25	$67.66	$65.11	$70.52	$72.14
Sensitivity Index														
Capex - 10%	0.965	0.967	0.975	0.977	0.972	0.970	0.990	0.989	0.990	0.989	0.989	0.989	0.990	0.990
Capex - Base	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Capex +10%	1.035	1.033	1.025	1.023	1.028	1.030	1.010	1.011	1.010	1.011	1.011	1.011	1.010	1.010
Percentage Change in Capex														
	3.5%	**3.3%**	**2.5%**	**2.3%**	**2.8%**	**3.0%**	**1.0%**	**1.1%**	**1.0%**	**1.1%**	**1.1%**	**1.1%**	**1.0%**	**1.0%**

7. Community Support

To help inform the decision about the most appropriate option for the short to medium term management of landfill waste the Shire hosted a face to face deliberative forum – Let's Talk Waste, for the community.

The forum took place over two, three hour meetings. Participants at the forum were made up from self-nominated members of the community, a representative sample of residents from across the Shire and a range of community, government and commercial interest groups. An indication of the percentage of representatives from the different stakeholder groups is provided in Table 40.

Table 40 Percent of Representation from Different Stakeholder Groups at Let's Talk Waste Forums

Stakeholder Group	Representation (%)
Community	83
Waste Industry	16
Government	1

Participants at the Forum were asked to nominate which of the four options they would select if they could only choose one of the four presented to them. Seventy-six people voted on this question. As indicated in Figure 4, 61% supported the further development of Rye and 39% supported taking the waste off the Peninsula.

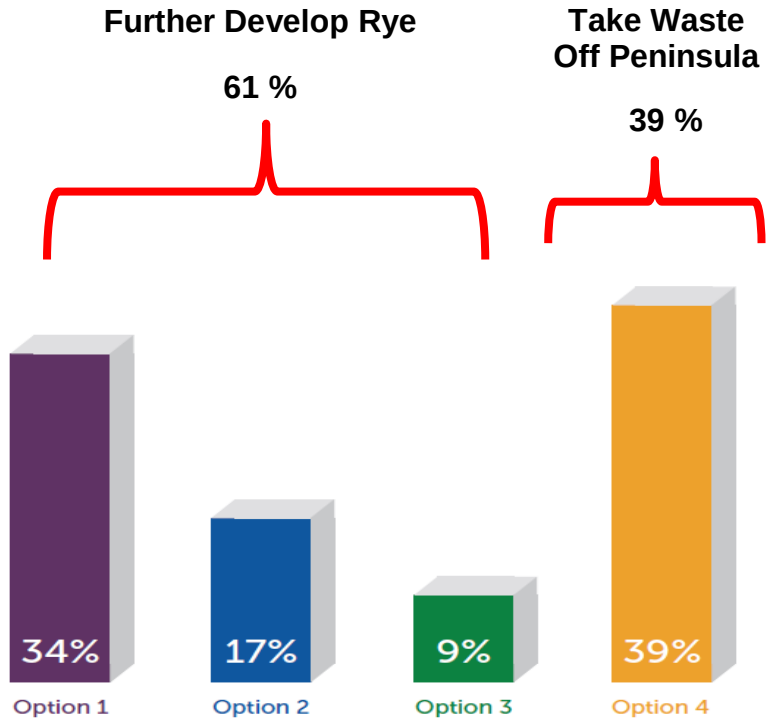

Figure 4 Level of Community Support for each Option

8. Preferred Option

8.1 Option Description

The community and Council have shown a continued desire for supporting an alternative to landfill. Until an AWT is available, the preferred option for the short to medium term management of the Shire's waste is Option 2, Partial Development of the Rye landfill – Western Portion.

A staged approach to implementation is recommended. The stages will be implemented along the western portion of the site to link the previous landfill cell, Cell 1 and the present tipping cell, Cell 2. The first stage will link into Stage 4 of Cell 2, and then development will progress north towards Cell 1 (see Appendix 1, Figure 12).

After the completion of each stage a hold point will occur to determine if the Shire is able to transition to an AWT or needs to continue landfilling.

In addition, a hold point will be executed in year 13 to confirm if the Shire should transition to Option 1 or continue with Option 2 and start hauling the waste off the Peninsula.

This approach supports the Shire maximising the landfill air space presently available at its own facility prior to transferring the waste off the Peninsula. It provides flexibility should an alternative to landfill become available within the life of the proposed development. It is also the most cost effective approach and results in reduced greenhouse gas emissions.

Figure 6 and Figure 7 illustrate the annual costs associated of this approach and the hold points.

8.1.1 Reducing Impacts

Visual

To assist with reducing the visual impacts of the development, the Shire will:

- Vary the height of the additional landfill area;
- Progressively rehabilitate subsequent landfill areas;
- Undertake further revegetation at key viewing locations; and
- Maintain existing vegetated landforms (outside the development area) within the landfill site to provide a visual buffer to external areas.

Flora and Fauna

Remnant vegetation removed at the site will be "off-set" (an equivalent planted elsewhere) in line with the Government's Native Vegetation Framework. In addition, all re-vegetated areas will be re-established.

Traffic

Residents and businesses located on Browns Road expressed concern about the entrance to the landfill being re-located to Browns Road. If the Resource Recovery Centre does need to be relocated the Shire will investigate alternative access routes to its Browns Road land.

8.2 Deliverability

The preferred approach proposes the development of a series of stages along the western portion of the site to link the previous landfill cell, Cell 1 and the present tipping cell, Cell 2. The first stage will link into Stage 4 of Cell 2, and then development will progress north towards Cell 1 (see Appendix 1, Figure 12).

The key steps and timeframes associated with this option are presented in Figure 5.

The exact size of the first stage of the development will be determined to inform the planning application process. The potential timing of any AWT will be considered at this point. Further information regarding the Procurement Strategy is provided in 8.4.

Activity	2015		2016		2017		2018	
Fill Cell 2, Stage 4								
Conduct Environment Studies for new cell								
Prepare planning application								
Procurement Strategy								
Planning Application Process								
Detail Design of Landfill Cell								
Detail Design Approval (EPA Victoria)								
Construct New Landfill cell, Stage 5								
Commence Filling new Cell , Stage 5								

Figure 5 Key Steps and Timeframes for Preferred Option

8.3 Funding Requirements

The approximate annual funding requirements for the implementation of the preferred approach, over a 30 year period, is provided in Table 41 and Table 42. Table 41 assumes Option 2 is fully implemented and Table 42 assumes Option 2 transitions to Option 1 in year 13. The exact cost will depend on the size of the stages developed and the decision made at the 13 year hold point. A graphical presentation of the data, assuming the larger cells are approved, along with an indication of all the hold points is provided in Figure 6 and Figure 7.

Table 41 Annual Funding Requirements for full implementation of Option 2

Year	Annual Cost (Large Cells)		Annual Cost (Smaller Cells)	
0	$5,297,969	Construct Stage 5	$2,941,368	Construct Stage 5
1	$1,863,279	Fill Stage 5	$1,812,433	Fill Stage 5
2	$1,863,279		$1,812,433	
3	$1,863,279		$4,216,156	Fill Stage 5 + Construct Stage 6
4	$1,863,279		$2,842,870	Fill Stage 6 + Rehabilitate Stage 5
5	$1,863,279		$1,791,678	Fill Stage 6
6	$1,863,279		$3,006,613	Fill Stage 6 + Construct Stage 7
7	$1,863,279		$2,888,649	Fill Stage 7 + Rehabilitate Stage 6
8	$1,863,279		$1,720,645	Fill Stage 7
9	$5,184,207	Fill Stage 5 + Stage 6 Construction	$2,935,580	Fill Stage 7 + Construct Stage 8
10	$3,683,959	Fill Stage 6 + Rehabilitate Stage 5	$2,109,999	Fill Stage 8 + Rehabilitate Stage 7
11	$1,815,141	Fill Stage 6	$1,720,645	Fill Stage 8
12	$1,815,141		$2,935,580	Fill Stage 8 + Construct Stage 9
13	$1,815,141		$2,109,999	Fill Stage 9 + Rehabilitate Stage 8
14	$1,815,141		$1,915,310	Fill Stage 9
15	$7,373,052	Fill Stage 6 + Build Bulk Haul facility	$7,278,556	Fill Stage 9 + Build Bulk Haul facility
16	$6,120,027	Utilise Bulk Haul facility + Rehabilitate Stage 6	$4,990,999	Rehabilitate Stage 9 + Utilise Bulk Haul facility
17	$4,601,645	Utilise Bulk Haul facility	$4,601,645	Utilise Bulk Haul facility
18	$4,601,645		$4,601,645	
19	$4,601,645		$4,601,645	
20	$4,601,645		$4,601,645	
21	$4,601,645		$4,601,645	
22	$4,601,645		$4,601,645	
23	$4,601,645		$4,601,645	
24	$4,601,645		$4,601,645	
25	$4,601,645		$4,601,645	
26	$4,601,645		$4,601,645	
27	$4,601,645		$4,406,980	Utilise Bulk Haul facility + Complete repayments for Bulk Haul Facility Infrastructure
28	$4,601,645		$4,406,980	Utilise Bulk Haul facility
29	$4,601,645		$4,406,980	
30	$4,406,980	Utilise Bulk Haul facility + Complete repayments for Bulk Haul Facility	$4,406,980	

		Infrastructure		
NPV	**$47,795,163**		**$47,323,221**	

Table 42 Annual Funding Requirements if Option 2 transitions into Option 1

Year	Annual Cost (Large Cells)		Annual Cost (Smaller Cells)	
0	$5,297,969	Construct Stage 5	$2,941,368	Construct Stage 5
1	$1,863,279	Fill Stage 5	$1,812,433	Fill Stage 5
2	$1,863,279		$1,812,433	
3	$1,863,279		$4,216,156	Fill Stage 5 + Construct Stage 6
4	$1,863,279		$3,162,682	Fill Stage 6 + Rehabilitate Stage 5
5	$1,863,279		$1,791,678	Fill Stage 6
6	$1,863,279		$4,137,619	Fill Stage 6 + Construct Stage 7
7	$1,863,279		$3,153,384	Fill Stage 7+ Rehabilitate Stage 6
8	$1,863,279		$1,782,380	Fill Stage 7
9	$5,184,207	Fill Stage 5 + Construct Stage 6	$3,719,003	Fill Stage 7+ Construct Stage 8
10	$3,935,563	Fill Stage 6 + Rehabilitate Stage 5	$3,016,849	Fill Stage 8 + Rehabilitate Stage 7
11	$1,815,141	Fill Stage 6	$7,147,511	Fill Stage 8 + Re-locate Green Waste Processing Facility
12	$1,815,141		$3,032,435	Fill Stage 8 + Construct Stage 9
13	$1,815,141		$3,195,508	Fill Stage 9 + Rehabilitate Stage 8
14	$7,203,881	Fill Stage 6 + Re-locate Green Waste Processing Facility	$6,589,174	Fill Stage 9 + Relocated Rye Resource Recovery Centre
15	$5,075,780	Fill Stage 6 + Construct Stage 7	$3,119,098	Fill Stage 9 + Construct Stage 10
16	$3,704,286	Fill Stage 7 + Rehabilitate Stage 6	$2,881,040	Fill Stage 10 + Rehabilitate Stage 9
17	$1,981,454	Fill Stage 7	$2,034,174	Fill Stage 10
18	$1,981,454		$3,119,098	Fill Stage 10 + Construct Stage 11
19	$6,536,454	Fill Stage 7 + Re-locate the Rye Resource Recovery Centre	$2,571,834	Fill Stage 11 + Rehabilitate Stage 10
20	$4,298,188	Fill Stage 7 + Construct Stage 8	$2,228,839	Fill Stage 11
21	$3,693,763	Fill Stage 8 + Rehabilitate Stage 7	$7,592,084	Fill Stage 11 + Construct Bulk Haul Facility
22	$2,072,257	Fill Stage 8	$5,448,511	Rehabilitate Stage 11 + Utilise Bulk Haul facility
23	$2,072,257		$4,910,851	Utilise Bulk Haul facility

24	$7,630,168	Fill Stage 8 + Construct Bulk Haul Facility	$4,910,851	
25	$6,220,491	Rehabilitate Stage 8 + Utilise Bulk Haul facility	$4,910,851	
26	$4,910,851	Utilise Bulk Haul facility	$4,722,112	Utilise Bulk Haul facility + Complete repayments for Green Waste Processing Relocation
27	$4,910,851		$4,722,112	Utilise Bulk Haul facility
28	$4,910,851		$4,722,112	
29	$4,722,112	Utilise Bulk Haul facility + Complete repayments for Green waste processing facility relocation	$4,601,645	Utilise Bulk Haul facility + Complete Paying off Relocation of Rye Resource Recovery Centre
30	$4,722,112	Utilise Bulk Haul facility	$4,601,645	Utilise Bulk Haul facility
NPV	**$46,827,113**		**$51,159,413**	

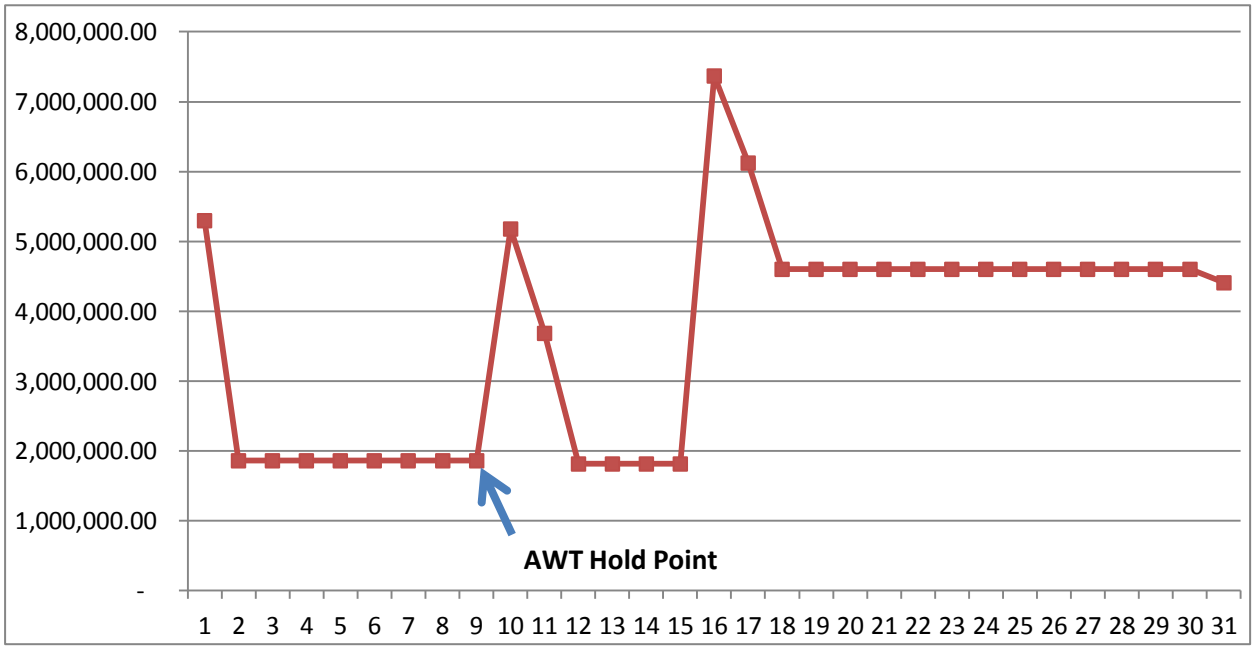

Figure 6 Annual Funding Requirements Plus Hold Points for Full Implementation of Option 2 (Large Cells)

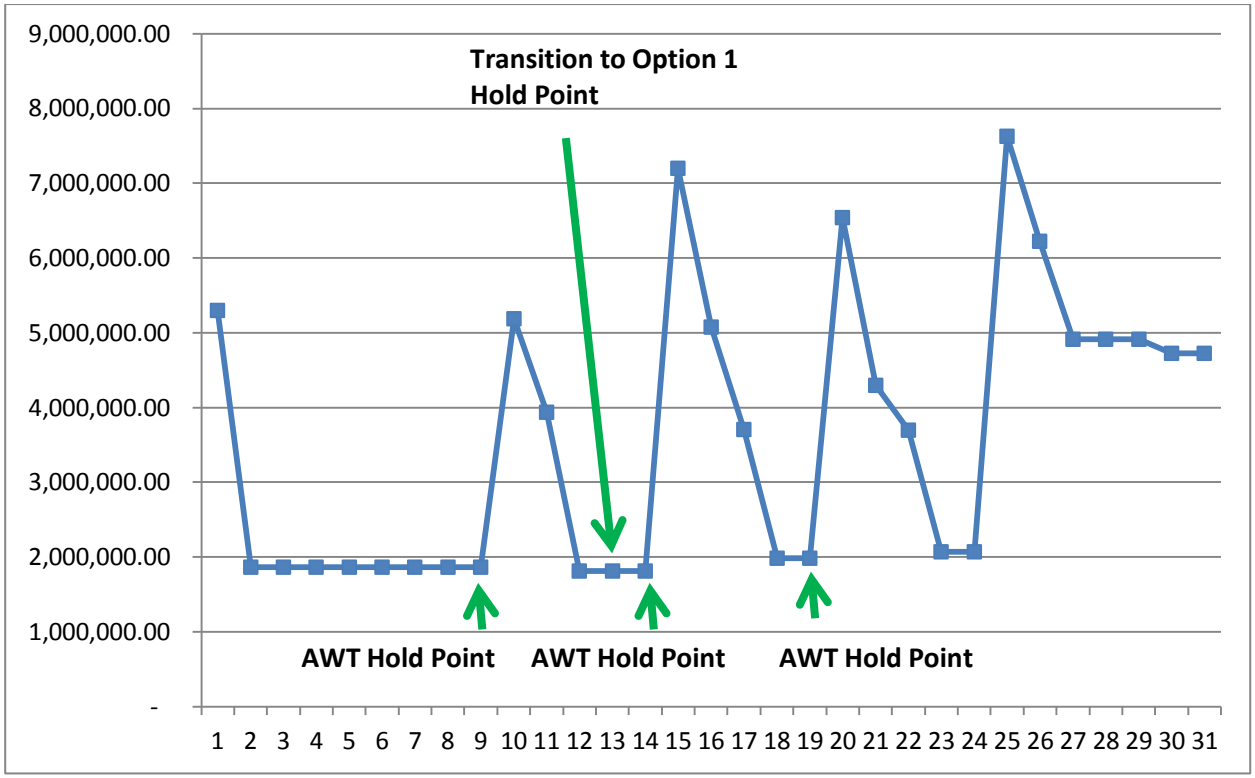

Figure 7 Annual Funding Requirements Plus Hold Points for Implementation of Option 2 to Year 12 followed by Transition to Option 1 (Large Cells)

8.4 Procurement Options

There are a number of procurement models available to Council. Below is a list of the procurement options identified in the *Major Projects Guidance for Local Government (*developed by Maddocks and Ernst and Young). These procurement options are described as the most likely to be suitable for major infrastructure projects and related services by local government.

- Construct only
- Design and Construct
- Design, Build and Maintain (BDM)
- Design, Build, Finance (DBF)
- Design, Build, Operate and Maintain (DBOM)
- Design, Build, Finance and Operate (DBFO)
- Design, Build, Finance and Maintain (DBFM)

Traditionally the Shire would engage different contractors to undertake different elements of the project, due to the diverse nature of the activities. For example a contractor to undertake the design of the landfill, one to undertake the build, and a different contractor to operate and maintain elements of the project.

An initial review of the options listed above indicated that the traditional approach could be maintained or the Shire could engage a private contractor to Design, Build, Finance

and Operate (DBFO) the landfill development. DBFO, is an option that requires the contractor to finance the construction of the asset, while Council retains ownership of the asset. The DBFO is a form of Public Private Partnership. Under this model the Shire would enter into a long term agreement with a contractor, with Council defining its requirements in a performance specification. A small number of landfills in Australia are operated under a DBFO model.

The advantages and disadvantages of both models are presented in Table 43 and Table 44. The Shire would consider procuring the services of a contractor if the whole of life cost (including risks) provides value for money compared to the cost to Council of public delivery.

Table 43 Advantages and Disadvantages to Traditional Landfill Operating Models

Advantages to Council	*Disadvantages to Council*
Complete control of the landfill and future waste management planning	Responsibility for all costs including capital costs to expand the site and operational costs
Ability to specify waste diversion and recycling rates / solid waste stream	Responsibility for all operational, environmental, closure, legacy liabilities etc
Provision of services to meet needs of the community, including the prices they charge	Responsible for all management requirements of landfill
Control of all assets and accountability of performance	Continues to grapple with community pressures (not in my backyard) and other political pressures associated with landfill
Control over compliance with regulations	
Organisation knowledge and continuity	
History of expenditure and understanding of budget needs	
Can control the gate fees, to make it fair and equitable for residents	

Table 44 Advantages and Disadvantages to a Design Build Finance and Operate Model

Advantages to Council	*Disadvantages to Council*
Contractor responsible for capital costs for new landfill, Council does not need to outlay the upfront capital	The viability for a private contractor, will be influenced by their ability to access capital expenditure to fund construction or borrow at a competitive rate (will be tested by the market)
May specify in contract controls on the: - Solid waste stream - Diversion rates - Prices charged - Service levels/operating hours - Timeframes for landfill life to align with future waste management planning	Indirect control of landfill operations such as: - rate of fill - solid waste stream composition - prices charged - commercial waste
Ability to maintain some oversight of the system dependent on specifications	Maintain some liabilities
Transfer of some risk including design and operation/ maintenance risk.	Experience two pronged costs – costs of the contract and costs of staff to monitor contract
Create context for running facilities like a	May experience costly and lengthy contract negotiation

business – take advantage of competitive opportunities	process (the project development and tendering stages can be resource intensive for Council, requiring large teams and appointment of external advisors to set up specifications – long term contract)
Tap into the experience and knowledge of the private sector	No control or little control over gate fee
May benefit from innovative techniques and technologies	Success of the project dependent on quality of the performance specifications prepared by Council

Once the preferred option for the disposal of landfill waste in the short to medium term is confirmed a procurement strategy would be developed and presented to Council.

8.5 Contingency Plan

The objective of the business case is to identify a reliable and sustainable option for the short to medium term management of the Shire's landfill waste. Should the project be delayed due to unforeseen circumstances then the contingency plan presently in place for the Rye landfill operations, that the Shire direct haul its waste to Sita's facility in the South East, will be maintained.

9. Conclusion

The community and Council have shown a continued desire for supporting an alternative to landfill. Until an AWT is available, the preferred option for the short to medium term management of the Shire's waste is Option 2, Partial Development of the Rye landfill – Western Portion. A hold point will be executed in year 13 to confirm if the Shire should transition to Option 1.

A staged approach to implementation is recommended. After the completion of each stage a hold point will occur to determine if the Shire is able to transition to an AWT or needs to continue landfilling.

This approach supports the Shire maximising the landfill air space presently available at its own facility prior to transferring the waste off the Peninsula. It provides flexibility should an alternative to landfill become available within the life of the proposed development. It is also the most cost effective approach and results in reduced greenhouse gas emissions.

10. References

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Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Qualifications, *National Greenhouse and Energy Reporting System Measurement, Technical Guidelines for Estimation of Greenhouse Gas Emissions by Facilities in Australia*, July 2013

EPA Victoria, *Best Practice Environmental Management – Siting, Design, Operation and Rehabilitation of Landfills,* October 2014 (publication 788)

EPA Victoria, *Recommended Separation Distances for Industrial Air Emissions,* March 2013

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Mornington Peninsula Shire, *Municipal Waste Management Strategy Review – Rye Landfill Site, Traffic Impact Analysis,* April 2014

Privatizing Landfills: Market solutions for solid waste disposal
http://reason.org/files/f5477f3e23eb04770b6a222456421e6d.pdf

SMEC, *Rye Landfill Flora and Fauna Assessment*, November 2014

Tract Consulting, *Possible Rye Landfill Development, Preliminary Visual Impact Assessment Technical Report*, June 2014

Appendix 1: Maps of Rye Landfill Site and Options

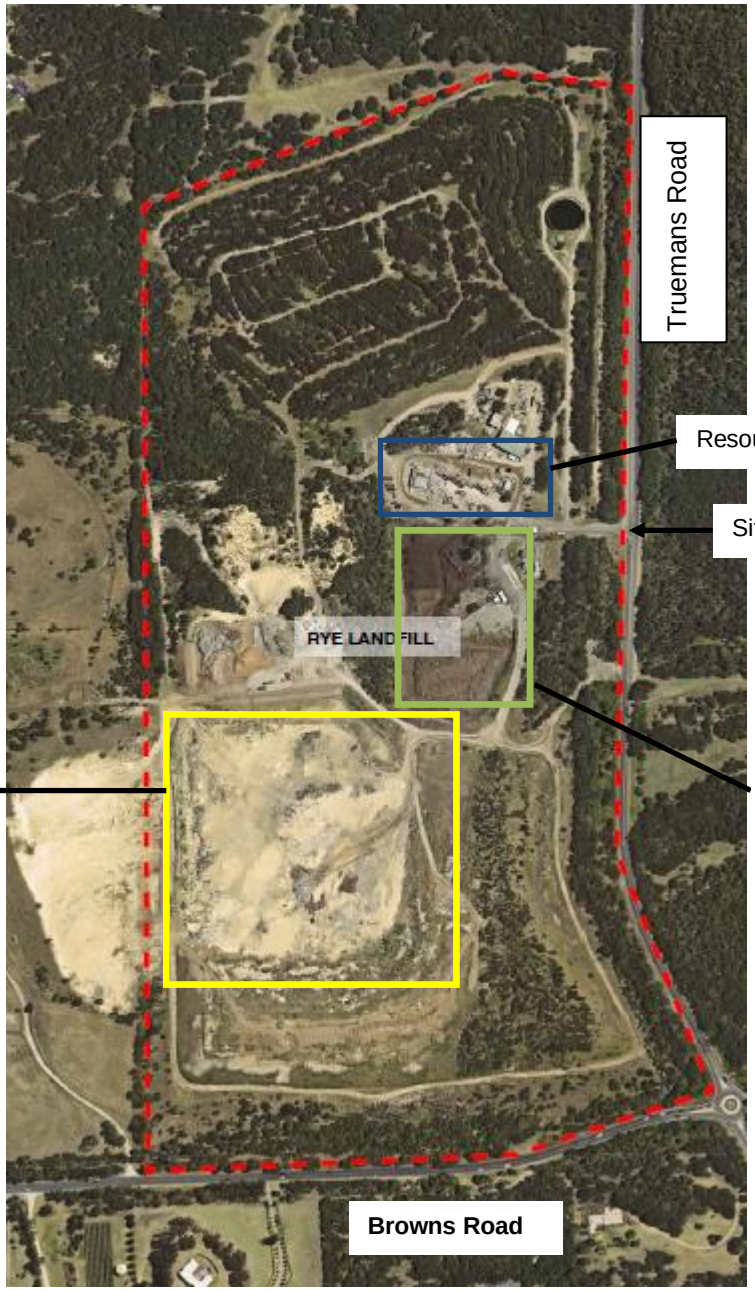


Figure 8 Rye Landfill Site Map

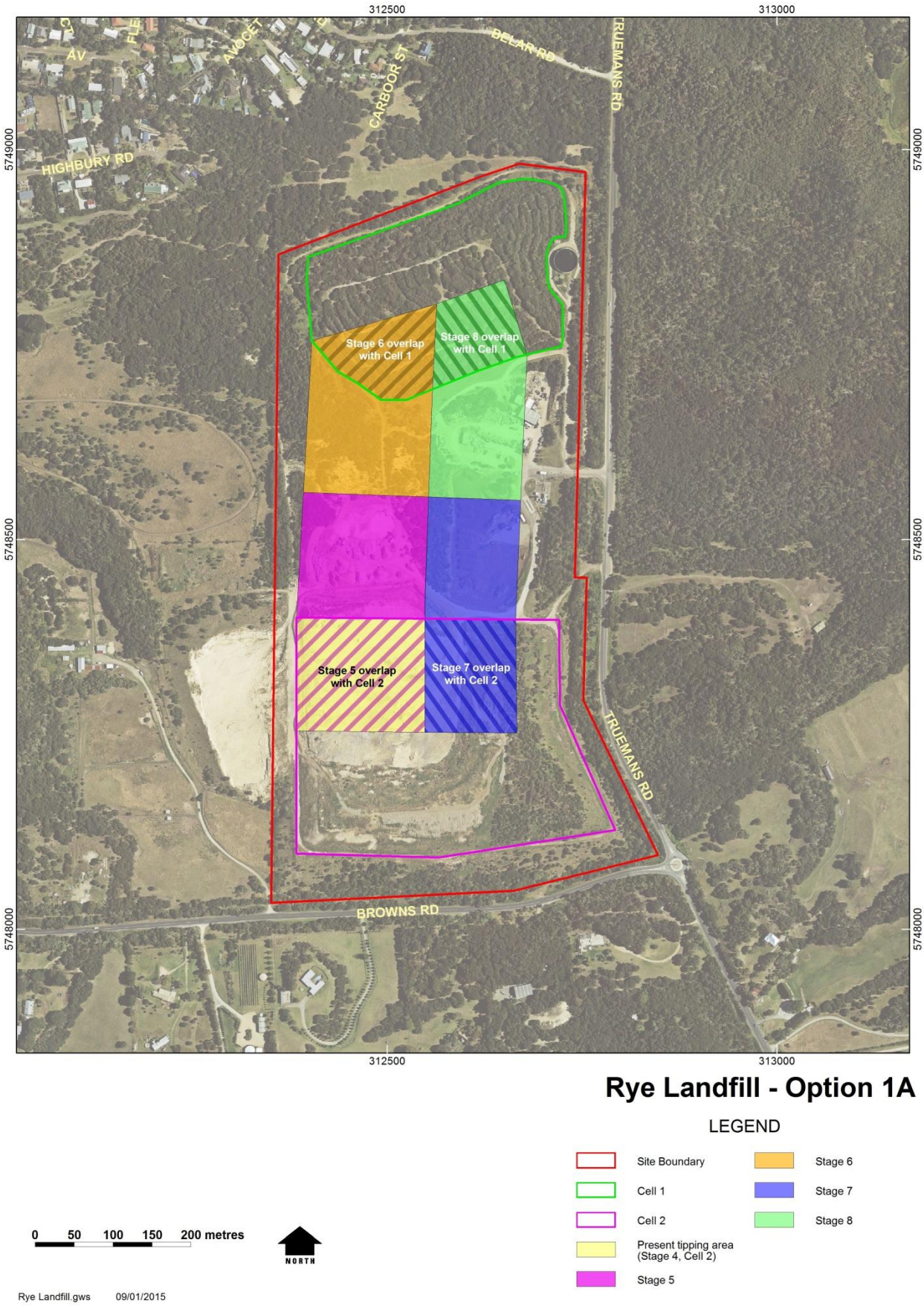


Figure 9 Map of Option 1A: Rye Landfill - Full Development

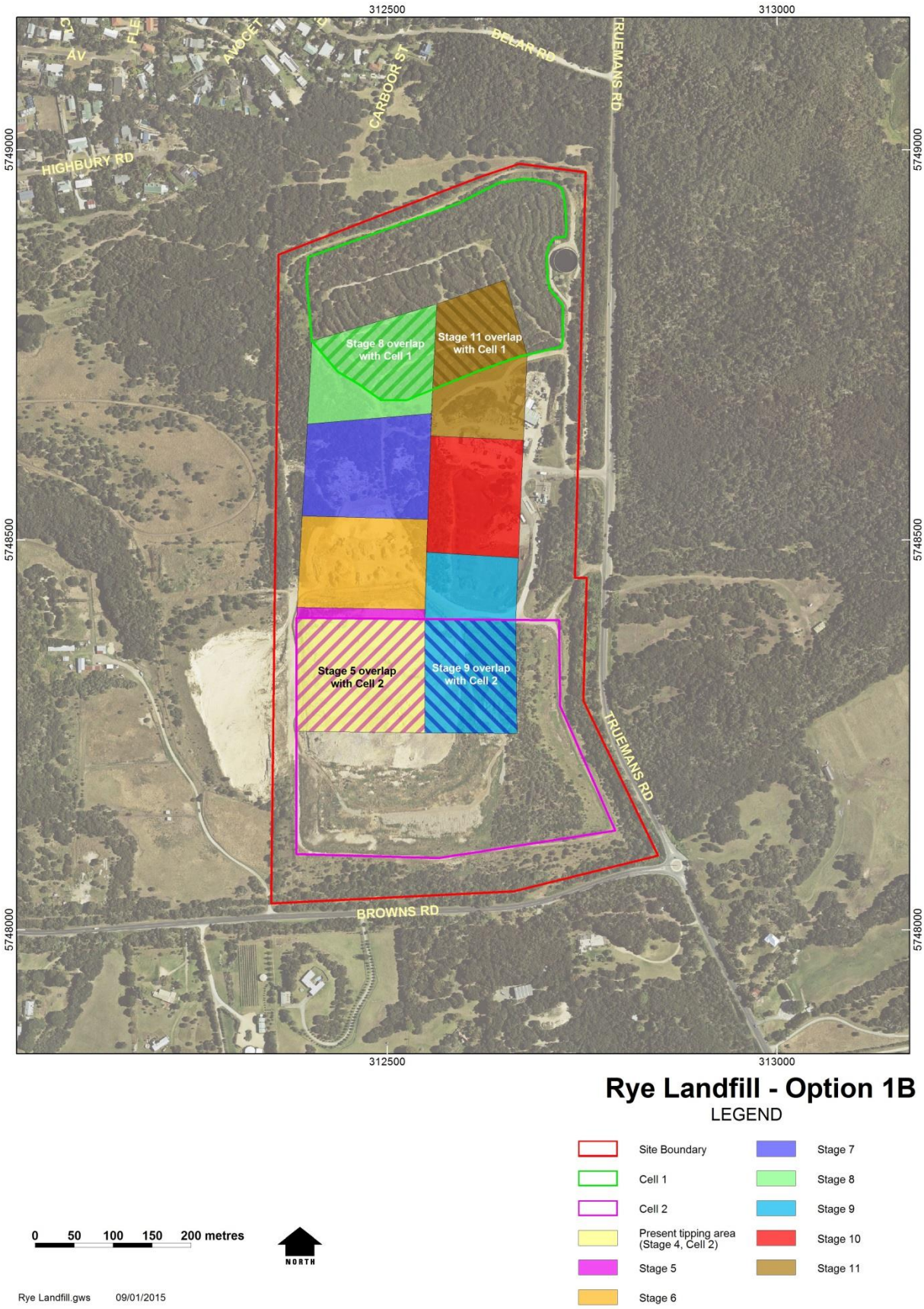


Figure 10 Map of Option 1B: Rye Landfill - Full Development

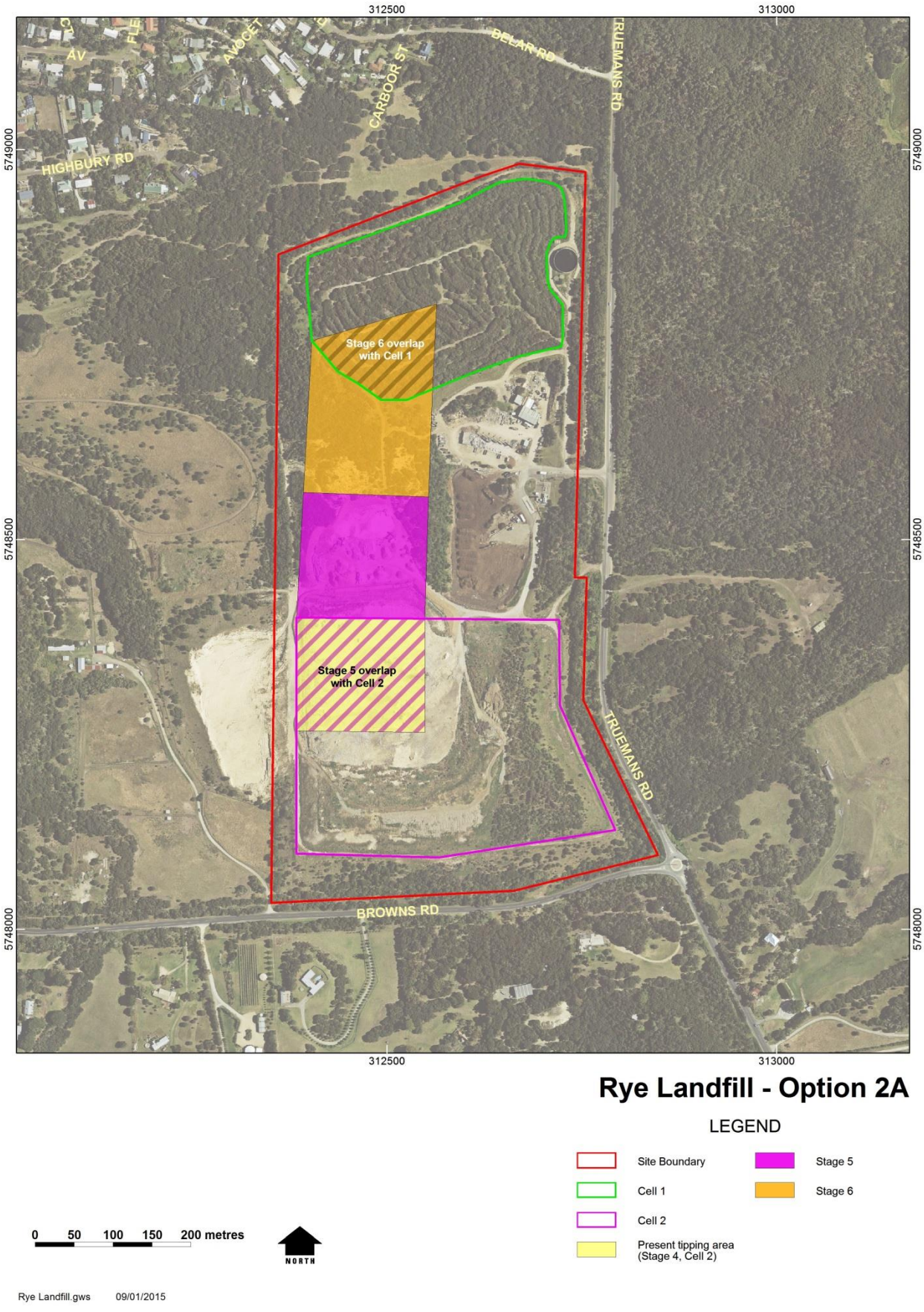


Figure 11 Map of Option 2A Rye Landfill - Development Western Portion

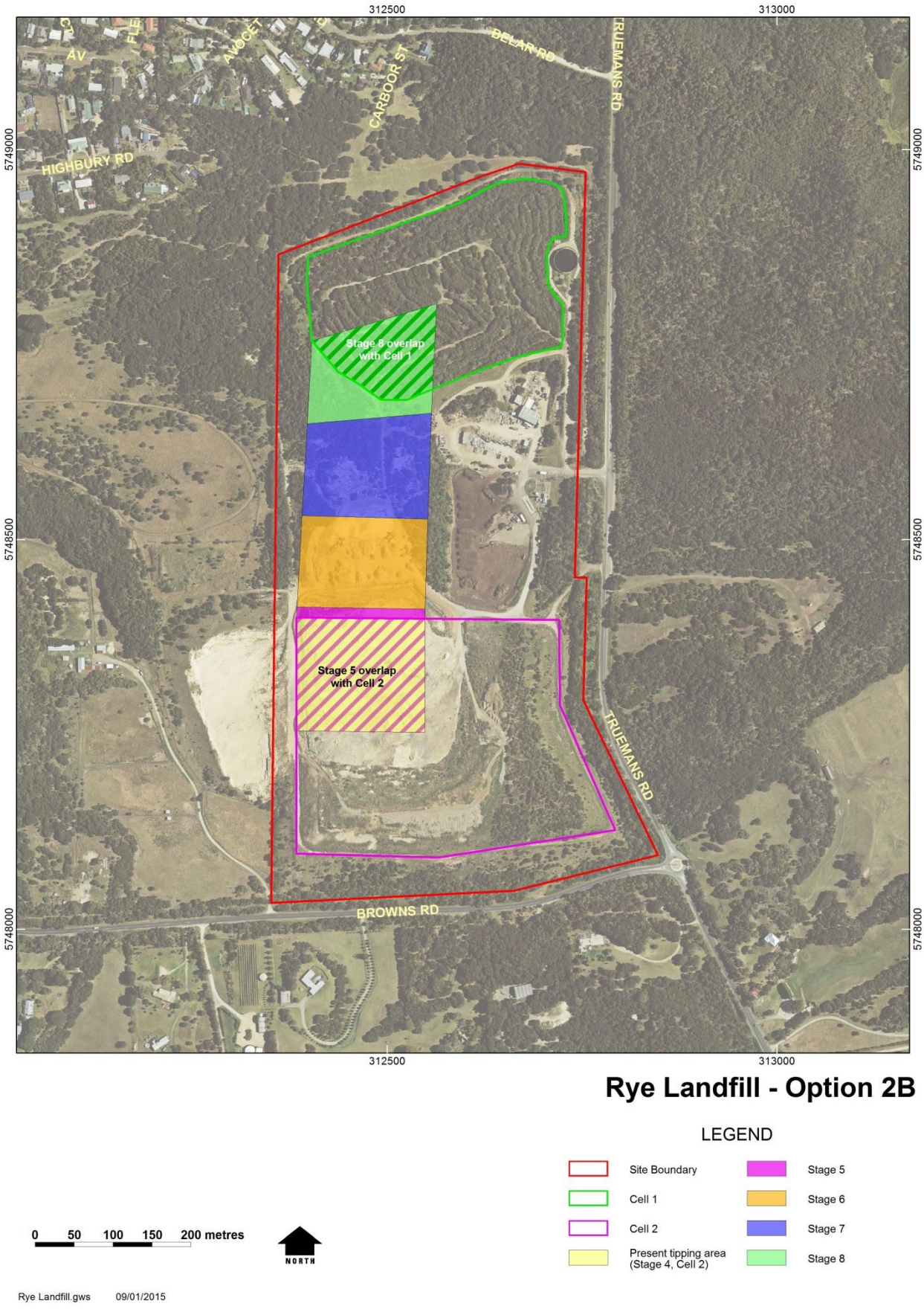


Figure 12 Map of Option 2B Rye Landfill - Development Western Portion

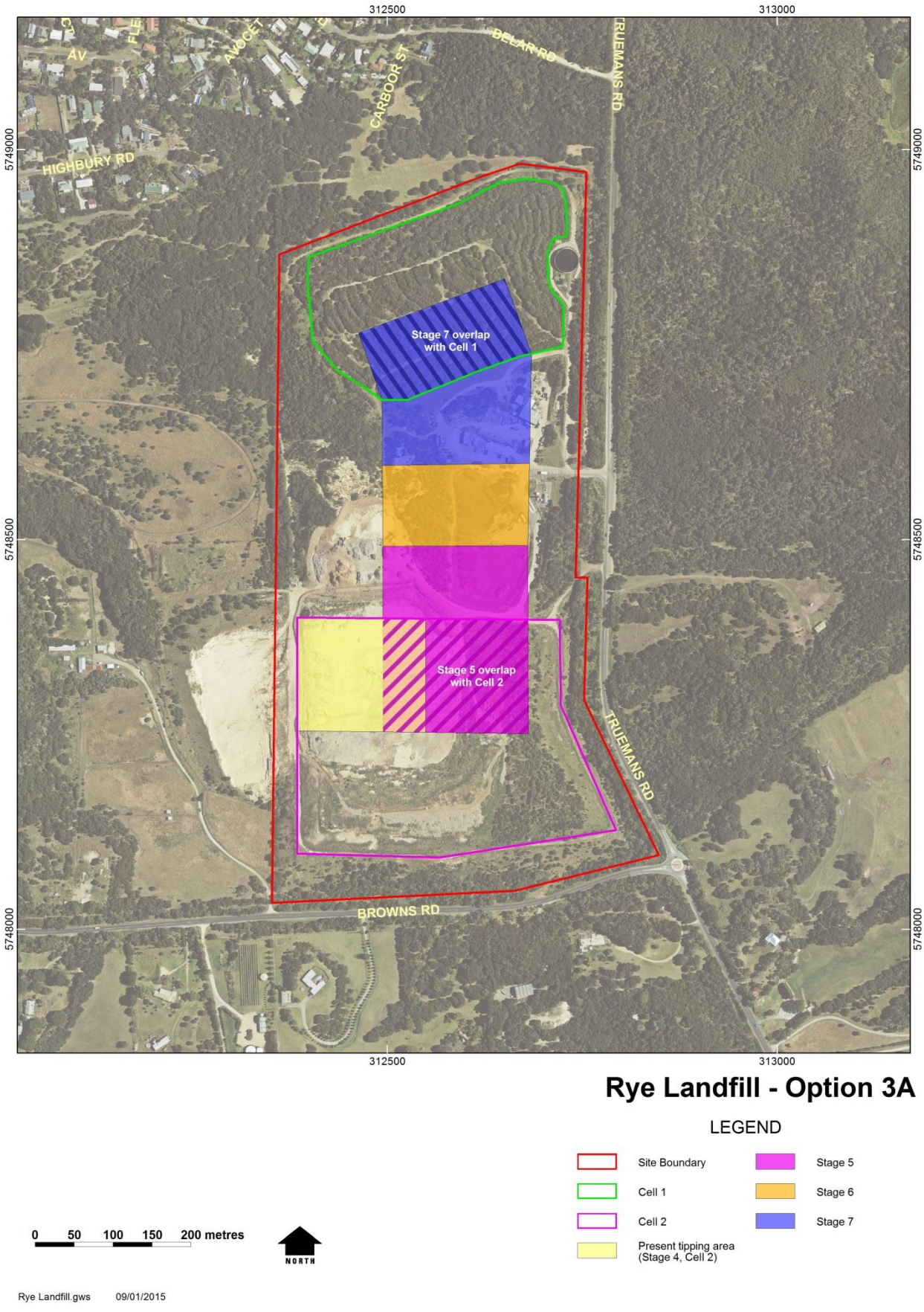


Figure 13 Map of Option 3A Rye Landfill - Development Eastern Portion

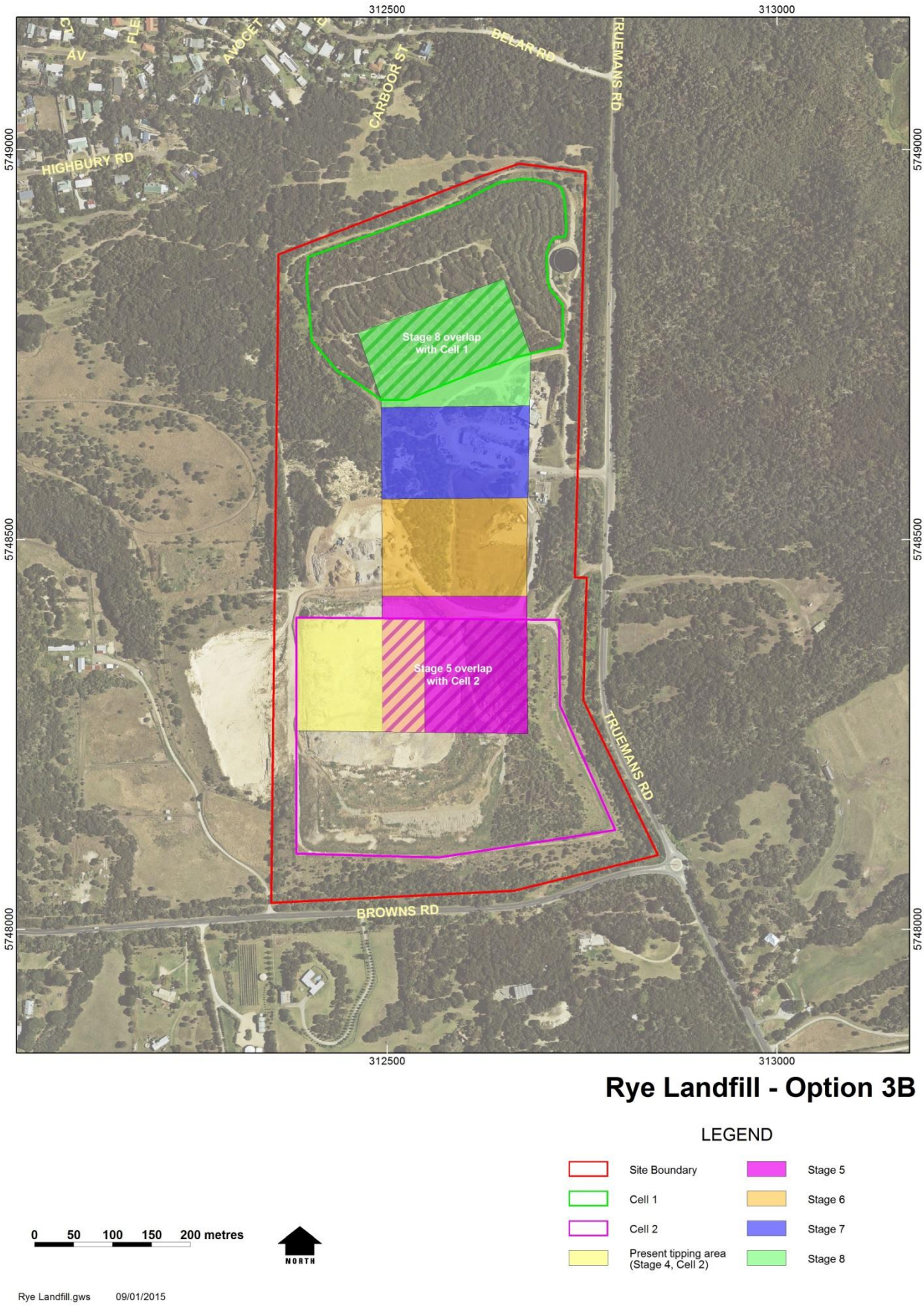


Figure 14 Map of Option 3A Rye Landfill - Development Eastern Portion

APPENDIX 2: COST AND GREENHOUSE GAS EMISSION ASSUMPTIONS

To determine the cost of the options under consideration a number of assumptions were developed.

General

	Source
Number of households – 88,000	MPS Rates Database
Amount of waste disposed of per annum: - 30,000 tonnes of municipal waste - 8,000 tonnes of commercial waste	MPS Landfill records
Landfill Levy $59 per tonne	EPA
Cost of Financing – 6% per annum	Finance Unit, MPS

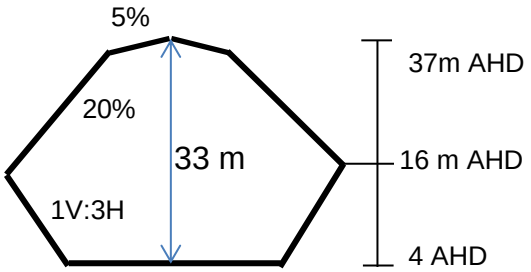
Landfill Design (Source: GHD (2015))

The landfill design assumptions ensure that the landfill is developed in line with EPA Victoria Landfill Best Practice Environmental Management (BPEM) Guidelines.

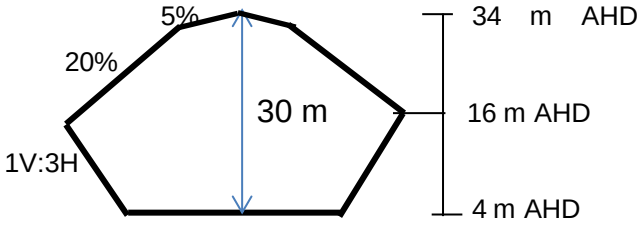
- A Geosynthetic Clay Liner (GCL) is in place, to ensure the cells are compliant with the Type 2 Landfill BPEM Guidelines indicative design.
- All options include a 'piggy back' lining system over existing Cell 1 and Cell 2 (where applicable for each Stage), in order to utilise the additional airspace created.
- All earthwork quantities are the same as Cell 2, Stage 4 geometry, determined from as-built surveys of Stage 4.
- All stage forms have a depth of 12 m below ground level (4 m Australian Height Datum (AHD)) and batter slopes of 1V:3H.
- An existing sand dune is located over Stage 5 and Stage 6 of Option 1 and 2, and half of all stages of Option 3. The height of the peak of the sand dune is 24 m AHD, with the natural surface beneath the sand dune at 16 m AHD.
- The top of cap surface was modelled with a peak of 37 m AHD for Option 1 and 2 and a peak of 34 m AHD for Option 3. The cap surface was assumed to extend

from the existing cap peak of Cell 1 from the north, and grade into the existing cap surface of Cell 2 to the south. The toe of the cap was assumed to match into the existing natural surface (16 m AHD) to the east and west. With consideration to Landfill BPEM requirements, cap slopes will be between 5% and 20%.

Cell Dimensions Options 1 and 2



Cell Dimensions Option 3



- A waste filling rate of 60,000 m3 per annum was utilised for the cell life calculations.

Table 45 Option 1, 2 and 3 Landfill Construction Indicative Costing Summary

Option	Stage	Total Airspace (m^3)	Cell Life (years)	Total Cell Construction Costs ($)	Assumed cap dimensions (m^2)	Total Cap Construction Costs ($)
1A	5	514,035	9	5,339,000	36,559	2,230,100
	6	386,183	6	3,913,000	29,704	1,811,900
	7	288,071	5	3,240,000	27,957	1,705,400
	8	223,618	4	2,371,000	22,580	1,377,400
1B	5	202,175	3	3,455,000	23,638	1,441,900
	6	200,845	3	2,946,000	23,638	1,441,900
	7	189,865	3	2,718,000	21,691	1,323,200
	8	181,000	3	$2,139,000	20,023	1,221,400
	9	197,872	3	1,310,000	9,270	565,500
	10	197,872	3	1,310,000	9,270	565,500
	11	197,872	3	1,310,000	9,270	565,500

2A	5	514,035	9	5,339,000	32,221	1,965,500
	6	386,183	6	3,913,000	26,179	1,596,900
2B	5	202,175	3	3,455,000	18,124	1,105,600
	6	200,845	3	2,946,000	20,138	1,228,400
	7	162,400	3	1,204,000	6,713	409,500
	8	162,400	3	1,204,000	6,713	409,500
	9	162,400	3	1,204,000	6,713	409,500
3A	5	251,960	4	2,729,000	26,786	$1,633,900
	6	197,050	3	1,998,000	24,107	1,470,500
	7	261,950	4	2,522,000	24,107	1,470,500
3B	5	190,632	3	2,417,000	22,172	1,352,500
	6	197,042	3	1,998,000	22,172	1,352,500
	7	183,889	3	2,333,000	19,708	1,202,200
	8	139,400	2	1,076,000	10,949	667,900

Note: Full detail of costings is available in GHD (2015)

Landfill Operation (Source: MPS Landfill Operations contract 2013/14)

The landfill will be operated in accordance with the following assumptions:

- Material compaction Rate - 1.25
- Annual operating cost - $600,000
- Annual Maintenance cost - $500,000
- Annual Leachate Management cost – $250,000
- Airspace required for daily cover – 15%

Capping Costs (Source: GHD (2015))

- A GCL liner is applied to the cap
- As a concept design and site investigations have not been completed for the final cap, a physical and price contingency of 30% has been applied to the cost estimates

RYE LANDFILL - CAPPING COST ESTIMATE OPTION 2 - GCL LINER				
Item		**Unit**	**Unit Rate**	**Cost**
	Cell Area	m²	24,400	
1	Development of Cell Design and Associated Audit Review	Item	$35,000	$35,000
2	**Cap Construction**			
2.1	Set out all works	Item	$40,000	$40,000
2.2	Supply and install GCL	m³	$15	$219,600
2.3	Supply and install geomembrane (1.0 mm LLDPE)	m²	$12	$292,800
2.4	Supply and install cushion geotextile	m²	$6	$146,400
2.5	Supply and install filter geotextile	m²	$4	$97,600
2.6	Soil sub base and topsoil	m³	$7	$170,800
3	Engineering Support	Item	$15,000	$15,000
4	Level 1 Supervision	Item	$23,100	$23,100
5	Construction audit and QA	Item	$70,000	$70,000
	Contingency @ 30%	Item		$310,000
	TOTAL Cell Rehabilitation			**$1,420,000**

- Rehabilitation cost per square meter - $58

Infrastructure (Source: GHD Report, 2015)

Resource Recovery Centre

- The present Resource Recovery Centre at Rye is demolished

Table 46 Indicative Demolition costs for Rye Resource Recovery Centre

Demolition Costs (2013 Rawlinsons)	Area (m^2)	Unit Price	Subtotal Cost
Demolition of buildings including grubbing up foundations, sealing of services and removing debris (Warehouse with reinforced concrete slab, framed walls and metal roof)	60	$55.00	$3,300
Cut away 150 mm reinforced concrete slab	450	$63.00	$28,350
Remove push pit retaining wall	180	$500.00	$90,000
Subtotal			*$121,650*
Contingency @30% of total			*$36,495*
TOTAL Demolition Costs			**$158,000**

- The new facility is located on Shire land at 266 Browns Rd, Rye
- The new facility includes a dual weighbridge, a large roofed structure containing

the push pit where waste would be deposited, skips for recyclables, an enclosed recycling shop, a large maintenance shed, a sealed road and car parking.

- No conceptual or detailed design work has been conducted to inform this cost estimate, general cost estimates are provided.
- A physical and price contingency of 30% has been applied to the cost estimates to reflect the present uncertainty of design and site conditions.

Table 47 Construction costs for new Resource Recovery Centre

Estimated Construction Costs	Area (m^2)	Unit Price	Subtotal Cost
Site Preparation (Clear bush with bulldozer, grub up roots and cart away)	10000	$0	$920
Topsoil removal (150mm deep) and spread and level onsite	10000	$20	$200,000
Subtotal Site Preparation			$200,920
Resource Recovery Facilities			
Dual Weighbridge with computer system		$120,000	$120,000
Covered Waste Disposal Area	1200	$590	$708,000
Concrete Push Pit Walls (25 MPa reinforced concrete wall)	60	$241	$14,460
Office (metal roof, framed and metal clad external walls, electrical service to board, air-conditioned, plumbing service and amenities)		$150,000	$150,000
Reinforced Concrete Ground Slab and thickening on fill (min 150 mm thick)	360	$235	$84,600
Recycling Shop			
Workshop (single storey, metal roof, medium span, framed and metal clad external wall, roller shutters, electrical and plumbing services)	700	$590	$413,000
Covered Recycled Goods Drop-off	250	$590	$147,500
Pavement and Carparking			
30 mm thick Type N Asphalt	1200	$18	$21,600
100 mm thick Class 3 FCR Bedding	1200	$16	$19,200
Greenwaste Pad			
Reinforced Concrete Ground Slab and thickening on fill (min 150 mm thick)	600	$235	$141,000
Maintenance Shed			
Framed and metal clad external walls, Standard shell construction, metal roof, roller shutters, electrical service to board, plumbing service	375	$545	$204,375
Reinforced Concrete Ground Slab and thickening on fill (min 150 mm thick)	375	$235	$88,125
Roadways			
30 mm thick Type N Asphalt	3500	$18	$63,000
100 mm thick Class 3 FCR Bedding	3500	$16	$56,000
Subtotal			*$2,431,780*
Contingency @30% of total			*$729,534*
RRC Construction Costs (nearest $1,000)			**$3,161,000**

In-vessel green waste processing facility

- The facility is located at Tyabb
- The in-vessel organics facility includes mechanical pre-treatment of food and garden organics to remove physical contamination i.e. plastic bags, shredding, mixing and homogenisation;
- Composting, using forced aeration and recirculation of liquids, for approximately 14 - 28 days, to produce a pasteurised and composted product; and
- Maturing and preparation for sale
- A detail design has not been undertaken, therefore a 30% contingency cost has been applied.
- Indicative cost: $5.2 million

Bulk Haul

There are a range of options being considered which include:

Option A – a bulk haul facility located at 280 Truemans Rd, Rye

Option B – a bulk haul facility located at 134 Watt Road, Mornington

Option C – a bulk haul facility located at 21 McKirdys Road, Tyabb

Option D – a standalone bulk haul facility located at Brasser Ave, Dromana

General

Assumption	Source
The transportation would be undertaken on weekends when necessary to maintain stockpiles of incoming material at a reasonable size	MPS contractor
Loading and unloading time: 1 hr per trip	MPS contractor
Bulk haul vehicle: 85m3 side tipper B-double carrying approximately 30 tonne per load	MPS contractor

Table 48 Travel Times for Bulk Haul Options

Round Trip (Hours)	Hampton Park	Werribee/Ravenhall
Rye	2.08	4.07
Mornington	1.52	3.42

Tyabb	1.13	3.25
Dromana	1.54	3.48

Source: MPS Contractor

The following costs are GST exclusive, include the collection contract rise and fall, tolls if applicable on direct haul and kerbside rates and toll rise and fall on all haulage. Rates are also based on a minimum of approximately 88,000 households.

If a bulk haul facility is established on the Peninsula it is assumed that it will process 40,000 tonnes of waste. This includes 30,000 tonnes of municipal waste and 10,000 tonnes of commercial

Table 49 Transportation Cost for Bulk Haul Options

	South East Melbourne	Western Melbourne
OPTION A: RYE	**$/T**	**$/T**
Transportation Cost	$21.63	$34.32
Tolls	$0.00	$1.30
TOTAL	***$21.63***	***$35.62***
OPTION B: MORNINGTON		
Transportation Cost	$17.67	$29.77
Tolls	$0.00	$1.30
TOTAL	***$17.67***	***$31.07***
OPTION C: TYABB		
Transportation Cost	$14.94	$28.55
Tolls	$0.00	$1.30
TOTAL	***$14.94***	***$29.85***
OPTION D: DROMANA		
Transportation Cost	$20.40	$30.99
Tolls	$0.00	$1.30
TOTAL	***$20.40***	***$32.29***

Source: MPS Contractor

Option A: Rye

Item	Cost	Source
Demolition Costs at Rye	$158,000	GHD 2015
Collocated Bulk Haul and Resource Recovery Facility	$5,197,998	GHD 2015

Option B: Mornington

	Cost	Source
Demolition Costs at Mornington -	$44,000	GHD, 2015
Collocated Bulk Haul and Resource Recovery Facility	$4,945,161	GHD, 2015

Option C: Tyabb

	Cost	Source
Demolition Costs at Tyabb	$8,000	GHD, 2015
Collocated Bulk Haul and Resource Recovery Facility	$5,309,000	GHD, 2015

Option D: Standalone

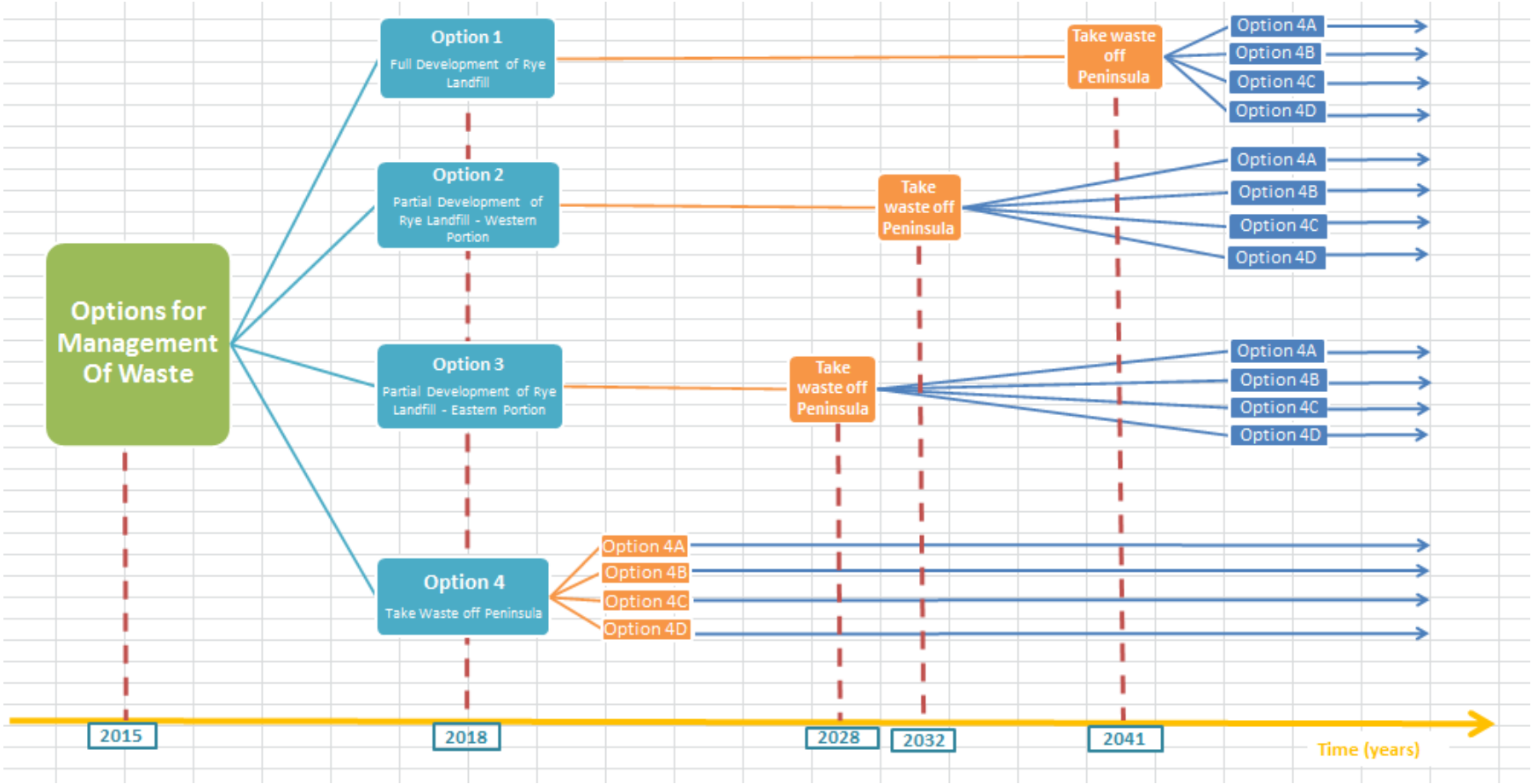
	Cost	Source
Standalone Bulk Haul Facility	$2,791,000	GHD, 2015
Upgrade a Resource Recovery Centre to Best Practice	$3,000,000	GHD, 2015

Greenhouse Gas Emissions

- 1L of diesel equates to 2.7 kg CO_2 emissions (Source: DIICCRTE, 2013)
- Each B-Double will carry 30 tonnes of waste (Source: MPS Contractor)
- A B-Double, carrying 30 tonnes of waste consumes 1L of diesel per kilometre (Source: MPS Contractor)

APPENDIX 3: Costing Model

3A: Decision flow diagram



3B: Annual Cost per Household – Excerpt from Analysis Model

Full model available for review, refer to Excel Model 'MPS_Waste Analysis Model _FINAL'.

Cost Analysis of Options for the Disposal of Landfill Waste in the Short to Medium Term

Janurary 2015

			Option 1 - Full Development		Option 2 - Partial Development (Western)		Option 3 - Partial Development (Eastern)	
	Interest Rate	6.00%	A	B	A	B	A	B
	Capex Index	1.00	Cell size/Life Option 1a	Cell size/Life Option 1b	Cell size/Life Option 2a	Cell size/Life Option 2b	Cell size/Life Option 3a	Cell size/Life Option 3b
Assumptions	**Source**		**Build Stage 5-8**	**Build Stage 5-9**	**Build Stage 5-6**	**Build Stage 5-6**	**Build Stage 5-7**	**Build Stage 5-7**
Cell Construction								
Total Construction Cost Stage 5	GHD (2015)		$5,339,000	$3,455,000	$5,339,000	$3,455,000	$2,729,000	$2,417,000
Total Airspace Stage 5 (m^3)	GHD (2015)		514,035	202,175	514,035	202,175	251,960	190,632
Cost to Construct Stage 5 per tonne	GHD (2015)		$10.39	$17.09	$10.39	$17.09	$10.83	$12.68
Size of Cap Stage 5 (square metre)	GHD (2015)		36,559	23,638	32,221	18,124	26,786	22,172
Life of Cell Stage 5	GHD (2015)		9	3	9	3	4	3
Cost of financing Stage 5 (over life of stage)	Calc		$1,725,565	$422,648	$1,725,565	$422,648	$421,265	$295,670
Total Construction Cost Stage 6	GHD (2015)		$3,913,000	$2,946,000	$3,913,000	$2,946,000	$1,998,000	$1,998,000
Total Airspace Stage 6 (m^3)	GHD (2015)		386,183	200,845	386,183	200,845	197,050	197,042
Cost to construct Stage 6 per tonne	GHD (2015)		$10.13	$14.67	$10.13	$14.67	$10.14	$10.14
Size of Cap Stage 6 (square metre)	GHD (2015)		29,704	23,638	26,179	20,138	24,107	22,172
Life of Cell Stage 6	GHD (2015)		6	3	6	3	3	3
Cost of financing Stage 6 over life of cell	Calc		$861,548	$360,383	$861,548	$360,383	$244,414	$244,414
Total Construction Cost Stage 7	GHD (2015)		$3,240,000	$2,718,000	$0	$1,204,000	$2,522,000	$2,333,000
Total Airspace Stage 7 (m^3)	GHD (2015)		288,071	189,865	0	162,400	261,950	183,889
Cost to construct Stage 7 per tonne	GHD (2015)		$11.25	$14.32	$0.00	$7.41	$9.63	$12.69
Size of Cap Stage 7 (square metre)	GHD (2015)		27,957	21,691	0	6,713	24,107	19,708
Life of Cell Stage 7	GHD (2015)		5	3	0	3	4	3
Cost of financing Stage 7 - over life of cell	Calc		$605,822	$332,491	$0	$147,285	$389,311	$285,395
Total Construction Cost Stage 8	GHD (2015)		$2,371,000	$2,139,000	$0	$1,204,000	$0	$1,076,000
Total Airspace Stage 8 (m^3)	GHD (2015)		223,618	181,000	0	162,400	0	139,400
Cost to construct Stage 8 per tonne	GHD (2015)		$10.60	$11.82	$0.00	$7.41	$0.00	$7.72
Size of Cap Stage 8 (square metre)	GHD (2015)		22,580	20,023	0	6,713	0	10,949
Life of Cell Stage 8	GHD (2015)		4	3	0	3	0	2
Cost of financing Stage 8 - over life of cell	Calc		$366,002	$261,663	$0	$147,285	$0	$97,780
Total Construction Cost Stage 9	GHD (2015)		$0	$1,310,000	$0	$1,204,000	$0	$0

Total Airspace Stage 9 (m^3)	GHD (2015)		0	197,872	0	162,400	0	0
Cost to construct Stage 9 per tonnes	GHD (2015)		$0.00	$6.62	0	$7.41	$0.00	$0.00
Size of Cap Stage 9 (square metre)	GHD (2015)		$0	9,270	$0	6,713	$0	0
Life of Cell Stage 9	GHD (2015)		0	3	0	3	0	0
Cost of financing Stage 9 - based over life of cell	Calc		$0	$160,252	$0	$147,285	$0	$0
Total Construction Cost Stage 10	GHD (2015)		$0	$1,310,000	$0	$0	$0	$0
Total Airspace Stage 10 (m^3)	GHD (2015)		$0	$197,872	$0	$0	$0	$0
Cost to construct Stage 10 per tonnes	GHD (2015)		$0.00	$6.62	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 10 (square metre)	GHD (2015)		$0	9,270	$0	0	$0	0
Life of Cell Stage 10	GHD (2015)		0	3	0	0	0	0
Cost of financing Stage 10 - based over life of cell	Calc		$0	$160,252	$0	$0	$0	$0
Total Construction Cost Stage 11	GHD (2015)		$0	$1,310,000	$0	$0	$0	$0
Total Airspace Stage 11 (m^3)	GHD (2015)		$0	$197,872	$0	$0	$0	$0
Cost to construct Stage 11 per tonnes	GHD (2015)		$0.00	$6.62	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 11 (square metre)	GHD (2015)		$0	9,270	$0	0	$0	0
Life of Cell Stage 11	GHD (2015)		0	3	0	0	0	0
Cost of financing Stage 11 - based over life of cell	Calc		$0	$160,252	$0	$0	$0	$0
Total Size of cap (square metre)	GHD (2015)		116,800	116,800	58,400	58,401	75,000	75,001
Total Life of all stages (years)	GHD (2015)		24	21	15	15	11	11
Total Cost of financing for construction of all stages	Calc		$3,558,937	$1,857,940	$2,587,113	$1,224,885	$1,054,990	$923,259
All Cell Construction Costs include 30% contingency								
Infrastructure								
Green waste taken to Tyabb and in-vessel facility established (includes 30% contingency)	GHD (2015)		$5,200,000	$5,200,000	$0	$0	$5,200,000	$5,200,000
Cost of financing Green Waste	MPS Finance		$2,831,096	$2,831,096	$0	$0	$2,831,096	$2,831,096
Resource Recovery Centre relocated to Browns Road, Rye (includes 30% contingency)	GHD (2015)		$3,319,000	$3,319,000	$0	$0	$3,319,000	$3,319,000
Cost of financing Resource Recovery Centre relocated	MPS Finance		$1,807,001	$1,807,001	$0	$0	$1,807,001	$1,807,001
Financing period (years)	MPS Finance		15	15	15	15	15	15
Waste Volumes								
Number of Households	MPS Finance		88,000	88,000	88,000	88,000	88,000	88,000
Municipal Waste Volume (Tonne) per annum	MPS RR		30,000	30,000	30,000	30,000	30,000	30,000
Commercial Volume (Tonne) per annum	MPS RR		8,000	8,000	8,000	8,000	8,000	8,000
Total Volume (Tonne) per annum	Calc		38,000	38,000	38,000	38,000	38,000	38,000
Landfill Operations								
Compaction Rate	MPS RR		1.25	1.25	1.25	1.25	1.25	1.25
Airspace required for daily cover (%)	MPS RR		15%	15%	15%	15%	15%	15%
Landfill Levy (as at July 2014) per tonne	EPA		$58.50	$58.50	$58.50	$58.50	$58.50	$58.50
Landfill Levy Rebate for sand use (%)	EPA		15%	15%	15%	15%	15%	15%

Cell rehabilitation ($ per square metre)	GHD (2015)		$58.00	$58.00	$58.00	$58.00	$58.00	$58.00
Rye landfill gate fee	MPS RR		$196.00	$196.00	$196.00	$196.00	$196.00	$196.00
Income from Commercial waste	Calc		-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000
Bulk Haul								
Contract price at a receiving landfill as at July 2014	Industry							
Contract price contingency (15%)	MPS RR							
Establish a Bulk Haul Facility (Option 1-3, assume average costs (includes 30% contingency))	GHD (2015)		$5,363,250	$5,363,250	$5,363,250	$5,363,250	$5,363,250	$5,363,250
Financing Period (Years)	MPS Finance		15	15	15	15	15	15
Cost of financing Bulk Haul Facility	MPS Finance		$2,919,975	$2,919,975	$2,919,975	$2,919,975	$2,919,975	$2,919,975
Transport Cost per tonne	Solo		0.00	0.00	0.00	0.00	0.00	0.00
Distance	Solo							
Calculations - per annum								
Infrastructure Costs								
Cost to construct cells	Calc		$500,572	$431,065	$488,531	$424,475	$484,734	$526,624
Daily cover cost of cells	Calc		$75,086	$66,344	$73,280	$63,671	$72,710	$78,994
Bulk Haul Facility cost	Calc		$0	$0	$0	$0	$0	$0
			$575,658	**$497,410**	**$561,811**	**$488,147**	**$557,444**	**$605,618**
Operating Costs								
Operating/Management Cost	MPS RR		$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Ongoing Maintenance	MPS RR		$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Leachate Management	MPS RR		$250,000	$250,000	$250,000	$250,000	$250,000	$250,000
Landfill Levy minus Rebate for sand use	Calc		$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550
Transport Cost	Calc		$0	$0	$0	$0	$0	$0
Processing Fee	Calc		$0	$0	$0	$0	$0	$0
			$3,239,550	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**
Relocation of Infrastructure								
Relocate Green Waste Processing Facility	Calc		$216,667	$247,619	$0	$0	$472,727	$472,727
Relocate Resource Recovery Centre	Calc		$138,292	$158,048	$0	$0	$301,727	$301,727
			$354,958	**$405,667**	**$0**	**$0**	**$774,455**	**$774,455**
Rehabilitation								
Rehabilitation	Calc		$282,267	$322,590	$225,813	$225,817	$395,455	$395,460
			$282,267	**$322,590**	**$225,813**	**$225,817**	**$395,455**	**$395,460**
Cost of financing								
Landfill Cell	MPS Finance		$148,289	$88,473	$172,474	$81,659	$95,908	$83,933
Infrastructure (Green Waste & Resource Centre)	MPS Finance		$193,254	$220,862	$0	$0	$421,645	$421,645
Bulk Haul Facility	MPS Finance		$0	$0	$0	$0	$0	$0

			$341,543	$309,335	$172,474	$81,659	$517,553	$505,578
Average Annual Total Cost	Calc		$4,793,976	$4,774,552	$4,199,649	$4,035,173	$5,484,456	$5,520,660
Average Annual Income	Calc		-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000
Average Annual Net Cost	Calc		$3,225,976	$3,206,552	$2,631,649	$2,467,173	$3,916,456	$3,952,660
Average Annual Net Cost per household for life of cells			$36.66	$36.44	$29.91	$28.04	$44.51	$44.92
Number of years waste to be transported off Peninsula (up to 15 years)			0	0	0	0	4	4
Average Annual Net Cost per household to dispose of waste off Peninsula (Option 1-3 assume avg cost for Option 4)			$56.35	$56.35	$56.35	$56.35	$56.35	$56.35
Average Annual Net Cost per household to 15 years			$36.66	$36.44	$29.91	$28.04	$47.67	$47.97
Number of years waste to be transported off Peninsula (up to 30 years)	Years		6	9	15	15	19	19
Average Annual Net Cost per household to 30 years			$40.60	$42.41	$43.13	$42.20	$52.01	$52.16

Cost Analysis of Options for the Disposal of Landfill Waste in the Short to Medium Term

Janurary 2015

			Option 4 - Transport off the Peninsula							
	Interest Rate	6.00%	A. Bulk Haul Facility - Rye		B. Bulk Haul Facility - Mornington		C. Bulk Haul Facility - Tyabb		D. Bulk Haul Facility - Stand alone	
	Capex Index	1.00	SE Melbourne Option 4A (i)	Western Melb Option 4A (ii)	SE Melbourne Option 4B (i)	Western Melb Option 4B (ii)	SE Melbourne Option 4C (i)	Western Melb Option 4C (ii)	SE Melbourne Option 4D (i)	Western Melb Option 4D (ii)
Assumptions	**Source**		**Life of operations**	**Life of operations**	**Life of operations**	**Life of operations**	**Life of operations**	**Life of operations**	**Life of operations**	**Life of operations**
Cell Construction										
Total Construction Cost Stage 5	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 5 (m^3)	GHD (2015)		0	0	0	0	0	0	0	0
Cost to Construct Stage 5 per tonne	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 5 (square metre)	GHD (2015)		0	0	0	0	0	0	0	0
Life of Cell Stage 5	GHD (2015)		0	0	0	0	0	0	0	0
Cost of financing Stage 5 (over life of stage)	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Total Construction Cost Stage 6	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 6 (m^3)	GHD (2015)		0	0	0	0	0	0	0	0
Cost to construct Stage 6 per tonne	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 6 (square metre)	GHD (2015)		0	0	0	0	0	0	0	0
Life of Cell Stage 6	GHD (2015)		0	0	0	0	0	0	0	0
Cost of financing Stage 6 over life of cell	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Total Construction Cost Stage 7	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 7 (m^3)	GHD (2015)		0	0	0	0	0	0	0	0

Cost to construct Stage 7 per tonne	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 7 (square metre)	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Life of Cell Stage 7	GHD (2015)		0	0	0	0	0	0	0	0
Cost of financing Stage 7 - over life of cell	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Total Construction Cost Stage 8	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 8 (m^3)	GHD (2015)		0	0	0	0	0	0	0	0
Cost to construct Stage 8 per tonne	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 8 (square metre)	GHD (2015)		$0	0	0	0	0	0	0	0
Life of Cell Stage 8	GHD (2015)		$0	0	0	0	0	0	0	0
Cost of financing Stage 8 - over life of cell	Calc		$0	$0	$0	$0	$0	$0		
Total Construction Cost Stage 9	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 9 (m^3)	GHD (2015)		0	0	0	0	0	0	0	0
Cost to construct Stage 9 per tonnes	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 9 (square metre)	GHD (2015)		$0	$0	$0	$0	$0	$0	0	0
Life of Cell Stage 9	GHD (2015)		0	0	0	0	0	0	0	0
Cost of financing Stage 9 - based over life of cell	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Total Construction Cost Stage 10	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 10 (m^3)	GHD (2015)		$0	$0	$0	$0	$0	$0	0	0
Cost to construct Stage 10 per tonnes	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 10 (square metre)	GHD (2015)		$0	$0	$0	$0	$0	$0	0	0
Life of Cell Stage 10	GHD (2015)		0	0	0	0	0	0	0	0
Cost of financing Stage 10 - based over life of cell	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Total Construction Cost Stage 11	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Total Airspace Stage 11 (m^3)	GHD (2015)		$0	$0	$0	$0	$0	$0	0	0
Cost to construct Stage 11 per tonnes	GHD (2015)		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Size of Cap Stage 11 (square metre)	GHD (2015)		$0	$0	$0	$0	$0	$0	0	0
Life of Cell Stage 11	GHD (2015)		0	0	0	0	0	0	0	0
Cost of financing Stage 11 - based over life of cell	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Total Size of cap (square metre)	GHD (2015)		0	0	0	0	0	0	0	0
Total Life of all stages (years)	GHD (2015)		0	0	0	0	0	0	0	0
Total Cost of financing for construction of all stages	Calc		$0	$0	$0	$0	$0	$0	$0	$0
All Cell Construction Costs include 30% contingency										
Infrastructure										
Green waste taken to Tyabb and in-vessel facility established (includes 30% contingency)	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0
Cost of financing Green Waste	MPS Finance		$0	$0	$0	$0	$0	$0	$0	$0
Resource Recovery Centre relocated to Browns Road, Rye (includes 30% contingency)	GHD (2015)		$0	$0	$0	$0	$0	$0	$0	$0

Cost of financing Resource Recovery Centre relocated	MPS Finance	$0	$0	$0	$0	$0	$0	$0	$0
Financing period (years)	MPS Finance	15	15	15	15	15	15	15	15
Waste Volumes									
Number of Households	MPS Finance	88,000	88,000	88,000	88,000	88,000	88,000	88,000	88,000
Municipal Waste Volume (Tonne) per annum	MPS RR	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Commercial Volume (Tonne) per annum	MPS RR	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Total Volume (Tonne) per annum	Calc	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Landfill Operations									
Compaction Rate	MPS RR	0	0	0	0	0	0	0	0
Airspace required for daily cover (%)	MPS RR	0%	0%	0%	0%	0%	0%	0%	0%
Landfill Levy (as at July 2014) per tonne	EPA	$58.50	$58.50	$58.50	$58.50	$58.50	$58.50	$58.50	$58.50
Landfill Levy Rebate for sand use (%)	EPA	0%	0%	0%	0%	0%	0%	0%	0%
Cell rehabilitation ($ per square metre)	GHD (2015)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	0
Rye landfill gate fee	MPS RR	$196.00	$196.00	$196.00	$196.00	$196.00	$196.00	$196.00	$196.00
Income from Commercial waste	Calc	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000
Bulk Haul									
Contract price at a receiving landfill as at July 2014	Industry	$118	$100	$118	$100	$118	$100	$118	$110
Contract price contingency (15%)	MPS RR	10%	10%	10%	10%	10%	10%	10%	10%
Establish a Bulk Haul Facility (Option 1-3, assume average costs (includes 30% contingency))	GHD (2015)	$5,355,998	$5,355,998	$4,989,000	$4,989,000	$5,317,000	$5,317,000	$5,791,000	$5,791,000
Financing Period (Years)	MPS Finance	15	15	15	15	15	15	15	15
Cost of financing Bulk Haul Facility	MPS Finance	$2,916,027	$2,916,027	$2,716,218	$2,716,218	$2,894,795	$2,894,795	$3,152,860	$3,152,860
Transport Cost per tonne	Solo	21.63	35.63	17.67	31.07	14.94	29.85	20.40	32.29
Distance	Solo	*140*	*320*	*80*	*220*	*65*	*200*	*116*	*256*
Calculations - per annum									
Infrastructure Costs									
Cost to construct cells	Calc	$0	$0	$0	$0	$0	$0	$0	$0
Daily cover cost of cells	Calc	$0	$0	$0	$0	$0	$0	$0	$0
Bulk Haul Facility cost	Calc	$357,067	$357,067	$332,600	$332,600	$354,467	$354,467	$386,067	$386,067
		$357,067	**$357,067**	**$332,600**	**$332,600**	**$354,467**	**$354,467**	**$386,067**	**$386,067**
Operating Costs									
Operating/Management Cost	MPS RR	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000

Ongoing Maintenance	MPS RR		$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Leachate Management	MPS RR		$0	$0	$0	$0	$0	$0	$0	$0
Landfill Levy minus Rebate for sand use	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Transport Cost	Calc		$821,940	$1,353,940	$671,460	$1,180,660	$567,720	$1,134,300	$775,200	$1,227,020
Processing Fee	Calc		$4,932,400	$4,180,000	$4,932,400	$4,180,000	$4,932,400	$4,180,000	$4,932,400	$4,598,000
			$6,154,340	**$5,933,940**	**$6,003,860**	**$5,760,660**	**$5,900,120**	**$5,714,300**	**$6,107,600**	**$6,225,020**
Relocation of Infrastructure										
Relocate Green Waste Processing Facility	Calc		$0	$0	$0	$0	$0	$0	$0	$0
Relocate Resource Recovery Centre	Calc		$0	$0	$0	$0	$0	$0	$0	$0
			$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Rehabilitation										
Rehabilitation	Calc		$0	$0	$0	$0	$0	$0	$0	$0
			$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Cost of financing										
Landfill Cell	MPS Finance		$0	$0	$0	$0	$0	$0	$0	$0
Infrastructure (Green Waste & Resource Centre)	MPS Finance		$0	$0	$0	$0	$0	$0	$0	$0
Bulk Haul Facility	MPS Finance		$194,402	$194,402	$181,081	$181,081	$192,986	$192,986	$210,191	$210,191
			$194,402	**$194,402**	**$181,081**	**$181,081**	**$192,986**	**$192,986**	**$210,191**	**$210,191**
Average Annual Total Cost	Calc		**$6,705,808**	**$6,485,408**	**$6,517,541**	**$6,274,341**	**$6,447,573**	**$6,261,753**	**$6,703,857**	**$6,821,277**
Average Annual Income	Calc		**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**
Average Annual Net Cost	Calc		**$5,137,808**	**$4,917,408**	**$4,949,541**	**$4,706,341**	**$4,879,573**	**$4,693,753**	**$5,135,857**	**$5,253,277**
Average Annual Net Cost per household for life of cells			**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Number of years waste to be transported off Peninsula (up to 15 years)			**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
Average Annual Net Cost per household to dispose of waste off Peninsula (Option 1-3 assume avg cost for Option 4)			**$58.38**	**$55.88**	**$56.24**	**$53.48**	**$55.45**	**$53.34**	**$58.36**	**$59.70**
Average Annual Net Cost per household to 15 years			**$58.38**	**$55.88**	**$56.24**	**$53.48**	**$55.45**	**$53.34**	**$58.36**	**$59.70**
Number of years waste to be transported off Peninsula (up to 30 years)	Years		**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
Average Annual Net Cost per household to 30 years			**$58.38**	**$55.88**	**$56.24**	**$53.48**	**$55.45**	**$53.34**	**$58.36**	**$59.70**

3C: Cost Waste Analysis of Waste Options- Yearly Calculations – Excerpt from Analysis Model

Full model available for review, refer to Excel Model 'MPS_Waste Analysis Model _FINAL'.

Cost Analysis of Options for the Disposal of Landfill Waste in the Short to Medium Term - Yearly Calculations
(December 2014)

	Option 1 - Full Development										
	1A	1A	1A	1A	1B	1B	1B	1B	1B	1B	1B
	Cell size/Life Option 1a	Cell size/Life Option 1a	Cell size/Life Option 1a	Cell size/Life Option 1a	Cell size/Life Option 1b	Cell size/Life Option 1b	Cell size/Life Option 1b	Cell size/Life Option 1b	Cell size/Life Option 1b	Cell size/Life Option 1b	Cell size/Life Option 1b
Total Life of Option (all stages)	24	24	24	24	21	21	21	21	21	21	21
	Stage 5 Costs	Stage 6 Costs	Stage 7 Costs	Stage 8 Costs	Stage 5 Costs	Stage 6 Costs	Stage 7 Costs	Stage 8 Costs	Stage 9 Costs	Stage 10 Costs	Stage 11 Costs
Years	Years 0-9	Years 10-15	Years 16-20	Years 21-24	Years 0-3	Years 4-6	Years 7-9	Years 10-12	Years 13-15	Years 16-18	Years 19-21
One-off costs associated with construction											
Construction costs											
Year to pay - Pay in year 0 (the year before year 1 of the stage)	0	9	15	20	0	3	6	9	12	15	18
Cost to construct per tonne	$10	$10	$11	$11	$17	$15	$14	$12	$7	$7	$7
MSW Volume (Tonne) per annum	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Life of Stage	9	6	5	4	3	3	3	3	3	3	3
Compaction Rate	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Minus Daily Cover cost of cells	666,031	433,164	400,682	302,183	365,281	313,529	305,992	252,603	141,512	141,512	141,512
	$5,106,240	**$3,320,928**	**$3,071,899**	**$2,316,734**	**$2,800,485**	**$2,403,723**	**$2,345,942**	**$1,936,622**	**$1,084,925**	**$1,084,925**	**$1,084,925**
Construction costs of Bulk Haul Facility at end of cell life											
Year to pay - Pay in the last year of the final stage				24							21
Establish a Bulk Haul Facility (includes 30% contingency)	$0	$0	$0	$5,363,250	$0	$0	$0	$0	$0	$0	$5,363,250
	$0	**$0**	**$0**	**$5,363,250**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$5,363,250**
Relocation of Infrastructure											
Year to pay - Pay the year before construction costs of the next stage		14	19					11	14		
Relocate Green Waste Processing Facility	$0	$5,200,000	$0	$0	$0	$0	$0	$5,200,000	$0	$0	$0
Relocate Resource Recovery Centre	$0	$0	$4,215,000	$0	$0	$0	$0	$0	$4,215,000	$0	$0
Demolition of Rye Resource Recovery Centre	$0	$0	$340,000	$0	$0	$0	$0	$0	$340,000	$0	$0
	$0	**$5,200,000**	**$4,555,000**	**$0**	**$0**	**$0**	**$0**	**$5,200,000**	**$4,555,000**	**$0**	**$0**
Cell Rehabilitation											

Year to pay - Pay this in one lump sum in the year after the life of the stage is complete.	10	16	21	25	4	7	10	13	16	19	22
Size of area requiring rehabilitation (square metre)	36,559	29,704	27,957	22,580	23,638	23,638	21,691	20,023	9,270	9,270	9,270
Cell rehabilitation ($ per square metre)	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58
	$2,120,422	**$1,722,832**	**$1,621,506**	**$1,309,640**	**$1,371,004**	**$1,371,004**	**$1,258,078**	**$1,161,334**	**$537,660**	**$537,660**	**$537,660**
Per Annum costs											
Financing costs											
Payable in	Years 0-9	Years 10-15	Years 16-20	Years 21-24	Years 0-3	Years 4-6	Years 7-9	Years 10-12	Years 13-15	Years 16-18	Years 19-21
	0	10	16	21	0	4	7	10	13	16	19
	9	15	20	24	3	6	9	12	15	18	21
Cost of financing cell construction costs (based on 6%)	$1,725,565	$861,548	$605,822	$366,002	$422,648	$360,383	$332,491	$261,663	$160,252	$160,252	$160,252
Life of Cell	9	6	5	4	3	3	3	3	3	3	3
	$191,729	**$143,591**	**$121,164**	**$91,500**	**$140,883**	**$120,128**	**$110,830**	**$87,221**	**$53,417**	**$53,417**	**$53,417**
Payable in	0	0	Years 14-20	Years 21-28	Years 0-3	Years 4-6	Years 7-9	Years 11-12	Years 13-16	Years 16-18	Years 19-25
	0	0	14	21	0	4	7	11	13	16	19
	0	0	20	28	3	6	9	12	16	18	25
Cost of financing to relocate Green Waste Processing Facility (based on 15 years)	$0	$0	$2,831,096	$2,831,096	$0	$0	$0	$2,831,096	$2,831,096	$2,831,096	$2,831,096
Cost of financing to relocate Resource Recovery Centre (based on 15 years)	$0	$0	$0	$1,807,001	$0	$0	$0	$0	$1,807,001	$1,807,001	$1,807,001
Financing costs based on 15 years	15	15	15	15	15	15	15	15	15	15	15
	$0	**$0**	**$188,740**	**$309,206**	**$0**	**$0**	**$0**	**$188,740**	**$309,206**	**$309,206**	**$309,206**
Payable in				Years 29-33							Years 26-28
				29							26
				33							28
Cost of financing to relocate Resource Recovery Centre (based on 15 years)				**$1,807,001**							**$1,807,001**
Financing costs based on 15 years				15							**$15**
				$120,467							**$120,467**
Payable in				Years 24-38							Years 20-34
	0	0	0	24	0	0	0	0	0	0	20
	0	0	0	38	0	0	0	0	0	0	34
Bulk Haul Facility (based on 15 years)	$0	$0	$0	$2,919,975	$0	$0	$0	$0	$0	$0	$2,919,975
Financing costs based on 15 years	15	15	15	15	15	15	15	15	15	15	15
	$0	**$0**	**$0**	**$194,665**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$194,665**
Landfill Operating costs											
Payable in	Years 1-8	Years 9-14	Years 15-19	Years 20-24	Years 1-3	Years 4-6	Years 7-9	Years 10-12	Years 13-15	Years 16-18	Years 19-21
	1	9	15	20	1	4	7	10	13	16	19
	8	14	19	24	3	6	9	12	15	18	21
Operating/Management Cost	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Ongoing Maintenance	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Leachate Management	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000
Landfill Levy (as at July 2014) per tonne	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59
MSW Volume (Tonne) per annum	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000

Landfill Levy Rebate for sand use (%)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Landfill Levy minus Rebate for sand use	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550
	$3,239,550	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**
Income											
Receivable in	Years 1-8	Years 9-14	Years 15-19	Years 20+	Years 1-3	Years 4-6	Years 7-9	Years 10-12	Years 13-15	Years 16-18	Years 19+
	1	9	15	20	1	4	7	10	13	16	19
	8	14	19	999	3	6	9	12	15	18	999
Commercial waste income	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000
Operating income											
	-$1,568,000	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**
Bulk Haul Specific Operating costs											
Payable in				Years 25+							Years 22+
	0	0	0	25	0	0	0	0	0	0	22
	999	999	999	999	999	999	999	999	999	999	999
Operating/Management Cost	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$200,000
Ongoing Maintenance	$0	$0	$0	$200,000	$0	$0	$0	$0	$0	$0	$200,000
Transport Cost	$0	$0	$0	$966,530	$0	$0	$0	$0	$0	$0	$966,530
Processing Fee	$0	$0	$0	$4,608,450	$0	$0	$0	$0	$0	$0	$4,608,450
	$0	**$0**	**$0**	**$5,974,980**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$5,974,980**

Cost Analysis of Options for the Disposal of Landfill Waste in the Short to Medium Term - Yearly Calculations

(December 2014)

	Option 2 - Partial Development (Western)							**Option 3 - Partial Development (Eastern)**						
	2A	**2A**	**2B**	**2B**	**2B**	**2B**	**2B**	**3A**	**3A**	**3A**	**3B**	**3B**	**3B**	**3B**
	Cell size/Life Option 2a	**Cell size/Life Option 2a**	**Cell size/Life Option 2b**	**Cell size/Life Option 2b**	**Cell size/Life Option 2b**	**Cell size/Life Option 2b**	**Cell size/Life Option 2b**	**Cell size/Life Option 3a**	**Cell size/Life Option 3a**	**Cell size/Life Option 3a**	**Cell size/Life Option 3b**	**Cell size/Life Option 3b**	**Cell size/Life Option 3b**	**Cell size/Life Option 3b**
Total Life of Option (all stages)	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**11**	**11**	**11**	**11**	**11**	**11**	**11**
	Stage 5 Costs	**Stage 6 Costs**	**Stage 5 Costs**	**Stage 6 Costs**	**Stage 7 Costs**	**Satge 8 Costs**	**Stage 9 Costs**	**Stage 5 Costs**	**Stage 6 Costs**	**Stage 7 Costs**	**Stage 5 Costs**	**Stage 6 Costs**	**Stage 7 Costs**	**Satge 8 Costs**
Years	**Years 0-9**	**Years 10-15**	**Years 0-3**	**Years 4-6**	**Years 7-9**	**Years 10-12**	**Years 13-15**	**Years 0-4**	**Years 5-7**	**Years 8-11**	**Years 0-3**	**Years 4-6**	**Years 7-9**	**Years 10-11**
One-off costs associated with construction														
Construction costs														
Year to pay - Pay in year 0 (the year before year 1 of the stage)	0	9	0	3	6	9	12	0	4	7	0	3	6	9
Cost to construct per tonne	$10	$10	$17	$15	$7	$7	$7	$11	$10	$10	$13	$10	$13	$8
MSW Volume (Tonne) per annum	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Life of Stage	9	6	3	3	3	3	3	4	3	4	3	3	3	2
Compaction Rate	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Minus Daily Cover cost of cells	666,031	433,164	365,281	313,529	158,470	158,470	158,470	308,686	216,733	274,392	271,011	216,742	271,185	109,993
	$5,106,240	**$3,320,928**	**$2,800,485**	**$2,403,723**	**$1,214,935**	**$1,214,935**	**$1,214,935**	**$2,366,592**	**$1,661,620**	**$2,103,672**	**$2,077,751**	**$1,661,688**	**$2,079,082**	**$843,278**

Construction costs of Bulk Haul Facility at end of cell life														
Year to pay - Pay in the last year of the final stage		15					15			11				11
Establish a Bulk Haul Facility (includes 30% contingency)	$0	$5,363,250	$0	$0	$0	$0	$5,363,250	$0	$0	$5,363,250	$0	$0	$0	$5,363,250
	$0	**$5,363,250**	**$0**	**$0**	**$0**	**$0**	**$5,363,250**	**$0**	**$0**	**$5,363,250**	**$0**	**$0**	**$0**	**$5,363,250**
Relocation of Infrastructure														
Year to pay - Pay the year before construction costs of the next stage								0	6		0	5		
Relocate Green Waste Processing Facility	$0	$0	$0	$0	$0	$0	$0	$5,200,000	$0	$0	$5,200,000	$0	$0	$0
Relocate Resource Recovery Centre	$0	$0	$0	$0	$0	$0	$0	$0	$4,215,000	$0	0	$4,215,000	$0	$0
Demolition of Rye Resource Recovery Centre	$0	$0	$0	$0	$0	$0	$0	$0	$340,000	$0	0	$340,000	$0	$0
	$0	$0	**$0**	**$0**	**$0**	$0	$0	**$5,200,000**	**$4,555,000**	**$0**	**$5,200,000**	**$4,555,000**	**$0**	**$0**
Cell Rehabilitation														
Year to pay - Pay this in one lump sum in the year after the life of the stage is complete.	10	16	4	7	10	13	16	5	8	12	4	7	10	12
Size of area requiring rehabilitation (square metre)	32,221	26,179	18,124	20,138	6,713	6,713	6,713	26,786	24,107	24,107	22,172	22,172	19,708	10,949
Cell rehabilitation ($ per square metre)	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58	$58
	$1,868,818	**$1,518,382**	**$1,051,192**	**$1,168,004**	**$389,354**	**$389,354**	**$389,354**	**$1,553,588**	**$1,398,206**	**$1,398,206**	**$1,285,976**	**$1,285,976**	**$1,143,064**	**$635,042**
Per Annum costs														
Financing costs														
Payable in	Years 0-9	Years 10-15	Years 0-3	Years 4-6	Years 7-9	Years 10-12	Years 13-15	Years 0-4	Years 5-7	Years 8-11	Years 0-3	Years 4-6	Years 7-9	Years 10-11
	0	10	0	4	7	10	13	0	5	8	0	4	7	10
	9	15	3	6	9	12	15	4	7	11	3	6	9	11
Cost of financing cell construction costs (based on 6%)	$1,725,565	$861,548	$422,648	$360,383	$147,285	$147,285	$147,285	$295,670	$295,670	$295,670	$421,265	$421,265	$421,265	$421,265
Life of Cell	9	6	3	3	3	3	3	4	3	4	3	3	3	2
	$191,729	**$143,591**	**$140,883**	**$120,128**	**$49,095**	**$49,095**	**$49,095**	**$73,918**	**$98,557**	**$73,918**	**$140,422**	**$140,422**	**$140,422**	**$210,632**
Payable in								Years 0-4	Years 5-7	Years 8-14	Years 0-3	Years 4-6	Years 7-9	Years 10-14
	0	0	0	0	0	0	0	0	5	8	0	4	7	10
	0	0	0	0	0	0	0	4	7	14	3	6	9	14
Cost of financing to relocate Green Waste Processing Facility (based on 15 years)	$0	$0	$0	$0	$0	$0	$0	$2,831,096	$2,831,096	$2,831,096	$2,831,096	$2,831,096	$2,831,096	$2,831,096
Cost of financing to relocate Resource Recovery Centre (based on 15 years)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,807,001	$1,807,001	$1,807,001	$1,807,001	$1,807,001
Financing costs based on 15 years	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$188,740**	**$188,740**	**$309,206**	**$309,206**	**$309,206**	**$309,206**	**$309,206**
Payable in										**Years 15-20**				**Years 15-19**
										15				15
										20				19
Cost of financing to relocate Resource Recovery Centre (based on 15 years)										**$2,831,096**				**$1,807,001**

Financing costs based on 15 years										**$15**				**$15**
										$188,740				**$120,467**
Payable in		Years 15-29					Years 14-26			Years 10-24			0	Years 10-24
	0	15	0	0	0	0	14	0	0	10	0	0	0	10
	0	29	0	0	0	0	26	0	0	24	0	0	0	24
Bulk Haul Facility (based on 15 years)	$0	$2,919,975	$0	$0	$0	$0	$2,919,975	$0	$0	$2,919,975	$0	$0	$0	$2,919,975
Financing costs based on 15 years	15	15	15	15	15	15	15	15	15	15	15	15	15	16
	$0	**$194,665**	**$0**	**$0**	**$0**	**$0**	**$194,665**	**$0**	**$0**	**$194,665**	**$0**	**$0**	**$0**	**$182,498**
Landfill Operating costs														
Payable in	Years 1-9	Years 10-15	Years 1-3	Years 4-6	Years 7-9	Years 10-12	Years 13-15	Years 1-4	Years 5-7	Years 8-11	Years 1-3	Years 4-6	Years 7-9	Years 10-11
	1	10	1	4	7	10	13	1	5	8	1	4	7	10
	9	15	3	6	9	12	15	4	7	11	3	6	9	11
Operating/Management Cost	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000
Ongoing Maintenance	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Leachate Management	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000
Landfill Levy (as at July 2014) per tonne	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59	$59
MSW Volume (Tonne) per annum	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Landfill Levy Rebate for sand use (%)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Landfill Levy minus Rebate for sand use	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550	$1,889,550
	$3,239,550	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**	**$3,239,550**
Income														
Receivable in	Years 1-9	Years 10+	Years 1-3	Years 4-6	Years 7-9	Years 10-12	Years 13+	Years 1-4	Years 5-7	Years 8+	Years 1-3	Years 4-6	Years 7-9	Years 10+
	1	10	1	4	7	10	13	1	5	8	1	4	7	10
	9	999	3	6	9	12	999	4	7	999	3	6	9	999
Commercial waste income	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000
Operating income														
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	$1,568,000	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**	**$1,568,000**
Bulk Haul Specific Operating costs														
Payable in		Years 16+					Years 16+			Years 12+			0	Years 12+
	0	16	0	0	0	0	16	0	0	12	0	0	0	12
	999	999	999	999	999	999	999	999	999	999	999	999	999	999
Operating/Management Cost	$0	$200,000	$0	$0	$0	$0	$200,000	$0	$0	$200,000	$0	$0	$0	$200,000
Ongoing Maintenance	$0	$200,000	$0	$0	$0	$0	$200,000	$0	$0	$200,000	$0	$0	$0	$200,000
Transport Cost	$0	$966,530	$0	$0	$0	$0	$966,530	$0	$0	$966,530	$0	$0	$0	$966,530
Processing Fee	$0	$4,608,450	$0	$0	$0	$0	$4,608,450	$0	$0	$4,608,450	$0	$0	$0	$4,608,450
	$0	**$5,974,980**	**$0**	**$0**	**$0**	**$0**	**$5,974,980**	**$0**	**$0**	**$5,974,980**	**$0**	**$0**	**$0**	**$5,974,980**

Cost Analysis of Options for the Disposal of Landfill Waste in the Short to Medium Term - Yearly Calculations

(December 2014)

	Option 4 - Transport off the Peninsula							
	A. Bulk Haul Facility - Rye		B. Bulk Haul Facility - Mornington		C. Bulk Haul Facility - Tyabb		D. Bulk Haul Facility - Stand alone	
	4A (i)	4A (ii)	4B (i)	4B (ii)	4C (i)	4C (ii)	4D (i)	4D (ii)
	Cell size/Life Option 4A (i)	Cell size/Life Option 4A (ii)	Cell size/Life Option 4B (i)	Cell size/Life Option 4B (ii)	Cell size/Life Option 4C (i)	Cell size/Life Option 4C (ii)	Cell size/Life Option 4D (i)	Cell size/Life Option 4D (ii)
Total Life of Option (all stages)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Years								
One-off costs associated with construction								
Construction costs								
Year to pay - Pay in year 0 (the year before year 1 of the stage)	0	0	0	0	0	0	0	0
Cost to construct per tonne	$0	$0	$0	$0	$0	$0	$0	$0
MSW Volume (Tonne) per annum	0	0	0	0	0	0	0	0
Life of Stage	0	0	0	0	0	0	0	0
Compaction Rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minus Daily Cover cost of cells	0	0	0	0	0	0	0	0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Construction costs of Bulk Haul Facility at end of cell life								
Year to pay - Pay in the last year of the final stage	0	0	0	0	0	0	0	0
Establish a Bulk Haul Facility (includes 30% contingency)	$5,355,998	$5,355,998	$4,989,000	$4,989,000	$5,317,000	$5,317,000	$5,317,000	$5,317,000
	$5,355,998	**$5,355,998**	**$4,989,000**	**$4,989,000**	**$5,317,000**	**$5,317,000**	**$5,317,000**	**$5,317,000**
Relocation of Infrastructure								
Year to pay - Pay the year before construction costs of the next stage	0	0						
Relocate Green Waste Processing Facility	$0	$0	$0	$0	$0	$0	$0	$0
Relocate Resource Recovery Centre	$0	$0	$0	$0	$0	$0	$0	$0
Demolition of Rye Resource Recovery Centre	$340,000	$340,000	$0	$0	$0	$0	$0	0
	$340,000	**$340,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Cell Rehabilitation								
Year to pay - Pay this in one lump sum in the year after the life of the stage is complete.	0	0	0	0	0	0	0	0
Size of area requiring rehabilitation (square metre)	0	0	0	0	0	0	0	0
Cell rehabilitation ($ per square metre)	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Per Annum costs								

Financing costs								
Payable in								
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
Cost of financing cell construction costs (based on 6%)								
Life of Cell								
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Payable in								
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
Cost of financing to relocate Green Waste Processing Facility (based on 15 years)								
Cost of financing to relocate Resource Recovery Centre (based on 15 years)								
Financing costs based on 15 years								
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Payable in								
Cost of financing to relocate Resource Recovery Centre (based on 15 years)								
Financing costs based on 15 years								
Payable in	Years 0-14	Years 0-14	Years 0-14	Years 0-14	Years 0-14	Years 0-14	Years 0-14	Years 0-14
	0	0	0	0	0	0	0	0
	14	14	14	14	14	14	14	14
Bulk Haul Facility (based on 15 years)	$2,916,027	$2,916,027	$2,716,218	$2,716,218	$2,894,795	$2,894,795	$2,894,795	$2,894,795
Financing costs based on 15 years	15	15	15	15	15	15	15	15
	$194,402	**$194,402**	**$181,081**	**$181,081**	**$192,986**	**$192,986**	**$192,986**	**$192,986**
Landfill Operating costs								
Payable in								
	0	0	$0	$0	$0	$0	$0	$0
	0	0	$0	$0	$0	$0	$0	$0
Operating/Management Cost	$0	$0	$0	$0	$0	$0	$0	$0
Ongoing Maintenance	$0	$0	$0	$0	$0	$0	$0	$0
Leachate Management	$0	$0	0	0	0	0	0	0
Landfill Levy (as at July 2014) per tonne	$59	$59	$59	$59	$59	$59	$59	$59
MSW Volume (Tonne) per annum	0	0	$0	$0	$0	$0	$0	$0
Landfill Levy Rebate for sand use (%)	0.00	0.00	$0	$0	$0	$0	$0	$0
Landfill Levy minus Rebate for sand use	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Income								
Receivable in	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+
	1	1	1	1	1	1	1	1
	999	999	999	999	999	999	999	999
Commercial waste income	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000	-$1,568,000

Operating income								
	-$1,568,000	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**	**-$1,568,000**
Bulk Haul Specific Operating costs								
Payable in	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+	Years 1+
	1	1	1	1	1	1	1	1
	999	999	999	999	999	999	999	999
Operating/Management Cost	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Ongoing Maintenance	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Transport Cost	$821,940	$1,353,940	$671,460	$1,180,660	$567,720	$1,134,300	$775,200	$1,227,020
Processing Fee	$4,932,400	$4,180,000	$4,932,400	$4,180,000	$4,932,400	$4,180,000	$4,932,400	$4,598,000
	$6,154,340	**$5,933,940**	**$6,003,860**	**$5,760,660**	**$5,900,120**	**$5,714,300**	**$6,107,600**	**$6,225,020**

Appendix 4 – Statement of Review

20 January 2015

Our ref: 31314980
Your ref:

Gabrielle McCorkell
Mornington Peninsula Shire Council
90 Besgrove Street
ROSEBUD VIC 3939

Dear Gabrielle,

Statement of Review

GHD was engaged by Mornington Peninsula Shire to review work carried out by the Council to evaluate options for the short to medium term management of landfill waste.

GHD was provided with the Analysis Model and the Business Case Report.

Approach

GHD has undertaken the following work:

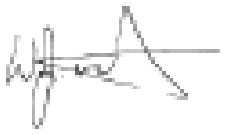
- Reviewed option assumptions to ensure they were realistic
- Verified costing data – where possible, costs where verified against available benchmarks, as well as cross referenced to similar costing analysis previously completed by GHD
- Model verification – verified the accuracy and sequencing of the calculations throughout the model. Validation was carried out on two levels:
    - simplification of data inputs to establish the workings of the algorithms applied and;
    - sensitivity analysis - to ensure realistic numbers are generated throughout the model.
- Presentation of options – advice was provided on the best way to present the options
- Business case review – reviewed the business case to identify opportunities for enhancement

Observations

- The overall modelling of the options was at a high level, with emphasis based on the quantitative analysis (transport, waste management and emission costs) to develop a household cost and an option Net Present Value.
- Non-quantitative factors were considered in the discussion of the optimal solution (visual impact, traffic impact, extended decision time, community support).
- The modelling approach adopted by MPS provides a detailed and correct cost based approach.
- The 'hard coding' of a number of key variables, made it difficult to test for sensitivity across all the options and some key variables.
- GHD re-cast the model to develop a top down costing approach, which identified some inconsistencies in the calculation of interest and cashflows. These inconsistencies were discussed with the client and appropriate adjustments were made. Alterations to the model resulted in small changes in the overall outcome of the analysis, but did not change the ranking or recommendation.
- GHD's model recommends Option 1 as the optimal solution, as further development of the Rye landfill presents a lower cost than taking the waste off the Peninsula. Any delay in taking the waste off the Peninsula reduces the overall costs to the Council and the rate payer.
- The business case was enhanced through the addition of a Multi-Criteria Analysis (MCA), so that the recommendations could take into account both the financial and non-financial factors, especially as a number of social and environmental factors were considered at a high level.

Recommendations

1. A further refinement of the analysis could result from broader stakeholder engagement to assess the respective weightings that are applied in the MCA analysis
2. As the Business Case addresses a long term issue, following the further development of the Rye landfill, the model data should be reviewed prior to any additional decision being made.



Wennie van Lint
Service Line Leader
Infrastructure Advisory – Strategy & Economics
GHD Pty Ltd