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BUILDING A BETTER WORLD

REPORT

Regional Landfill Disposal Study

Prepared for Nelson City Council and Tasman District Council

MAY 2013

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Executive Summary

Introduction

In terms of Nelson City and Tasman District Councils' Joint Waste Management and Minimisation Plan (JWMMP) and, in particular, Method 3.1.5.1, the Councils have a purpose to investigate a joint landfill solution as a matter of priority in the first year that the JWMMP is operative.

MWH New Zealand Ltd has been commissioned jointly by Nelson City Council and Tasman District Council to investigate aspects of a joint landfill solution. These aspects are:

- an assessment of the financial implications of different options relative to the current landfill disposal activity of each Council
- a high level assessment of option in terms of the six guiding principles contained within the JWMMP.

A financial model is used to assess the financial implications. In essence it addresses the following question: *"What is the most cost-effective regional waste disposal option for the waste from both Nelson City and Tasman District, taking account of long-term disposal options at either York Valley Landfill or Eves Valley Landfill".*

The high level assessment of options compares the identified options using the six guiding principles stated in the JWMMP.

Local Government Act Section 14 Principles relating to local authorities states that in performing its role, a local authority must act in accordance with a number of principles. One of these, Section 14(1)(e), states that *"…a local authority should collaborate and co-operate with other local authorities and bodies as it considers appropriate to promote or achieve its priorities and desired outcomes, and make efficient use of resources…".*

The Councils in commissioning this study are acting in accordance with this principle.

Description of the Financial Model

The financial model is a Net Present Value model that evaluates costs relating to disposal options over a 40 year period. Five disposal options have been considered in the financial model, as described in the table below.

Status Quo		
Option	**Tasman District**	**Nelson City**
SQ	Continue disposal at Eves Valley Landfill (EVLF) by extending Stage 2 at about 2017. When it is full construct Stage 3 and continue disposal at EVLF. Assume Landfill Gas (LFG) extraction is implemented when Stage 2 is extended.	Continue disposal at York Valley Landfill (YVLF) as occurs presently.
Disposal At Eves Valley Landfill		
Option	**Tasman District**	**Nelson City**
1	Continue disposal at EVLF by extending Stage 2 at about 2017. When it is full construct Stage 3 and continue disposal at EVLF. Assume LFG extraction is implemented when Stage 2 is extended.	Continue disposal at YVLF until the current stage is appropriately shaped with waste to allow landfill closure (assume this will occur in 2017), then dispose at EVLF.
Disposal At York Valley Landfill		
Option	**Tasman District**	**Nelson City**
2	EVLF to remain open for the duration of existing consents (until September 2015), thereafter close EVLF and dispose at YVLF.	Continue disposal at YVLF as occurs presently.
3	EVLF to remain open until about 2022 by extending Stage 2, thereafter dispose at YVLF.	Continue disposal at YVLF as occurs presently.
4	As for Option 2 but keep EVLF open after 2015 for the disposal of special waste only from both districts. Tasman District general waste to go to YVLF from 2015.	Continue disposal at YVLF as occurs presently but from 2015 send all Nelson City special waste to EVLF.

In order to obtain the base cost to each Council, as well as an overall cost per tonne, the model considers only those costs that are incurred for services delivered. Costs, such as cross-subsidies, or local levies, for activities such as recycling and green waste processing have not been considered.

The use of a sensitivity analysis has helped to determine how changes to cost inputs can affect the model output.

Assumptions for developing the financial model are listed in section 5 of this report.

The cost model outputs are intended to be used to compare options, and not to establish accurate disposal costs. Additionally, cross subsidies or local levies have not been considered, and each Council would need to include such costs as a separate exercise in assessing overall disposal charges

Cost Model Outputs

The following table provides a summary of the cost model outputs. Costs exclude GST.

		Apportioned Cost per Tonne		Net Present Value Costs	Total Cost per Tonne
Long-term Disposal	**Option**	**Tasman District Council**	**Nelson City Council**	**Private Commercial Haulage to YVLF, EVLF or Pascoe Street TS**	**Combined Tasman District and Nelson City costs and NC Private Commercial Haulage Costs**
EVLF and YVLF	**Status Quo**	$62	$41	$3,936,000	$55
EVLF	**1**	$59	$54	$9,334,000	$66
YVLF	**2**	$47	$38	$3,936,000	$46
	3	$48	$38	$3,936,000	$47
	4	$49	$39	$4,138,000	$47

Considering the combined total costs (right hand column), the options which assume long-term disposal at YVLF (Options 2, 3 and 4) are the lowest cost for the region, followed by the Status Quo. The most expensive option is the long-term disposal of waste at EVLF (Option 1).

For Tasman District Council all shared landfill options (Options 1 to 4) would be more cost effective than the status quo. The most cost effective option for Tasman District Council (Option 2 at $47 per tonne) would be about 24% less costly than the Status Quo Option (at $62 per tonne).

For Nelson City Council all shared YVLF disposal options (Options 2 to 4) would be more cost effective than the status quo. The most cost effective options for Nelson City Council (Options 2 and 3 at $38 per tonne) would be about 7% less costly than the Status Quo Option (at $41 per tonne).

Summarising the above, the financial modelling exercise shows that Options 2, 3 and 4 are practically identical in costs and are the most cost-effective solutions. Option 2 is marginally the lowest cost option for Tasman District Council and from an overall regional perspective.

EVLF requires new resource consents in 2015 for the existing landfill (Stages 1 and 2), irrespective of its future use, though the scope of the resource consents will be different if it is closed (compared to if it remains available or open for future waste disposal). Additionally, EVLF will need to have a new stage developed in the future (Stage 3) if it is to be used for general waste disposal in the long-term.

The landfills are significant and important assets and, irrespective of the disposal solution that is chosen, the Councils should plan on flexibility to utilise both landfills in the future, if needed.

Assessment of Options against the JWMMP Guiding Principles

Haulage costs are considered a measure of the extent to which the various options will impact on the environment. Reducing the environmental impact is reflected in the two core guiding principles of *Global Citizenship* and *Kaitiakitanga/Stewardship.*

A regional disposal option allows for *Full Cost Pricing* because Councils do not need to consider how disparate landfill charges might cause customers to move to another landfill service provider.

The financial model considers the *Precautionary Principle* in that the costs of future landfill development are based on "good practice".

A joint solution should provide better opportunities in terms of the *Product Stewardship* and *Life Cycle* Principles, and for the application of economic instruments such as landfill bans.

Sensitivity Analysis and Other Risk Factors

A sensitivity analysis has been done by varying the following six input parameters: NPV discount rate, ETS charge rate, operational costs, development costs, transport costs and waste quantities.

In all cases, long-term disposal to YVLF (Options 2, 3 and 4) remains the most cost effective, with Option 2 being marginally more cost effective than Options 3 and 4.

Other risk factors associated with the options have been identified but have not been investigated. These are:

- impact of extra traffic travelling to a regional landfill
- demand for "host" fees from the communities adjacent to a regional landfill
- trans-boundary movements of waste
- risk of only having a single operable landfill in the case of a seismic event
- re-opening of a landfill after it has been "dormant" for a considerable period of time
- risk of obtaining resource consent for extending Stage 2 of EVLF due to increased height.

If both landfills are designated then these designations would help mitigate the risk of not being able to re-open the landfills should one of them have been closed for a period of time. Re-opening could be either for long-term disposal purposes after the other landfill had been filled to capacity, or for a temporary measure should the other landfill be inoperable, for instance due to a seismic event.

The resource consent conditions for EVLF are more specific for waste acceptance, however the criteria for acceptance of special waste appear to be similar for both landfills and are currently in line with the MfE guidelines for a Class A landfill.

It is doubtful whether either landfill would achieve a Class A status without having to construct more extensive landfill liners and leachate collection systems than currently exist on each site. The financial model has assumed that such facilities will be provided for future extensions to each landfill.

The status of the EVLF may have to change from Class A to Class B if the extension of Stage 2 of the landfill continues in the same manner that Stage 2 has been constructed to date. The implications of this would be more stringent special waste acceptance criteria.

There is an advantage to both Councils to have EVLF available for the disposal of special waste because it is a mechanism for keeping the landfill open for future further use as a regional landfill.

Landfill Resource Consents

EVLF's resource consents expire at the beginning of October 2015. YVLF resource consents expire at the end of 2034.

Tasman District Council needs to have certainty by September 2013 as to which option is to be adopted in order to avoid a potentially more complicating resource consent application process.

Conclusions

The following conclusions from the study are drawn.

Overall, the options that model disposal at YVLF (Options 2, 3 and 4) have the lowest financial costs, even taking account of private commercial haulage costs. On average, the cost of those options is about 25% cheaper than the next most cost effective option which is the Status Quo.

Option 1, using EVLF as a regional landfill, is by far the most expensive option being more than 50% more expensive than the average of Options 2, 3 and 4 (YVLF disposal options).

The Status Quo Option has the lowest net present value of haulage costs, followed closely by Option 3. Options 2 and 4 are slightly less costly than Option 3 but not sufficient to rule out Option 3.

The construction of Stage 3 at EVLF (considered in Options SQ and 1) is a significant development cost in the short term for EVLF. By opting for a regional landfill at YVLF major landfill development costs within the region can be deferred for about 20 years making disposal of waste at YVLF an attractive financial option.

However, Option 4, which assumes that EVLF is kept open for disposing of the region's special waste is also a financially attractive option. This option assumes special waste quantities will remain at the same level and that special waste will meet the current waste acceptance criteria for disposal at EVLF.

Assessed timelines for obtaining new resource consents for EVLF for Options 2, 3 and 4 show that there is a limited time available and in order to avoid a potentially more complicating resource consent application process for EVLF, a decision should be made by September 2013 as to the future of EVLF.

Tasman District Council needs to have certainty by September 2013 as to which option is to be adopted in order to avoid a potentially more complicating resource consent application process.

Appropriate designations for each landfill would help mitigate the risk of being unable to re-open the landfills in the future, either for long-term disposal purposes or as a temporary measure, should it be needed.

In future, major triggers for re-assessing the financial viability of a joint solution would be the future renewal of resource consents and the likelihood of major capital expenditure being required, for instance, for the development of the next stage of a landfill.

Nelson City Council and Tasman District Council

Regional Landfill Disposal Study

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APPENDICES

1 Introduction

1.1 Background

In 2012, Nelson City Council and Tasman District Council adopted a Joint Waste Management and Minimisation Plan (JWMMP). The JWMMP sets a number of objectives, policies and methods. Method 3.1.5.1 states: "*The Councils will investigate a joint landfill solution as a matter of priority in the first year this plan is operative (and the options will include using one landfill as a regional facility serving both Districts or that the two landfills will be used for separate materials).*"

1.2 Purpose

Given the JWMMP and, in particular, Method 3.1.5.1, the Councils have a purpose to investigate a joint landfill solution as a matter of priority in the first year that the JWMMP is operative.

1.3 Scope

MWH New Zealand Ltd (MWH) has been commissioned jointly by Nelson City Council and Tasman District Council to investigate aspects of a joint landfill solution. These aspects are:

- an assessment of the financial implications of different options relative to the current landfill disposal activity of each Council
- a high level assessment of option in terms of the six guiding principles contained within the JWMMP.

The financial implications of different options have been assessed using a financial model. The objective of the model is to determine an optimum regional waste disposal solution from a financial perspective.

In essence, a financial model is to address the following question: *"What is the most cost-effective regional waste disposal option for the waste from both Nelson City and Tasman District, taking account of long-term disposal options at either York Valley Landfill or Eves Valley Landfill".*

The high level assessment of options compares the identified options using the six guiding principles stated in the JWMMP. They are: *Global Citizenship*; *Kaitiakitanga/Stewardship*; *Product Stewardship*; *Full-cost Pricing*; *Life-cycle Principle*; *Precautionary Principle*. The assessment presents information in relation to the principles and identifies other parties who may provide guidance.

This report:

- describes the cost model developed for the study, the options considered, the model inputs and assumptions made, and the cost model outputs
- presents an assessment of the options with respect to the guiding principles of the JWMMP.

1.4 Local Government Act

Since the Councils adopted the JWMMP, the Local Government Act has been amended.

Amended section 10 states:

The purpose of local government is –

(a) to enable democratic local decision-making and action by, and on behalf of, communities; and

(b) to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.

It is considered that the results of the study provide information that will assist the Councils achieve this purpose in relation to waste disposal.

Local Government Act Section 14 Principles relating to local authorities states that in performing its role, a local authority must act in accordance with a number of principles. One of these, Section 14(1)(e), states that *"…a local authority should collaborate and co-operate with other local authorities and bodies as it considers appropriate to promote or achieve its priorities and desired outcomes, and make efficient use of resources…".*

The Councils in commissioning this study are acting in accordance with this principle.

2 Description of the Model

A net present value cost model was chosen because it is simple to set up in an Excel spread sheet, input information is available from spread sheets developed for Councils' Long Term Plans (LTPs) and Asset Management Plans (AMPs), and the model can provide output either as a cost per tonne or as a net present value for each option modelled.

A modelling period of 40 years was used because that is a reasonable period of time within which significant development costs are incurred at both landfills for the various options. From a financial modelling perspective it provides a sufficient timeframe to determine what the impact is of developing additional landfill capacity at both landfills.

3 Options Considered

The options considered in the modelling study are presented in the table below. Options are based on securing relevant resource consents and a timely decision on a joint landfill solution to enable relevant resource consent applications for Eves Valley Landfill to be lodged before April 2015.

Status Quo		
Option	**Tasman District**	**Nelson City**
SQ	Continue disposal at Eves Valley Landfill (EVLF) by extending Stage 2 at about 2017. When it is full construct Stage 3 and continue disposal at EVLF. Assume Landfill Gas (LFG) extraction is implemented when Stage 2 is extended.	Continue disposal at York Valley Landfill (YVLF) as occurs presently.
Disposal At Eves Valley Landfill		
Option	**Tasman District**	**Nelson City**
1	Continue disposal at EVLF by extending Stage 2 at about 2017. When it is full construct Stage 3 and continue disposal at EVLF. Assume LFG extraction is implemented when Stage 2 is extended.	Continue disposal at YVLF until the current stage is appropriately shaped with waste to allow landfill closure (assume this will occur in 2017), then dispose at EVLF.
Disposal At York Valley Landfill		
Option	**Tasman District**	**Nelson City**
2	EVLF to remain open for the duration of existing consents (until September 2015), thereafter close EVLF and dispose at YVLF.	Continue disposal at YVLF as occurs presently.
3	EVLF to remain open until about 2022 by extending Stage 2, thereafter dispose at YVLF.	Continue disposal at YVLF as occurs presently.
4	As for Option 2 but keep EVLF open after 2015 for the disposal of special waste only from both districts. Tasman District general waste to go to YVLF from 2015.	Continue disposal at YVLF as occurs presently but from 2015 send all Nelson City special waste to EVLF.

Consideration has been given to modelling an out-of-region disposal option whereby both EVLF and YVLF are assumed to be closed in the near future and waste transported and disposed at a regional landfill elsewhere. However, it is fairly evident that the cost of transport and landfill disposal fees for an out-of region landfill would mean that an out-of-region option would not be comparable to any of the options considered and so the out-of-region option has not been pursued further.

In considering the options it is noted that currently waste from Buller District, which amounts to about 3,000 tonnes per year, is disposed at YVLF. Disposal of this waste at EVLF could potentially save transport costs which would align with the core guiding principles of *Global Citizenship* and *Kaitiakitanga/Stewardship.*

It must be noted, however, that currently haulage of Buller District to YVLF is affordable because the haulage operator is able to back-haul freight from Nelson to Buller District. Even if the trip is shortened by hauling as far as EVLF, the hauler may still have to go as far as Nelson to obtain freight for back-haul purposes so as to make the whole trip financially feasible.

It should also be noted that Buller District Council is currently seeking proposals for the overall waste management in the district. Whether the current haulage arrangement or even the current arrangements for disposal remain in place will be dependent on the outcome of this process.

4 Cost Model Inputs

In order to obtain the base cost to each Council, as well as an overall cost per tonne, the model considers only those costs that are incurred for services delivered. Costs, such as cross-subsidies, or local levies, for activities such as recycling and green waste processing have not been considered. To do so and to make sure that Tasman District's costs are comparable to Nelson City's costs would mean taking account of all waste management activities which is out of scope of this study.

A full list of the inputs and costs that have been included in the financial model is given in Appendix A together with the source of information.

It should be noted that the format of information for operational and development costs provided by each Council is different. This does present a risk that one might not be directly comparing "like" with "like" costs. However, provided the costs are for landfill operations and development, there is little chance of significant errors occurring. The use of a sensitivity analysis has helped to determine how changes to cost inputs can affect the model output.

Not included in the future development of Stage 3 at EVLF are the costs of logging trees within the Stage 3 area, together with the impact that this has on surrendering NZ Emission Trade Units, set against any income that will be received on harvesting the trees.

5 Assumptions

The financial model has been constructed using the following assumptions.

- Future waste quantities for years 1 to 20 are as predicted by each Council for their 20 year forecasts. Thereafter, for years 21 to 40 waste quantities are assumed to be the same as for year 20. For Tasman District this is an increase of about 24% over 20 years, whilst for Nelson City the quantities remain static from year 2 onwards.

- Financial repayment of all development costs (Capex) is assumed to be 8.5% of the development costs per year, carried forward over the next 20 year period for each development cost item. Because the modelling period is 40 years, only development costs incurred in the first 20 years would be fully paid over the modelling period. Therefore the modelling period for development costs has been extended by a further 20 years to include payment for all Capex borrowed over the 40 year modelling period.

- NPV discount rate is assumed to be 6.5%.

- Resource consents will be granted for the landfills within the timeframes assumed.

- The current statutory and regulatory environment will remain the same for the modelled period.

- YVLF accepts commercial vehicles. It is assumed that for disposal at EVLF commercial vehicles will be able to access the landfill instead of having to go via a resource recovery centre (RRC). A weighbridge will be installed at the landfill to accommodate weighing of vehicles there. Assumptions have been made about the average trip distance of existing commercial vehicles to YVLF, and for the same vehicles to go to EVLF. At this stage it is assumed that there is no change in the traffic patterns to Richmond RRC, even if EVLF is opened for private commercial traffic.

- Development costs at EVLF have been based on estimates carried out for the Tasman District Council 20 year plan and which include the capital costs of developing Stage 3.

- Development costs for the next gully at YVLF (Gully 3), which is understood to be required in about 30 years at the current rate of filling, have been approximated by using similar costs to those estimated for Stage 3 of EVLF.

- Other development costs at YVLF which are required for infrastructure such as access roads, monitoring wells and weighbridge improvements, have been based on capital expenditure estimates provided in the Nelson City AMP.

- Where contract haulage rates are unknown, waste haulage costs have been calculated using the NZ Transport Agency (NZTA) Economic Evaluation Manual Volume 1.

- Private commercial vehicles are assumed to be Medium Commercial Vehicles, compactor vehicles carrying waste from the transfer stations to EVLF and YVLF are considered to be Heavy Vehicle Class I, whilst vehicles hauling waste from Buller District are assumed to be type Heavy Vehicle Class II.

- Costs for hauling waste by private commercial operators are not ascribed to either Council.

- For options which consider the shared use of landfill facilities (ie. Options 1 to 4), operational and development costs for each landfill are apportioned to each Council by the ratio of waste quantities derived from each district. Refer to the notes to the table included in Appendix B.

- The model does not consider any income from waste disposal from any sources.

- The existing capacity of Gully 1 at YVLF is assumed to be 1,530,000m^3. The estimated capacity of Stage 2 of EVLF assuming a vertical extension is approximately 300,000m^3.

6 Cost Model Outputs

The purpose of the cost model is to estimate the total costs to the region (Tasman District and Nelson City) of developing and operating the EVLF and YVLF under different options. In doing so, the costs to each Council have been separated, as have the haulage costs to private commercial operators.

The cost model outputs are intended to be used to compare options, and not to establish an accurate disposal cost. Additionally, as mentioned in section 4, cross subsidies or local levies have not been considered, and each Council would need to include such costs as a separate exercise in assessing overall disposal charges. The cost model outputs for Tasman District and Nelson City Councils are given in $/tonne and haulage costs for private commercial operators are given in net present value dollars.

It is emphasised that care must be taken not to assume that the output values (in $/tonne) are true disposal rates.

The following table provides a summary of the cost model outputs. Costs exclude GST. Summary details and explanations of how the costs per tonne are derived for each Council are given in the table attached as Appendix B.

		APPORTIONED COST PER TONNE		NET PRESENT VALUE COSTS	TOTAL COST PER TONNE
Long-term Disposal	**Option**	**Tasman District Council**	**Nelson City Council**	**Private Commercial Haulage to YVLF, EVLF or Pascoe Street TS**	**Combined Tasman District and Nelson City costs and NC Private Commercial Haulage Costs**
EVLF and YVLF	**Status Quo:** Extend Stage 2 at EVLF, then develop Stage 3 when needed for TDC waste only. YVLF to continue accepting all of NCC waste.	$62	$41	$3,936,000	$55
EVLF	**1:** Extend Stage 2 and develop Stage 3 at EVLF. Close YVLF in 2017 with reduced costs to shaping and capping of landfill, and send all NCC waste to EVLF.	$59	$54	$9,334,000	$66
YVLF	**2:** Close EVLF in 2015 and send all TDC waste to YVLF. All NCC waste continues to go to YVLF.	$47	$38	$3,936,000	$46
	3: Extend Stage 2 at EVLF until 2022, then send all TDC waste to YVLF. All NCC waste continues to go to YVLF.	$48	$38	$3,936,000	$47
	4: Close EVLF in 2015 for general waste but keep open for all special waste from TDC and NCC. Send all TDC general waste to YVLF. All NCC general waste continues to go to YVLF.	$49	$39	$4,138,000	$47

The following comments are made about the above cost model outputs.

- Considering the combined total costs (green highlighted column), the options which assume long-term disposal at YVLF (Options 2, 3 and 4) are the most economical for the region, followed by the Status Quo. The most expensive option is the long-term disposal of waste at EVLF (Option 1).

- The options which consider long-term disposal at YVLF (Options 2, 3 and 4) are practically the same cost for each individual Council.

- Option 2 (highlighted in red) is very marginally more cost effective for the region (combined Tasman District and Nelson City and private commercial costs) and for Tasman District Council.

- For Tasman District Council all shared landfill options (Options 1 to 4) would be more cost effective than the status quo. The most cost effective option for Tasman District Council (Option 2 at $47 per tonne) would be about 24% less costly than the Status Quo Option (at $62 per tonne).

- For Nelson City Council all shared YVLF disposal options (Options 2 to 4) would be more cost effective than the status quo. The most cost effective options for Nelson City Council (Options 2 and 3 at $38 per tonne) would be about 7% less costly than the Status Quo Option (at $41 per tonne).

- The private commercial haulage costs (highlighted in the brown column) show a significant range with haulage costs for the EVLF disposal option being just over 230% more than the Status Quo Option. This is because the average haulage distance for private commercial hauliers to EVLF is significantly further than the distance they have to travel to YVLF.

- The model has assumed that existing private commercial traffic to YVLF would travel directly to EVLF if YVLF were closed. This also assumes that Pascoe Street Transfer Station would not accept commercial loads. In reality, some of the private commercial traffic would travel to Richmond RRC in which case haulage costs would then be transferred over to Tasman District Council. Summarising the above, the financial modelling exercise shows that Options 2, 3 and 4 are practically identical in costs and are the most cost-effective solutions. Option 2 is marginally the lowest cost option for Tasman District Council and from an overall regional perspective.

Option 2 is to close EVLF when the existing consents expire in 2015 and send all Tasman District waste to YVLF which becomes a regional landfill after that date.

An advantage of Option 4 is that the airspace remaining within Stage 2 of the EVLF at the end of 2015 would then be used for the disposal of special waste thereafter. The airspace remaining after 2015 is sufficient to accommodate all of the region's special waste for the next 30 to 40 years, assuming the current rate of disposal of special waste remains the same, and the special waste meets the waste acceptance criteria for EVLF. Additionally, this assumes that no additional liners or leachate collection systems are needed for a Stage 2 extension – refer to section 8.9.3 for further comments on this matter.

This study has assumed a 40 year planning horizon. If YVLF becomes a regional landfill a new landfill stage will be required during this period, together with new resource consents for the new and the existing stages.

EVLF requires new resource consents in 2015 for the existing landfill (Stages 1 and 2), irrespective of its future use, though the scope of the resource consents will be different if it is closed (compared to if it remains available or open for future waste disposal). Additionally, EVLF will need to have a new stage developed in the future (Stage 3) if it is to be used for general waste disposal in the long-term.

Because the YVLF development and resource consents costs occur much further into the future compared to the EVLF costs, especially if Stage 3 of the EVLF is needed, these costs do not make a significant difference to the financial study because it is based on a net present value model.

The landfills are significant and important assets and, irrespective of the disposal solution that is chosen, the Councils should plan on flexibility to utilise both landfills in the future, if needed. This is briefly discussed further in section 8.8.

In future, major triggers for re-assessing the financial viability of a joint solution would be the future renewal of resource consents and the likelihood of major capital expenditure being required, for instance, for the development of the next stage of a landfill.

7 Consideration of Guiding Principles

Six guiding principles form part of the JWMMP. A preliminary assessment of these options (ie. status quo versus a joint solution and the joint solutions) has been carried out and is reported in the table below.

Guiding Principle	Joint Solution Relative to Status Quo	Differences Amongst Joint Solution Options
Global Citizenship Our responsibility to protect the environment extends beyond Nelson and Tasman.	There is likely to be little difference in environmental effects beyond the region between a single landfill and two landfills. Possibly the main difference is in greenhouse gas emission. Fugitive emissions may be greater with two landfills than one. Haulage vehicle emissions may be a little greater with a single landfill but the reduction with operational vehicle emissions may offset this or even result in a net reduction in emissions with a single landfill.	The EVLF as the joint solution would result in higher greenhouse gas emissions than the YVLF options primarily due to the increased private commercial haulage costs. Whilst YVLF presently has a landfill gas capture system and so currently has less fugitive emissions, the landfill gas collection and destruction system at EVLF will have to be significantly improved if it became the joint solution landfill, and it its efficiency would be expected to match that of YVLF.
Kaitiakitanga / Stewardship All members of society are responsible for looking after the environment, and for the impact of products they purchase and wastes they make, use and discard.	There is likely to be little difference in terms of this guiding principle between one landfill and two. Two exceptions are that there may be cultural implications and that with a single joint landfill service there is greater potential for the two Councils to invest in public awareness and behaviour change programmes. This is because there will be no competition between the landfills and consequently there will be increased confidence in budgeted financial returns from the landfill operation.	On the basis that the transport costs indicate environmental effects (refer to Note 1 and Appendix B), the EVLF option would have greater adverse environmental effects than the YVLF options. However, there may be cultural implications associated with the transfer of waste.
Product Stewardship Producers, consumers and the wider community have responsibilities for a product throughout the product's life-cycle.	A joint solution will provide better opportunities for product stewardship and for the application of economic instruments such as landfill bans.	There is nothing to differentiate the joint solution options in terms of this guiding principle.
Full-cost Pricing The environmental effects of production, distribution, consumption and reuse, recycling or disposal of goods and of the associated services should be consistently costed and charged as closely as possible to the point they occur.	A regional disposal option (i.e. joint solution) allows for full cost pricing because Councils do not need to consider how disparate landfill charges might cause customers to move to another landfill service provider as is the case with two landfills in the region.	The financial modelling has shown that the YVLF disposal options are more cost-effective as a joint solution in terms of this guiding principle.

Guiding Principle	Joint Solution Relative to Status Quo	Differences Amongst Joint Solution Options
Life-cycle Principle Products and substances should be designed, produced and managed so all environmental effects are accounted for and minimised during generation, use, recovery and reuse as a manufacturing resource, or disposal.	A joint landfill solution will allow Councils to be better positioned to use economic instruments to influence behaviour commensurate with the Life-cycle Principle.	There is nothing to differentiate the joint solution options in terms of this guiding principle.
Precautionary Principle Where there is a threat of serious or irreversible damage, lack of full scientific certainty should not be a reason for postponing measures to prevent environmental degradation or potential adverse health effects.	This principle should apply to each case. Risks in relation to changing from two landfills to one landfill are identified in Section 8.8. A risk assessment would appropriately be a matter for a separate study.	This principle should apply to each case. Risks in relation to changing from two landfills to one landfill are identified in Section 8.8. A risk assessment would appropriately be a matter for a separate study.

Note.

1. Increased haulage has impacts on the environment including:

- an increase in exhaust gases (toxins, particulates and greenhouse gases) and discharges from oil spills, tyre and brake wear
- increased use of scarce fuel and oil resources
- increase in road wear and associated remediation costs
- increase in traffic noise
- increase in traffic congestion
- potential for greater number of road accidents.

Assuming no variation in the quantities of waste that have been modelled, it is the haulage of waste that most directly impacts on two of the six guiding principles, namely, the principles of *Global Citizenship* and *Kaitiakitanga/Stewardship.*

The table in Appendix C has been extracted from the financial model to provide a measure of the financial cost of haulage of waste that occurs with each option.

The model shows the following results.

- The Status Quo appears to have the lowest haulage costs overall, with Options 2, 3 and 4 following closely behind.

- On average, total haulage costs to the EVLF disposal option (Option 1) are just over 1½ times more than to an YVLF disposal option (Options 2, 3 and 4).

- For Tasman District Council, haulage costs to YVLF are only about 1% higher than haulage costs to EVLF.

- For Nelson City Council haulage costs to EVLF are about 330% higher than haulage costs to YVLF.

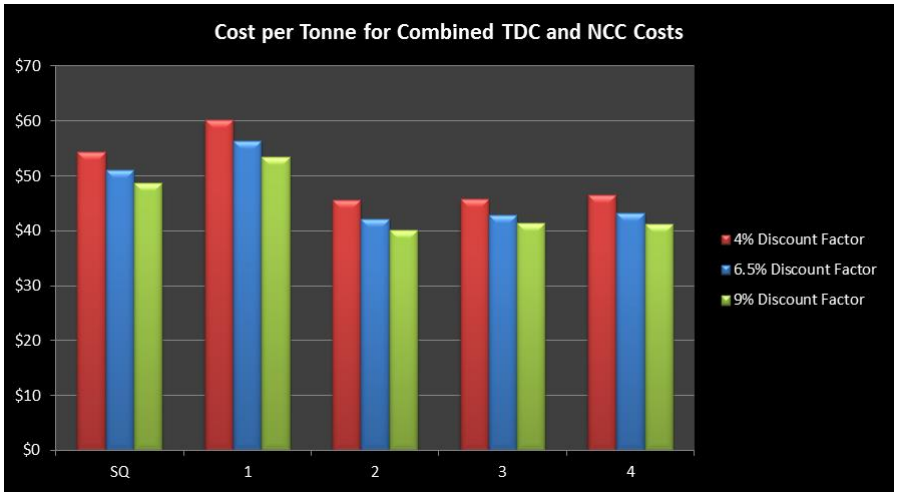
8 Sensitivity Analysis

The base model can be varied by changing any of the input parameters, each of which could affect the output. It has been agreed that the following input parameters should be tested in a sensitivity analysis:

- NPV discount rate
- NZ Emission Trading Scheme (NZ ETS) charges
- operational costs
- development costs
- transport costs
- waste quantities.

8.1 Varying the NPV Discount Rate

A base NPV discount rate of 6.5% was applied to the model. This was varied between 4% and 9%. The graph below shows how the cost per tonne for combined Tasman District and Nelson City Council costs varies with a change in discount rate.

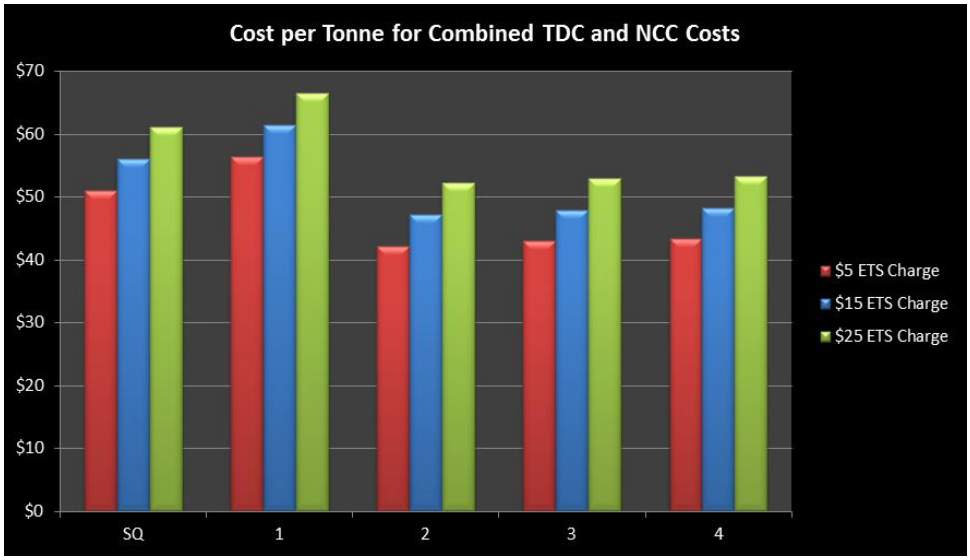


Points to note are.

- The order of the options does not change.
- Increasing the discount rate tends to reduce the overall cost per tonne.
- Options 2, 3 and 4 (disposal to YVLF) are least affected by changes to the discount rate because development costs occur later in the 40 years modelling period for each option, and they are the options having the lowest costs per tonne.

8.2 Varying the NZ ETS Charges

In the base model NZ ETS charges were set at $5/tonne of waste. Currently the cost of “carbon credits” is practically at an all-time low and is even lower than this value. However, this is an area of uncertainty and the effect of increasing NZ ETS charges has been assessed by setting charges at $15/tonne and at $25/tonne. The graph on the following page shows how changing ETS charges impacts on the cost per tonne for combined Tasman District Council and Nelson City Council costs.

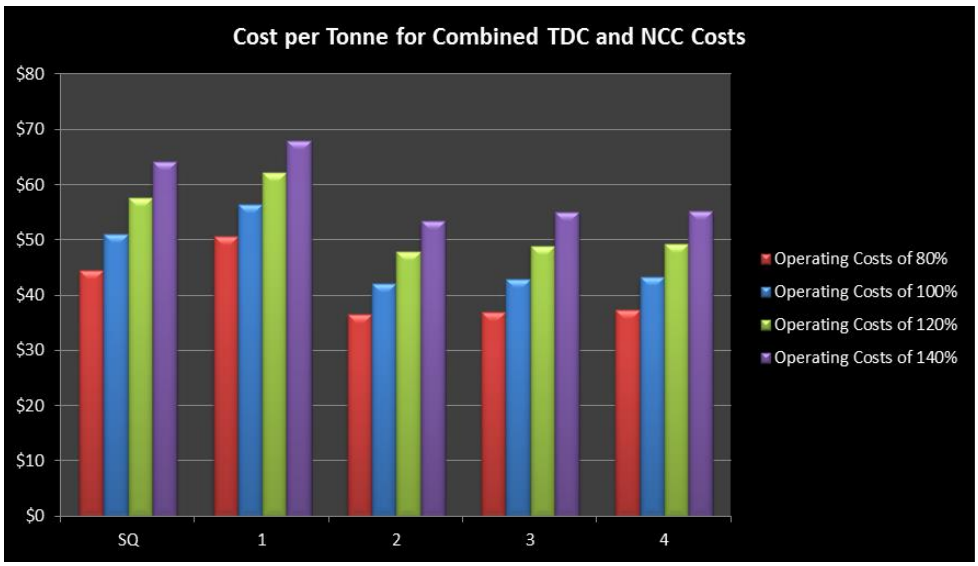


Points to note are.

- For all options any increase in the ETS charge over and above the base rate of $5/tonne is reflected as an increased cost equal to 50% of the difference between the new ETS charge and the base rate charge. This is because the model assumes, as stated recently by central government, that all ETS charges for the waste sector will have a discount rate of 50%.
- Indications are that in the short term (until 2015 at least) the price of carbon is likely to be depressed which means that a cost of $5/tonne is realistic in the short-term. An improved European economy may result in the price of carbon increasing.
- With the central government having stated that a discount rate of 50% will apply for ETS charges levied on the waste industry indefinitely, the overall cost of ETS charges is likely to be much less than assumed in Nelson City's AMP ($20 per tonne), and even less than the $15 per tonne assumed in the Tasman District LTP.
- Disposal to YVLF (Options 2, 3 and 4) remains the most cost-effective overall.
- Changes to the cost per tonne due to the changes in the ETS do not affect the relative order of the options.

8.3 Varying Operational Costs

Operational costs have been varied between 80% and 140% of the assumed base costs. The graph below shows how changing operational costs impacts on the cost per tonne for combined Tasman District Council and Nelson City Council costs.

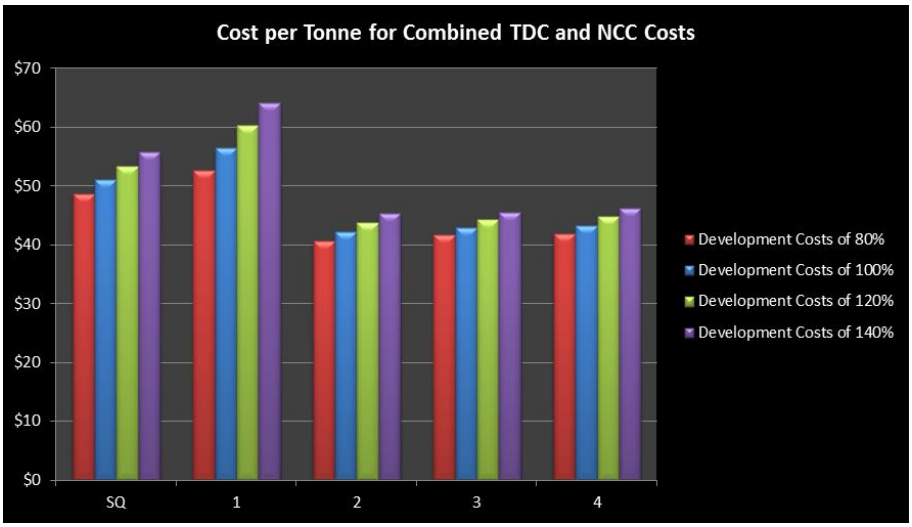


Points to note are.

- Disposal to YVLF (Options 2, 3 and 4) remains the most cost-effective overall and the order of options does not change.
- Increasing operational costs has the largest effect on Option SQ, followed by Options 3 and 4 which are similar, and then Options 1 and 2, which are also similar.
- For Options 2, 3 and 4, increasing the base operating cost by 40% results in an increased cost per tonne of about 27.5% which highlights that the bulk of costs for those options are operational costs.

8.4 Varying Development Costs

Development costs have been varied between 80% and 140% of the assumed base costs. The graph below shows how changing development costs impacts on the cost per tonne for combined Tasman District Council and Nelson City Council costs.

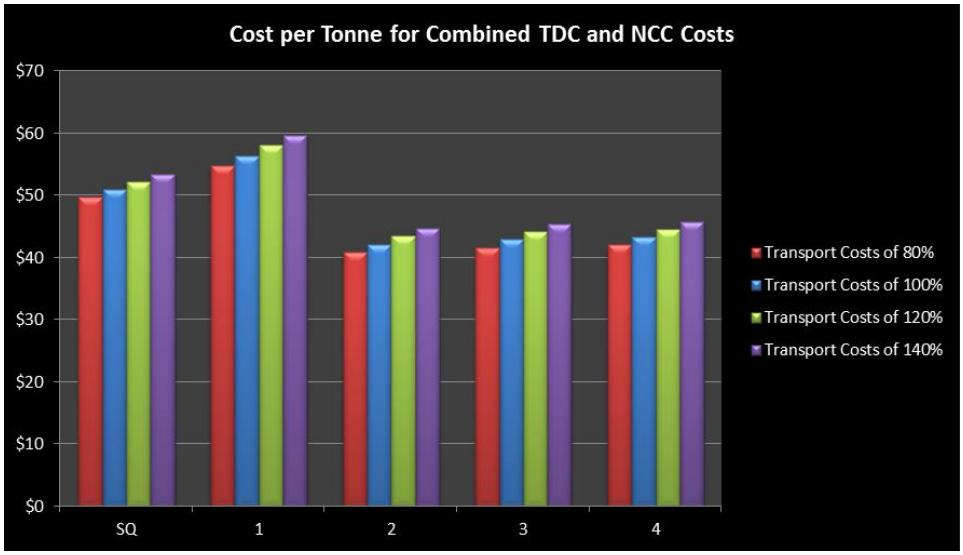


Points to note are.

- Disposal to YVLF (Options 2, 3 and 4) remains the most cost-effective overall and the order of options does not change.
- Option 1 is most affected by an increase in development costs with Option SQ being less affected.
- Options 2, 3 and 4 are least affected - increasing the base development cost by 40% results in an increased cost per tonne of about 6.7% which indicates that developments costs contribute relatively little to the overall costs for those three options.

8.5 Varying Transport Costs

Transport costs have been varied between 80% and 140% of the assumed base costs. The graph below shows how changing transport costs impacts on the cost per tonne for combined Tasman District Council and Nelson City Council costs.



Points to note are:

- Disposal to YVLF (Options 2, 3 and 4) remains the most cost-effective overall and the order of options does not change.
- Option SQ is slightly less affected by an increase in transport costs with the other options being similarly affected.
- Increasing the base transport costs for Options 2, 3 and 4 by 40% results in an increased cost per tonne of just about 6% which indicates that transport costs contribute slightly less than development costs for those three options.

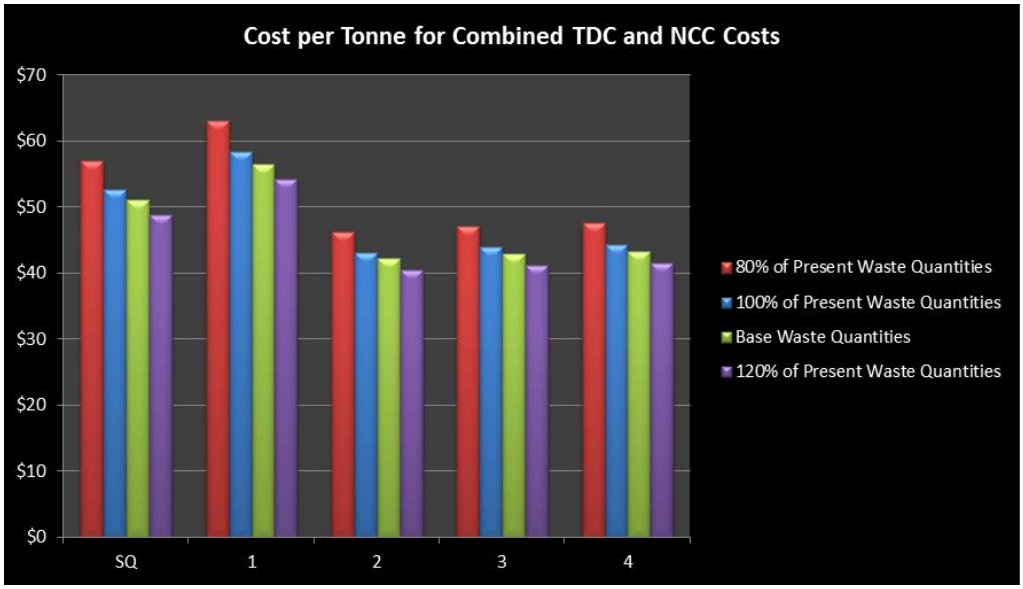
8.6 Varying Waste Quantities

Varying the waste quantities is not as simple as varying the other input parameters. This is because in the base case, the waste quantities for Nelson City are assumed to remain static whilst those for Tasman District increase by approximately 24% over the first 20 years of the modelling period..

The table below shows how waste quantities have been varied in the sensitivity analysis compared to the base quantities.

Case	Nelson City Waste Quantities (as a % of existing quantities)	Tasman District Waste Quantities (as a % of existing quantities)
80%	80%	80%
100%	100%	100%
Base	100%	124%
120%	120%	124%

The graph below shows how changing waste quantities impacts on the cost per tonne for combined Tasman District Council and Nelson City Council costs.



Points to note are.

- Increasing waste quantities reduces the cost per tonne.
- Disposal to YVLF (Options 2, 3 and 4) remains the most cost-effective overall.
- Option 2 is more economical than Options 3 and 4 for both reduced and increased quantities, but the difference is very slight and amounts to approximately $1/ tonne.
- Option 1 is slightly more affected by a change in waste quantities, followed by Option SQ and then Options 2, 3 and 4.

8.7 Summary of Sensitivity Analysis

A sensitivity analysis has been carried out by varying the following six input parameters:

- NPV discount rate
- NZ Emission Trading Scheme (NZ ETS) charges
- operational costs
- development costs
- transport costs
- waste quantities.

In all cases those options that assumed long-term disposal at YVLF (Options 2, 3 and 4) remained the most cost-effective. Additionally, in all cases the order of options remained the same.

Varying the NPV discount rate, development costs and waste quantities had a relatively minor effect on Options 2, 3 and 4.

Conversely, Options SQ, 3 and 4 were most affected by changes in operating costs.

8.8 Other Risk Factors

The sensitivity analysis provides a means to test the financial risk of changing some of the input parameters. Other risks associated with a regional landfill disposal solution include, but are not limited to the following.

- What impact will extra traffic have on local communities?
- Will there be a demand for "host fees" from the local communities?
- Are trans-boundary movements of waste considered an issue?
- Would reverting to a single landfill in the region present a risk should it become inoperable, for instance, due to a severe seismic event? This risk could be mitigated by having the other (closed) landfill designated as an emergency landfill.
- Closing a landfill, for instance EVLF, and then re-opening it after YVLF becomes full may be problematic if there is no expectation from the neighbours of EVLF that EVLF could ever re-open. As noted above, having the landfill appropriately designated as such would assist with continuing with the landfill activity in the future.
- Option 3 assumes that Stage 2 of EVLF will be extended by increasing its height. Obtaining a resource consent for the extension is a risk since the landfill will become more visible from surrounding areas.
- Option 4 assumes that EVLF will remain open for the disposal only of special waste from both Nelson City and Tasman District. Whether or not EVLF is the better landfill for the disposal of special waste, and whether or not EVLF can continue in the future accepting the same type of special waste that it presently accepts is discussed further in Section 8.9 below.

These risks may need mitigation with the advancement of any one of the joint disposal options presented in this study.

8.9 Acceptance of Special Waste

Currently EVLF accepts more special waste than YVLF (respectively approximately 1,600 tonnes per and 900 tonnes per annum).

The EVLF Management Plan describes special waste as follows:

'Special wastes comprise all wastes, other than normal refuse, which require special means for disposal. This could be as a result of their quantity, concentration, composition or physical properties or hazardous nature.

They are divided into:

i. Hazardous wastes where the levels of concentration of hazardous materials do not exceed the acceptance criteria.
ii. Difficult wastes such as animal carcasses, offal, industrial wastes etc."

Whilst the resource consent conditions concerning waste acceptance are somewhat different for each landfill, there does not appear to be any significant restriction placed on one landfill compared to the other for the acceptance of special waste.

8.9.1 Special Waste at YVLF

The waste acceptance criteria for special waste at YVLF are written into the consent conditions. There is no specific requirement for waste acceptance criteria to be specified in a Landfill Management Plan.

The YVLF consent conditions state that *"…with the exception of medical waste and asbestos wastes, no hazardous waste shall be accepted for disposal at the landfill…"*

Wastes, however, which exhibit poisonous, toxic or eco-toxic characteristics, and which meet certain threshold limits through using the US EPA Toxicity Characteristic Leaching Procedure (TCLP), may be accepted as not being hazardous.

TCLP acceptance limits are stated for various constituents in Schedule 2 of Discharge Consent 975261-D, with the limits being derived from NZS 9201 Model Trade Waste By-Law; USEPA Report 40 CRF I 261, and Health and Environmental Guidelines for Selected Timber Treatment Chemicals.

The resource consent conditions allow for TCLP limits to be set at 100 times the drinking water standard for substances where TCLP limits do not exist for those substances.

The TCLP criteria for waste acceptance attached as Schedule 2 to the YVLF resource consents have limits that generally correspond with a Class A landfill, as defined in the MfE Guideline[1].

8.9.2 Special Waste at EVLF

The EVLF resource consent conditions provide more detailed requirements for waste acceptance criteria. Annexure 2 of Resource Consent NN970221 lists the acceptance procedures to be adopted, as well as detailing how applications for special waste disposal are to be evaluated.

Waste acceptance criteria generally follow the CAE Landfill Guidelines and reference is made to Appendix 6 of that document for total and leachable concentration limits. In general, the values stated are also applicable for a Class A landfill[2].

Section 7 of the EV Landfill Management Plan provides details of waste acceptance which adhere to the resource consent conditions.

The methods stated in the EVLF consent conditions to evaluate substances where TCLP criteria are not stated in Appendix 6 of the CAE Landfill Guidelines are similar to those provided in the YVLF resource consents.

Whilst the waste acceptance criteria for EVLF are more explicitly stated in the consent conditions[3], in general the waste acceptance criteria appear to be similar to those in the YVLF resource consents in that they follow the acceptance of waste for a Class A landfill.

8.9.3 Implications for Landfill Classification

The MfE Guidelines on waste acceptance (see reference 1 below) were published after both landfills were granted their resource consents.

Appendix D of the guidelines provides a list of requirements that should be met by a landfill in order to achieve a Class A landfill status.

Amongst the design requirements are the following which are not fully met by either YVLF or EVLF.

- Landfill has a base and side composite liner 1.5mm HDPE overlying 600mm clay, or an alternative landfill liner design that provides equivalent level of risk mitigation.
- Leachate collection system designed to ensure the maximum leachate head over the liner is less than 300mm.

Under the MfE Guidelines both landfills would be classed as Class B, and on renewal of resource consents the waste acceptance criteria would quite likely be increased to match Class B thresholds.

However, if new landfill cells were to be designed to the Class A requirements, then waste acceptance criteria would likely remain for a Class A landfill.

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[1] *Module 2: Hazardous Waste Guidelines. Landfill Waste Acceptance Criteria and Landfill Classification.* Ministry for the Environment; May 2004.
[2] ibid
[3] Possibly also in the Landfill Management Plan, however, the YVLF Management Plan has not been reviewed as part of this assessment.

All landfill development cost estimates for future stages of landfill at both EVLF and YVLF are based on fully lined future extensions with formal leachate collection systems, ie. on Class A standards. The exception to this is the extension of Stage 2 at EVLF. There is a risk that new resource consents for the Stage 2 extension would include waste acceptance criteria for a Class B landfill as given in the MfE guidelines. Mitigation for this would be to construct a liner on top of the existing Stage 2 as part of the development of the extension. The costs to do this are not reflected in the financial model.

It should be noted that the CAE Landfill Guidelines are currently under review and the draft review document classifies landfills in a different manner. A landfill that accepts solely special waste would be expected to be lined and have an engineered leachate collection system.

9 Resource Consent and Other Timelines

EVLF's resource consents expire at the beginning of October 2015. YVLF resource consents expire at the end of 2034.

Irrespective of which option is advanced, Tasman District Council needs to plan for new resource consents for EVLF as a matter of priority.

As part of a separate exercise Tasman District Council has considered the timelines required for preparing and applying for resource consents for each option. Whilst it is conceded that timeframes may vary depending on the complexity of resource consent applications, as a guide it would appear that the required lead time varies between about 12.5 and 18.5 months, depending on the future activities at EVLF.

Applications must be lodged by the beginning of April 2015, a full six months before the resource consents expire. This is in order to allow the existing activity to continue, as provided for in the RMA, should the new resource consents not be granted by October 2015.

Working back from the beginning of April 2015, it is apparent that resource consent preparation for the most time-consuming option (Option 2, which has an estimated lead time of 18.5 months) should start in mid-September 2013 in order to meet the April 2015 deadline.

Tasman District Council needs to have certainty by September 2013 as to which option is to be adopted in order to avoid a potentially more complicating resource consent application process.

10 Summary

The following is a summary of the modelling process and the output results.

Description of the Net Present Value Model

- A net present value model has been constructed that compares the total cost of waste disposal for the combined Tasman District and Nelson City for different options and the status quo (ie. each council continuing with its own landfill).
- The input costs are only those that are not common between the options and therefore the cost outputs presented do not reflect total costs, ie. the cost outputs present comparative costs only.
- Whilst input data for operational and development costs for the EVLF and YVLF and other aspects of each Council's waste disposal contracts have been provided in different formats, one can be reasonably confident that similar costs are being compared.
- Five options have been assessed using the model including the Status Quo disposal option.
- The model outputs are considered as a cost per tonne for Council costs, and as a net present value for haulage costs for Buller District and private commercial waste.

Modelling Results

- Overall, the options that model disposal at YVLF (Options 2, 3 and 4) have the lowest financial costs, even taking account of private commercial haulage costs. On average, the cost of those options is about 25% cheaper than the next most cost effective option which is the Status Quo.
- Option 1- using EVLF as a regional landfill is by far the most expensive option being more than 50% more expensive than the average of Options 2, 3 and 4 (YVLF disposal options).
- The Status Quo Option has the lowest net present value of haulage costs, followed closely by Option 3.
- Options 2 and 4 are slightly more economical than Option 3 but not sufficient to rule out Option 3.
- The construction of Stage 3 at EVLF (considered in Options SQ and 1) is a significant development cost in the short term for EVLF. By opting for a regional landfill at YVLF major landfill development costs within the region can be deferred for about 20 years making disposal of waste at YVLF an attractive financial option.

Assessment of Options Against the JWMMP Guiding Principles

- Haulage costs are considered a measure of the extent to which the various options will impact on the environment. Reducing the environmental impact is reflected in the two core guiding principles of *Global Citizenship* and *Kaitiakitanga/Stewardship.*
- A regional disposal option allows for *Full Cost Pricing* because Councils do not need to consider how disparate landfill charges might cause customers to move to another landfill service provider.
- The financial model considers the *Precautionary Principle* in that the costs of future landfill development are based on "good practice".
- A joint solution should provide better opportunities in terms of the *Product Stewardship* and Life Cycle Principles, and for the application of economic instruments such as landfill bans.

Haulage Costs

- Consideration of Buller District haulage costs does not affect the modelled outcome – there is little difference between hauling from Buller District to EVLF compared to hauling to YVLF.
- Haulage costs for the EVLF disposal option is just over 150% times higher than those for YVLF because the costs of hauling waste from Nelson City to EVLF are much higher than the costs of hauling waste from Tasman district to YVLF.
- Tasman District Council haulage costs to YVLF are only about 1% higher than to EVLF.

Sensitivity Analysis and Risk Factors

- A sensitivity analysis has been done by varying the following six input parameters: NPV discount rate, ETS charge rate, operational costs, development costs, transport costs and waste quantities.
- In all cases, long-term disposal to YVLF (Options 2, 3 and 4) remains the most cost effective, with Option 2 being marginally more cost effective than Options 3 and 4.
- A number of other risk factors associated with the options have been identified but have not been investigated. If both landfills are designated then these designations would help mitigate the risk of being able to re-open the landfills should one of them have been closed for a period of time. Re-opening could be either for long-term disposal purposes after the other landfill had been filled to capacity, or could be a temporary measure should the other landfill be inoperable, for instance due to a seismic event.
- The resource consent conditions for EVLF are more specific for waste acceptance, however the criteria for acceptance of special waste appear to be similar for both landfills and are currently in line with the MfE guidelines for a Class A landfill.
- It is doubtful whether either landfill would achieve a Class A status without having to construct more extensive landfill liners and leachate collection systems than currently exist on each site. The financial model has assumed that such facilities will be provided for future extensions to each landfill.
- The status of the EVLF may have to change from Class A to Class B if the extension of Stage 2 of the landfill continues in the same manner that Stage 2 has been constructed to date.
- There is an advantage to both Councils to have EVLF available for the disposal of special waste because it is a mechanism for keeping the landfill open for future further use as a regional landfill.

Description of Most Cost-effective Options

- Option 2 assumes closure of EVLF in October 2015, with all Tasman District waste then going to YVLF which will become a regional landfill after October 2015.
- Option 3 assumes Stage 2 of EVLF will be extended to allow it to operate until about 2022, thereafter all Tasman District waste will go to YVLF which will become a regional landfill after 2022.
- Option 4 assumes closure of EVLF in October 2015 for all waste but special waste, with all Tasman District general waste then going to YVLF which will become a regional landfill after October 2015, and EVLF remaining open for all of the region's special waste. An extension to Stage 2 of the EVLF has sufficient capacity to accommodate the present quantities of special waste generated in the region for the next 30 to 40 years.

Renewal of Resource Consents and Associated Decisions

- EVLF resource consents expire in October 2015. Irrespective of its future use new resource consents will need to be applied for. It is estimated that a time period of between 12.5 and 18.5 months is needed to apply for resource consents for the different options. Applications need to be lodged by 01 April 2015 which means that for the worst case option the application process needs to be started by mid-September 2013.
- Tasman District Council needs to have certainty by September 2013 as to which option is to be adopted in order to avoid a potentially more complicating resource consent application process.

The following table provides a list of the advantages and disadvantages of each of Options 1 to 4 for each Council, in comparison to the Status Quo Option. The cost per tonne for each Council's Status Quo option is presented in the table together with apportioned costs per tonne for all other options for each Council, excluding private commercial haulage costs.

Option	Apportioned Cost/tonne and Advantages and Disadvantages Compared to Status Quo Option			
	Tasman District Council		Nelson City Council	
SQ	$62		$41	
1	$59		$54	
	Advantages • Continuation of service at EVLF. • Full cost pricing applicable • Lower haulage costs than Options 2, 3 or 4. • Cost sharing for development costs. • Full use of existing Stage 2. • Costs lower than SQ.	Disadvantages • 18.5 months consent application period. • Increased road traffic – possible increased disruption to neighbours and road maintenance.	Advantages • Reduced road traffic, disruption to neighbours and road maintenance. • Full cost pricing applicable. • No development costs.	Disadvantages • Discontinuation of service at YVLF. • Significantly increased haulage costs. • Costs higher than SQ.
2	$47		$38	
	Advantages • 12.5 months consent application period. • Costs significantly lower than SQ. • Significantly reduced road traffic to EVLF. • Full cost pricing applicable. • No future development costs.	Disadvantages • Discontinuation of service at EVLF. • Slightly higher haulage costs than SQ. • Stage 2 not fully utilised.	Advantages • Continuation of service at YVLF. • No increase in haulage costs. • Costs lower than SQ. • Full cost pricing applicable.	Disadvantages • Increased road traffic – possible disruption to neighbours and road maintenance. • Development of next stage is advanced compared to SQ.
3	$48		$38	
	Advantages • Costs significantly lower than SQ, but not as low as Option 2. • Reduced road traffic to EVLF. • Full cost pricing applicable. • Limited future development costs. • Stage 2 fully utilised.	Disadvantages • 18.5 months consent application. • Discontinuation of service at EVLF after 2022. • Slightly higher haulage costs than SQ.	Advantages • Continuation of service at YVLF. • No increase in haulage costs. • Costs lower than SQ. • Full cost pricing applicable.	Disadvantages • Increased road traffic – possible disruption to neighbours and road maintenance. • Development of next stage is advanced compared to SQ.
4	$49		$39	
	Advantages • Costs significantly lower than SQ but not as low as Option 2. • Reduced road traffic to EVLF. • Full cost pricing applicable. • Limited future development costs. • Stage 2 fully utilised for disposal of special waste.	Disadvantages • 14.5 months consent application. • Slightly higher haulage costs than SQ.	Advantages • Continuation of service at YVLF. • No increase in haulage costs. • Costs lower than SQ but not as low as Options 2 and 3. • Full cost pricing applicable. • Special waste goes to EVLF.	Disadvantages • Increased road traffic – possible disruption to neighbours and road maintenance. • Development of next stage is advanced compared to SQ.

11 Conclusions

The following conclusions from the study are drawn.

- Overall, the options that model disposal at YVLF (Options 2, 3 and 4) have the lowest financial costs, even taking account of private commercial haulage costs. On average, the cost of those options is about 25% cheaper than the next most cost effective option which is the Status Quo.
- Option 1- using EVLF as a regional landfill is by far the most expensive option being more than 50% more expensive than the average of Options 2, 3 and 4 (YVLF disposal options).
- The Status Quo Option has the lowest net present value of haulage costs, followed closely by Option 3.
- Options 2 and 4 are slightly more economical than Option 3 but not sufficient to rule out Option 3.
- The construction of Stage 3 at EVLF (considered in Options SQ and 1) is a significant development cost in the short term for EVLF. By opting for a regional landfill at YVLF major landfill development costs within the region can be deferred for about 20 years making disposal of waste at YVLF an attractive financial option.
- However, Option 4, which assumes that EVLF is kept open for disposing of the region's special waste is also a financially attractive option. This option assumes special waste quantities will remain at the same level and that special waste will meet the current waste acceptance criteria for disposal at EVLF.
- Assessed timelines for obtaining new resource consents for EVLF for Options 2, 3 and 4 show that there is a limited time available and a decision on which option is to be adopted is required by September 2013.
- Tasman District Council needs to have certainty by September 2013 as to which option is to be adopted in order to avoid a potentially more complicating resource consent application process.
- Appropriate designations for each landfill would help mitigate the risk of being unable to re-open the landfills in the future, either for long-term disposal purposes or as a temporary measure, should it be needed.
- In order to avoid a potentially more complicating resource consent application process for EVLF, a decision needs to be made by September 2013 as to the future of EVLF.
- In future, major triggers for re-assessing the financial viability of a joint solution would be the future renewal of resource consents and the likelihood of major capital expenditure being required, for instance, for the development of the next stage of a landfill.

Appendix A List of Inputs and Costs Included in the Financial Model

- Waste tonnages (*20yr Operational Forecast for Tasman District and Nelson City AMP*).

- Waste haulage costs from RRCs to EVLF and YVLF (*20yr Operational Forecast for Tasman District and Nelson City AMP, NZTA transport models*).

- EVLF operational costs for (*20yr Operational and Capital Forecast for Tasman District, Tasman District AMP*) including:
  - ✓ Provision of service
  - ✓ Landfilling of waste
  - ✓ Special waste handling charges
  - ✓ Unit rate items
  - ✓ Asset maintenance
  - ✓ Active landfill monitoring
  - ✓ Levy for post-closure monitoring
  - ✓ Closed landfill monitoring and maintenance
  - ✓ Professional services and survey
  - ✓ Council engineering and administration overheads
  - ✓ Rates and sewerage charges
  - ✓ Waste levy charges
  - ✓ ETS charges
  - ✓ ETS reporting
  - ✓ Weighbridge operations costs (*MWH estimate*).

- YVLF operational costs for (*Nelson City AMP*) including:
  - ✓ Marginal cost of accepting additional waste
  - ✓ York Valley Landfill operations
  - ✓ LFG operations
  - ✓ Leachate control
  - ✓ Resource consent conditions
  - ✓ Toe embankment maintenance
  - ✓ Illegally dumped refuse
  - ✓ Waste levy charges
  - ✓ ETS levy
  - ✓ Telephones
  - ✓ Electricity
  - ✓ Rates
  - ✓ Water by meter charges
  - ✓ Trade waste charges
  - ✓ Insurance
  - ✓ Levy for closure costs
  - ✓ Valuations/surveys
  - ✓ Plant maintenance
  - ✓ Weighbridge maintenance
  - ✓ Aftercare amortisation
  - ✓ Depreciation
  - ✓ Loss of service potential.

- EVLF development costs (*20yr Capital Forecast for AMPs; MWH estimate for resource consents applications for EVLF*):
  - ✓ EVLF Stage 2 extension estimate
  - ✓ EVLF Stage 3 development
  - ✓ Pavement enhancements
  - ✓ Capping of Stage 2 of EVLF
  - ✓ Consent renewal for EVLF
  - ✓ Retrofit LFG to Stage 2 of EVLF
  - ✓ Gas flare for EVLF
  - ✓ Weighbridge to accommodate private commercial vehicles (*MWH estimate*).

- YVLF development costs (*Nelson City AMP*[4]*; MWH estimate for resource consents applications and development costs for Stage 3 of EVLF*):
  - ✓ Access road stormwater
  - ✓ Renewal of gas meter
  - ✓ Other sundry renewals
  - ✓ Capital for piezo monitoring wells
  - ✓ Horizontal drilling for drainage
  - ✓ Collection network/flare/gas
  - ✓ Capital for furniture and fittings
  - ✓ Planting
  - ✓ Road extension
  - ✓ Reseal of roads
  - ✓ Leachate control
  - ✓ Stormwater control
  - ✓ Capital for weighbridge improvements
  - ✓ Resource consent and development costs for Gully 3 (assumed as for Stage 3 of the EVLF).

[4] The Nelson City AMP provides costs for a ten-year period. To account for the 20-year modelling term the costs assumed in the AMP for years 1-10 have been extrapolated for years 11-20.

Appendix B Details of Model Output Costs

The table below provides information on the net present value costs for haulage, landfill operations and development for each Council. Landfill operations and developments costs have been pro-rated between each Council in the ratio of the estimated waste quantities over the 40 year modelling period. The split between Tasman District and Nelson City waste quantities is estimated to be approximately 46%: 54%. From these costs the total cost per tonne has been derived for each Council.

		APPORTIONED NET PRESENT VALUE COSTS									
		TASMAN DISTRICT COUNCIL					NELSON CITY COUNCIL				
Long-term Disposal	**Option**	**Haulage Costs[1]**	**Operating Costs[2]**	**Development Costs[3]**	**TOTAL TDC NPV COSTS**	**TDC COST PER TONNE[4]**	**Haulage Costs[1]**	**Operating Costs[2]**	**Development Costs[3]**	**TOTAL NCC NPV COSTS**	**NCC COST PER TONNE[4]**
EVLF and YVLF[5]	**Status Quo:** Extend Stage 2 at EVLF, then develop Stage 3 when needed for TDC waste only. YVLF to continue accepting all of NCC waste.	$5,237,000	$13,546,000	$9,771,000	$28,554,000	$62	$944,000	$19,502,000	$1,907,000	$22,353,000	$41
EVLF	**1:** Extend Stage 2 and develop Stage 3 at EVLF. Close YVLF in 2017 with reduced costs to shaping and capping of landfill, and send all NCC waste to EVLF.	$5,237,000	$13,196,000	$8,832,000	$27,265,000	$59	$3,147,000	$15,499,000	$10,373,000	$29,019,000	$54
YVLF	**2:** Close EVLF in 2015 and send all TDC waste to YVLF. All NCC waste continues to go to YVLF.	$5,297,000	$12,970,000	$3,510,000	$21,777,000	$47	$944,000	$15,233,000	$4,123,000	$20,300,000	$38
	3: Extend Stage 2 at EVLF until 2022, then send all TDC waste to YVLF. All NCC waste continues to go to YVLF.	$5,275,000	$13,855,000	$2,981,000	$22,111,000	$48	$944,000	$16,272,000	$3,501,000	$20,717,000	$38
	4: Close EVLF in 2015 for general waste but keep open for all special waste from TDC and NCC. Send all TDC general waste to YVLF. All NCC general waste continues to go to YVLF.	$5,297,000	$13,665,000	$3,326,000	$22,288,000	$49	$944,000	$16,050,000	$3,906,000	$20,900,000	$39

[1] Haulage costs are for Council haulage of refuse from their own RRCs to either the EVLF or YVLF, depending on the option under consideration.
[2] Operating costs are apportioned to each Council by summing all operating costs for both EVLF and YVLF for each option and then pro-rating them to each Council on the basis of the tonnes disposed of by each Council over the 40 year modelling period. The ratio is approximately 46% Tasman District to 54% Nelson City. This does mean that where a landfill closes, eg. EVLF for Options 2, 3 and 4, both Councils will contribute to the on-going costs at EVLF for aftercare operations.
[3] Development costs are similarly apportioned for each Council as described for the operating costs.[4] Total cost per tonne for each Council is (TOTAL COUNCIL NPV COST / TOTAL COUNCIL NPV TONNES).
[5] There is no apportioning of operating and development costs for the Status Quo Option.

Appendix C Waste Haulage Costs

The table below has been extracted from the financial model to provide a measure of the financial cost of haulage of waste that occurs with each option.

		NET PRESENT VALUE COSTS				
Long-term Disposal	**Option**	**For Tasman District**	**For Nelson City**	**Buller District Council Haulage to Either YVLF or EVLF**	**Private Commercial Haulage to YVLF, EVLF or Pascoe Street TS**	**Total Haulage Costs**
EVLF and YVLF	**Status Quo:** Extend Stage 2 at EVLF, then develop Stage 3 when needed for TDC waste only. YVLF to continue accepting all of NCC waste.	$5,237,000	$944,000	$1,382,000	$3,936,000	$11,499,000
EVLF	**1:** Extend Stage 2 and develop Stage 3 at EVLF. Close YVLF in 2017 with reduced costs to shaping and capping of landfill, and send all NCC waste to EVLF.	$5,237,000	$3,147,000	$1,327,000	$9,334,000	$19,045,000
YVLF	**2:** Close EVLF in 2015 and send all TDC waste to YVLF. All NCC waste continues to go to YVLF.	$5,297,000	$944,000	$1,382,000	$3,936,000	$11,559,000
	3: Extend Stage 2 at EVLF until 2022, then send all TDC waste to YVLF. All NCC waste continues to go to YVLF.	$5,275,000	$944,000	$1,382,000	$3,936,000	$11,537,000
	4: Close EVLF in 2015 for general waste but keep open for all special waste from TDC and NCC. Send all TDC general waste to YVLF. All NCC general waste continues to go to YVLF.	$5,297,000	$944,000	$1,382,000	$4,138,000	$11,761,000

The following comments are made.

- The Status Quo appears to have the lowest haulage costs overall, with Options 2, 3 and 4 following closely behind.
- On average, total haulage costs to the EVLF disposal option (Option 1) are just over 1½ times more than to an YVLF disposal option (Options 2, 3 and 4).
- For Tasman District Council, haulage costs to YVLF are only about 1% higher than haulage costs to EVLF.
- For Nelson City Council, haulage costs to EVLF are about 330% higher than haulage costs to YVLF.

The results shown in the table and accompanying comments need to be considered in light of the following notes.

- Currently the two Councils have different landfill access policies. Private commercial vehicles may go directly to YVLF whereas they cannot do so at EVLF. Transport costs may be reduced to EVLF if large commercial loads could be sent directly.
- Whilst Buller District Council haulage costs appear slightly less to EVLF, it is known that the haulage of waste is contingent on the transport operator being able to back-haul freight to the Buller District. It is most likely that the transporter will have to travel beyond EVLF to pick up the back-loads which will negate the cost difference between hauling to EVLF and hauling to YVLF.