Final

Nelson Tasman Regional Landfill Business Unit

Activity Management Plan 2021– 2031

Mahere Ruapara 2021 - 31

tasman district council

Nelson City Council
te kaunihera o whakatū

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Cover Photos:
Front Face of York Valley Landfill (left), New Borrow Area at Eves Valley Landfill (right)

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Executive Summary

i. The Purpose of the Plan

The Nelson-Tasman Regional Landfill Business Unit (NTRLBU) was established in 2017. In the Deed of Agreement, dated 13 April 2017, the NTRLBU has been delegated control of all activities and assets used for Gully 1 of the York Valley Landfill and those used for the Eves Valley Landfill, and for the operational control of these areas within both landfills.

The Terms of Reference for the NTRLBU requires that the landfills be operated on a regional basis in accordance with the NTRLBU Activity (Asset) Management Plan (AMP) amongst other plans.

This Landfill AMP summarises the management, financial, engineering and technical practices to ensure that the required level of service is provided effectively for the landfill activity.

The purpose of this AMP is to ensure that landfill assets are operated and maintained so that they deliver the required level of service to existing and future customers in a sustainable and cost-effective manner.

ii. Asset Description

The Nelson Tasman Regional Landfill Business Unit (NTRLBU) manages the York Valley (currently operating) and Eves Valley Landfill (currently closed to landfilling) assets, which have a replacement value of $7.9M (excluding value of land), on behalf of the Nelson City and Tasman District Councils (the Councils). The value of depreciation is directly related to the replacement cost and useful life of assets.

Should upgrades require funding beyond funds available within the closed account, funds are borrowed from the two Councils, as an internal loan on application to and with the approval of both Councils.

The landfill activity has a loss of $2,000,000 (due to a significant change in discount rate for post-closure provision ($3.0m), partially compensated by a reduced emissions trading cost ($1.0m)) that is being paid back at a rate of $200,000 per year for the next 10 years.

Operational activities are funded from landfill charges.

iii. Key Issues

The responsibility for the management of the York Valley and Eves Valley Landfills has been transferred to the NTRLBU. The Nelson-Tasman area is well positioned in this regard with two designated landfill sites located in the region.

Over the next 10 years the landfill activity faces a variety of issues and challenges, as outlined below.

- York Valley capacity will be exceeded on the current design resulting in the requirement for a consent for an extension to landfilling at York Valley or for a new landfill to be consented, constructed and commissioned either at Eves Valley or a new location.
- Options may be available for extending the life of York Valley Gully 1 and these options need to be investigated and if possible implemented.
- Changing legislation and compliance requirements:

- The Waste Minimisation Act 2008 established a $10 per tonne national waste disposal levy through which central government can influence waste minimisation initiatives. The government has signalled that the national waste disposal levy is to be increased to $60 per tonne for municipal solid waste by 2024 in a series of steps. The costs will be passed on to customers.
- The Emissions Trading Scheme (ETS) will continue to have a significant impact on solid waste management because the cost of carbon is linked to local commodity markets. This has resulted in the cost of units increasing from less than $2 several years ago to being close to $35 per unit, and likely to increase further in the short term. The Government proposes to introduce an NZU price floor of $20 for the period 2020 to 2025 that will work by placing a reserve price below which NZUs will not be sold at auction. A trigger price ceiling of $50 for 2020 to 2025 is being proposed. As an interim measure, the Government is proposing to amend legislation to increase the fixed price option from $25 to $35 for surrender obligations arising from 2020 activities**.** The intention is that this will stabilise the price in that the Government will release more credits to the market in the event that the fixed price threatens to go above $50.
- The implications for the NTRLBU is that the ETS is likely to increase the cost of landfill operations. This additional cost will be met by increasing the base cost of each tonne of waste to landfill. As for the national waste disposal levy, costs associated with the ETS will also be passed on to customers. However, NTRLBU intends to apply for a reduction in ETS charges as discussed in Section 3.1.6 to offset the increase in base cost.
- The Zero Carbon Bill- The purpose of the Climate Change Response (Zero Carbon) Amendment Bill is to provide a framework by which New Zealand can develop and implement clear and stable climate change policies that contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 degrees. The bill provides for target emission reductions such that net emission of greenhouse gases in a calendar year are zero by 1 January 2020.

- Growing demand will lead to increased usage and expansion of waste services, increasing demand on landfill disposal services:
  - Increasing population, visitors and industry will increase demand for services.
  - The impacts of climate change could increase the demand for investigating and introducing alternative ways of dealing with waste materials (this is a matter for Councils to consider, rather than for the NTRLBU).
- Increasing customer expectations:
  - Improved communication and consultation may be required, which might include carrying out landfill customer surveys.
  - Increased external communication and performance information availability.
- Operational challenges at York Valley Landfill include:
  - Fire detection system to reduce the risk from the increasing number of fires caused by discarded batteries and flares.
  - Road alignment to facilitate maximum airspace availability.

- Vehicle wash down requires improvement.
- Sediment control and sediment ponds are not to current standards; they need re-design and re-construction.
- Stormwater system has failed in some locations and requires replacement/significant improvement.
- Landfill gas harvesting efficiency is not optimal and may be declining.
- Gas harvesting conflicts with existing contract holders.
- "SWAP" (Solid Waste Analysis Protocol) studies are required to understand the composition of waste being received. This may lead to consideration of partial diversion e.g. to an alternative cleanfill site.
- Weighbridge office needs refurbishment.
- Stability of the landfill needs careful monitoring.
- A specific design for the closed landfill surface needs to be developed to guide current placement of waste and siting of cleanfill borrow areas, and integrate with the stormwater system design.

- For Eves Valley Landfill the following current issues exist:
  - Potential for Health & safety issues and/or odour complaints, and ongoing carbon emissions management because of venting of landfill gas to atmosphere; even though gas vents have recently been closed off.
  - Access to the site is occasionally cut-off due to flooding of the Landfill Stream over the access road.
  - Limited capacity to deal with leachate volumes during storm events, with increased costs to tanker leachate. Risks of leachate overflow to stormwater system and beyond.
  - The downstream leachate pipeline (to Brightwater) integrity and performance is not well understood.

The focus of the landfill activity over the next few years will be to implement this Landfill Activity Management Plan.

iv. Levels of Service

The NTRLBU is responsible for ensuring that an accessible and efficient landfill facility is provided for existing and future customers in a sustainable and cost-effective manner.

Levels of service are driven by customer expectations, technical constraints, compliance with legislative requirements and NTRLBU's strategic goals and objectives.

Customer expectations relating to the landfill are:

- That the landfill operations comply with legislation and the requirements of the resource consents;
- That planning and development of the landfills be carried out in a timely manner to ensure continuity of the disposal service;
- That financing of landfill developments, operations and aftercare be done in an equitable way across generations.

The landfill activity contributes to community outcomes in several ways:

- All waste collected by the Councils' operators or delivered to the landfill is disposed of in an appropriate and sustainable manner through activities managed to minimise the impact on the receiving environment;
- Landfill activities are operated in a safe and efficient manner;
- Planning is made for future growth and provision of disposal services that communities are satisfied with.

Enhanced customer engagement will ensure that feedback on the landfill activity informs our planning and activities.

Performance measures have been set in line with the following strategic themes that relate to community outcomes of health, environment and education:

- Impacts:
    - All landfill activities, facilities and services comply with resource consent conditions, site management plans and appropriate legislative requirements with nil non-compliances;
    - Adequate landfill space is available (five years consented and two years developed) to ensure future sustainability of solid waste disposal;
- Costs:
    - Cost effective and sustainable landfill services are available that require no rates and are 100% user pays (gate fees include a local waste levy that subsidises other waste management activities e.g. waste management and minimisation activities undertaken by the Councils, so reducing rates, but there are no rates for landfill activities, as such);
- Demand:
    - NTRLBU operational contracts require minimum standards of waste compaction (> 0.8t/m^3) to maximise landfill capacity;
    - Landfills are open at convenient times and 100% of the specified opening hours;
- Health and Safety:
    - Landfill activity provided in a safe manner and pose no health and safety risks to contractors and nearby residents with zero complaints and incidents being recorded;
- Quality
    - Good quality customer service with a rating of "highly satisfied";
    - 90% of inquiries received through the Councils' service request system are acknowledged within 24 hours.

v. Future Demand

The total tonnage of residual waste disposed of at municipal landfills in the Nelson-Tasman area tended to trend downwards for the period from 2005/2006 through to 2011/2012. For the next five years it remained approximately constant aside from a small increase in 2013/2014. From 2017 (note change to calendar years), waste quantities have increased with quite a significant increase in 2018 followed by a slight reduction in 2019. These trends are shown in Figure 1.

From 2018 all waste in the region has been disposed of at York Valley Landfill. In that year there was also a significant increase in waste quantities with most of it being in the form of special waste (HAIL, Residential NESCS (National Environmental Standard for Assessing and Managing Contaminants in Soil) and Nelson WWTP sludge). Total waste quantities reduced in 2019 and currently sit around 74,000 tonnes of waste per annum, including around 2,000 tonnes from Buller District.

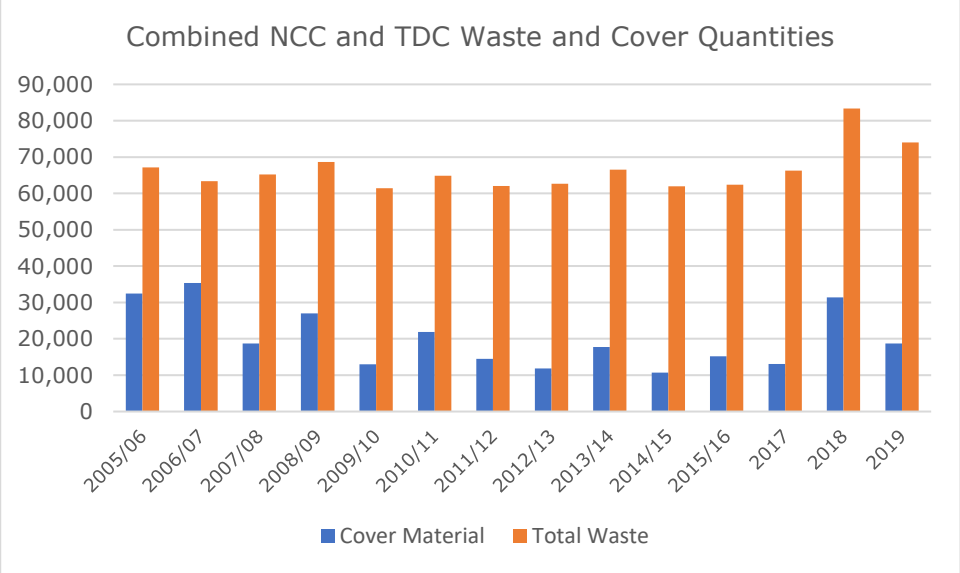

Figure 0-1: Graph of Residual Waste Disposed to Landfill from Nelson City, Tasman and Buller Districts

There is uncertainty how the management of HAIL classified properties will affect demand in future.

Analyses of Nelson-Tasman trends suggest solid waste quantities will continue to grow moderately. Reasons for this include population growth and a reduction in the range of products that can be recycled (some plastics are no longer accepted for recycling). This trend is expected to continue unless action is taken to effect behavioural change in the community or new diversion techniques are introduced, either at a local or national level.

For landfill tonnages to start trending downwards again would most likely require continued intervention by the Councils, however, the effects of the Covid-19 pandemic are likely to stifle economic growth in the short term, and it is possible that a reversal in tonnages may become evident this financial year. Further reversal may be achieved if the Government's consultation document 'Proposed priority products and priority product stewardship guidelines' is adopted, which targets wastes such as tyres, batteries, refrigerants and agrichemicals.

Figure 110-2 below indicates potential tonnes of waste disposed to landfill in Nelson–Tasman over the next 12 years and presents four scenarios: growth at 1% per annum (in line with long term population projections), 0.5% growth, no growth and a small decrease in waste per annum. These last three scenarios will require interventions and a reduction in waste per capita to be achieved.

Both Councils have stated intentions to reduce the amount of solid waste being disposed of to landfill by 10% by year 2030. Based on current waste quantities (~74,000 tonnes), this would imply a reduction down to 66,600 tonnes per year which would require significant intervention, either at a local or national level.

For the purposes of future planning a conservative assessment (higher) has been undertaken. This assumes a growth of 1%. Historic volumes have been as high as 81,000 tonnes per annum.

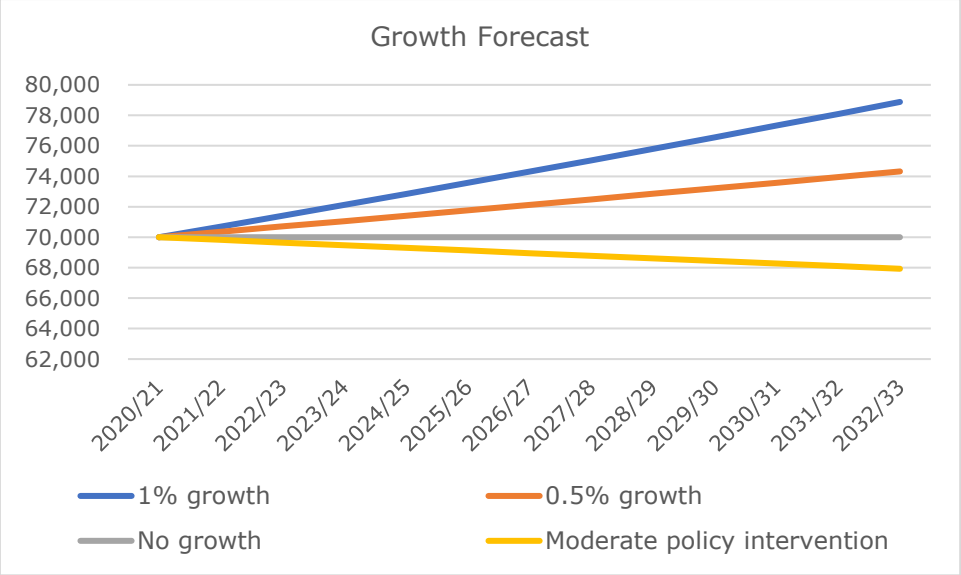

Figure 0-2: Waste growth forecasts for Nelson-Tasman residual waste.

With an expected future population growth in the Nelson-Tasman region, waste quantities are also expected to increase. This increase will be off-set only if new initiatives are implemented to effect behavioural change in the community, or new diversion techniques are introduced either at a local or national level.

vi. Lifecycle Management Plan

The assets of the landfill activity and those for which the NTRLBU is responsible are the York Valley and Eves Valley Landfills.

The lifecycle of a landfill consists of the following broad phases, which can overlap: planning, conceptual design, resource consenting, detailed design, construction, operations, closure, aftercare and end use. Different stages of the same landfill can be at different phases. For instance, Stage 2 of the Eves Valley Landfill has recently been closed, whilst Stage 3 is at the start of the planning and conceptual design stages. Gully 1 of York Valley Landfill is in the operations stage.

Landfills are assets that consist of various asset components (e.g. road pavements, pipes, service buildings etc.). Each of these asset components have finite lives and so each have their own asset lifecycle. The York Valley and Eves Valley Landfills do not have identical asset components. For instance, there is no hazardous waste store at York Valley Landfill and Eves Valley Landfill does not have a landfill gas collection system with a flare, a wheel wash or a weighbridge and kiosk.

For a landfill there are two "levels" of asset lifecycle management. At the higher level there is the landfill facility, taken as a whole and at the lower level there are the physical asset components that make up the landfill asset.

The asset lifecycle management at these two levels is different. The financial management of the landfill asset is undertaken by carrying out a full cost accounting (FCA) exercise that takes account of all the capital and operating costs that will be incurred over the whole life of the landfill, (i.e. from planning through to end use). FCA is a dynamic process that needs to be able to respond to changes over the lifetime of a landfill project. The FCA model should be revised on a regular basis to reflect new and better information.

An FCA model has been used to estimate costs for Stages 2 and 3 of Eves Valley Landfill. The last detailed revision of the FCA model was done in 2014 for Stage 3 of

the landfill. Since then cost adjustment factors have been applied to update the estimate for inclusion in Tasman District Council's 2018-2028 LTP and to inform the Landfill AMPs in 2018 and 2021.

The Eves Valley Landfill FCA model should be reviewed and cost estimates revised for Stage 3 as part of the Improvement Plan.

Landfill development is limited for the remaining capacity of Gully 1 of York Valley Landfill. The present cost estimates have been derived from estimates that were done for the 2018 Landfill AMP and it is considered appropriate to review those cost estimates as part of the Improvement Plan.

There is between approximately nine and 14 years of available landfill capacity at York Valley Landfill, as at the end of June 2020, depending on the compaction density and annual waste tonnage, and whether or not additional airspace can be developed. Note, however, that the resource consent for York Valley Landfill expires at the end of 2034 and so the maximum available time life can only be achieved by a combination of reduced waste tonnages, high waste compaction densities and by applying for a resource consent, however this is not yet confirmed.

The asset components vary in age and are recorded in separate valuation reports. The level of detail is limited and further work is required to identify the condition of individual asset components and their remaining lives.

The NTRLBU contracts out the day-to-day operation and maintenance of landfill assets and waste disposal services with the contracts being let on a combination of prescriptive and performance basis. There is a single contract, which covers the activities at both landfills.

The renewal and upgrade plan allows for significant capital expenditures of $750,000 in both 2020/2021 and 2021/2022 for improving stormwater control at York Valley Landfill. Capital has also been allowed for in the plan for the drilling of additional piezometer wells, planting the front face of the landfill, improving the weighbridge management and load recording systems, and upgrading the vehicle wash.

Additional funding will be required to increase the gas capture following the completion of a gas management review. An estimate of $2.0M will be required at York, with another $1.0M at Eves Valley.

$50,000 was allowed for the Eves Valley landfill in 2020/2021 to continue consenting of Stage 2 with $200,000 in both 2021/2022 and 2022/2023 to carry out additional consent actions for Stage 2 and investigations for Stage 3 as a regional site.

Further work will be required in 2021/2022 to consider the economic implications of changing from York Valley Gully 1 to Eves Valley Stage 3 rather than York Valley Gully 3. It is necessary to review options for future landfill sites due to the significant cost implication ($4M/ annum) from ETS liabilities. From 2023/24 considerable capital expenditure is projected for further investigating and consenting Stage 3 of the Eves Valley landfill. This is followed by the construction of the landfill, which is projected to commence in 2026/27.

The NTRLBU is yet to establish a Disposal Plan for any of the asset components. This will be developed by 2024/25.

vii. Risk Management Plan

The risk management framework adopted for this asset management plan is consistent with the joint Australian, New Zealand Standard AS/NZI 4360:2004 Risk Management.

Presently an assessment of risks at an operational level has only been done for York Valley Landfill and so a consistent approach to assessing risk will need to be applied to both landfills in the future. Nevertheless, many of the risks identified for York Valley Landfill are also applicable to Eves Valley Landfill. One of the identified risks has a rating of "Extreme", three have ratings of "Moderate", with the rest being rated as "Low", as noted in Table 0-1.

Table 0-1 Risk Priority Rating Matrix for York Valley Landfill (Semi-Quantitative)

Risk Event	Consequence	Score	Risk
Earthquake	Causing structural failure of landfill and/or toe buttress, roads and services	123	Mod
Landslide	Causing disturbance to landfill working face	39	Low
Leachate pipe failure	Causing downstream leak to ground	45	Low
Gas flare system failure	Landfill gas leakage to air, and increased ETS costs	81	Low
Gas collection system failure	Landfill fire	84	Low
Non-compliance with resource consent	Resulting in remedial action to ensure compliance	105	Mod
Competition from alternative landfill	Could affect level of service, service delivery model and increase cost to customers	26	Low
Hazardous waste not identified	Causing H&S hazards or environmental effects	91	Low
Increases in ETS charges	Increase cost to customers, could affect level of service, increased fly-tipping	119	Mod
Increase in National Waste Disposal Levy charges	Increase cost to customers, could affect level of service, increased fly-tipping	133	Mod
Rapid use of airspace	Limited available capacity; need to develop additional airspace sooner	75	Low
External event causes significant reduction in tonnages	Reduced landfill revenue may require an increase in user charges	45	Low
Stormwater damage to landfill	Cause disturbance to landfill working face; result in discharges of sediment/leachate off site	87	Low
Fire in the landfill	Site closure; release of noxious fumes	245	Extreme

The following strategies are in place to mitigate the consequences of these risk events occurring:

- A Deed of Agreement has been signed in terms of which the remaining capacity in Stage 2 of Eves Valley Landfill shall be used for disposal of regional waste for up to one year under emergency conditions. The consent for this has not yet been completed.
- The NTRLBU has management plans for the landfill activities for which the Councils hold resource consents. Each plan identifies actions and responsibilities associated with the land, the facility development, the operation, and operational and environmental monitoring. The plans are based on statutory requirements and good practice and significant cultural values, and form the basis of any assignment of responsibilities, such as through contracts or leases.
- A new entrant to the solid waste disposal market could bring in a low cost, easy to use collection system aimed at maximising residual waste collection. Such a system could create an environment where gains made over time in recycling and re-use could be compromised and result in Councils having to

rely on rates funding to manage solid waste initiatives. Councils offer collection services which helps Councils control the disposal of certain fractions of the waste stream.

- Increases in ETS or national waste disposal levy charges will, most likely, be transferred to customers through gate charges. Depending on the amount of increase, it could lead to an increased usage of recycling and waste diversion facilities. Councils should keep customers informed of any impending increases in ETS or national Waste Levy charges.

- Significant reductions in waste tonnages are unlikely and if they did occur, are most likely to be related to periods of marked reduced economic growth, which are unlikely to prevail in the long-term. Operations may need to be scaled back to suit reduced tonnages, if this risk eventuated.

viii. Financial Summary

The landfill activity is funded from gate charges, sale of gas and electricity and interest.

A significant component of the gate charges (43%) is used to raise a local waste disposal levy which funds waste management and minimisation initiatives of each Council that are not fully funded directly from non-landfill activity user charges.

The local waste disposal levy has been set at a value of $2,400,000 for the 2020/21 financial year for each Council. The value of the local waste disposal levy will be reviewed annually as part of the Annual Plan processes of the Councils in liaison with the Joint Committee of the NTRLBU.

The landfill activity is funded from landfill charges. Table 6-12 summarises the projected operations and maintenance costs for the next ten years (2020/21 costs included for comparison). Similarly, Table 0-3 summarises the projected capital costs. Total operations and maintenance costs for 2021/22 to 2030/31 are approximately $160m and capital costs for the same period are approximately $18m.

Table 0-2: Landfill Operation and Maintenance Costs

Landfill operation and maintenance costs for the next 10 years are summarised below:

Costs (thousands)	**2020/21 (this year)**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**
Operations											
Base Expenditure	$10,070	$12,219	$14,180	$16,178	$16,215	$15,934	$16,023	$16,133	$16,246	$16,360	$16,470
Maintenance											
Un-programmed Expenses	$215	$215	$215	$215	$215	$215	$215	$215	$215	$215	$215
Programmed Expenses	$141	$146	$146	$147	$147	$148	$148	$149	$149	$150	$150
Total	$10,426	$12,580	$14,541	$16,540	$16,577	$16,297	$16,386	$16,497	$16,610	$16,725	$16,835

Table 0-3: Capital Costs

Capital costs for renewals and upgrades of the landfills over the next ten years are summarised below:

Costs (thousands)	2020/21 (this year)	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Renewals	$730	$2,680	$962	$100	$263	$100	$0	$0	$145	$0	$0
Upgrades	$860	$1,060	$417	$500	$500	$193	$2,249	$1,675	$1,263	$1,097	$135
Un-programmed capital	$425[1]	$2,115	$1,065	$65	$65	$65	$65	$65	$565	$65	$65
Total capital expenditure	**$2,015[1]**	**$5,855**	**$2,444**	**$665**	**$828**	**$358**	**$2,314**	**$1,740**	**$1,973**	**$1,162**	**$200**

[1] – This includes PGF funded projects, which were not in NTRLBU Business Plan.

Figure 0-3 shows the projected capital expenditure for the landfills for the following ten years (includes 20/21). The consenting of and any possible extension to the consent for York Valley Gully 1 and the consenting for Stage 3 of the Eves Valley Landfill, and its subsequent development in sub-stages (or individual cells) accounts for practically all of the capital costs from 2023/24 (year 3) onwards. Most of the capital expenditure in 2021/2022 is made up of stormwater control and greenhouse gas management improvements at York Valley Landfill, with the greenhouse gas management system at Eves Valley Landfill making up a significant portion of the rest. The final significant work item is the allowance for the toe buttress at York Valley Gully 1 to allow the capacity of the landfill to be extended.

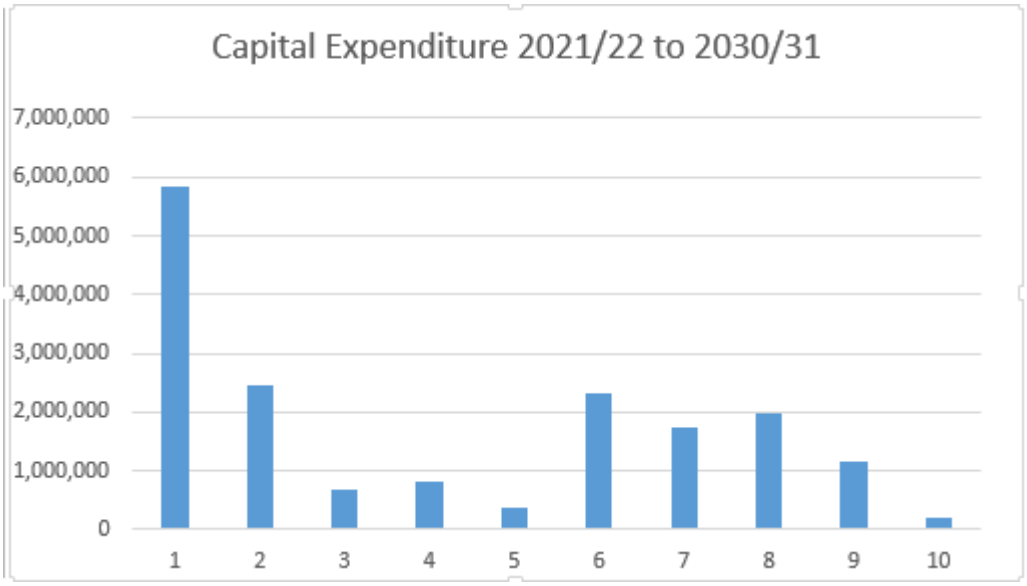

Figure 0-3: Capital Expenditure from 2021/22 to 2030/31.

ix. Asset Management Practices

The AM practices adopted by the NTRLBU are aligned with those which are used by Nelson City Council.

The original AM plan was compiled by a consultant with specific input from the Councils' asset managers and organisational staff who are engaged within the NTRLBU. It was originally compiled from information previously included in the two Councils' solid waste AM plans.

Asset information is not held separately by the NTRLBU and this results in operational delays and issues. The collation of all relevant data would be a useful AM improvement activity. Included in Table 0-4 are improvements AP-1 and AP-2, which will address these issues.

At a technical and operational level the NTRLBU has three staff who also manage the Nelson Regional Sewerage Business Unit: General Manager, Operations Manager and Activity Engineer. From time to time, professional service providers will be appointed, generally through a tender process, to assist with the landfill capital works programme, support the activity management practice and the management of the operations and maintenance contracts.

It is clear from the work profile over the next ten years that a significant amount of capital development work will be required on an ongoing basis and it is intended that NTRLBU will take on additional staff to undertake these activities. The intent is that contractors shall only be required occasionally rather than continually.

The NTRLBU procured a new 5-year operations contract (No. 3912) in December 2018 with Downer that covers operational and maintenance activities at both the York Valley and Eves Valley Landfills.

Section 17A of the Local Government Act requires Councils to review the cost effectiveness of their current arrangements for providing local infrastructure, services, and regulatory functions at regular intervals. Reviews must be undertaken when service levels are significantly changed, before current contracts expire, and in any case not more than six years after the last review. Within the last two years Nelson City Council has undertaken a review of the delivery of landfill services, the outcome being Contract No. 3912.

x. Monitoring and Improvement Programme

Table 0-4 below sets out the actions to be undertaken to improve the management of the Landfill assets.

Table 0-4: Actions to be undertaken

	Actions	Resource Requirements	Progress
AP-1	Include Eves Valley Landfill assets in Infor (NCC's Asset Management System) and valuation model	Internal and consultant	Complete by FY 2022/23
AP-2	Review and audit all landfill assets in the assets register, including in-field inspections to assess conditions.	Internal and consultant	Complete by FY 2022/23
AP-3	Review of stormwater management at York Valley Landfill and develop long term strategy	Internal and consultant	Funding allowed for in capital budget for 2020/21 through to 2022/23.
AP-4	Review York Valley Landfill Management Plan	Internal and consultant	Complete by FY 2022/23
AP-5	Review operations and maintenance costs projected for York Valley Landfill	Internal and consultant	Complete by FY 2022/23
AP-6	Increase landfill gas harvesting and destruction efficiency at York Valley Landfill	Internal and consultant	Funding of 200K in 20/21 for planning
AP-7	Obtain feedback from landfill customers through a direct engagement plan	Internal and consultant	December 2021
AP-8	Review the Risk Register for both landfills	Internal and consultant	December 2021

AP-9	Consider optimisation of the airspace (maximise available capacity) of YVLF Gully 1	Internal and consultant	September 2021
AP-10	Investigate the feasibility of developing special wastes landfill and/or a cleanfill	Internal and consultant	Complete by FY 2022/23
AP-11	Review resource consent application costs and capital cost estimates for development of Stage 3 of Eves Valley Landfill, using the FCA model	Internal and consultant	Complete by FY 2022/23
AP-12	Investigate the feasibility of collecting and using/destroying landfill gas at Eves Valley Landfill	Internal and consultant	Complete by FY 2022/23
AP-13	Check to ensure that the nominal working lives assigned to different classes of assets are the same for each landfill	Internal and consultant	September 2021
AP-14	Investigate and identify appropriate access route to Eves Valley Landfill	Internal and consultant	Complete by FY 2022/23
AP-15	Develop an Asset Disposal Plan	Internal and consultant	September 2021
AP-16	Renewal of York Valley Landfill RC for one year emergency use	Internal and consultant	2028/29

1. Introduction (Why we need a Plan)

The Nelson-Tasman Regional Landfill Business Unit (NTRLBU) was established in 2017. In terms of the Deed of Agreement, dated 13 April 2017, the NTRLBU has been delegated control of all activities and assets used for Gully 1 of the York Valley Landfill, and those used for the Eves Valley Landfill, and for the operational control of these areas within both landfills.

The terms of reference for the NTRLBU requires that the landfills be operated on a regional basis in accordance with the NTRLBU Activity Management Plan (AMP), amongst other plans.

This Landfill AMP combines the management, financial, engineering and technical practices to ensure that the required level of service is provided effectively for the Landfill activity.

Note that each council will continue to prepare a Solid Waste Activity Management Plan encompassing all other activities of solid waste management that are not delegated to the NTRLBU.

The format of this AMP is largely based on that prescribed for Nelson City Council Activity Management Plans.

1.1. Background

1.1.1. Objective of Asset Management Planning

The overall objective of asset management planning is to:

Deliver the required level of service to existing and future customers in a sustainable and cost-effective manner.

1.1.2. Purpose of Plan

The purpose of this Landfill AMP is to ensure that assets are operated and maintained, so that they provide the required level of service for present and future customers in a sustainable and cost-effective manner.

The Landfill AMP supports the purpose by:

- Demonstrating responsible, sustainable management and operation of landfill assets which are significant, strategic and valuable assets belonging to Nelson City and Tasman District;
- Identifying funding requirements;
- Demonstrating linkages to stated levels of service.

1.1.3. Interpretation of Terms

For the purpose of this Landfill AMP, waste includes material disposed of to landfill and diverted material includes materials handled by current council and non-council services (e.g. recyclables such as glass, paper, cardboard, plastics, steel and aluminium cans, and garden organics). This interpretation is consistent with the interpretation given in the Waste Minimisation Act 2008 (WMA) and it enables a description of the collection, recycling, recovery, treatment, and disposal services provided within the region.

For reference, the interpretations given in the WMA for waste, diverted material, disposal facility and household waste are:

Waste

(a) means anything disposed of or discarded; and

(b) includes a type of waste that is defined by its composition or source (for example, organic waste, electronic waste, or construction and demolition waste); and

(c) to avoid doubt, includes any component or element of diverted material, if the component or element is disposed of or discarded.

Cover material means earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odours, blowing litter and scavenging.

Diverted material means anything that is no longer required for its original purpose and, but for commercial or other waste minimisation activities, would be disposed of or discarded.

Disposal facility means

(a) a facility including a landfill, -

(i) at which waste is disposed of; and

(ii) at which the waste disposed of includes household waste; and

(iii) that operates, at least in part, as a business to dispose of waste; and

(b) any other facility or class of facility at which waste is disposed of that is prescribed as a disposal facility.

Household waste means waste from a household that is not entirely from construction, renovation, or demolition of the house.

Both the York Valley Landfill and Eves Valley Landfill are considered to be disposal facilities, as defined by the WMA, and for the purpose of this Landfill AMP, they are classed as **municipal solid waste landfills,** which accept **municipal solid waste (MSW)**.

The WasteMINZ Technical Guidelines for Disposal to Land (2018) define these terms as follows:

Municipal solid waste (MSW) means any non-hazardous, solid waste from household, commercial and/or industrial sources. It includes putrescible waste, garden waste, biosolids, and clinical and related waste sterilised to a standard acceptable to the Ministry of Health. All municipal solid waste should have an angle of repose of greater than five degrees (5°) and have no free liquid component.

It is recognised that municipal solid waste is likely to contain a small proportion of hazardous waste from households and small commercial premises that standard waste screening procedures will not detect. However, this quantity should not generally exceed 200 ml/tonne or 200 g/tonne.

Municipal solid waste landfill means any landfill that accepts municipal solid waste.

1.1.4. Relationship with other Documents

This Landfill AMP is a key document for the NTRLBU's planning processes.

Other documents and legislation that either informs this Landfill AMP, or are important for managing and planning the landfill activity include:

- Deed of Agreement for the Nelson-Tasman Regional Landfill Business Unit, April 2017
- Terms of Reference for the Nelson-Tasman Regional Landfill Business Unit, May 2019
- Annual Business Plan(1) (the latest version is 2020/2021, dated March 2020)
- York Valley Landfill Management Plan(2), February 2000
- Eves Valley Landfill Management Plan(2), June 2018
- York Valley Landfill Annual Monitoring Report(1) - July 2018 to June 2019, dated December 2019
- Eves Valley Landfill Annual Report(1) - 2018, dated November 2018
- Contract No. 3912(3): York Valley and Eves Valley Landfills Operation and Maintenance, December 2018
- Waste Minimisation Act (WMA) 2008
- Emissions Trading Scheme
- Zero Carbon Amendment Act 2019.

Notes:

(1) The business plan and landfill monitoring reports are updated annually and so the latest version of those reports should be referenced.

(2) Landfill management plans need to be updated periodically (e.g. every three to five years) to reflect good solid waste management practice and take into account changes that may have occurred in the operating environment. The York Valley Landfill Management Plan was last updated in 2000. It is recommended that it be updated, as part of the Improvement Plan for this Landfill AMP.

(3) The Operation and Maintenance Contract may change from time to time, as contract variations are introduced. When referring to the Contract Document ensure that the latest version is being referenced.

1.1.5. Planning Inputs, Controls and Implementation of the Landfill Activity

The Landfill AMP and each Council's LTPs also form part of each Council's statutory planning requirements for solid waste management and minimisation under the WMA.

The specific planning inputs into the Landfill AMP, and the manner in which it is controlled and implemented are diagrammatically represented below in Figure 1 below.

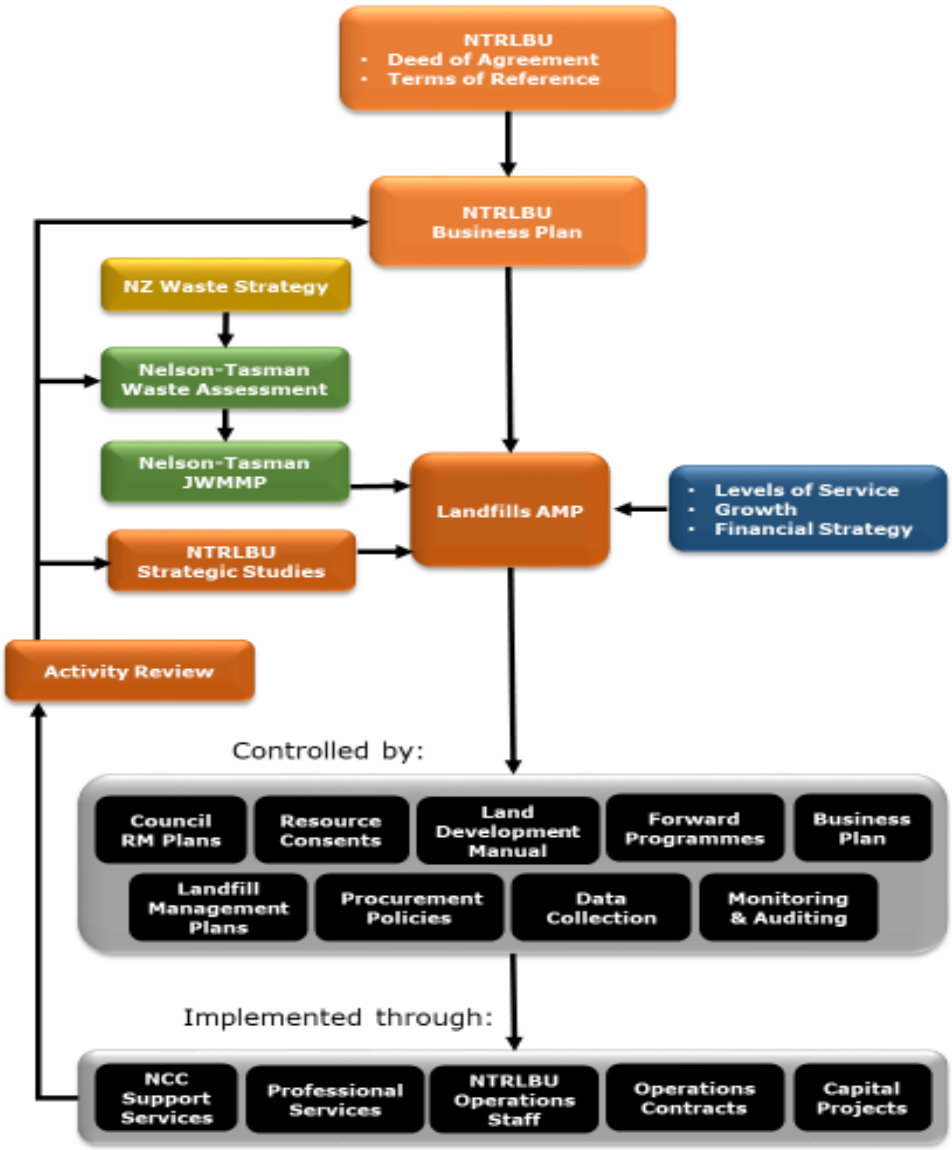

Figure 1: Specific planning inputs for the Landfill AMP, with controls and manner of implementation.

1.1.6. Service Delivery Review

Section 17A of the Local Government Act 2002 requires all local authorities to review the cost-effectiveness of its current arrangements for delivering good quality local infrastructure, local public services, and performance of regulatory functions at least every six years.

This was done in 2018 and resulted in the procurement of the Landfills Operation and Maintenance Contract.

1.1.7. Infrastructure Assets Included in the Plan

The Deed of Agreement sets out how the Councils' landfill assets are to be used:

- From 1 July 2017 the York Valley Landfill is the primary regional landfill facility until Gully 1 is at capacity. Depending on the quantity of waste disposed at the landfill, it has an estimated remaining life of between nine and 14 years from

June 2020. This gives an estimated closure date of between mid-2029 and the end of December 2034, when the resource consents expire. Note that the remaining life is dependent on several factors, which are discussed in more detail in section 4.1.2 of this Landfills AMP.

- Stage 2 of the Eves Valley Landfill is to be consented to accept up to one years' waste from the Nelson-Tasman region, in case of unforeseen temporary closure of the York Valley Landfill. The renewal of resource consents for Eves Valley Landfill has not yet been finalised.
- Stage 3 of the Eves Valley Landfill is to be retained for future use as a potential regional landfill facility.

The Deed of Agreement also states that the land and assets of both the York Valley and Eves Valley Landfills are to remain owned separately by each Council. However, the control of all activities and assets used for Gully 1 of the York Valley Landfill and Eves Valley Landfill, and operational control within the areas of both landfills has been delegated to the NTRLBU.

York Valley Landfill

The York Valley Landfill is located in Bishopdale, approximately 4km south of Nelson City centre, and is accessed off Market Road. It receives municipal solid waste from transfer stations, resource recovery centres and approved commercial operators.

Figure 2: York Valley Landfill Location

Gully 1 is currently in use and is consented to accept solid waste until 2034. Gullies 3 and 4 are potential land for future development and are designated for landfill activity but their use is not anticipated by the Deed of Agreement.

The landfill is a valley type landfill and occupies approximately 3.5ha. The site has been filled in 3m lifts across the site progressing up the valley sides in a controlled manner.

The waste disposal area has been built up around seven stone chimney drains connected to a leachate collection system, which is piped into the city sewer system. The chimney drains which are extended as the landfill is built up serve as ducts to vent landfill gas from the landfill. The chimney drains were capped in 1998 and connected to a gas extraction system.

The introduction of the NZ Emissions Trading Scheme (NZ ETS) regulations under the Climate Change and Control Act resulted in the Nelson City Council (as consent holder) being liable for New Zealand Emission Units (NZU's) from 2013. Each year the consent holder is required to report on landfill activities and is required to surrender NZU's equivalent to the emissions assessed for the landfill activity, based on the tonnage of waste entering the landfill.

Nelson City Council previously signed an agreement to sell the landfill gas to Energy for Industry, a division of Pioneer Energy. The extracted gas is de-watered and piped to Nelson Hospital for steam generation, which supplies 90% of its heating needs. However, the quantity of gas being captured is only about 25-30% of that being emitted.

The NTRLBU may, however, apply for a unique emissions factor (UEF) under the Climate Change (Waste) Amendment Regulations 2015 that allows for a reduction in the amount of NZUs to be surrendered for landfills that have gas collection and destruction systems. An application submitted January 2020 for a UEF was successful.

Based on the most recent available waste disposal information and future estimates, York Valley Landfill has between nine and 14 years of airspace available, as discussed further in section 4.1.2.

The available airspace is based on the landfill profile as depicted in Figure 3.

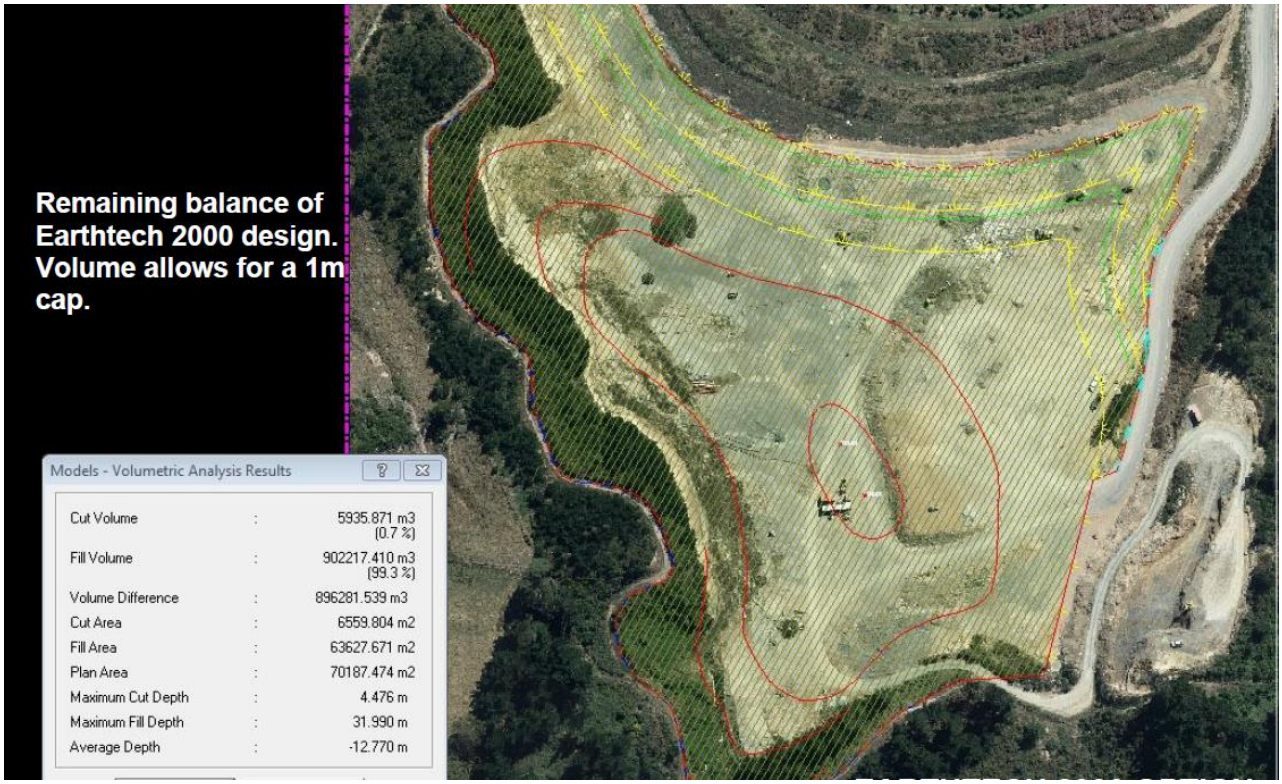

Figure 3: Available airspace for York Valley Landfill

The following asset components at York Valley Landfill are managed by the NTRLBU:

- land, resource consents and designation;
- leachate collection system, including stone drains, and gravity main;
- stormwater collection and settling ponds, including cut-off drains;
- gas collection system, including stone chimney vents;

- pavements including sealed and unsealed roadways;
- weighbridge and kiosk;
- vehicle wheel wash;
- signs, fencing, and landscaping.

Within the York Valley site, Pioneer Energy owns and manages a compound containing landfill gas equipment.

Table 1-1 provides a list of the resource consents held by Nelson City Council for York Valley Landfill.

Table 1-1: York Valley Landfill Resource Consents

Consent No.	Consent Type	Effective Date	Expiry Date
RM975261-A	Water permit to divert stormwater	05/11/1999	31/12/2034
RM975261-B	Water permit to dam stormwater	05/11/1999	31/12/2034
RM975261-C	Water permit to take leachate and groundwater	05/11/1999	31/12/2034
RM975261-D	Discharge consent to discharge leachate into ground	05/11/1999	31/12/2034
RM975261-E	Discharge consent to discharge contaminated stormwater to the York Stream	05/11/1999	31/12/2034
RM975261-F	Discharge consent to discharge contaminated landfill gases and contaminants into air	05/11/1999	31/12/2034
RM975261-G	Discharge consent to discharge contaminants in stormwater	05/11/1999	31/12/2034
RM975261-H	Land disturbance consent to carry out site works	05/11/1999	31/12/2034
RM015033	Change of conditions of consent (D17)	02/02/2001	31/12/2034
RM055044	Change of conditions of consent (D18, D22, D23, D25, 15)	18/05/2005	31/12/2034
RM055343	Change of conditions of consent (15) of RM055044	13/06/2006	31/12/2034
RM065160	Change of conditions of consent (A6, D12, D15, D19, E6, E7, F5, G6, I18) and add new conditions (D27, A7, A8, A9, A10)	28/02/2007	31/12/2034
RM975261 V1	Consent to allow disposal of HAIL soil at York Valley Landfill	08/07/2016	31/12/2034

Table 1-2 provides details of the designation held by Nelson City Council for York Valley Landfill.

Table 1-2: York Valley Landfill Property Designation

ID	Location of Site	Site Name / Purpose	Duration of Designation
DN1	York Valley	Refuse disposal	Indefinite – given effect

Eves Valley Landfill

The Eves Valley Landfill is located approximately 5km north-west of Brightwater. Access to the landfill is gained via a sealed road from an intersection with Eves Valley Road, 2km west of Waimea West Road. Figure 4 shows the layout of the landfill.

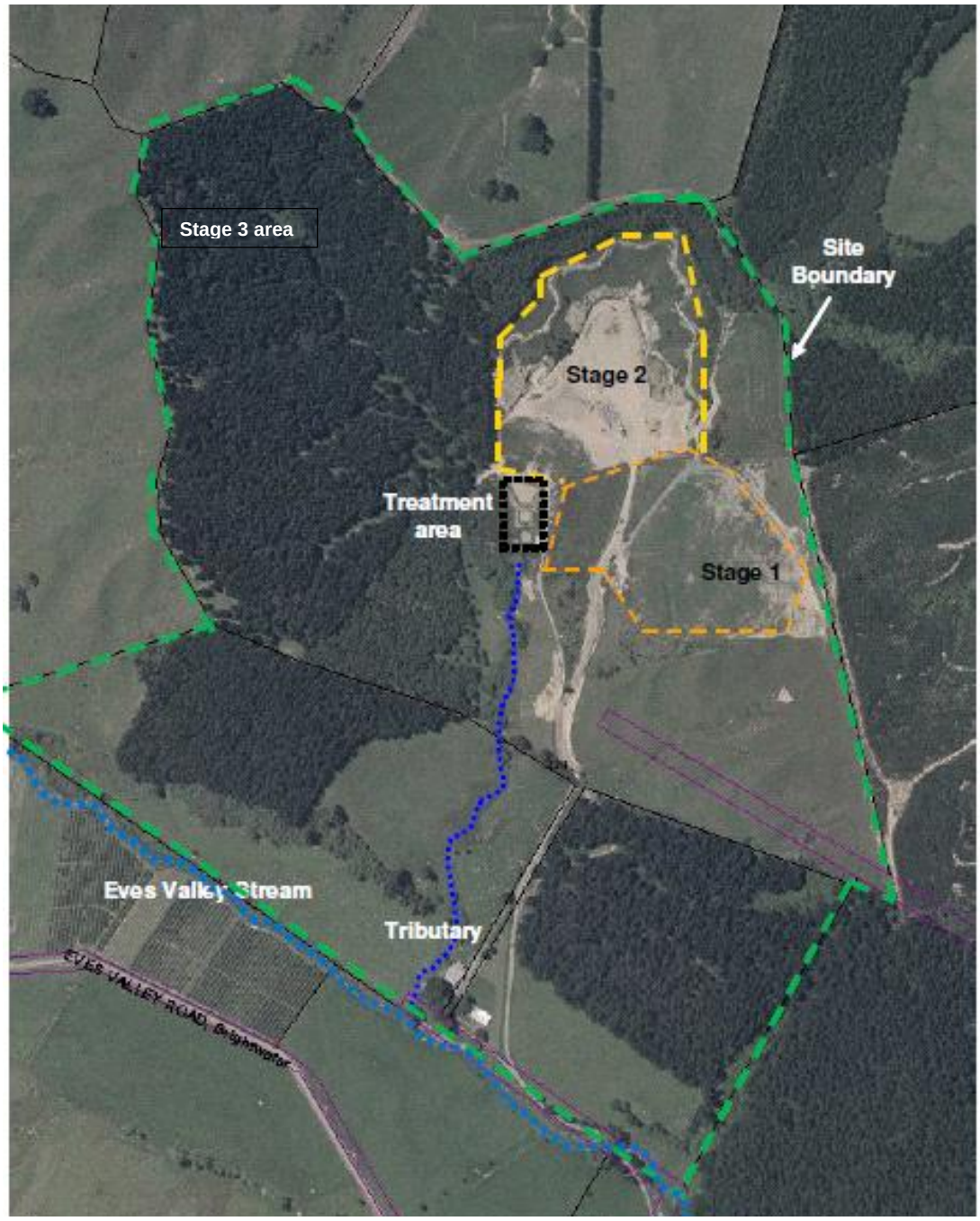

Figure 4: Layout of Eves Valley Landfill

Stage 1 of the landfill was filled in July 2002, with the final capping being completed in March 2005. It had a capacity of approximately 184,500 tonnes (217,000m^3).

Stage 2 construction was completed in August 2000 and filling commenced in July 2002 with a design capacity of 435,000m^3 in a valley-type landfill. At 30 June 2017, when waste disposal operations ceased, approximately 418,200 tonnes of solid waste had been placed in Stage 2.

The construction of Stage 2 included an HDPE liner in the base of the landfill on clayey gravels which formed a natural liner above the base footprint.

In the last few years of operation Stage 2 was progressively shaped for closure and covered with intermediate soil cover. In 2019 Stage 2 was capped using clayey soils. Later in 2020 it is intended that the area will be top soiled and grassed.

Landfill gas is currently discharged to air via stone chimney vents installed in the waste pile during the landfilling process. The vents have been sealed with the capping of the landfill. This complies with current legislative requirements but there may be good reasons for capturing the landfill gas and either using it or flaring it off. This is to be investigated as part of the AM improvement plan.

The introduction of the NZ Emissions Trading Scheme (NZ ETS) regulations under the Climate Change and Control Act resulted in the Tasman District Council being liable for New Zealand Emission Units (NZUs) from 2013. Each year the Council reported landfill activities and was required to surrender NZUs equivalent to the emissions assessed for the landfill activity.

Liability for NZUs under the NZETS ceased for Stage 2 when it was closed at the end of June 2017. However, if Stage 2 is re-opened and when Stage 3 becomes operational, liability for NZUs will re-commence.

Leachate is currently collected from the base of Stages 1 and 2 of the landfill and from collectors placed at the interface of succeeding layers of solid waste. Leachate is collected in a storage pond on site and pumped to Brightwater where it joins the Tasman District Council sewerage network and is ultimately disposed of at the Nelson Regional Sewerage Business Unit (NRSBU) treatment plant at Bell Island.

Survey and design work has been undertaken for Stage 2 to determine a final profile for when the landfill is filled to capacity, assuming it needs to be re-opened under contingency conditions for acceptance of up to one year of regional waste. An approximation of the proposed final profile is shown in Figure 5 on the following page.

The Eves Valley Landfill Management Plan provides guidance on how Stage 2 is to be re-opened, filled and then re-closed, should it be required.

Future Stage 3 is proposed for the third and largest of the three gullies on the site (Figure 4, west of Stage 2 area). Development of this gully as well as filling of the main valley which is linked to the side gullies constituting Stages 1, 2 and 3 could result in an estimated capacity of up to 1,930,000m³, depending on the total area utilised. Services such as the leachate ponds and stormwater ponds would need to be relocated prior to this part of the site being developed.

Tasman District Council holds on behalf of the NTRLBU the following asset components at Eves Valley Landfill, which are managed by the NTRLBU:

- land, resource consents and designation;
- 20m^3 water tank and supply lines (connected to the Redwood Valley Rural Water Supply);
- hazardous waste store;
- leachate collection system, including stone drains, pump station and rising main (to Brightwater);
- stormwater collection and settling pond, including cut-off drains;
- landfill capping;
- gas venting system, including stone chimney vents;
- pavements including sealed and unsealed roadways;
- signs, fencing, and landscaping.

Many of these assets have reached the end of their economic life with the closure of Stage 2 and NTRLBU needs to consider what it will do to dispose or renew these assets.

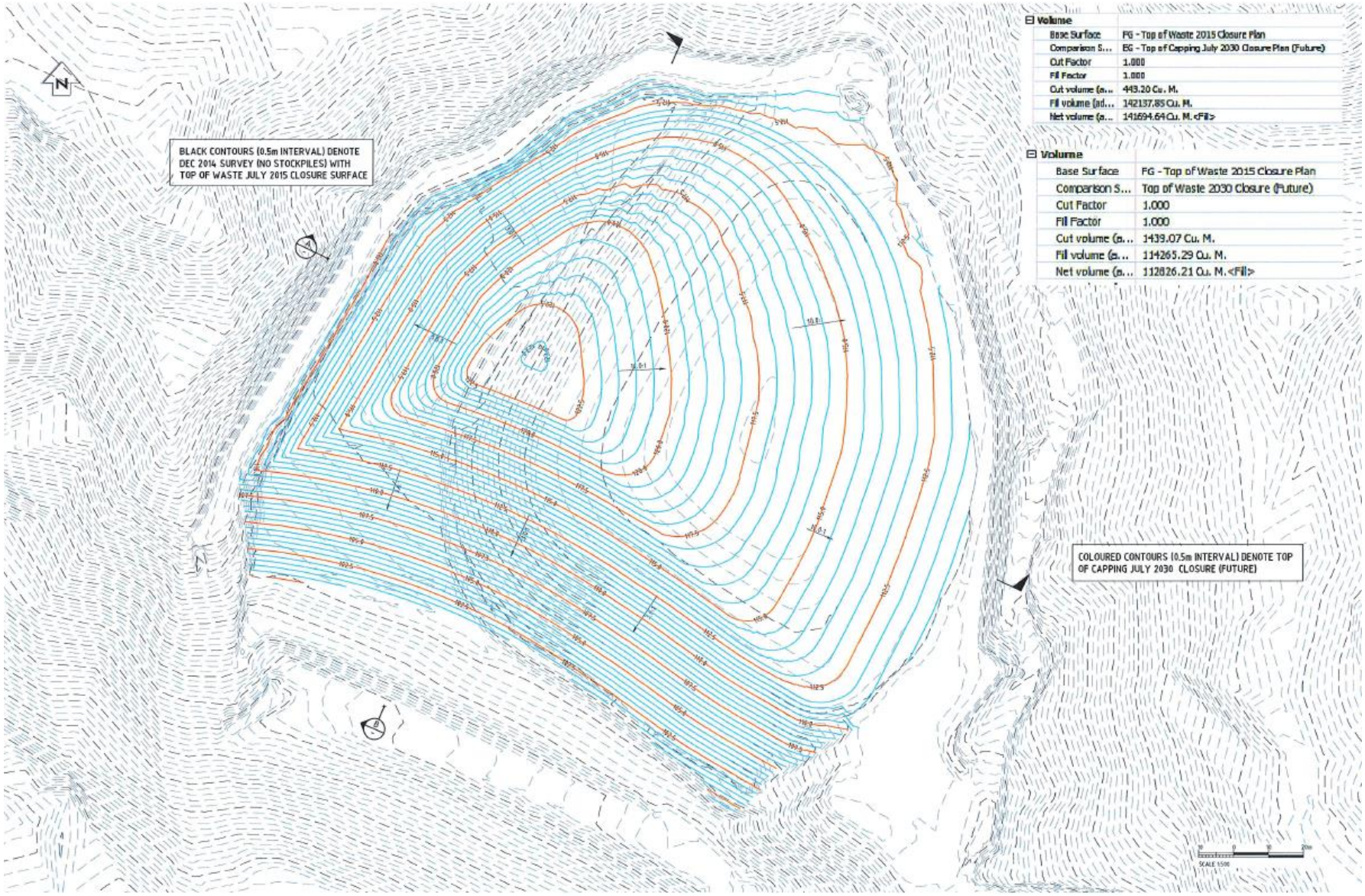

Figure 5: Proposed Final Profile of Stage 2 of Eves Valley Landfill, assuming it is filled with approximately one year of regional waste after June 2017.

Table 1-3 provides a list of the resource consents held by Tasman District Council for Eves Valley Landfill.

Table 1-3: Eves Valley Landfill Resource Consents

Consent No.	Consent Type	Effective Date	Expiry Date
NN970122V2	Discharge to land	22/08/2014	1/10/2015*
NN970123	Discharge to air	24/02/1998	1/10/2015*
NN970272V1	Discharge to air	23/03/1998	1/10/2015*
NN970271V2	Discharge to water	23/03/1997	1/10/2015*

* On 31 March 2015 Council submitted an application for replacement resource consents for the operation of the Eves Valley landfill (RM150348, RM150349, RM150351, RM150352 and RM150353). The consent was processed with limited notification to affected parties. The consent process has not yet been finalised (as at end June 2020).

Table 1-4 provides details of the designation held by Tasman District Council for Eves Valley Landfill.

Table 1-4: Eves Valley Landfill Property Designation

ID	Location of Site	Site Name / Purpose	Duration of Designation
D163	Eves Valley	Sanitary landfill solid waste disposal	Indefinite – given effect

1.1.8. Key Stakeholders in the Plan

The customers of and the stakeholders in the landfill activity are essentially a sub-set of those of the solid waste activity.

The landfill assets have the following external stakeholders:

- Residential, commercial and industrial waste generators;
- Waste industry service providers;
- Local Iwi;
- Environmental Interest Groups.

Internal stakeholders include:

- Elected Members;
- Trade Waste Officers;
- Environmental officers;
- Asset, Operations and Maintenance staff.

The York Valley Landfill is accessible only for disposal purposes by commercial customers and contractors who have negotiated access with the NTRLBU.

The customers for the landfill activity are therefore limited to the following:

- Contractors bringing in waste;
- Commercial customers;
- Council contractors.

1.1.9. Organisation Structure

In order for the NTRLBU to deliver the levels of service for the landfill activity it needs to have a team that implements the required functions to ensure the activity is managed effectively and efficiently. Figure 6 illustrates the structure of this team.

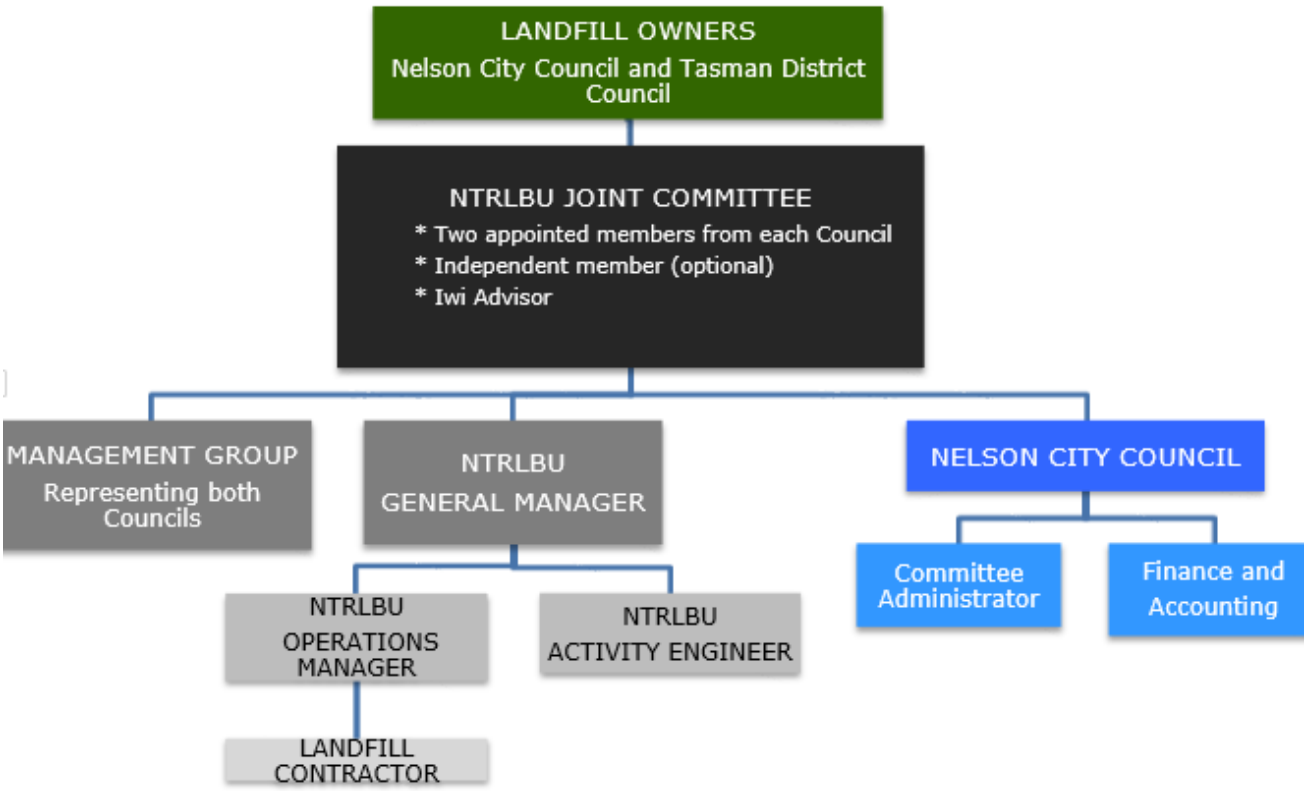

Figure 6: Organisational Structure for the Landfill Activity

1.2. Goals and Objectives of Asset Ownership

1.2.1. Reasons and Justification for Asset Ownership

One of Councils' principal roles is to provide core services that meet the needs of the community. The purpose of solid waste assets is to provide an accessible and efficient solid waste collection and disposal system, which protects public health and is environmentally friendly.

It is important to note that many of the solid waste activities, including disposal to landfill, are voluntary rather than mandatory. This means that councils have the ability to opt out of many of the provisions of their solid waste services if they wish. This assumes that the private sector would be offering alternative services.

The legal authority for councils to be involved in the provision of solid waste services and ownership of assets is contained in the provisions of several government statutes including:

Local Government Act 2002 (LGA) and the 2014 Amendment Act

The LGA allows councils to provide any activity that is considered appropriate for the effective management of waste, to own, maintain and operate works and facilities

necessary to implement their waste management and minimisation plan. The Act also allows councils to make bylaws and policy relating to the management of waste.

Health Act 1956

This Act allows for local authorities to facilitate the collection and disposal of refuse and other offensive matter and for the licensing of offensive trades.

Waste Minimisation Act (WMA) 2008

The WMA states that councils must promote effective and efficient waste management and minimisation within their district. The Act aims to protect the environment from harm by encouraging the efficient use of materials and a reduction in waste.

Under this legislation councils are required to prepare a Waste Management and Minimisation Plan. This plan sets the strategic direction for councils for solid waste management. Nelson City Council and Tasman District Council have elected to prepare a Joint Waste Management and Minimisation Plan (JWMMP). The JWMMP was last reviewed in 2019.

Waste management and minimisation planning is also guided by the following:

- Resource Management Act 1991 (RMA), particularly in relation to land disposal (landfills and cleanfills);
- Emissions Trading Amendment Act 2008 (ETAA) which has implications for some landfills;
- Hazardous Substances and New Organisms Act 1996 (HSNO) where hazardous wastes are present in the solid waste stream;
- Litter Act 1979 (Litter Act) which sets out provisions for prevention and enforcement of litter offences; and
- Health and Safety at Work Act 2015 (HSWA).

1.2.2. Links to both Council's Visions, Missions, Goals and Objectives

The JWMMP is a key strategic document relating to the solid waste activity which includes the landfill activity and the goals outlined in the JWMMP are the goals for this Landfill AMP.

The shared Vision of the Councils in relation to waste management and minimisation is:

"*The communities of the Nelson Tasman region work together to reduce waste*".

The goals of the JWMMP are:

Goal 1: Avoid the creation of waste

Goal 2: Improve the efficiency of resource use

Goal 3: Reduce the harmful effects of waste.

The following core principles have been adopted to guide the Councils in their implementation of the JWMMP.

1. The Waste Hierarchy
2. Global Citizenship
3. Kaitiakitanga and Guardianship
4. Product Stewardship
5. Full-cost Pricing
6. Life cycle Principle
7. Precautionary Principle

Each of the three Goals are underpinned by Objectives, Policies and Methods. The following Methods are relevant to the NTRLBU in managing Councils' Landfill Activities and they have been restated accordingly:

- Method 7.1.3. The Councils will continue to jointly own and manage the Eves Valley and York Valley landfills through the Nelson Tasman Regional Landfill Business Unit.
- Method 7.3.1. The Councils will carry out financial reviews of disposal charges to encourage the separation and diversion of materials as alternatives to waste disposal to landfill.
- Method 7.4.1. The Councils may subsidise the disposal and treatment of waste that cannot be funded by user charges.
- Method 7.5.1 The Councils, through the Regional Landfill Business Unit, will investigate options to provide on-going landfill capacity in the region, including further development at Eves Valley and York Valley landfills and consents for development of facilities.
- Method 7.5.2 The Councils will investigate options for pre-processing and diversion of materials prior to landfill in association with landfill capacity investigations.
- Method 7.5.3 The Councils will investigate options other than a municipal landfill to provide disposal of contaminated soil in the region, including consideration of naturally high background mineral levels in regional soils and development of contaminated soil guidance for landowners.
- Method 7.6.1 The Councils, through the Regional Landfill Business Unit, will continue to provide a landfill disposal service for approved waste from Nelson and Tasman.
- Method 7.6.2 The Councils, through the Regional Landfill Business Unit, will manage the landfill service such that consented landfill airspace is monitored and maintained to ensure that, at any time, there is at least five years consented airspace and the ground has been prepared so that waste can be placed without further construction for the next two years.
- Method 8.1.1. The Councils will annually review compliance with resource consents for operational and closed waste facilities.
- Method 9.1.1 The Councils will review and change, where appropriate, the health and safety practices followed for any existing waste management and minimisation initiatives where concerns are raised.

  Method 9.1.2 The Councils will investigate and review health and safety impacts for all methods proposed to improve waste management and minimisation before implementing new initiatives.

1.3. Mission Statement of the NTRLBU

The NTRLBU's mission statement is to plan for the future needs of the community in a cost efficient and environmentally sustainable manner in accordance with the objectives of the JWMMP.

1.4. Strategic Goals of the NTRLBU

The NTRLBU aspires to achieve the following goals:

- Provide sanitary landfill capacity for the needs of the Nelson-Tasman region.
- The costs of disposal of residual solid waste are affordable.
- Risks associated with the activity are identified and mitigated to a level agreed with the owners.

- We engage the right people with the right skills and experience.
- The NTRLBU operates sustainably and endeavours to remedy or mitigate any identified adverse environmental, social and cultural impact.
- Greenhouse gas emissions are monitored and managed in a responsible manner.
- Good relationships are maintained with all stakeholders.
- All statutory obligations are met.

2. Levels of Service (What we provide)

One of the key objectives of asset management planning is to ensure that the levels of service a local authority strives to provide matches the desired levels of service the community expects. It enables the relationship between levels of service and the cost of the service (the price/quality relationship) to be determined.

This section of the AMP aims to define the proposed levels of landfill service the NTRLBU plans to deliver to the Nelson-Tasman region within the 2021/2031 financial planning period. It also defines the tools that will be employed in measuring, monitoring and evaluating how these levels of service are delivered.

The levels of service the NTRLBU will ultimately provide to meet the requirements of stakeholders are dependent on the following parameters:

- Imposed Standards (Legislative Requirements) – these are "mandatory"
- Resource consent requirements – these are "mandatory"
- Customer Expectations and Technical Constraints – these are "desired".

2.1. Legislative Requirements

The provision and maintenance of landfill services by the NTRLBU is subject to the following legislative requirements (refer to Appendix 1 for further details).

2.1.1. Statutory Acts and Regulations

- Waste Minimisation Act 2008 (WMA)
- Local Government Act 2002 (LGA) and the 2014 Amendment Act, particularly with respect to consultation, bylaws and service reviews
- Resource Management Act 1991 (RMA), particularly in relation to land disposal (landfills and cleanfills)
- Emissions Trading Amendment Act 2008 (ETAA) which has implications for some landfills
- Hazardous Substances and New Organisms Act 1996 (HSNO) where hazardous wastes are present in the solid waste stream; Hazardous Substances and Noxious Organisms Act (HSNO) 2004
- Health Act 1956 (Health Act), as solid waste management must consider the potential impacts on public health
- Litter Act 1979 (Litter Act) which sets out provisions for prevention and enforcement of litter offences; and Litter Act 2004
- Health and Safety at Work Act 2015 (HSWA) which recognises that a well-functioning health and safety system relies on participation, leadership, and accountability by government, business and workers
- Local Government (Rating) Act 2002
- Building Act 1994
- Health & Safety Act in Employment Act 1992
- Civil Defence Emergency Management Act 2002
- Public Works Act 1981

2.1.2. National policies, regulations and strategies

In addition to the legislation provided above, the Ministry for the Environment has also released the following documents which relate to the landfill activity:

- New Zealand Waste Strategy (NZWS) 2010 provides high-level direction to guide the use of tools available to manage and minimise waste in New Zealand. These tools include a legislative framework, international conventions and guidelines.
- National Environmental Standards for Air Quality.
- National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS).
- National Policy Statement for Freshwater Management 2020 (Freshwater NPS2020).

2.1.3. National guidelines and standards

There are many national guidelines and standards which relate to the landfill activity. Two of the most recent guidelines are listed below, with others being referenced in Appendix 1:

- Technical Guidelines for Disposal to Land, Waste Management Institute of New Zealand, August 2018.
- Health and Safety Guidelines: for the Solid Waste and Resource Recovery Sector – part five, Waste Management Institute of New Zealand, March 2017.

2.1.4. Regional and local policies and strategies

Both Councils also have several planning policy and/or management documents detailing their responsibilities under the legislation listed above. Those which impact on the provision of the NTRLBU's landfill activity are:

- Nelson – Tasman Joint Waste Management and Minimisation Plan 2019
- District Plans
- Regional Policy Statements
- Council Long Term Plans / Annual Plans /Annual Reports
- Engineering Standards and Policies
- Procurement Strategies
- Various Bylaws

2.2. Resource consent requirements

Compliance with resource consents is a key deliverable for the NTRLBU. Additionally, there are requirements to be met under various National Environmental Standards.

All landfill activities, facilities and services are to comply with resource consent conditions, landfill management plans and appropriate legislative requirements, with the annual target being "nil" non-compliances.

2.2.1. Performance Measuring and Monitoring

Environmental monitoring is undertaken quarterly for air, groundwater, surface water and leachate quality and the results are reported in the landfills annual monitoring reports.

The landfill management plans require records to be kept of waste tonnages and types of waste disposed to landfill, and the volume of landfill capacity used up annually. From this information, the level of waste compaction is determined annually.

2.2.2. Actions to limit environmental impacts

The following actions are proposed to address aspects of environmental impacts:

- Review of stormwater management at York Valley landfill and develop long term strategy;
- Optimise landfill cover application and usage;
- Maximise landfill gas harvesting;
- Investigate the feasibility of collecting and using/destroying landfill gas at Eves Valley Landfill.

2.3. Customer Expectations and Satisfaction, and Community Consultation

2.3.1. Customer Expectations

Customer expectations are one of the key considerations that are used to determine the acceptable target levels of service prescribed for the landfill activity. Common public expectations relating to the landfill are:

- That the landfill operations comply with the requirements of the resource consents.
- That planning and development of the landfill be carried out in a timely manner to ensure continuity of the disposal service.
- That financing of landfill developments, operations and aftercare be done in an equitable way across generations.

The customers of and the stakeholders in the landfill activity are essentially a sub-set of those of the solid waste activity and they are listed in section 1.1.8 of this Landfill AMP.

2.3.2. Community Consultation

The Councils have consulted their various stakeholders as part of setting the service levels and expectations they have towards waste management and minimisation. Landfill charges are reviewed annually and proposed changes are consulted on through the long term plan and annual plan processes.

2.3.3. Customer Satisfaction Surveys

Customer satisfaction surveys regarding the solid waste activity have been carried out regularly out by the Councils, with a particular focus on waste minimisation and recycling activities, rather than on the landfill activity. The format of the existing customer surveys is not applicable to the landfill activity.

It is proposed that customer feedback on the landfill activity will be dealt with in the future through a direct engagement plan.

2.4. Current Level of Service

Levels of service (LoS) can be defined as the service quality for a given activity against which service performance may be measured and usually relates to core parameters such as quality, quantity and reliability.

Performance measure is a quantitative measure that we will use to tell our customers:

- how well we are doing/performing,
- whether or not we are meeting our goals/targets,
- whether or not our customers are satisfied with the way we are performing; and
- what improvements, if any, are necessary?

The LoS targets are presented in Table 2-1 below.

Table 2-1: Landfill Levels of Service Targets

Related Community Outcomes	Strategic Themes	Levels Of Service	Performance Indicators	Method of Measurement	Target
SOLID WASTE DISPOSAL - NTRLBU will provide a landfill for waste disposal					
Health Environment Education	Impacts	All landfill activities, facilities and services comply with resource consent conditions, landfill management plans and appropriate legislative requirements.	Compliance with resource consents.	Number of non-compliances	Nil
		Adequate landfill airspace available to ensure future sustainability of solid waste disposal.	Available landfill space that has been consented.	Years of available consented landfill space	>5 Years
			Available landfill space that has been developed.	Years of available developed landfill space	>2 Years
	Costs	Cost effective and sustainable landfill services available.	No rates required to support landfill activities.	User Pays %	100%
	Demand	NTRLBU operational contracts require minimum standards of waste compaction to maximise landfill capacity.	Waste compaction density exceeds minimum target level.	Surveyed compaction	> 0.8t/m^3
		Landfills are open at convenient times.	Hours and days that the landfill is available for disposal.(1)	Opening hours specified	100%
	Health and Safety	Landfill activity provided in a safe manner and pose no health and safety risks to nearby residents.	No reported incidences of injury or illness attributable to use of facilities.	Complaints and incident forms.	Nil

Related Community Outcomes	Strategic Themes	Levels Of Service	Performance Indicators	Method of Measurement	Target
	Quality	Good quality customer service.	Customers are content with the services offered.	Customer satisfaction survey	Highly satisfied(2)
		Inquiries received through the Councils' service request system are acknowledged within 24 hours.	All requests responded to in compliance with Council customer service policy.	Service request response time	90%

(1) York Valley hours of operation, as detailed in Contract 3912:

Monday to Friday	between 08.00 AM – 4.30 PM.
Saturdays	between 12.00 PM – 4.00 PM.
Public Holidays*	between 10.00 AM - 2.00 PM.

* Excludes Christmas Day and Good Friday.

(2) This is a new measure which will be assessed through a landfill customer survey.

2.5. Desired Level of Service

If the Councils decide to amend the targets and/or implement new LoS for their Solid Waste activity, which impact the Landfill activity, then the affordability of the different options will be assessed and evaluated. The decision as to the most reasonable action that can be implemented will then be based on consultation with the community through one of, or a combination of, the following consultative processes:

- review of the JWMMP
- Councils' Long Term Plans and/or
- Councils' Annual Plan consultation processes or
- special consultative processes.

At this stage for future planning purposes no consideration has been given to changing the current levels of service.

3. Future Demand (Planning for the future)

This section of the Landfill AMP provides details on the current demand, future demand and the impact that any change in demand will have on the operations, maintenance and the level of service that the landfill assets will be required to deliver over the next 30 years.

3.1. Demand Drivers

Demand forecasting is used to obtain an understanding of the current and future demands on the landfill activity and its associated assets. Understanding these demands allows the NTRLBU to plan the assets to meet the desired community outcomes.

The demand for landfill capacity (or airspace) is related both to the production of waste (i.e. tonnage) and the extent to which that waste can be compacted in the landfill.

The production of waste is driven primarily by the following drivers:

- Demographic change (e.g. population and/or household changes);
- Change in commercial and industrial activity and economic conditions;
- Impact of waste flows from other areas;
- Impact of technological changes;
- Consumer behaviour - consumption patterns / product quality;
- National policy, legislation and regulation;
- Impact of waste minimisation programmes, services and future initiatives (demand management strategies);
- Community expectations.

Secondary drivers also impact on demand for waste services but are indirect in nature. Examples of such drivers are climate change that may lead to increased or decreased vegetation growth and subsequently increased or decreased organic waste. Due to the uncertainty of their impact and difficulty in measuring them, they are not discussed in detail.

The density of waste is determined by the extent to which the waste can be compacted, which depends on:

- Waste composition;
- Moisture content;
- Type of compaction plant used.

Waste composition and moisture content may be affected by some of the drivers stated above. For instance, the NTRLBU may choose to restrict the disposal of certain organic materials at the landfill and thereby change the make-up of the waste going into the landfill.

However, the type of compaction plant used, and to a certain extent the moisture content of the landfill (through water entering the waste from stormwater run-off) are determined by operational aspects and so they do not drive demand, but they do affect it.

3.1.1. Demographic Change

It is generally accepted that as population increases so the amount of solid waste produced increases in direct proportion, and similarly for economic

growth. A reduction in solid waste (or diversion of materials) is directly related to the extent and effectiveness of waste prevention and minimisation initiatives that may be introduced.

Tasman–Nelson currently has a population hovering just over 100,000 with the region having experienced higher population growth than the average across the rest of New Zealand. Figure 7 shows predicted population growth through to 2043.

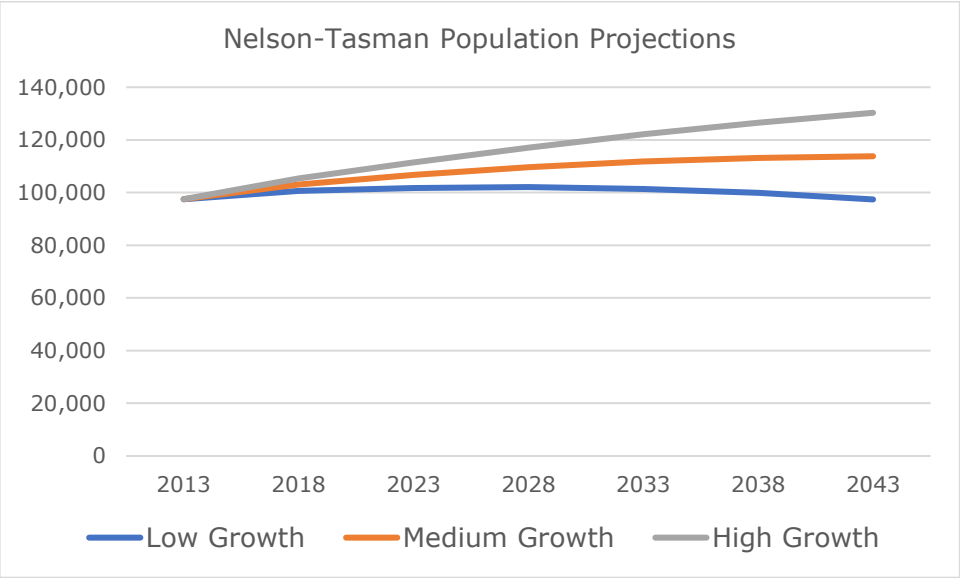

Figure 7: Population projections for the Nelson-Tasman Region from 2013 to 2043 (Source: Statistics NZ, http://nzdotstat.stats.govt.nz/)

Collection and disposal services to the region are expected to be able to cope with local change in population, with new development areas being added to the existing collection routes.

The waste per capita had been trending downwards, as shown in Figure 8, but in 2016/2017 it increased somewhat.

Overall, waste to landfill per person in the region decreased from 731 kg per person in 2005-2006 to a low of 612 kg per person in 2015-16, increasing through to 2018-2019 to 743kg per person. There was a decrease in 2019-20 to 636kg per person.

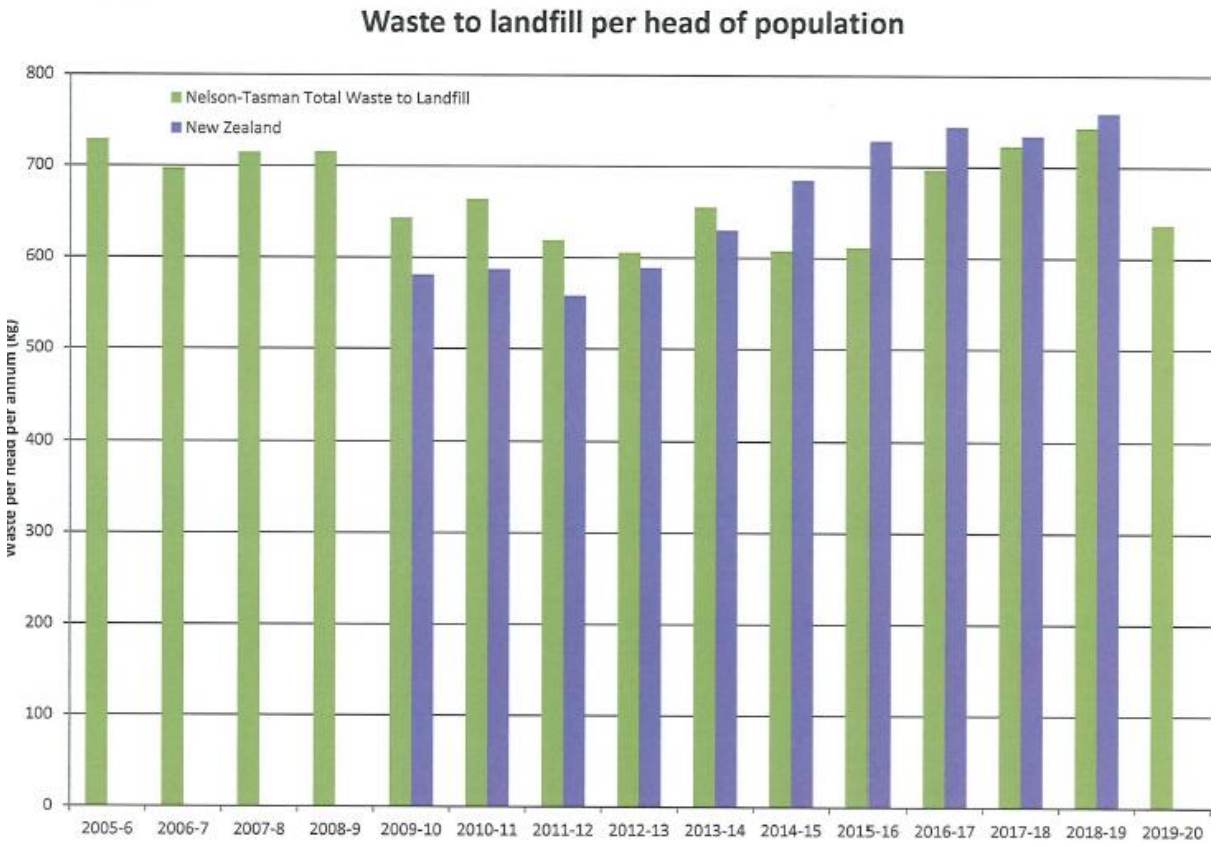

Figure 8: Waste to Landfill per Head of Population – Comparison of Nelson-Tasman Region data versus National Data

3.1.2. Changes in Commercial and Industrial / Economic Activity

A key indicator of commercial and industrial activity is Gross National Product (GNP). Across New Zealand, GNP has fluctuated over the last decade dropping into a recessionary period in 2008-2009 but returning to positive growth towards the end of 2009. The global financial situation and response to natural events, such as the earthquakes and pandemics will continue to influence local economic activity.

Traditionally waste generation has been coupled to economic activity indicators, such as GNP. It is generally anticipated that without significant intervention in how waste is managed (e.g. increased diversion / resource recovery activity or changes to legislation) growth in waste per capita is likely to continue along previous trends.

Another specific example of change to commercial and/or industrial activity that impacts the demand for waste services is one-off large scale infrastructure and development projects. In 2018 the Nelson North Wastewater Treatment plant was desludged resulting in the disposal of 4,933 tonnes of sludge to landfill.

There have also been significant housing developments in the region resulting in considerable quantities of construction and demolition waste coming to landfill.

There was a short term reduction in waste during COVID 19 level 4 lockdown, however waste volumes have returned to pre-COVID 19 Levels. At present it is unclear what (if any) effect the ongoing effects of COVID 19 will have on waste over the next few years.

3.1.3. Waste Flows from Other Areas

The policy, services and facilities of one district can dramatically impact on demand for services in neighbouring districts.

Pricing of landfill disposal is, in itself, a useful method for managing demand for landfill services. This issue has been a key reason for the Councils to establish a joint landfill operation.

Any increase in gate charges for general refuse at the Councils' landfills may have a flow-on effect of increased material being diverted to cleanfills in the region.

Only waste from Buller District is believed to originate from outside the region.

3.1.4. Technological Changes

Technological change has the ability to impact on the demand for solid waste services. These changes can reduce or increase the demand for solid waste infrastructure. Relevant examples which would reduce the demand for landfill capacity are:

- Industry altering the design of packaging to become more environmentally friendly, reducing packaging or allowing more reuse, recycling or composting of packaging wastes;
- Development of more economic recycling or composting technology;
- Development of alternative waste disposal technologies, such as incineration of waste. Over the past several years, there has been a proposal floated to establish a waste incinerator on the West Coast. The feasibility of the project has been questioned by the Ministry for the Environment and its viability would require waste from most of the districts in the South Island. There has also been very strong community backlash to the proposal and a strong anti-group has formed ("Westland not Wasteland"). It is unlikely that the project will go ahead but if it did it would have a significant effect on the need for landfill assets in the Nelson-Tasman region in the medium to long-term.

It is important for the NTRLBU to be aware of continued technological changes to adequately predict demand trends and the effect on infrastructure requirements.

3.1.5. Consumer Behaviour

Consumer behaviour is a key driver for household waste generation and there are a number of factors that influence this.

Such behaviours are the target of many New Zealand policies and programmes, both at a local and national level, that have the common aim of reducing waste generation at a household level.

The Councils are anticipated to continue with existing initiatives to influence waste disposal behaviour and demand for waste services and improve on them over time.

3.1.6. National Policies, Legislation and Regulation

Legislation, such as the Waste Minimisation Act, encourages waste avoidance, a reduction in the amount of waste that is generated and disposed of in New Zealand and aims to lessen the environmental harm of waste. Provisions such as the national waste disposal levy and product stewardship schemes help encourage waste minimisation, protect the environment and provide wider social, economic and cultural benefits. There are also a variety of local regulatory measures that can affect demand for services.

National Waste Disposal Levy

The national waste disposal levy on residual waste disposed of at municipal landfills has the potential to act as a disincentive to wasteful behaviour. The Government is proposing to increase the landfill levy and apply it to more landfills than just those that receive municipal waste.

Presently the national waste disposal levy is set at $10 per tonne (excluding GST) and it is only levied on waste disposed at landfills that accept household waste, accounting for around only 40% of the total waste sent to landfills in New Zealand.

Strong calls to increase the national waste disposal levy and expand its coverage have come from local government. The Tax Working Group, the Organisation for Economic Co-operation and Development (OECD) and the New Zealand Productivity Commission have also made similar calls.

It is considered that increasing the national waste disposal levy will better reflect the full environmental, social and economic costs of waste disposal and encourage materials to be reused and recycled rather than sent to landfill. This will help the New Zealand economy become more efficient and help create jobs.

It is proposed to make the following changes to the national waste disposal levy rate and coverage:

- Increase the national waste disposal levy for landfills that take municipal waste in stages from the existing $10 per tonne to $50 or $60 per tonne by 2023.
- Apply the national waste disposal levy to all landfills except cleanfills and farm dumps.
- This includes landfills taking construction and demolition waste, industrial waste, and those that take largely inert materials like rubble and soils. For these landfill types, the national waste disposal levy would be either $10 or $20 per tonne of waste disposed.

The Government's proposals to increase the national waste disposal levy and expand its coverage would significantly grow levy revenue from approximately $30 million currently to around $220–$250 million per annum by 2023. It is intended to develop an investment plan to ensure this levy revenue is spent where it can be most effective in achieving a low-waste future for New Zealand.

As an example, a domestic rubbish bag that can hold approximately 6.5kg would currently attract a levy of 6.5 cents. At a national waste disposal levy rate of $60 per tonne, the rubbish bag would attract a levy of 39 cents.

A rubbish bag that currently retails for $2.50 (GST included) could retail for $2.83 under the maximum proposed rate of $60 per tonne levy regime.

The proposed timeline for changing the national waste disposal levy is as follows:

- November 2019 – February 2020: Public consultation
- Mid-2020: Final policy decisions made
- Mid-late 2020: Regulations made and notified
- Mid-2020 – mid-2023: Landfill levy changes proposed to take effect
- By July 2023: All new levy rates proposed to be in place.

The impacts of changing the national waste disposal levy, as proposed, are significant and could be a driver for establishing a separate cleanfill (no levy

proposed), or a controlled landfill, for certain non-organic wastes (levy of between $10 and $20 per tonne), within the region.

Section 6.5 of this AMP provides further information on the financial implications of changing the national waste disposal levy.

Product Stewardship

Product stewardship relates to a process through which those involved in the lifecycle of a product or service are involved in identifying and managing its health, safety and environmental impacts from the development and manufacture of a product through to its use and final disposal.

There are two types of product stewardship schemes; mandatory and voluntary (industry or company led) schemes. The WMA has provision for both types of scheme, but to date the Government has only accredited voluntary schemes.

A mandatory product stewardship scheme would be of benefit to the NTRLBU through a reduction in problematic wastes such as tyres, e-waste and agricultural chemicals and plastics.

In July 2020 the NZ government announced that six products would be declared 'priority products' for the establishment of regulated product stewardship schemes under the Waste Minimisation Act. The products are:

- Plastic packaging
- Tyres
- Electrical and electronic products (e-waste)
- Agrichemicals and their containers
- Refrigerants
- Farm plastics**.**

Emissions Trading Scheme (ETS)

The Climate Change Amendment Act 2008, and the associated New Zealand Emissions Trading Scheme (NZ ETS), is the Government's principal policy response to climate change. It puts a price on greenhouse gas emissions, which creates a financial incentive to either invest in forestry or reduce emissions.

Landfills emit greenhouse gases and the emissions are calculated based on the volume of waste received. The NZ ETS requires landfill owners to purchase emission trading units (ETUs) to cover methane emissions generated from the landfill. A New Zealand ETU (also known as an NZU) represents one metric tonne of carbon dioxide.

The costs for emissions units will be passed on to users in user charges for waste disposal services.

The following information relates to the York Valley Landfill:

- The landfill was assessed at 1.19 tonne of carbon per tonne of waste. This is the Default Emissions Factor (DEF) that was used to calculate the number of NZUs that the NTRLBU was required to surrender each year.
- A Unique Emissions Factor (UEF) has been obtained for the 2019 calendar year.
- The requirement for units moved to 1.0 unit per tonne for 2019.

- As of 6 March 2020 the NTRLBU had 141,552 units.
- The number of NZUs required for the 2019 calendar year liability will be reduced due to the Unique Emissions Factor (UEF).
- NZUs can be purchased this year (2020) for $25 and it is projected that this will rise to $35 per NZU next year (2021).

The following actions are to be undertaken with respect to the NZ ETS:

- Keep up to date on national and international emission trading trends and adjust the next AMP financial forecasts accordingly.
- The Nelson City Council financial team will monitor the market and pre-purchase trading units accordingly.

In terms of the current regulations, landfill owners can apply for a reduction in the amount of ETUs to be surrendered per tonne of waste if they can demonstrate that they have a waste composition that results in less generation of greenhouse gases compared to the default waste composition. Additionally, a reduction can be applied for if they have a landfill gas collection and destruction system in place for which it can be demonstrated that the net emissions are less than otherwise.

In an initiative to reduce organics in household waste, NCC is implementing a kitchen waste collection trial funded from a climate reserve action fund, expectation is the trial will commence by the end of 2020. This activity will be conducted by a local social enterprise, which will compost the waste collected. Anticipated amounts are in the order of 67 tonnes over 12 months for the trial, and purpose of the trial is to assess whether this should be supported as a long term service for Nelson residents; the long term expectation is that between four and five thousand tonnes of food waste could be diverted from landfill per annum.

It was previously thought that since the NTRLBU sells the landfill gas, it cannot apply for a reduction in charges under the ETS for landfill gas collection and destruction for York Valley Landfill.

It is now known that this position was incorrect and the Unique Emissions Factor (UEF) now takes into account the amount of landfill gas that is currently collected and destroyed.

The 2019 UEF has reduced from the default DEF value of 1.19 down to a value of 0.885.

This is a significant financial benefit to the whole community; plus it has the added beneficial outcome that the landfill gas is used instead of burning coal at the local hospital.

The NTRLBU intends refining the landfill gas destruction system to increase efficiency and amount of gas destroyed. A new lower UEF will then be applied for.

In addition, the NTRLBU intends to apply for a reduction in ETS charges if it can prove that the waste composition will generate less greenhouse gases than the default waste composition.

The cost of ETUs is determined by the NZ market. About five years ago the price of ETUs was insignificant (less than $1 per tonne of waste), but the price has increased steadily in the ensuing period. As shown in Figure 9 the price has risen from about $21.50 per unit at the start of 2018 to nearly $29.45 at the start of 2020. The effect of the Covid-19 pandemic has seen prices drop to just under $22.00 near the end of April, thereafter they have started rising and were at $24.50 on 1 May 2020 and above $33 in August 2020.

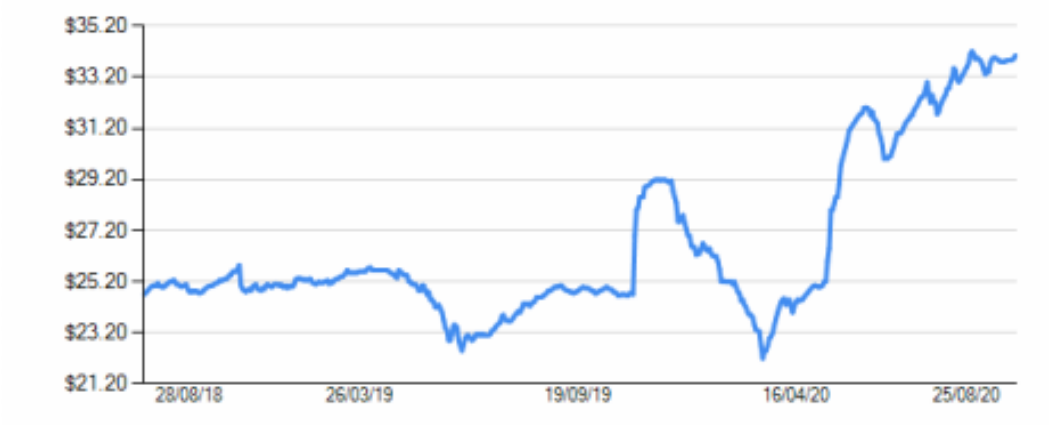

Figure 9: Spot price of NZ Trading Units (source: Carbon news http://www.carbonnews.co.nz/Market Latest Wednesday 26 August 2020)

In 2019 the MfE proposed to use price controls to provide the mechanism to address the risks associated with emissions budgets being set too high or too low.

The Government proposes to introduce an NZU price floor of $20 for the period 2020 to 2025 that will work by placing a reserve price below which NZUs will not be sold at auction.

A trigger price ceiling of $50 for 2020 to 2025 is being proposed. As an interim measure, the Government is proposing to amend legislation to increase the fixed price option from $25 to $35 for surrender obligations arising from 2020 activities.

The implications for the NTRLBU is that the ETS is likely to increase the cost of landfill operations. This additional cost will be met by increasing the base cost of each tonne of waste to landfill. The financial implications associated with these changes is described in section 6.5 of this AMP.

Another key implication from the ETS is that organic waste diversion may be incentivised if the landfill waste composition has less organics than the ETS default composition, as reducing organics to landfill should assist in lowering emission liabilities. It's worth noting that the relatively minor emissions arising from organics composting are exempt from the ETS, further incentivising this option.

A simple exercise has been carried out by comparing a default waste composition[1] to that which has reduced fractions of greenwaste, organics (food waste) and timber waste. The results show[2]:

- Reducing by 5% - savings in ETS costs of $61,000
- Reducing by 15% - savings in ETS costs of $183,000
- Reducing by 25% - savings in ETS costs of $305,000

However, the above only holds true if the actual waste composition has reduced fractions of greenwaste, organics and timber waste compared to the default waste composition. From waste composition studies conducted in 2012, Nelson-Tasman region has higher fractions of organic waste compared to the default waste composition. If that remains true, then there would be no benefit in applying for a unique emissions factor on account of waste composition because it would result in a higher unique emissions factor being applied compared to the default factor. Additional waste analysis was started in July 2020 which will provide additional information regarding the organic content of Nelson / Tasman wastes.

Simply applying the default factor on reduced tonnages though, would provide the following savings in ETS costs:

- Reducing by 5% - savings in ETS costs of $38,000
- Reducing by 15% - savings in ETS costs of $115,000
- Reducing by 25% - savings in ETS costs of $192,000

Overall, however, there would be a loss in revenue from reduced tonnages and this has not been taken account of in the simple analysis above.

Nevertheless, the ETS is an important driver of waste diversion from landfill, and it creates another economic incentive to divert materials. For methane-generating organic waste there is further incentive to reduce the organic fraction by applying for a unique emissions factor for waste composition, but this is only worthwhile when the landfill waste composition has the same or less organic fractions compared to the default waste composition.

Other National Legislation and Regulation

Another consideration is the potential for a national cleanfill standard to be developed, as this could have a key impact on the types and quantity of waste disposed of at landfills.

Local / Regional Regulation

Along with national policy and regulation, local / regional regulation has an impact on demand for waste management and minimisation services.

Regional regulation can occur at a consenting level, for major waste facilities, such as sanitary landfills, monofills and for some cleanfills.

The success of consent applications or the consent conditions by Third Parties can play a part in impacting demand. For example, if the Nelson Regional Sewerage Business Unit (NRSBU) Resource Consent application to apply biosolids directly to forestry land on Rabbit Island was denied for some reason, this could result in those materials having to be landfilled at a municipal landfill, thus having an impact on demand for disposal capacity.

[1] Default waste composition from Schedule 3 of the Climate Change (Waste) Amendment Regulations 2015.

[2] Based on initial annual tonnage of 70,000 tonnes, which is reduced for diversion of greenwaste, organics and timber waste, and assuming an ETS charge of $25 per unit.

Councils can also use regulation to impose bans on materials to landfill and other waste bylaw provisions to manage waste, particularly where alternative services exist to deal with the waste stream in question. Although potentially powerful tools, these have not been widely introduced in the Nelson Tasman region.

3.1.7. Impact of Waste Minimisation Programmes

Further to the existing waste education and minimisation programmes being run in the Nelson-Tasman region, additional waste minimisation programmes and services will be investigated by the Councils through the implementation of the JWMMP.

Potential future services such as increased green waste diversion and composting or a kitchen food waste collection, would have a quantifiable reduction of waste to landfill which may reduce demand for landfill space in the future.

3.1.8. Community Expectations

Community expectations vary geographically and over time. Key trends in community expectations that the NTRLBU recognises include:

- Environmental awareness is leading to a demand for higher standards at disposal and treatment facilities;
- Increased pressure on the NTRLBU to provide services at lower cost.

Implications for the landfill activity are:

- Resource consents for future facilities may be more difficult to obtain and require an increased level of environmental protection;
- Reduced appetite for services at greater cost.

The JWMMP, adopted by the Councils after consultation with the community, may be considered an additional indicator of community feedback and expectations.

3.1.9. Climate Change

The RMA 1991 requires local authorities to account of the effects of climate change when developing and managing its resources. The MfE has prepared various reports to support councils in assessing expected effects of climate change and to help them prepare appropriate responses when necessary.

For landfills the key climate influences are likely to be changes in rainfall and temperature which could result in the following possible effects:

- Increased flooding and clean-up wastes;
- Biosecurity changes;
- Changes in ground water level and leachate flows;
- Increased methane emissions.

3.2. Demand Forecasts

3.2.1. Existing Demand

The total tonnage of residual waste disposed of at municipal landfills in the Nelson-Tasman area tended to trend downwards for the period from 2005/2006 through to 2011/2012. For the next five years it remained fairly constant aside from a small increase in 2013/2014. From 2017 (note change to calendar years, as discussed below), waste quantities have increased with quite a significant increase in 2018 followed by a slight reduction in 2019. These trends are shown in Figure 10 on the following page.

Note that, because of data availability, waste and cover quantities are shown in calendar years from 2017 onwards. Also, waste and cover quantities in 2017 have been estimated for Tasman District (Eves Valley Landfill).

From 2018 all waste in the region has been disposed of at York Valley Landfill. In that year there was also a significant increase in waste quantities with most of it being in the form of special waste (HAIL, Residential NESCS and Nelson WWTP sludge). Total waste quantities reduced in 2019 and currently sit around 74,000 tonnes of waste per annum, including around 2,000 tonnes from Buller District.

A large proportion of total waste comes from a variety of sources — residential properties, commercial and industrial activities, construction and demolition, and landscaping activities. This waste is termed "municipal waste" and results from the day-to-day activities of residents and businesses in the region. Municipal waste trends change over time and reflect the activity of the community and it currently accounts for about 67,000 tonnes per year (includes Buller District waste).

The balance of the waste is "special waste" which is waste that needs to be dealt with in a special manner because of its particular characteristics (e.g. sewage sludge, bagged asbestos). In 2019 special waste amounted to about 7,200 tonnes per year, though in 2018 it was nearly 18,600 tonnes.

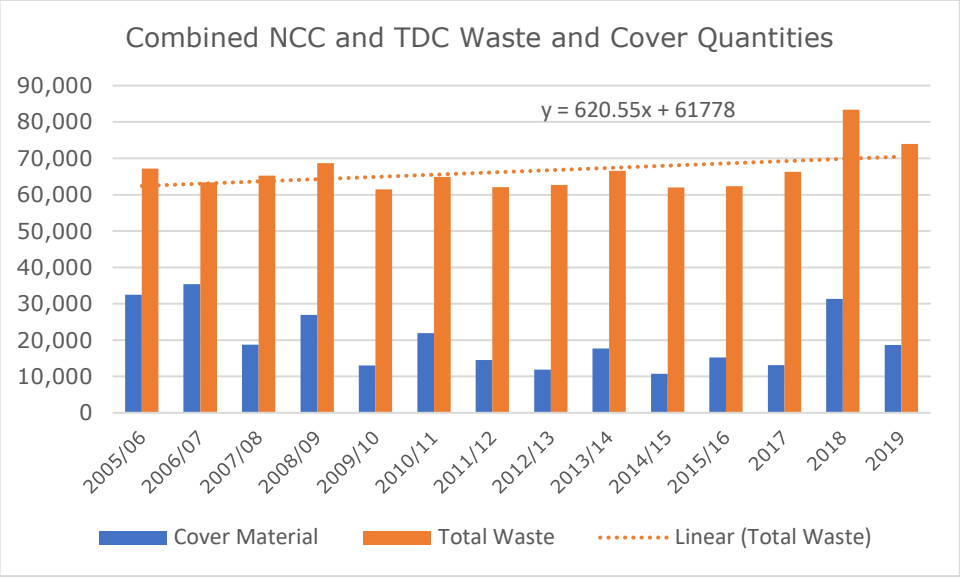

Figure 10: Graph of Residual Waste Disposed to Landfill from Nelson City, Tasman and Buller Districts.

There is uncertainty how the management of HAIL classified properties will affect demand in future.

These waste totals do not necessarily represent the waste generated in each of the Nelson and Tasman districts, as some waste moves across the Nelson–Tasman boundary.

Some waste from Nelson–Tasman may also be disposed of at other landfills outside the region, but these quantities are likely to be small. This inter-region waste movement is likely to occur near the boundaries between districts (such as Rai Valley Transfer Station in Marlborough and Murchison Resource Recovery Centre in Tasman).

3.2.2. Projected Residual Waste

Analyses of Nelson-Tasman trends suggest solid waste quantities will continue to grow moderately. This trend is expected to continue unless action is taken to effect behavioural change in the community or new diversion techniques are introduced, either at a local or national level.

For landfill tonnages to start trending downwards again would most likely require continued intervention by the Councils, however, the effects of the Covid-19 pandemic are likely to stifle economic growth in the short term, and it is possible that a reversal in tonnages may become evident this financial year.

Figure 11 indicates potential tonnes of waste disposed to landfill in Nelson–Tasman over the next 12 years and presents four scenarios: growth at 1% per annum (in line with long term population projections), 0.5% growth, no growth and a small decrease in waste per annum. These last three scenarios will require interventions and a reduction in waste per capita to be achieved.

Both Councils have stated intentions to reduce the amount of solid waste being disposed of to landfill by 10% by year 2030. Based on current waste quantities (74,000 tonnes), this would imply a reduction down to 66,600 tonnes per year, which would require significant intervention, either at a local or national level.

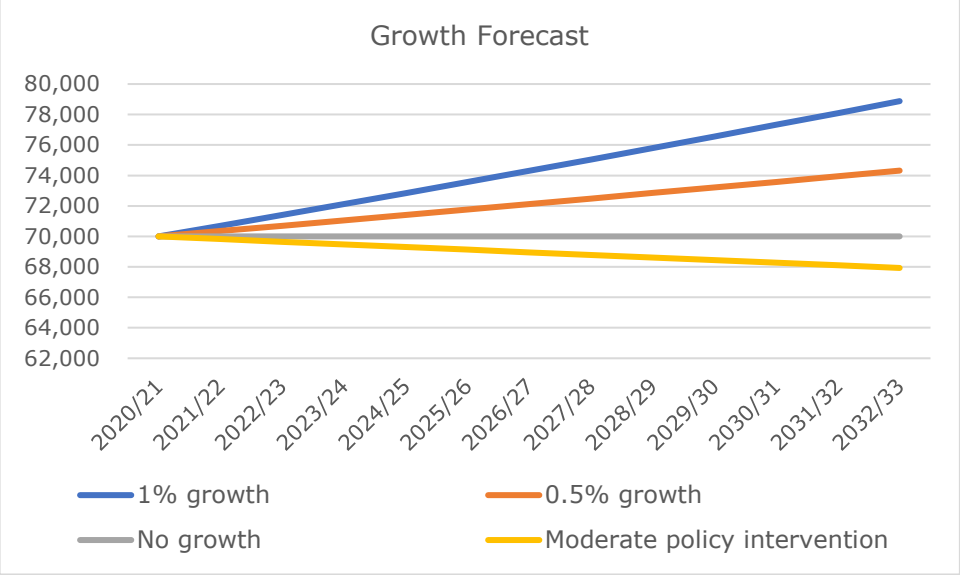

Figure 11: Waste growth forecasts for Nelson-Tasman residual waste.

The geographical location of York Valley Landfill makes it unlikely that waste originating from outside the region will become a problem for the area. It is anticipated that Buller District will continue to use York Valley Landfill as their preferred landfill.

With an expected future population growth in the Nelson-Tasman region, waste quantities are also expected to increase. This increase will be off-set only if new initiatives are implemented to effect behavioural change in the community, or new diversion techniques are introduced either at a local or national level.

It should also be noted that JWMMP initiatives affect the generation of residual waste that needs to be landfilled.

3.2.3. Trends in Waste Types

Whilst most of the 20 categories of waste tracked at York Valley have stayed relatively stable in spite of population growth, the following six categories of waste have shown significant changes over the last few years: general rubbish, skip and mini bin waste, demolition waste, treated

sawdust, HAIL material and sewage sludge. Residential NECS waste also increased in 2018, but none was recorded the following year.

With the last two years being the first two full years that waste has been accepted regionally at York Valley, a meaningful historic comparison of these waste category quantities cannot be done and so Figure 12 shows only the two year's data for those waste categories.

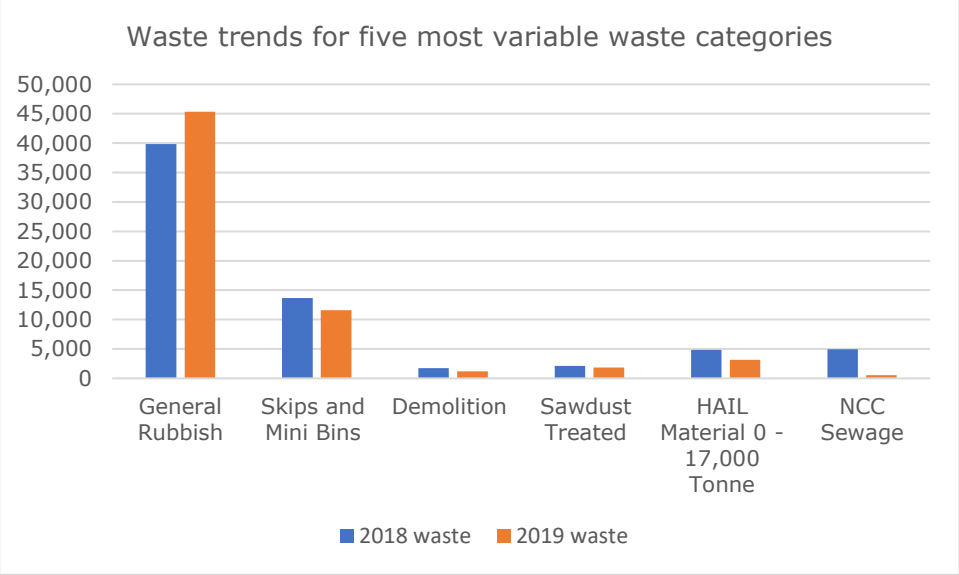

Figure 12: Waste quantities for the five most variable waste types.

From a capacity point of view it is more conservative to base the replacement of future landfill capacity on higher growth projections.

However, for estimating budget income it is considered prudent to base projected landfill tonnages using the current trend.

The current trend projection is somewhat difficult to establish based on the waste tonnage data seen in Figure 12. Overall, a growth of 1% per annum has been adopted (and this is reflected in the financial projections).

Currently the national waste disposal levy is only applied to landfills that accept municipal solid waste. Whilst the MfE has signalled that it may well extend the range of landfills to which the levy will be applied, reduced levies may well be applied to wastes that have less potential to generate greenhouse gases. So, there may be benefit in developing landfills for special waste types. This matter is to be investigated as part of the AM improvement plan.

3.3. Demand Impacts on Assets

With the population in the region expected to increase over the medium to long term, it is expected that without further intervention (e.g. through waste minimisation measures) more landfill space will be required year on year.

Diversion of waste through resource recovery activities will increase the longevity of the available landfill airspace. In particular, potential future services such as increased green waste diversion and composting or a kitchen food waste collection, would have a quantifiable reduction of waste to landfill.

However, these are presently matters for the Councils to consider and not the NTRLBU.

3.4. Demand Management Plan

The approach to demand management centres around three key areas:

- full cost disposal pricing;
- education and promotion;
- waste minimisation services.

The NTRLBU is responsible for setting gate charges, but the second and third key areas are the responsibility of each Council through their waste management activities.

Increasing gate charges is a disincentive for customers to dispose of waste, and it was one of the reasons why the national waste disposal levy was introduced through the WMA 2008.

However, simply increasing gate charges without the Councils providing other means for diverting waste from landfill (e.g. through recycling collections) can result in adverse behaviours such as increased fly-tipping.

Gate charges have been set to cover not only the full cost of the Landfill activity, but they also include a local waste disposal levy, which accounts for 41% of the gate charge in the 2020/2021 budget (see Figure 23), and which is used by the Councils to subsidise other waste management activities such as recycling.

3.5. Asset programmes to meet Demand

In the short to medium term, Gully 1 of York Valley Landfill will provide the capacity to meet the demand for disposal of municipal solid waste in the region.

There are no major programmes proposed for further developing Gully 1, though renewals are proposed for certain infrastructure and site features.

Based on the assumptions provided below, it is projected that by 2021/2022 work will need to commence on investigating, designing and consenting Stage 3 of Eves Valley Landfill, with construction of the first part of Stage 3 commencing in around 2026/2027.

- Assume York Valley Landfill will be full by 2030/2031.
- Eves Valley Landfill Stage 3 to be developed by 2028/2029 to fulfil the level of service target of having two years available developed landfill space.
- Allow two years for construction of Stage 3 of Eves Valley Landfill, so start in 2026/2027.
- Allow three years for investigations, designing and consenting of Stage 3, so start in 2023/2024.

A summary of the asset programme required to meet the demand over the next ten years is given in the table below.

Table 3-1: Asset programme from 2021/2022 to 2030/2031(next 10 years)

Capital Expenditure	Total ($)
Capital (Renewals)	**4,249,938**
Piezo monitor well	73,377
Collection Network/Flare/Gas	2,519,458
Planting Eves stage 3	500,000
Road extension	43,240

Horizontal drilling for drains	43,240
Weigh bridge improvements	175,396
Upgrade vehicle wash	0
Access road development at Eves Valley Landfill	895,227
Capital Growth (Upgrade)	**9,090,240**
Stormwater control	850,000
Access Rd Stormwater	57,293
Construction of Stage 3 of Eves Valley Landfill	6,612,947
Investigations & Consents for Stage 2 and 3 as regional site	1,500,000
Miscellaneous & Safety Eves Valley Landfill	50,000
Certified Emissions Management and Reduction	20,000
Unprogrammed Capital Expenditure	**4,200,000**
Capacity upgrades, gas systems, consents, facilities	3,550,000
Contingency Board discretion (renewals and minor upgrades)	650,000
Total Capital Expenditure	**17,540,178**

4. Asset Lifecycle Management (How we provide the service)

In general terms, asset lifecycle management is a business approach that aims to maximize the efficiency and cost-effectiveness of the assets throughout their lifespan. This includes the conceptual design phase through regular usage to the eventual decommission and replacement.

Key stages of asset management lifecycle are usually stated as:

- Planning
- Acquisition
- Operation and Maintenance
- Disposal

Applying these stages to an asset, like a building for instance, there may be a period of 100 years covering planning through to the end of operation and maintenance. Thereafter, the building could be disposed of, that is demolished or removed for use elsewhere, and a new building planned and constructed, so repeating the lifecycle.

In considering each landfill as an asset, the key stages are somewhat different and generally consist of the stages described below. An approximate time scale is shown in years in brackets, though some activities could be concurrent.

- Planning (2 to 4 years)
- Land acquisition (2 to 4 years)
- Concept design (1 year)
- Site investigations (2 years)
- Resource consenting (2 to 3 years, possibly longer)
- Detailed design (1 to 2 years)
- Construction (1 to 3 years)
- Operation and Maintenance (15 to 50 years)
- Closure (1 to 2 years)
- Aftercare (30 to 40 years)
- End use (no limit)

Upon closure, the waste within the landfill will still continue to decompose generating both landfill gas and leachate, both of which will need to be taken care of, which is why there is such a long aftercare period allowed for landfills. Even in the end use stage when the landfill may be used as a park or other recreational area, measures are needed to mitigate the risks of landfill gas and take care of leachate that will continue to be collected. Unless the landfill is very small, or the land so valuable, it will not be economic to move the landfill and re-use the land again. Any new landfill will have to be constructed elsewhere.

The landfill facility is an asset in its own right, and it is made up of various asset components (e.g. road pavements, pipes, service buildings etc.). Each of these asset components have finite lives and so each have their own asset lifecycle.

So, for a landfill there are two “levels” of asset lifecycle management. At the higher level there is the landfill facility, as a whole, and at the lower level there are the physical asset components that make up the landfill asset.

The asset lifecycle management at these two levels is different, as described further below.

4.1. Landfill Lifecycle Full Cost Accounting

In terms of the financial management of the landfill asset, as a whole, it is important that a full cost accounting (FCA) exercise be carried out that encompasses the capital and operating costs that will be incurred over the whole life of the landfill, (i.e. from planning through to end use), which have to be recovered and on which a return may be required. Typical categories of costs include:

- management, administration and organisational overhead costs
- planning and resource consent costs
- land cost
- development costs
- operational costs
- closure and aftercare costs.

FCA is a dynamic process that needs to be able to respond to changes over the lifetime of a landfill project. This is often done with an FCA computer model, such as the MfE's FCA model.

Once the FCA model has been set up for a landfill project, the model should be revised on a regular basis to reflect new and better information. For instance, waste quantities may have changed which will affect the rate at which the landfill is filled up which will affect the timing for the construction of new stages of the landfill.

For a landfill project it is recommended that full cost modelling be undertaken, or repeated, at the following stages:

- planning and project evaluation
- site selection and preliminary design
- detailed final design following resource consent processes
- at intervals throughout the landfill operating life, including reviews that take account of waste minimisation and recycling programmes, as their economic input on final disposal cost can be significant due to cashflow movements.

At each stage, refined information will be available to enable more accurate determination of actual disposal costs, or any charging or cost adjustments needed.

4.1.1. Eves Valley Landfill FCA Model

The MfE's FCA model has been used to estimate costs for Stages 2 and 3 of the Eves Valley Landfill. The exercise was first done in 2003/2004 and has been redone several times since.

The last detailed FCA estimate was done in 2014 for Stage 3 of the landfill and cost adjustment factors were applied to this estimate in 2017 to update costs for inclusion in Tasman District Council's LTP. These estimates have also informed the Landfills AMP in 2018 and 2021.

It is considered appropriate for the FCA model to be reviewed and cost estimates revised for Stage 3 of Eves Valley Landfill. This should be done as part of the Improvement Plan.

4.1.2. York Valley Landfill Cost Estimates

The remaining capacity of Gully 1 of York Valley Landfill is currently less than the projected airspace consumption to the end of the consented period. There is a possibility that the landfill life can be extended to the current consented period (or beyond) by increasing the stability of the landfill. There is no requirement to construct a landfill liner or extend the leachate collection system up the side slopes as the landfill increases in height. The present cost estimates have been derived from estimates that were included in the 2018 Landfills AMP, and capital allowance

has been made for stability improvements that would result in landfill capacity increase.

It is considered appropriate to review the cost estimates that have been done for York Valley Landfill as part of the Improvement Plan.

4.2. Landfill Asset Capacity

For many landfills, the most valuable component is the available developed landfill capacity (e.g. volume, or airspace), which can be used for disposing of waste.

The rate at which the airspace is used up depends on two factors: firstly, the amount of waste (tonnage) which needs to be disposed of in the landfill and secondly, the efficiency at which the waste can be compacted into a given volume (its density).

The following equation defines waste density, which is proportional to the waste tonnage and inversely proportional to the volume occupied by the waste and cover:

Waste Density = Waste Tonnage / Volume of Waste and Cover

Increasing the tonnage or decreasing the density will result in an increasing volume of landfill airspace being used up.

Additionally, reducing the volume of cover used, will increase the waste density.

For landfill assets, their future use as operational facilities is determined by the availability of developed landfill capacity as well as the potential for additional capacity to be developed in the future.

Table 4–1 provides a summary of the current and future capacities for each landfill.

Table 4-1: Current and Future Capacities of the York Valley and Eves Valley Landfills

Landfill Stage	Capacity (m^3)	Available Life (Years)	Comments
Existing consented York Valley LF Gully 1	896,000(1)	10.2(2)	Resource consent for Gully 1 expires in 2034.
Existing consented Eves Valley LF Stage 2	78,200 (3)	0.9 (2)	NTRLBU Deed of Agreement assumes 1 year capacity for regional disposal.
Future non-consented Eves Valley LF Stage 3	1,930,000	22.1 (2)	Future capacity lies in Stage 3 and main valley.
Future non-consented York Valley LF Gulley 3	750,000	8.5 (2)	Gully 3 is in same watershed, and could use the existing gas system and infrastructure as York Valley 1.

Landfill Stage	Capacity (m^3)	Available Life (Years)	Comments
Future non-consented York Valley LF Gully 4	2,700,000 (4)	30.9(2)	Gully 4 only considered.

Notes:
(1) Based on 3 Dimensional modelling and topographical survey at the end of June 2020 (Beca Ltd, Landfill Capacity Review).
(2) Assumes 70,000 tpa compacted at 0.8 t/m^3.
(3) Available capacity within Stage 2. Assumes 70,000 tpa compacted at 0.8 t/m^3.
(4) Capacity is for Gully 4 only.

Note that Gullies 3 and 4 at York Valley LF are designated for landfill use, but are excluded from the NTRLBU Deed of Agreement.

4.3. Annual Utilisation and Compaction Density

The landfills are surveyed annually to determine what volume has been used up in the previous year. This provides a means to determine the remaining capacity and life of the landfill.

Knowing the volume of landfill used up in a year, and the tonnage of waste disposed in the landfill, one can calculate the density of the compacted waste. Table 4-2 provides the latest available information on the waste compaction densities achieved at the York Valley and Eves Valley Landfills, calculated on a year by year basis.

Table 4-2: Waste Compaction Data for York Valley and Eves Valley Landfills

Landfill	Waste Tonnage (t)	Landfill Volume Used (m^3)	Apparent Density (t/m^3)
York Valley(1)	81,190	112,445	0.72
Eves Valley(2)	31,388	40,395	0.78

Notes:
(1) From beginning of July 2018 to end of June 2019
(2) From beginning of July 2016 to end of June 2017

4.3.1. Benchmark Compaction Densities

The waste compaction densities achieved at York Valley and Eves Valley Landfills were at the lower end of compaction densities reported elsewhere in New Zealand. At York Valley Landfill the compactor was old and was occasionally out of service. It has since been replaced and the new compactor is achieving better compaction since July 2019.

A report on an application for a resource consent for Redvale Landfill in 2014 indicated waste compaction densities of between 0.8 and 1.0 tonnes/m^3 were being targeted.

Levin Landfill has recorded waste densities between 0.99 and 1.26 tonnes/m^3 over the past nine years with an average of 1.10 tonnes/m^3.

The contractual requirement for compaction density at York Valley Landfill is 0.8 tonnes/m^3.

4.3.2. Landfill Lives

Applying a range of apparent densities from 0.8 to 1.0 tonnes/m^3 and assuming a range of future annual waste tonnages between 65,000 and 80,000 tonnes, one can estimate a range for the remaining life of the York Valley Landfill, and for the future lives of unconsented stages of both landfills. The ranges of life estimates are shown in Table 4-3 below. Appendix 6 provides a more extensive sensitivity analysis exercise for estimating the remaining life at York Valley Landfill.

Table 4-3: Estimated Landfill Lives

		65,000 tpa		80,000 tpa	
Landfill	**Landfill Volume (m^3)**	**Remaining Life in Years - Density of 0.8 t/m^3**	**Remaining Life in Years - Density of 1.0 t/m^3**	**Remaining Life in Years - Density of 0.8 t/m^3**	**Remaining Life in Years - Density of 1.0 t/m^3**
York Valley Gully 1	896,000	11	13.2	8.9	10.75
Eves Valley Stage 2(1)	78,200	1.0	1.2	0.8	1.0
York Valley Gully 3 (2)	750,000	9.2	11.5	7.5	9.4
Eves Valley Stage 3 (3)	1,930,000	23.8	29.7	19.3	24.1
York Valley Gully 4 (2)	2,700,000	33.2	41.5	27	33.8

Notes:
(1) Renewal of resource consents for Stage 2 not yet finalised.
(2) Not consented and not part of the NTRLBU Deed of Agreement.
(3) Not yet consented.

Policy 7.6 of the JWMMP requires that "*The Councils will, through the Regional Landfill Business Unit, ensure jointly that there is landfill capacity in both Council areas for the safe disposal of waste*."

Method 7.6.2 states that "*The Councils, through the Regional Landfill Business Unit, will manage the landfill service such that consented landfill airspace is monitored and maintained to ensure that, at any time, there is at least five years consented airspace and the ground has been prepared so that waste can be placed without further construction for the next two years*."

From Table 4-3 it is clear that there is between 9 and 13.2 years of available landfill capacity at York Valley Landfill Valley Gully 1, as at the end of June 2020, depending on the compaction density and annual waste tonnage. Options are being investigated to increase the compaction density, the diversion of wastes, and the capacity of the Valley 1. Note, that the resource consent for York Valley Landfill expires at the end of 2034 and so the maximum available time from June 2020 is actually 14.5 years unless the resource consents for Gully 1 of York Valley Landfill are renewed.

In order to have confidence in the available airspace it is appropriate to conduct periodic independent landfill surveys. This is undertaken by UAV LIDAR data capture. The information gained from these surveys provide an assessment of available airspace and can also be used to improve the management of the landfill and to maximise its useful life.

4.4. Critical Assets

The York Valley and Eves Valley Landfills are assets that are presently considered important within the Councils' solid waste systems.

The level of risk from these assets if a failure should occur is unacceptable not only for the organization but for the wider community.

4.5. Landfill Asset Components

The assets of the landfill activity and those for which the NTRLBU is responsible are the York Valley Landfill and the Eves Valley Landfill.

A comprehensive description of the York Valley and Eves Valley Landfills is given in Section 1.1.7 and Table 4-4 below provides a summary of the asset components.

Table 4-4: List of asset components at each of the landfills

Asset Components	York Valley Landfill	Eves Valley Landfill
Land	✓	✓
Resource Consents	✓	✓
Designation	✓	✓
Water supply	✓	✓
Hazardous waste store		✓
Leachate collection system	✓	✓
Stormwater collection system	✓	✓
Gas venting system	✓	✓
Gas flare	✓	
Road pavements	✓	✓

Asset Components	York Valley Landfill	Eves Valley Landfill
Weighbridge and kiosk	✓	
Wheel wash	✓	
Signs, fencing, landscaping	✓	✓

The asset components vary in age and are recorded in separate valuation reports.

4.5.1. Asset Component Failure Modes

It is generally assumed that physical failure is the critical failure mode for most of the asset components. However, the asset management process recognises that other modes of failure exist. The range of failure modes includes:

Table 4-5: Asset Failure Modes

Structural	Where the physical condition of the asset is the measure of deterioration, service potential and remaining life
Capacity	Where the level of under or over capacity of the asset is measured against the required level of service to establish the remaining life
Level of Service Failure	Where reliability of the asset or performance targets are not achieved
Obsolescence	Where technical change or lack of replacement parts can render assets uneconomic to operate or maintain
Cost or Economic Impact	Where the cost to maintain or operate an asset is greater than the economic return
Operator Error	Where the available skill level to operate an asset could impact on asset performance and service delivery

4.5.2. Current Issues

For York Valley Landfill the following current issues exist:

- Vehicle wash down requires a change to design;
- Sediment ponds are not to current standards and need re-design and construction;
- Concern about potential occasional leachate outbreaks;
- Stormwater system has failed and requires replacement;

- Landfill gas harvesting efficiency appears to be declining;
- Weighbridge office needs refurbishment;
- Internet /Wi-Fi and power (mains or generator) improvement required at office.

For Eves Valley Landfill the following current issues exist:

- Potential for odour complaints and Health & Safety issues because of uncontrolled venting of landfill gas to atmosphere, though gas vents have been sealed;
- Access to the site is occasionally cut-off due to flooding of the Landfill Stream over the access road;
- Limited capacity to deal with leachate volumes during storm events.

4.5.3. Summary of Asset Valuations

York Valley Landfill

The Nelson City solid waste assets were re-valued by NCC and peer reviewed by OPUS International Consultants (OPUS) in June 2020. All assets are valued based on optimised replacement costs (ORC), assuming the use of modern techniques and pipe materials. The values have been adjusted by council officers annually based on an index provided by OPUS. Once the revaluation was completed the values were peer reviewed by OPUS.

All costs are reported in June 2020 dollars and Goods and Services Tax is not included in the costs.

All assets have been revalued as at 30 June 2020.

In addition to direct purchase/construction costs, professional fees for investigation, resource consent (where applicable), design, construction and 'as built' information have been included.

Financial charges incurred in carrying project costs in the period prior to commissioning are included in valuations.

Replacement costs have been optimised to represent the lowest cost and most efficient combination of assets providing the same service as the existing assets. Optimisation involves adjustment to deduct any surplus capacity or over design.

Land, access roads and fencing are included on the inventory, as they are recorded in Nelson City Council's Fixed Asset Register.

The value of landfill assets is shown in the table below.

Table 4-6: York Valley Landfill Valuation 30 June 2020

Asset Category	Replacement Value	Optimised Depreciated Replacement Cost	Annual Depreciation
York Valley Landfill	$7,896,532	$3,973,141	$202,864

A summary of the York Valley landfill asset valuation included in this report in Appendix 4.

Eves Valley Landfill

An asset valuation of all of Tasman District Council solid waste assets was carried out in April 2017[3]. The valuation was reviewed by NRSBU staff in June 2020. There is no clear distinction within the report of assets that comprise or serve Eves Valley Landfill. However, a review of the spreadsheet that provides input to the report has yielded the valuation figures (relating to leachate drain and pump only) shown in the table below.

Table 4-7: Solid Waste Valuations June 2020

Asset Category	Replacement Value	Optimised Depreciated Replacement Cost	Annual Depreciation
Eves Valley Landfill	$1,100,810	$713,168	$14,800

Confidence in Asset Component Valuations

The valuations that have been done for the landfills are dated and there is doubt whether the physical condition of the asset components has been taken account of in estimating their remaining useful lives. It is recommended that the valuation of asset components be reviewed, including undertaking physical inspections to determine the condition of various asset components so that their remaining useful lives can be assessed. This recommendation is included in the Improvement Plan.

4.5.4. Historical data

Table 4-8 provides a summarised statement[4] of the financial position of the NTRLBU for the past three financial years.

Table 4-8: Summarised Statement of Financial Position for the NTRLBU

Assets / Liabilities	Actual 30 June 2020	Actual 30 June 2019	Actual 30 June 2018
Current Assets			
Nelson City Council Current Account	2,341,803	386,297	452,843
Trade and other receivables from exchange transactions	572,537	549,376	960,331
Inter-entity receivables from exchange transactions	338,700	265,015	281,430
Inter-entity other financial assets	3,440,105	3,394,115	3,318,859
Emissions Trading Scheme (ETS) Credits	1,979,862	2,584,194	2,079,194
Total Current Assets (1)	**8,673,007**	**7,178,997**	**7,092,657**
Current Liabilities			
Trade Payables from exchange transactions		-	-
Sundry Creditors and other payables from exchange transactions	1,163,738	1,060,100	1,038,122
Inter-entity payables from exchange transactions	851,596	265,015	281,430
Current portion of Provisions	325,200	245,340	540,200
Total Current Liabilities (2)	**2,340,534**	**2,144,289**	**2,813,941**

[3] Tasman District Council Valuation of Non-Roading Infrastructure Assets as at 1 April 2017; Tasman District Council, May 2017.
[4] From NTRLBU Annual Financial Statements – For the Year ended 30 June 2019.

Net Working Capital (3) = (1)-(2)	**6,332,473**	**5,034,709**	**4,278,716**
Non-Current Assets			
Property, plant and equipment	5,373,857	5,801,173	6,037,845
Total Non-Current Assets (4)	**5,373,857**	**5,801,173**	**6,037,845**
Non-Current Liabilities			
Provisions	7,007,318	4,281,555	4,031,266
Total Non-Current Liabilities (5)	**7,007,318**	**4,281,555**	**4,031,266**
Net Assets (7) = (3)+(4)-(5)	**4,699,012**	**6,554,327**	**6,285,296**

4.6. Operations and Maintenance

Routine maintenance is the regular ongoing day-to-day work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again.

4.6.1. Operations and maintenance plan

The NTRLBU has responsibility to ensure the following activities are carried out in managing the landfill activity:

- Contract management, monitoring and design;
- Renewal and rehabilitation of asset;
- Emergency capability such as response to adverse external events.

Typical operation and maintenance activities costs include contractors' claims, consultants' fees, administrative costs, monitoring costs and Government levies.

Maintenance falls into two broad categories as follows:

- Planned maintenance: Proactive inspections and maintenance works done to ensure continued operation of the asset.
- Unplanned Maintenance: Reactive maintenance to correct failures.

Both the York Valley and Eves Valley landfills are operated and maintained in accordance with their respective Landfill Management Plans.

The operations of the landfills are contracted out and specialist consultants are contracted to carry out the consent monitoring.

Only the York Valley landfill is open for waste disposal purposes, and access to the landfill is restricted to approved contractors.

4.6.2. Operations and maintenance strategies

The NTRLBU contracts out the day-to-day operation and maintenance of landfill assets and waste disposal services with the aim of maintaining required levels of service in a cost-effective manner.

A single contract was let to Downer in December 2018 for the operation and maintenance of both the York Valley and Eves Valley landfills.

The contract has been let on a combination of prescriptive and performance basis with a view to:

- Achieving maintenance efficiencies and cost effectiveness by allowing the contractors to be innovative in managing the operation and maintenance activities;
- Encouraging pro-active maintenance practices rather than reactive practices;
- Ensuring compliance with legislative, monitoring and resource consent requirements;

The O&M Contract must be reviewed 1.5 years before the Date of Expiry. At 1 year from the Date of Expiry the NTRLBU must advise the Contractor whether it will award a contract extension or not.

The Contract Date of Expiry is currently 30 June 2024.

To ensure that the landfill activity is efficient and effective the NTRLBU monitors and reviews the contractors' performance on a regular basis.

Site operations also include regular inspections to ensure assets are performing their intended objectives and general site maintenance.

Programmed maintenance includes regular cleaning of drains.

Reactive maintenance comprises those activities which are undertaken on site by approved contractors as and when required.

4.7. Renewals / Upgrades

Capital expenditure in the landfill activity includes renewals and upgrades.

Renewals include the renewal and rehabilitation of existing assets to maintain the asset to their original size and condition. Renewal expenditure includes the following examples:

- Replacing asset components and preventative maintenance;
- Rehabilitating leachate collection pipes and assets;
- Planting front face.

Upgrades are work that is intended to extend or upgrade the facilities or works and is required to allow for new development and growth or to achieve a higher level of service and may include:

- Creating a new asset;
- Improve the asset capacity beyond its original capacity.

4.7.1. Renewal identification and renewal strategies

Assets are considered for renewal as they near the end of their effective working life, or where the cost of maintenance becomes uneconomical and when the risk of failure of the assets is high.

Renewal decisions are supported by reports from the operations contractor's work based on their knowledge of the systems. In addition, theoretical life expectances of asset components have been used for the purpose of some financial projections.

The strategy for replacement of landfill assets is largely knowledge based and depends on professional judgement on the viability and integrity of the assets to be either maintained, replaced or relocated.

To improve the information base for the renewals strategy and replacement programme, the NTRLBU will focus on the following improvements:

- Determining critical assets for the activity, in the light of recent changes to operations;
- Updating the valuations of both landfills, and visually assessing remaining life of critical or high value assets;
- Better defining which assets will require renewal and which may be abandoned;
- Reviewing the life and renewal cycle for critical stormwater and leachate collection assets that are managed by the activity;
- Better defining the maintenance and renewal strategy for sealed pavements on sites.

Some of the particular areas where the NTRLBU needs to improve its knowledge include:

- Assessing condition and remaining life of paved road surfaces on landfill sites;
- Renew / replacement strategy for below ground infrastructure at Eves Valley landfill (leachate rising main);
- Renew / replacement strategy for stormwater infrastructure at York Valley landfill.

The renewal and upgrade plan allows for significant capital expenditures of $750,000 in both 2020/2021 (year 0) and 2021/2022 for improving stormwater control at York Valley landfill. Capital has also been allowed for in the plan for the drilling of additional piezometer wells, planting the front face of the landfill, improving the weighbridge and upgrading the vehicle wash.

$50,000 has been allowed for the Eves Valley landfill in 2020/21 to complete consenting of Stage 2 with $250,000 in both 2021/22 and 2022/23 to carry out additional investigations for Stage 3 as a regional site. From 2023/24 considerable capital expenditure is projected for further investigating and consenting Stage 3 of the Eves Valley landfill. This is followed by the construction of the landfill which is projected to commence in 2026/27.

4.8. Creation/Acquisition/Augmentation Plan

4.8.1. Summary of Future costs

It is projected that by 2023/24 work will need to commence on investigating, designing and consenting Stage 3 of Eves Valley Landfill, with construction of the first part of Stage 3 commencing in around 2026/27.

A summary of the asset programme required to meet the demand over the next ten years is given in the Table 3-1: Asset programme from 2021/22 to 2030/31.

A financial projection of Capital Growth (upgrade) is provided within Table 6-1: Financial Projections from 2021/22 to 2030/31.

Any upgrades for the landfills are loan funded.

4.9. Disposal Plan

Assets may be disposed of due to under-utilization, obsolescence, provision exceeds required levels of service, uneconomical to upgrade or operate, or the service is provided effectively by other means.

The NTRLBU is yet to establish a Disposal Plan for any of the asset components. It is intended that a plan is completed by 2022/23.

5. Risk Management Plan (Dealing with uncertainty)

5.1. Critical Assets

5.1.1. How critical assets are identified and managed

The JWMMP identifies York Valley and Eves Valley Landfills as critical assets. They are considered strategic within the Councils' solid waste systems.

The maintenance philosophy employed by NTRLBU for critical assets is to ensure reliability of the asset by minimizing and/or eliminating unexpected failures. To achieve this, the balance between how we plan for and how we react to issues with the assets must be taken into consideration during the life cycle cost of the asset.
An improvement action is required to assess the criticality of assets within the landfills and determine if any further action is required to manage risks.

5.2. Risk Assessment

5.2.1. Approach for assessing risks

The Nelson City and Tasman District Councils have slightly different approaches for addressing risks, though both have a risk management framework that is consistent with the joint Australian, New Zealand Standard AS/NZI 4360:2004 Risk Management. This standard has been superseded by AS/NZS ISO 31000: 2009 and so the risk assessment will be reviewed in line with that standard as part of the improvement plan.

5.2.2. Top risks and how these will be managed.

The Risk Register for activities at York Valley Landfill is shown in the following table. No assessment of risks at an operational level has been done for Eves Valley Landfill. A consistent approach to assessing risk will be applied to both landfills in the future. It should be noted, however, that many of the risks identified for York Valley Landfill are also applicable to Eves Valley Landfill.

Table 5-1: Risk Priority Rating Matrix for York Valley Landfill (Semi-Quantitative)

	Risk Event	Consequence	Score	Risk	Mitigation
York Valley Landfill	Earthquake	Causing structural failure of landfill and/or toe buttress, roads and services	123	Mod	Note 1
	Landslide	Causing disturbance to landfill working face	39	Low	Notes 1 & 2
	Leachate pipe failure	Causing downstream leak to ground	45	Low	Note 2
	Gas flare system failure	Landfill gas leakage to air	81	Low	Note 2
	Gas collection system failure	Landfill fire	84	Low	Note 2
	Non-compliance with resource consent	Resulting in remedial action to ensure compliance	105	Mod	Note 2
	Competition from alternative landfill	Could affect level of service, service delivery	26	Low	Note 3

	Risk Event	Consequence	Score	Risk	Mitigation
		model and increase cost to customers			
	Hazardous waste not identified	Causing H&S hazards or environmental effects	91	Low	Note 2
	Increases in ETS charges	Increase cost to customers, could affect level of service, increased fly-tipping	119	Mod	Note 4
	Increase in National Waste Disposal Levy charges	Increase cost to customers, could affect level of service, increased fly-tipping	133	Mod	Note 4
	Rapid use of airspace	Limited available capacity; need to develop additional airspace sooner	175	High	Note 1
	External event causes significant reduction in tonnages	Reduced landfill revenue may require an increase in user charges	45	Low	Note 5
	Stormwater damage to landfill	Cause disturbance to landfill working face; result in discharges of sediment/leachate off site	87	Low	Note 2
	Fire in the landfill	Site closure; release of noxious fumes	245	Extreme	Note 2

Even though most of the risks identified are low there are strategies in place to mitigate the consequences of these events occurring.

Note 1: A Deed of Agreement has been signed in terms of which the remaining capacity in Stage 2 of Eves Valley Landfill shall be used for disposal of regional waste for up to one year under emergency conditions. Options are being investigated to increase capacity of York Valley Gully 1 to extend the airspace capacity.

Note 2: The NTRLBU has management plans for the landfill activities for which the Councils hold resource consents. Each plan identifies actions and responsibilities associated with the land, the facility development, the operation, and operational and environmental monitoring. The plans are based on statutory requirements and good practice and significant cultural values, and form the basis of any assignment of responsibilities, such as through contracts or leases.

Note 3: A new entrant to the solid waste disposal market could bring in a low cost, easy to use collection system aimed at maximising residual waste collection. Such a system could create an environment where gains made over time in recycling and re-use could be compromised and result in Councils having to rely on rates funding to manage solid waste initiatives. Councils offer collection services which helps Councils control the disposal of certain fractions of the waste stream.

Note 4: Increases in ETS or national waste disposal levy charges will, most likely, be transferred to customers through gate charges. Depending on the amount of increase, it could lead to an increased usage of recycling and waste diversion facilities. Councils should keep customers informed of any impending increases in ETS or national Waste Levy charges.

Note 5: Significant reductions in waste tonnages are unlikely and if they did occur, are most likely to be related to periods of marked reduced economic growth, which are unlikely to prevail in the long-term.

Operations could be scaled back to suit reduced tonnages, if this risk eventuated.

5.3. Infrastructure Resilience Approach

The York Valley Landfill is the primary regional landfill facility until Gully 1 is at capacity, or until expiry of the resource consents for York Valley Landfill in December 2034, whichever occurs first.

Stage 2 of the Eves Valley Landfill is to have all necessary consents and approvals to accept up to one year's waste from the Nelson-Tasman region in case of unforeseen temporary closure of the York Valley Landfill.

Furthermore, Stage 3 of the Eves Valley Landfill is to be retained for future use as a regional landfill.

Aside from these provisions, both landfills are to be operated in accordance with their respective Landfill Management Plans, which will contain provisions for dealing with emergencies.

6. Financial Summary (What it will cost and how we pay for it)

Appendix 2 provides the details of the financial projections from 2021/22 through to 2030/31. Tables 6-1 and 6-2 below provide summaries of future operations and maintenance costs and future capital costs respectively.

6.1. Financial Statements and Projections

Operations and maintenance constitute the cost of running of the solid waste activities and includes the following:

- Staffing and Overhead: Engineering supervision, asset management, corporate services, IT support, etc.;
- Operations: Reactive maintenance, telephones, rates, closure costs, levies, resource consent compliance, reactive maintenance etc.;
- Maintenance: Programmed maintenance and minor renewals.

6.2. Summary of future operations and maintenance costs

The landfill activity is funded from landfill charges. Table 6-1 summarises the projected operations and maintenance costs for the next ten years.

Table 6-1: Landfill Operation and Maintenance

Costs (thousands)	2020/21 (this year)	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Operations											
Base Expenditure	$10,070	$12,219	$14,180	$16,178	$16,215	$15,934	$16,023	$16,133	$16,246	$16,360	$16,470
Maintenance											
Un-programmed Expenses	$215	$215	$215	$215	$215	$215	$215	$215	$215	$215	$215
Programmed Expenses	$141	$146	$146	$147	$147	$148	$148	$149	$149	$150	$150
Total	$10,426	$12,580	$14,541	$16,540	$16,577	$16,297	$16,386	$16,497	$16,610	$16,725	$16,835

6.3. Summary of future capital costs

Capital costs for renewals and upgrades of the landfills over the next ten years are shown in Table 6-2. 2020/21 is budget is included for comparison.

Table 6-2: Capital Costs for Next Ten Years

Costs (thousands)	2020/21 (this year)	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Renewals	$730	$2,680	$962	$100	$263	$100	$0	$0	$145	$0	$0
Upgrades	$860	$1,060	$417	$500	$500	$193	$2,249	$1,675	$1,263	$1,097	$135

Un-programmed capital	$425[1]	$2,115	$1,065	$65	$65	$65	$65	$65	$565	$65	$65
Total capital expenditure	**$2,015[1]**	**$5,855**	**$2,444**	**$665**	**$828**	**$358**	**$2,314**	**$1,740**	**$1,973**	**$1,162**	**$200**

[1] – This includes PGF funded projects, which were not in NTRLBU business Plan.

Figure 13 shows the projected capital expenditure for the landfills for the following ten years. The consenting of Stage 3 of the Eves Valley landfill, and its subsequent development in sub-stages (or individual cells) accounts for practically all of the capital costs from 2023/24 (year 3) onwards.

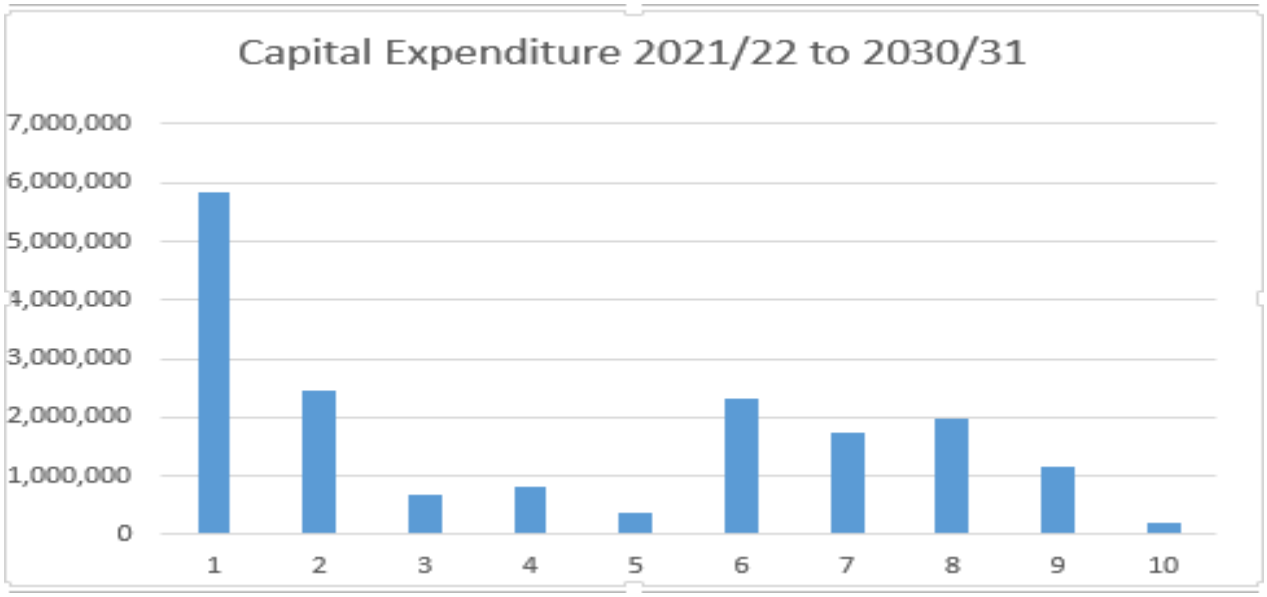

Figure 13: Capital Expenditure from 2021/22 to 2030/31.

6.4. Funding Strategy

6.4.1. Details of how expenditure will be financially treated (e.g. capitalisation policies) and funded

Funding

The landfill activity is a self-funded account. Income generated from fees, charges, levies and grants are used to fund all expenditure with any surpluses retained in the landfill special reserve fund. Up to $300,000 can be retained in the landfill special reserve fund. Further surpluses will be distributed to the Councils for use to fund solid waste activities.

Fees and Charges

Fees and charges are set following the approval of the annual Business Plan and make up the largest part of the income stream for the landfill activity.

Landfill Aftercare Fund

With the eventual closure of the York Valley and Eves Valley Landfills there will continue to be aftercare costs for approximately the next 30 years after closure. With projected income after closure being limited to landfill gas harvesting a Landfill Aftercare Fund has been established to provide for the aftercare of the landfills.

Grants

Grants are only included within revenue figures when eligibility has been established by the granting agency.

Loans

Upgrade projects can be funded by internal loans, if needed.

Operational costs

Operation costs relate to all the costs associated with the operational function of the landfill activity and include the cost of capital and depreciation.

Renewal and Upgrade cost

Renewals and upgrades are depreciated over the shorter of their physical lives or economic lives (the assessed life of the landfill). The depreciation is funded by fees and charges.

Should upgrades require funding beyond funds available within the closed account, funds are borrowed from the two Councils as an internal loan.

6.5. Valuation Forecasts

6.5.1. Forecasts of depreciation

Depreciation

- Typical useful lives from the NZ Infrastructure Asset Valuation and Depreciation Guidelines – Version 1.0 have been used as a guide in determining base lives. However, the manual generally provides average expected life detail for asset components and NTRLBU experience from the renewals of its assets has been used to vary these base lives where appropriate. Appendix 6 provides detail of asset lives.

6.6. Key assumptions made in Financial Forecasts

6.6.1. Key Assumptions for Operations and Maintenance

Operations and maintenance in running the landfill activity includes:

- Management;
- Engineering supervision;
- Electricity and telephones;
- Maintenance of the landfill activity includes:
    - Regular and ongoing annual expenditure necessary to keep the assets at their required service potential;
    - Work which provide for normal care and attention of the asset including repairs and minor replacements;
    - Unplanned maintenance. i.e. failures requiring immediate repair to reinstate the asset;
    - Planned maintenance.

It is assumed that operations and maintenance will be carried out at the same level as at present. Items such as the stability analysis of York Valley Landfill are scheduled in the plan and programmed in accordance with forward projections. These activities are programmed based on professional judgement and will be reviewed as information becomes available. With changes having been made recently to Council solid waste staff as well as the changes in NTRLBU service staff, it is important that a thorough review of all operations and maintenance cost projections be done to ensure that all relevant costs are captured and that legacy costs are not simply being brought forward.

The following assumptions are made with respect to the financial costs:

- Projections are in June 2020 dollars.
- Projections do not include inflation adjustment beyond year 2020/21.

- The landfill activity is required to operate with an annual surplus of $200,000 for the next ten years to pay back a loss of $2,000,000 incurred in 2019/20. No interest is paid on the money owed to Councils as the loss is funded from aftercare provisions held by Councils to cover post-closure costs.

The York Valley and Eves Valley Landfills are operated and maintained in accordance with their respective Landfill Management Plans.

York Valley Landfill is the only operational landfill, whilst Eves Valley Landfill has been closed temporarily.

The landfill gas recovery system at York Valley Landfill and the operation of the landfill itself is contracted out to Downers and specialist consultants are contracted to carry out the consent monitoring. Access to the landfill is restricted to approved contractors.

The landfill activity is funded from landfill charges.

The national waste disposal levy is set by legislation (WMA 2008) and is presently $10 per tonne of residual waste disposed of in the landfill (2020/21). With the government signalling strongly that the national waste levy is likely to be increased, the NTRLBU budget is based on the following waste disposal levy charges:

- $20 per tonne for 2021/2022
- $30 per tonne for 2022/2023
- $50 per tonne from 2023/2024
- $60 per tonne from 2024/2025 onwards.

ETS charges fluctuate with market demand but the government is proposing to introduce price controls through having a floor price of $25 per NZU and a ceiling price of $50 per NZU. In the financial forecast the following ETS charges have been assumed:

- $35 per NZU for 2020/2021 (year 0)
- $37.50 per NZU for 2021/2022
- $42.50 per NZU for 2022/2023
- $47.50 per NZU for 2023/2024
- $50 per NZU from 2024/2025 onwards.

One of the most significant operating expenses is the local waste disposal levy. This has been set at $4.8 million for 2020/2021 with a 50:50 split to each Council. It is set at $5.4M for 2021/22, $6M for 2022/23 and $6.6M for 2023/24.

The local waste disposal levy is determined by the NTRLBU with input from Councils. It is recovered from gate charges. The local waste disposal levy funds other waste management and minimisation activities (e.g. recycling) that provide a public good but cannot be fully funded through a user pays model. The local waste disposal levy is also used by each Council to balance the transfer station and green-waste activities.

6.6.2. Key Assumptions for Capital Expenditure

The York Valley Landfill infrastructure consists of mostly long-life assets.

Projections for Eves Valley Landfill Stage 3 capital expenditure are based on estimates done several years ago for the Tasman District Council LTP.

The Stage 3 estimates were based on the MfE Full Cost Accounting Model and assumed modern standards of landfill design (composite liner), together with a landfill gas collection and destruction system (gas flare). Other infrastructure improvements were also assumed for Eves Valley Landfill, including the upgrade of the access road through the current stream crossing to mitigate the risk of having no access during times of flooding of that stream.

6.6.3. Key Assumptions for Income

The source of income and distribution of income plays a significant role in how the landfill activity is managed.

The subsidisation of waste management and minimisation activities through the local waste disposal levy that is funded from landfill charges is a significant component of the cost of the landfill activity, as is shown in Figure 14 below. It makes up 43% of the total cost per tonne.

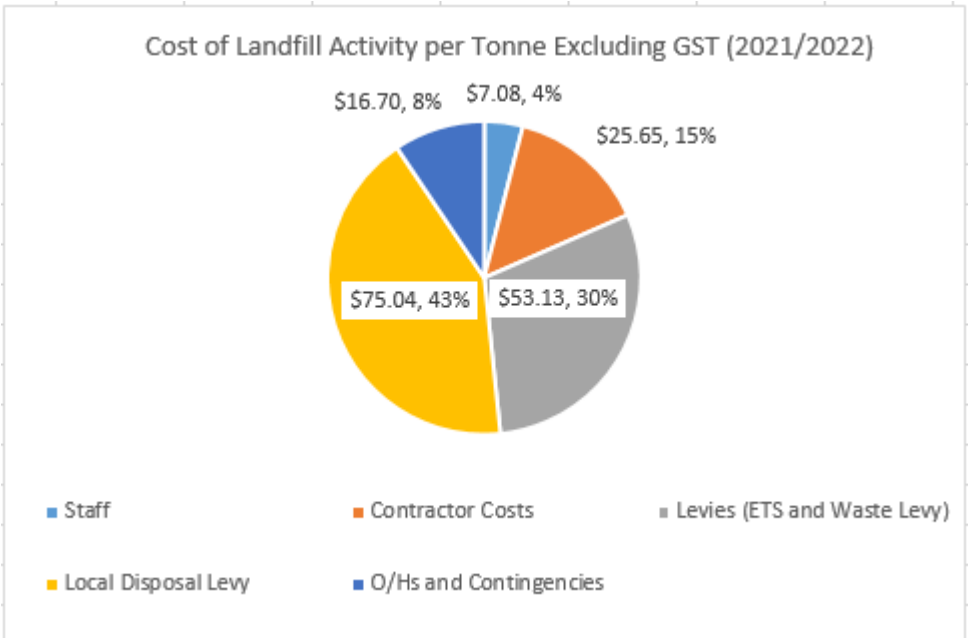

Figure 14: Cost of Landfill Activity per Tonne in 2020/2021, excluding GST

Table 6-3 below shows the sources of income for the landfill activity for the next ten years. The charging of a local waste disposal levy and possible increases in the national waste levy and ETS charges will have a significant impact on any joint waste disposal model that might be considered in the future.

Gas sales are income derived from the sale of landfill gas.

Table 6-4 below shows the assumed amount of waste for the next ten years and the charges required for different waste types to ensure that the waste charges cover the operational costs. It is assumed that HAIL waste and sludge (Resource Consent only allows up to 150 tonnes of sludge pa, which is negligible. Most sludge is applied to forest at Rabbit Island) will be charged at 85% of the standard waste charge.

HAIL waste quantities have been estimated to be 2,500 tonnes per year for the next ten years, whilst sludge waste quantities are estimated to be 1,000 tonnes in 2020/2021, reducing to 500 tonnes in 2021/22 and then becoming zero thereafter.

The overall budget is presented in Appendix 2.

Table 6-3: Income Sources for the Landfill Activity from 2020/21 to 2031/32

	2020/21 Budget	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32
Income	**-10,501,976**	**-12,779,600**	**-14,740,970**	**-16,739,870**	**-16,776,770**	**-16,496,870**	**-16,586,070**	**-16,696,470**	**-16,809,970**	**-16,924,770**	**-17,034,770**	**-17,098,870**
804505100278. Landfill Fees	-10,404,976	-12,431,600	-14,415,970	-16,439,870	-16,476,770	-16,196,870	-16,286,070	-16,396,470	-16,509,970	-16,624,770	-16,734,770	-16,798,870
80450530. Sundry Income	0	0	0	0	0	0	0	0	0	0	0	0
80450560. Sales: Gas	-23,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000
80450630. Recoveries Electricity	-27,000	0	0	0	0	0	0	0	0	0	0	0
80450710. Interest	-47,000	-48,000	-25,000	0	0	0	0	0	0	0	0	0

Table 6-4: Waste Charges for Different Waste Types from 2020/21 to 2031/32 to Match Landfill Fees (excluding GST)

	2020/21 Budget	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32
MSW	149	178	204	230	228	222	221	221	220	219	219	217
HAIL>17,000t	126	151	173	196	194	189	188	188	187	186	186	185
HAIL<17,000t	134	160	184	207	206	200	199	199	198	197	197	196
Res. HAIL	89	107	122	138	137	133	133	132	132	132	131	130
Polystyrene	1895	2264	2600	2935	2913	2835	2822	2813	2805	2796	2787	2770

6.7. Forecast Reliability and Confidence

Income and operational and maintenance expenses are based on existing budgets. These are usually considered to be accurate for the short term (first three years), but all are directly related to the tonnage of waste disposed of at the landfill, which could vary. The 2020 COVID-19 pandemic has resulted in some uncertainty.

The tonnages assumed are considered conservative in that they are based on existing tonnages, which are more likely to increase than decrease, and so the projected income is assumed to be conservative. The NTRLBU deliberately uses a slightly lower than expected waste mass for the financial forecast. This insulates the NTRLBU against a significant loss should waste mass reduce during the year. For this reason the financial forecast is based on receiving a mass of 70,000 tonnes, rather than 74,000 tonnes.

There are three other significant cost inputs which can influence the operating expenses:

- Local waste disposal levy
- National waste disposal levy
- Cost of ETUs

The local waste disposal levy is covered by gate charges and is intended to subsidise the costs of other solid waste activities (e.g. recycling), which do not generate sufficient income to cover their own costs.

Future changes to the other solid waste activities may cause the cost of those activities to increase, in which case Councils may seek to off-set those costs through an increase in the local waste disposal levy.

The MfE is in the process of consulting about proposed changes to the national waste disposal levy. Four options are being considered which are summarised in Table 6-5 below. Note that the MfE is proposing to extend waste levies to all classes of landfill except for clean fills. In the table below, only the changes proposed to the Class 1 landfills are applicable for York Valley Landfill.

Note that the financial forecast done for this Landfills AMP has assumed Option A.

Table 6-5: Landfill types and proposed levy options (source: MfE website article "Plan to increase and expand the national waste disposal levy", 2020).

Landfill Types	Proposed Levy changes
Municipal landfills (class 1)	$20 1 July 2021 $30 1 July 2022 $50 1 July 2023 $60 1 July 2024
Construction and demolition fills (class 2)	$20 1 July 2022 $30 1 July 2024
Contaminated soils and inert materials (managed and controlled fill sites; class 3 & 4)	$10 1 July 2023

The cost of ETUs is determined on the open market by the price of carbon credits. It has been increasing steadily for the past several years. There has been speculation that the sale of ETUs will be linked to the international carbon market in the future which makes it difficult to predict how it may change over time, but it is likely to increase.

Forward buying of the ETUs can assist in providing more certainty in the short term, and the application of the local waste disposal levy can help buffer any increased costs in ETUs. The purchase of ETUs is currently done under Nelson City Council's treasury policy and is not the responsibility of the NTRLBU.

In 2019 the MfE released a consultation document "*Reforming the New Zealand Emissions Trading Scheme: proposed settings*" in which it is proposed to use price controls to provide the mechanism to address the risks associated with emissions budgets being set too high or too low. To avoid unacceptably low or high NZU prices, price controls are complemented by the current NZ ETS stockpile and the ability to review price controls if the floor or ceiling prices are reached.

The Government proposes to introduce an NZU price floor that will work by placing a reserve price below which NZUs will not be sold at auction. The Government proposes that the auction reserve price floor be $20 for the period 2020 to 2025.

The Government proposes to implement a new price ceiling mechanism known as a cost containment reserve. The reserve works by releasing an additional number of NZUs onto the market if a specified 'price trigger' is reached at auction. A trigger price ceiling of $50 for 2020 to 2025 is being proposed. As an interim measure, the Government is proposing to amend legislation to increase the fixed price option from $25 to $35 for surrender obligations arising from 2020 activities.

So, the cost of NZUs could increase between 2020/2021 and 2024/2025 in line with that shown in Table 6-6 below.

Table 6-6: Possible increases to ETS Levy

Cost of NZUs (all figures are GST exclusive)				
2020/2021	**2021/2022**	**2022/2023**	**2023/2024**	**2024/2025**
$35.00	$37.50	$42.50	$47.50	$50.00

Note that the possible increases to the ETS Levy (Table 6-5 above) have been allowed for in the financial forecast done for this Landfills AMP.

Aside from the potential change (i.e. increase) in the cost of NZUs, there is potentially the option of applying for another Unique Emissions Factor (UEF) on account of the collection and destruction of landfill gas occurring at York Valley landfill.

In the long term, increases in the national waste disposal levy and cost of ETUs will be passed on to the landfill customers.

An exercise has been carried out to determine how much the gate charges would change for a range of scenarios relating to changes in the costs of the

National Waste Levy and procurement of a UEF relating to landfill gas collection and destruction.

Table 6-7 provides details of the scenarios considered, with Figure 15 showing the results graphically.

Table 6-7: Scenarios considered for changes to National Waste Levy, ETS Levy and/or application for a UEF.

Scenario	ETS Levy Charges	Emissions factor for Levy Charges	MfE Levy Charges	Comments
A = No responses made to counter charges	$35/t in 2020/21 $37.50/t in 2021/22 $42.50/t in 2022/23 $47.50/t in 2023/24 $50/t in 2024/25	1.19 = DEF	$20/t by 1 July 2021 $30/t by 1 July 2022 $50/t by 1 July 2023 $60/t by 1 July 2024	No allowance for LFG collection and destruction.
B	$35/t in 2020/21 $37.50/t in 2021/22 $42.50/t in 2022/23 $47.50/t in 2023/24 $50/t in 2024/25	0.885 = UEF already obtained	$20/t by 1 July 2021 $30/t by 1 July 2022 $50/t by 1 July 2023 $60/t by 1 July 2024	Allow for LFG collection and destruction.
C - As modelled in the financial forecast	$35/t in 2020/21 $37.50/t in 2021/22 $42.50/t in 2022/23 $47.50/t in 2023/24 $50/t in 2024/25	0.885 UEF 20/21 0.75 UEF 21/22 0.5 UEF 22/23 0.4 UEF 23/24 and forward	$20/t by 1 July 2021 $30/t by 1 July 2022 $50/t by 1 July 2023 $60/t by 1 July 2024	Allow for purchase of Pioneer energy contracts. Improved gas capture, and gas wells. Enclosed flare at York with maximum gas extraction. Organics Diversion.
D – As for C with Waste diversion of 6000 tonnes	$35/t in 2020/21 $37.50/t in 2021/22 $42.50/t in 2022/23 $47.50/t in 2023/24 $50/t in 2024/25	0.885 UEF 20/21 0.75 UEF 21/22 0.5 UEF 22/23 0.4 UEF 23/24 and forward	$20/t by 1 July 2021 $30/t by 1 July 2022 $50/t by 1 July 2023 $60/t by 1 July 2024 Diversion of 6000 tonnes at 30 per tonne	Allow for purchase of Pioneer energy contracts. Improved gas capture, and gas wells. Enclosed flare at York with maximum gas extraction. Organics Diversion plus waste diversion.

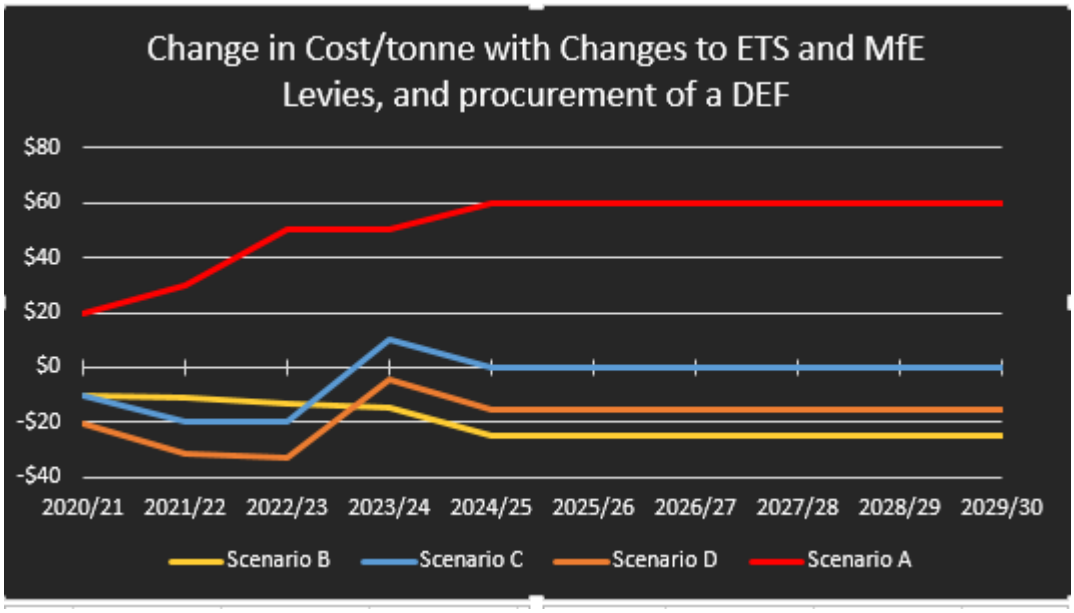

Figure 15: Change in cost/tonne for Scenarios A to D

The following points are made with respect to Figure 15:

- For Scenario A the costs climb significantly ($60 per tonne)
- For Scenario B (The existing UEF), the overall cost per tonne is relatively static with a saving compare to stand of around $15 per tonne.
- For Scenario C, there is a significant saving related to the ETS savings, which is reduced by the increasing Waste levy costs as they increase.
- Scenario D assumes that waste diversion is implemented at York Valley and 6,000 tonnes is diverted from the landfill to Eves Valley which runs as a clean fill. It is clear that the waste diversion has little effect on the overall landfill price compared to the influence of the levy and ETS costs.

The bulk of the forecast capital expenditure is for the consenting and development of Stage 3 of Eves Valley Landfill, which is projected to commence in earnest in seven years' time.

The costs are based on estimates done for the Tasman District Council LTP with the original estimate being done some four ago using the MfE Full Cost Accounting Model as a basis for the estimates. The level of confidence is for that of a concept design based on "good landfill" practice. It is recommended that these cost estimates be reviewed as part of the improvement plan.

There is a level of uncertainty regarding the timing of the construction of Stage 3 because it is directly related to the rate at which landfill airspace is used up at York Valley Landfill. The airspace usage at York Valley Landfill will be tracked accurately which should provide plenty of time to amend the timing of Stage 3, should it be needed.

7. Asset Management Practices

7.1. AM Leadership and Structure

The AM practices adopted by the NTRLBU are aligned with those, which are used by Nelson City Council.

The original AM plan was compiled by a consultant with specific input from the Councils' asset managers and organisational staff who are engaged within the NTRLBU. It was originally compiled from information previously included in the two Councils' Solid Waste AMPs.

7.2. Management Systems

The NTRLBU has broadly followed Nelson City Council's AMP template.

Accounting and Financial Systems

Accounting is carried out to International Financial Reporting Standards to comply with the Local Government Amendment Act Number 3 (the No. 3 Act). The Nelson City Council uses integrated computer software supplied by Napier Computer Systems.

The General Ledger is linked to packages that run Debtors, Creditors, Banking, Rates, Fixed Assets, Invoicing, Billing, Job Costing and Payroll.

Internal monthly financial reports are generated by activity and sub-activity.

External financial reports by significant activity are published in the annual report. Quarterly summaries are presented to the Joint Committee of the NTRLBU.

Definition of Expenditure Categories

Expenditure can be divided into two broad categories:

- Ongoing day to day operations and maintenance works;
- Programmed works that upgrade or renew the asset to provide the required level of service.

All expenditure on infrastructure assets will therefore fall into one of three categories:

- Maintenance Expenditure;
- Capital Expenditure – renewals/replacements;
- Capital Expenditure – creation/enhancement.

7.3. Information Systems and Tools

Information is not held separately by the NTRLBU and this results in operational delays and issues. The collation of all relevant data would be a useful AM improvement activity.

Geographical Information Systems

All York Valley Landfill asset information is stored on Nelson City Council's Arcinfo, a computer based Geographical Information System and Infor Asset Spreadsheets. The accounting system used is integrated computer software supplied by Napier Computer Systems. The various systems are linked.

Tasman District Council uses the Confirm GIS to store asset information for Eves Valley Landfill. A comprehensive description of the asset management systems

and data used by Tasman District Council is provided in its Waste Management and Minimisation Activity Management Plan 2018.

New data is updated into the GIS systems on a monthly basis.

SCADA Telemetry

Nelson City Council has a "Kingfisher" SCADA (Supervisory Control and Data Acquisition) system and an "Intouch" system at the base station. The system is used to monitor and control critical aspects of the network.

The only solid waste activity that utilises the SCADA system is the gas flare and weather station.

7.4. Service Delivery

Professional Support

At a technical and operational level the NTRLBU only has three staff: General Manager, Operational Manager and Activity Engineer. There is also a need to access specialist skills for design, planning and policy to support the in-house management of the operations and maintenance contracts.

The NTRLBU has, and will from time to time, request proposals from the NCC professional services providers who have been appointed to a professional services panel that was appointed through an open market tender. For some specialist related activities, the NTRLBU may also seek proposals from consultants outside of the panel.

Procurement Strategy

The Nelson City Council has a formal Procurement Strategy that it follows in order to engage contractors and consultants to assist the Engineering Services department. The NTRLBU will generally follow this strategy in procuring contractors and consultants for undertaking work at the landfills.

The NTRLBU procured a new 5-year operations contract (Contract No. 3912) in December 2018 with Downer that covers operational and maintenance activities at both the York Valley and Eves Valley Landfills. The NTRLBU has discretion to offer a 5-year extension to the contract, for consideration by the contractor.

Service Delivery Reviews

In 2014, Section 17A was inserted into the Local Government Act which requires Councils to review the cost effectiveness of their current arrangements for providing local infrastructure, services, and regulatory functions at regular intervals. Reviews must be undertaken when service levels are significantly changed, before current contracts expire, and in any case not more than six years after the last review. Within the last two years Nelson City Council has undertaken a review of the delivery of landfill services, the outcome being Contract No. 3912.

8. Plan Improvement and Monitoring (What we're doing to improve)

8.1. Status of AM Practices

Improving Accuracy and Confidence in Asset Management Plan

Asset management improvements and associated objectives are noted throughout this Landfill AMP.

These improvements will improve the accuracy of and confidence in the Landfill AMP.

A risk assessment is an important element of any AMP. This involves identification of critical assets, risk analysis and development of risk reduction and contingency planning to suit the business situation. An update should be undertaken by the end of 2021.

8.2. Improvement Programme

Throughout the AMP, objectives, targets, capital works, maintenance and improvements to general business processes are referred to:

- Ongoing management actions;
- Record landfill tonnages monthly;
- Continue landfill monitoring.

Table 8-1: Actions to be undertaken

	Actions	Resource Requirements	Progress
AP-1	Include Eves Valley Landfill assets in Infor (NCC's Asset Management System) and valuation model	Internal and consultant	Complete by FY 2022/23
AP-2	Review and audit all landfill assets in the assets register, including in-field inspections to assess conditions.	Internal and consultant	Complete by FY 2022/23
AP-3	Review of stormwater management at York Valley Landfill and develop long term strategy	Internal and consultant	Funding allowed for in capital budget for 2020/21 through to 2022/23.
AP-4	Review York Valley Landfill Management Plan	Internal and consultant	Complete by FY 2022/23
AP-5	Review operations and maintenance costs projected for York Valley Landfill	Internal and consultant	Complete by FY 2022/23
AP-6	Increase landfill gas harvesting and destruction efficiency at York Valley Landfill	Internal and consultant	Funding of 200K in 20/21 for planning

AP-7	Obtain feedback from landfill customers through a direct engagement plan	Internal and consultant	December 2021
AP-8	Review the Risk Register for both landfills	Internal and consultant	December 2021
AP-9	Consider optimisation of the airspace (maximise available capacity) of YVLF Gully 1	Internal and consultant	September 2021
AP-10	Investigate the feasibility of developing special wastes landfill and/or a cleanfill	Internal and consultant	Complete by FY 2022/23
AP-11	Review resource consent application costs and capital cost estimates for development of Stage 3 of Eves Valley Landfill, using the FCA model	Internal and consultant	Complete by FY 2022/23
AP-12	Investigate the feasibility of collecting and using/destroying landfill gas at Eves Valley Landfill	Internal and consultant	Complete by FY 2022/23
AP-13	Check to ensure that the nominal working lives assigned to different classes of assets are the same for each landfill	Internal and consultant	September 2021
AP-14	Investigate and identify appropriate access route to Eves Valley Landfill	Internal and consultant	Complete by FY 2022/23
AP-15	Develop an Asset Disposal Plan	Internal and consultant	September 2021
AP-16	Renewal of York Valley Landfill RC for one year emergency use	Internal and consultant	2028/29

8.3. Monitoring and Review Procedures

Monitoring and Review Procedures

This plan will be reviewed annually and revised every three years to incorporate, amongst other things, improved decision-making techniques, updated asset information, and NTRLBU policy changes which impact on targeted levels of service.

Statutory Audit

The Local Government Act requires that an annual, financial audit of the operations of the Council be carried out. Audits may include all significant activities such as AM planning.

Review and Updates

The Landfill Activity AMP programmes and costs will be reviewed and updated annually for incorporation into the annual NTRLBU Business Plan.

9. Appendices

APPENDIX 1 – LEGISLATIVE AND STRATEGIC CONTEXT

Both legislation and a national strategy provide the basic framework for waste management and minimisation in New Zealand. This chapter contains a brief summary of the national policy context and key legislation that the Councils must consider in Waste Management and Minimisation Planning.

Key legislation

A number of Acts of Parliament provide the legal framework for waste management and minimisation in New Zealand. These are:

- New Zealand Waste Strategy (NZWS)
- Waste Minimisation Act (WMA) 2008
- Local Government Act (LGA) 2002
- Resource Management Act 1991 (RMA)
- Emissions Trading Amendment Act 2008.

The following section provides a brief summary of these Acts and identifies their relevance or implications for Councils.

New Zealand Waste Strategy

Waste management and minimisation in New Zealand is underpinned by the New Zealand Waste Strategy — Reducing Harm and Improving Efficiency (NZWS). The NZWS outlines the Government's high-level strategic direction for waste management and minimisation and it sets the framework, strategic vision, objectives and targets for achieving waste minimisation. It also sets goals for managing and minimising waste.

Waste Minimisation Act (WMA) 2008

The enactment of the WMA in 2008 represented a change in the Government's approach to managing and minimising waste. The WMA recognises the need to focus efforts higher up the waste hierarchy in terms of reducing and recovering waste earlier in its life cycle, and shifting the focus away from treatment and disposal. This change in focus is reflected in new tools enabled by the WMA such as a framework for developing accredited product stewardship schemes and the creation of a national waste disposal levy — half of which is distributed back to councils on a population basis.

Emphasising and promoting waste minimisation in the WMA reflects a modernisation of previous waste legislation. The purpose of the Act (section 3) is to "encourage waste minimisation and a decrease in waste disposal in order to protect the environment from harm; and to provide environmental, social, economic and cultural benefits".

The Act contains a mechanism for the accreditation and monitoring of product stewardship schemes to minimise waste from products. Product stewardship relates to a process through which those involved in the life cycle of a product or service are involved in identifying and managing the health, safety and environmental impacts from the development and manufacture of a product through to its use and final disposal. Ideally, product stewardship schemes will be designed to promote reduction of waste at the source, as well as make recycling, treatment and disposal safer and more efficient.

Councils can benefit from some of these schemes, because they may simplify the recovery and diversion of waste products that councils currently deal with. In some cases TAs may be directly or indirectly involved in a product stewardship scheme, either on a voluntary or a statutory basis.

Another key provision of the WMA is the imposition of a national waste disposal levy on each tonne of waste to landfill, to be paid by landfill operators. The levy is currently set at $10 per tonne for waste disposed to municipal landfills. The government is proposing to increase the waste levy in stages to between $50 and $60 per tonne and to apply the levy to other types of landfills, at a lower rate. It is proposed that the changes will be fully implemented by July 2023. The national waste disposal levy is used to fund waste minimisation projects. Some of it is distributed directly to councils, and the remainder goes into a contestable Waste Minimisation Fund. Internationally, levies have tended to increase steadily over time once they are introduced.

The WMA provides benefits but also a number of responsibilities. Part 4 of this Act is fully dedicated to the responsibilities of TAs which "must promote effective and efficient waste management and minimisation within their districts" (section 42).

The WMA does not prescribe specific waste management and minimisation targets. This enables significant local flexibility in the approach taken. However, there is the scope within the WMA for the Minister for the Environment to set performance standards for the implementation of WMMPs and for councils who are not making satisfactory progress on their plans to receive Ministerial direction to alter their WMMPs.

Climate Change (Emissions Trading) Amendment Act 2008

The Act requires landfill owners to purchase emission trading units to cover methane emissions generated from the landfill. Should any future solid waste incineration plants be constructed, the Act would also require emission trading units to be purchased to cover carbon dioxide, methane and nitrous oxide emissions from the incineration of household wastes.

Ultimately these costs for emissions units will need to be paid by the landfill owner and will be passed on to users in gate rates and user charges for waste collection and disposal services.

The implications for the Councils are that the ETS will increase the cost of operating the landfill. It's likely that these costs will be met by increasing the base cost of each tonne of waste to landfill.

Another key implication from the ETS is that organic waste diversion is incentivised somewhat, as reducing organics to landfill should assist in lowering emission liabilities. It's worth noting that the relatively minor emissions arising from organics composting are exempt from the ETS, further incentivising this option.

For these reasons the ETS will be an important driver of waste diversion from landfill, as it creates another economic incentive to divert materials, particularly methane-generating organic waste.

Local Government Act 2002 (LGA 2002)

The LGA 2002 contains various provisions that may apply to TAs when they are preparing their WMMPs, including consultation and bylaw provisions. Sections 145–146 provide TAs with broad bylaw powers, including the power to make

solid waste and waste management bylaws. Section 158 outlines provisions for the review of these bylaws. The procedure for making a bylaw and the requirement for completing a special consultative procedure when making a bylaw are outlined in sections 155 and 156.

Section 77 of the LGA 2002 refers to legislative requirements for council decision-making, including consideration of the benefits and costs of different options in terms of the present and future social, economic, environmental and cultural well-being of the district. The Act also includes requirements for information to be included in a long term plan (LTP), including summary information about their WMMPs.

Section 17A of the Act requires councils to periodically review the delivery of waste management and minimisation services within their area of jurisdiction.

Resource Management Act 1991 (RMA)

The RMA provides guidelines and regulations for the sustainable management of natural and physical resources. Although it does not specifically define 'waste', the Act addresses waste management and minimisation activity through controls on the environmental effects of waste management and minimisation activities and facilities. It does this through national, regional and local policies, standards, plans and consent procedures. In this way, the RMA exercises considerable influence over facilities for waste disposal, recycling, recovery, treatment and other solid waste activities in terms of managing the potential impacts of these facilities on the environment.

Under section 30 of the RMA, regional councils are responsible for controlling the discharge of contaminants into or onto land, air or water. These responsibilities are addressed through regional planning and discharge consent requirements.

In addition, the RMA provides for the development of national policy statements and for the setting of national environmental standards (NES). The Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins, and Other Toxics) Regulations 2004 (the NES for Air Quality) requires certain landfills (e .g. those with a capacity of more than 1 million tonnes of waste) to collect landfill gases and either flare them or use them as fuel for generating electricity. The result is increased infrastructure and operational costs for qualifying landfills. However, these costs are potentially offset by the harnessing of captured emissions for energy generation.

Unless exemption criteria are met, the NES for Air Quality also prohibits the lighting of fires and burning of wastes at landfills, the burning of tyres, bitumen burning for road maintenance, burning coated wire or oil, and the operation of high-temperature hazardous waste incinerators. These prohibitions limit the range of waste treatment/disposal options available within New Zealand with the aim of protecting air quality.

The National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health came into force in January 2012 and requires the identification of HAIL sites throughout New Zealand. NCC carried out this work in 2013 and has identified and included 3,265 properties on the NCC HAIL site database. The standards affect the way in which soil disturbance is managed and require that spoil originating from these sites is disposed of at a suitable landfill facility.

Other legislation

The following is a summary of other legislation that is to be considered with respect to waste management and minimisation planning.

The Hazardous Substances and New Organisms Act 1996 (HSNO Act)

The HSNO Act addresses the management of substances that pose a significant risk to the environment and/or human health, from manufacture to disposal. The Act relates to waste management primarily through controls on the import or manufacture of new hazardous materials and the handling and disposal of hazardous substances.

Hazardous substances may be explosive, flammable, have the capacity to oxidise, toxic to humans and/or the environment, corrosive, or have the ability to develop any of these properties when in contact with air or water. Depending on the amount of a hazardous substance on site, the HSNO Act sets out requirements for material storage, staff training and certification. These requirements need to be addressed within operational and health and safety plans for waste facilities. Hazardous substances commonly managed by TAs include used oil, asbestos, agrichemicals, LPG and batteries.

The HSNO Act provides minimum national standards for the disposal of a hazardous substance. However, under the RMA a regional council or TA may set more stringent controls relating to the use of land for storing, using, disposing or transporting hazardous substances.

The Health Act 1956

The Health Act 1956 places obligations on TAs (if required by the Minister of Health) to provide sanitary works for the collection and disposal of refuse, for the purpose of public health protection (Part 2 – Powers and duties of local authorities, s 25). It specifically identifies certain waste management practices as nuisances (s 29) and offensive trades (Third Schedule). The Health Act enables TAs to raise loans for certain sanitary works and/or to receive government grants and subsidies, where available.

The Act no longer requires removal of refuse by a TA itself.

The Litter Act 1979 (and Amendment Act 2006)

The Litter Act enables councils to create roles as litter enforcement officers or "Litter Control Officers" who have powers to issue infringement notices, with fines for those who have committed a littering offence.

The Litter Act was amended on 27 June 2006. The principal amendment was to strengthen the powers of TAs to issue infringement notices (and fees). Territorial Authorities may adopt the amended infringement notice provisions provided they pass a new resolution, with a 14 day public notification period. TAs can use the Litter Act to regulate litter and illegal dumping, but the enforcement process is difficult and often unsuccessful.

The Health and Safety at Work Act 2015

The Health and Safety at Work Act 2015 specifies health and safety responsibilities in relation to employees at work. The Act requires employers to identify and manage hazards present in the workplace, provide adequate training and supervision, and supply appropriate protective equipment.

Employers must take all practicable steps to ensure the safety of employees while at work, and in particular must take all practicable steps to ensure

employees are not exposed to hazards arising out of the arrangement, disposal, organisation, processing, storage, transport or use of things in their place of work.

The Act places duties on any person in control of a place of work, (e.g. a principal), to ensure that people are not harmed by any hazard resulting from work activities. Those who employ contractors therefore "have the same occupational health and safety obligations to contractors or contracted labour as they do their own employees". Employers therefore need to establish health and safety systems to manage the health and safety of any contractors or contracted labour.

National Guidelines and Standards

- Centre for Advanced Engineering (CAE), Management of Hazardous Waste, 2000
- A Guide to the Management of Cleanfills
- A Guide to the Management of Closing and Closed Landfills in New Zealand
- Calculation and Payment of the National Waste Disposal Levy: Guidance for Waste Disposal Facility Operators
- Guidance Principles: Best Practice for Recycling and Waste Management Contracts: Working Draft
- Guide to Landfill Consent Conditions
- Guidelines for the Management and Handling of Used Oil
- Hazards of Burning at Landfills
- Health and Safety Guidelines: for the Solid Waste and Resource Recovery Sector – parts one, two, three, four and five, WasteMINZ, 2017
- Landfill Full Cost Accounting Guide for New Zealand
- Module 1 - Hazardous Waste Guidelines: Identification and Record-keeping
- Module 2 - Hazardous Waste Guidelines: Landfill Waste Acceptance Criteria and Landfill Classification
- Online Waste Levy System: User Guide for Waste Disposal Facility Operators
- Solid Waste Analysis Protocol and Summary Procedures
- Supplementary Guidance to Disposal Facility Operators: Diverted Tonnage and Cover Material
- Technical Guidelines for Disposal to Land, WasteMINZ, 2018
- Updated Users Guide to Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins and Other Toxics) Regulations 2004 (including Amendments 2005) (second draft)
- Waste Assessment Checklist: for territorial authorities completing a waste assessment before reviewing their waste management and minimisation plans

- Waste Management and Minimisation – a good practice guide for territorial authorities
- Waste Management and Minimisation Planning: Guidance for Territorial Authorities
- What's in your Waste? – A resource for trade businesses.
- SNZ HB 4360:2000 Risk Management for Local Government
- AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines
- AS/NZS ISO 9001:2008 Quality Management Systems
- AS/NZS 4801:2001 Occupational Health and Safety Management Systems.

APPENDIX 2 - FINANCIAL DETAILS

Table A.2.1: Financial Projections from 2020/21 to 2030/31

	2020/21 Budget	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Projected Surplus/ Deficit - Grand Total	**-76,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**	**-200,000**
GST Excluded Gate price	148.64	177.59	203.90	230.23	228.46	222.36	221.37	220.66	219.99	219.32	218.59
% Increase	1.05	1.19	1.15	1.13	0.99	0.97	1.00	1.00	1.00	1.00	1.00
Income	**-10,501,976**	**-12,779,600**	**-14,740,970**	**-16,739,870**	**-16,776,770**	**-16,496,870**	**-16,586,070**	**-16,696,470**	**-16,809,970**	**-16,924,770**	**-17,034,770**
804505100278. Landfill Fees	-10,404,976	-12,431,600	-14,415,970	-16,439,870	-16,476,770	-16,196,870	-16,286,070	-16,396,470	-16,509,970	-16,624,770	-16,734,770
80450530. Sundry Income	0	0	0	0	0	0	0	0	0	0	0
80450560. Sales: Gas	-23,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000	-300,000
80450630. Recoveries Electricity	-27,000	0	0	0	0	0	0	0	0	0	0
80450710. Interest	-47,000	-48,000	-25,000	0	0	0	0	0	0	0	0
Total Expenses	**10,425,976**	**12,579,600**	**14,540,970**	**16,539,870**	**16,576,770**	**16,296,870**	**16,386,070**	**16,496,470**	**16,609,970**	**16,724,770**	**16,834,770**
Base Expenditure	**10,069,872**	**12,218,900**	**14,179,770**	**16,178,170**	**16,214,570**	**15,934,170**	**16,022,870**	**16,132,770**	**16,245,770**	**16,359,970**	**16,469,370**
804518808015. TDC Staff time	8,160	8,200	8,200	8,200	8,200	8,200	8,200	8,200	8,200	8,200	8,200
80451602. Corprorate Overhead	21,930	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900	21,900
80451671 NCC Utilities Staff	74,594	74,600	74,600	74,600	74,600	74,600	74,600	74,600	74,600	74,600	74,600
80451631 NCC Finance Staff	25,808	25,800	25,800	25,800	25,800	25,800	25,800	25,800	25,800	25,800	25,800
80451690 NCC Admin Staff	15,856	15,900	15,900	15,900	15,900	15,900	15,900	15,900	15,900	15,900	15,900
80451635 NCC IT Services	17,969	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
80452010. York Valley Landfill Operation	1,494,952	1,509,900	1,525,000	1,540,300	1,555,700	1,571,300	1,587,000	1,602,900	1,618,900	1,635,100	1,651,500
804520100420. Resource Consent Conditions	69,247	69,200	69,200	69,200	69,200	69,200	69,200	69,200	69,200	69,200	69,200
80452310. ETS levy	2,182,500	2,323,000	2,659,000	2,544,000	1,803,000	1,457,000	1,471,000	1,486,000	1,501,000	1,516,000	1,531,000
Carbon Studies, advice and Verfification		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
804523100467. Waste Levy Min for Environment	700,000	1,400,000	2,121,000	3,570,000	4,327,000	4,371,000	4,414,000	4,458,000	4,503,000	4,548,000	4,593,000
804523100728. Local Disposal Levy TDC	2,400,000	2,700,000	3,000,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000
804523830730. Local Disposal Levy NCC	2,400,000	2,700,000	3,000,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000
80452607. Telephones	3,570	7,100	7,100	7,100	7,100	7,100	7,100	7,100	7,100	7,100	7,100
80452617. Electricity	26,520	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000
80452620. Lease of Kelly land	0	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
80452621. Rates	7,820	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800
804526218014. EV Rates	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
80452625. Water by meter charges	4,292	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300
80452626. Trade Waste Charges	3,204	3,400	3,400	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
80452637. Insurance	5,250	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800	5,800
80452671 Bad Debts	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
80452693. Levy for Closure Costs	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000
80452720. Valuations / Surveys	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
804527600800. General Manager/ Staffing	120,000	220,000	220,000	220,000	220,000	220,000	220,000	220,000	220,000	220,000	220,000
804527600801. GM other Professional Advice	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Interest		12,000	36,000	40,000	24,000	9,000	13,000	33,000	51,000	62,000	46,000
80455503 Aftercare Amortisation	26,527	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
80455505 Depreciation	8,570	10,800	8,570	8,570	8,570	8,570	8,570	8,570	8,570	8,570	8,570
80455507 Loss of Service potential	238,903	704,000	971,000	1,016,000	1,037,000	1,058,000	1,070,000	1,085,000	1,104,000	1,131,000	1,180,000
Unprogrammed Expenses	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**	**215,000**
80452760 Professional Advice (Board discretion)	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
New item Contingency GM discretion	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000	190,000
Programmed Expenses	**141,104**	**145,700**	**146,200**	**146,700**	**147,200**	**147,700**	**148,200**	**148,700**	**149,200**	**149,800**	**150,400**
804520100418. LFG Operation	23,429	23,700	23,900	24,100	24,300	24,500	24,700	24,900	25,100	25,400	25,700
804520100419. Leachate Control	26,775	27,000	27,300	27,600	27,900	28,200	28,500	28,800	29,100	29,400	29,700
804520100422. Toe Embankment Maintenance	90,900	95,000	95,000	95,000	95,000	95,000	95,000	95,000	95,000	95,000	95,000
Capital Expenditure	**2,015,000**	**5,855,000**	**2,443,773**	**665,000**	**828,231**	**357,768**	**2,314,062**	**1,740,262**	**1,973,127**	**1,162,463**	**200,491**
Renewals	**730,000**	**2,680,000**	**961,480**	**100,000**	**263,231**	**100,000**	**0**	**0**	**145,227**	**0**	**0**
804573902025. Capital: Piezo monitor well	30,000	30,000	25,000		18,377						
804573902031. Collection Network/ Flare/ Gas	$ 200,000	$ 2,000,000	500000		19,458						
80457470. Planting Eves stage 3	25,000	100,000	100,000	100,000	100,000	100,000					
804576551533. Road extension	250,000		43,240								
804576902027. Horizontal drilling for drains			43,240								
804576902775. Weigh bridge improvements	50,000	50,000			125,396						
Moveable debris catch fences at York Valley.											
Upgrade vehicle wash	75,000										
Access road development at Eves Valley Landfill	100000	500000	250000						145,227		
Capital Growth (Upgrade)	**860,000**	**1,060,000**	**417,293**	**500,000**	**500,000**	**192,768**	**2,249,062**	**1,675,262**	**1,262,900**	**1,097,463**	**135,491**
804576902774. Stormwater control	750,000	750,000	100,000								
804579602024. Access Rd Stormwater			57,293								
Construction of Stage 3 of Eves Valley Landfill					0	192,768	2,249,062	1,675,262	1,262,900	1,097,463	135,491
Investigations & Consents for Stage 2 and 3 as regional site	50,000	250,000	250,000	500,000	500,000						
Miscellaneous & Safety Eves Valley Landfill	50,000	50,000									
Certified Emissions Management and Reduction	10,000	10,000	10,000								
Unprogrammed Capital Expenditure	**425,000**	**2,115,000**	**1,065,000**	**65,000**	**65,000**	**65,000**	**65,000**	**65,000**	**565,000**	**65,000**	**65,000**
Contingency Board discretion (renewals and minor upgrades	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000
York Landfill Toe Buttress		600,000									
Eves Valley landfill gas collection and destruction system			1,000,000								
Eves Valley Weighbridge for Inert waste diversion.		150,000									
Pioneer Contract and Asset purchase		1,000,000									
Stage 3 / Valley 3 consent											
York valley 1 consent									500,000		
PGF road resurfacing	250,000										
PGF Planting Eves	100,000										
Facilities, Controls, Gates and Security - Eves valley	10,000	300,000									
Total	2,015,000	5,855,000	2,443,773	665,000	828,231	357,768	2,314,062	1,740,262	1,973,127	1,162,463	200,491

APPENDIX 3 – LANDFILL ASSET VALUATIONS

Table A.3.1: York Valley Landfill Asset Valuations (June 2020 Report (A2415039))

Asset Category	June 2020		
	RV ($)	DRV ($)	Depr ($)
Stormwater System	1,147,463	371,019	37,104
Gas Collection System	744,307	224,713	22,447
Sewer Collection System	402,587	84,506	8,451
Leachate Collection System	705,542	202,901	20,292
Water Supply	47,686	11,431	1,143
Internal Road	1,864,718	1,644,033	19,599
Weighbridge	595,724	346,464	41,535
Resource consent	786,219	224,619	22,463
Vehicle wash	26,528	5,414	541
Whiteware/carbody area	149,440	42,694	4,270
Monitoring equipment	325,508	102,178	10,219
TOTAL	**6,795,722**	**3,259,972**	**188,064**

Table A.3.2: Eves Valley Landfill Asset Valuations

Asset Category	June 2020		
	RV ($)	DRV ($)	Depr ($)
Stormwater System			
Gas Collection System			
Sewer Collection System			
Leachate Collection System	1,100,810	713,168	14,800
Water Supply			
Internal Road			
Weighbridge			
Resource consent			
Vehicle wash			
Whiteware/carbody area			
Monitoring			
TOTAL	**1,100,810**	**713,168**	**14,800**

APPENDIX 4 – RISK ANALYSIS

Table A.4.1: Nelson City Council Likelihood Ratings (Semi-Qualitative Measure)

Rating	Description	Score
Almost Certain	Likely to occur frequently and several times a year.	0.9
Likely	Likely to occur more than once during the life of the project.	0.7
Moderate	Likely to occur during the life of the project.	0.3
Unlikely	May occur once in up to 100 years.	0.1
Rare	Might occur once in 100+ years.	0.01

Consequence is the effect or impact of an event if it occurs and may be a loss, injury, disadvantage or gain. Consequence ratings are provided in the table below.

Table A.4.2: Nelson City Council Semi-Quantitative Measures of Consequence and Areas of Impact (Consequence ratings)

Areas of Impact	Consequence				
	Negligible (10)	Minor (30)	Moderate (50)	Major (70)	Catastrophic (100)
Health and Safety	Minor injury possible.	Serious injury to one person.	Serious injury to multiple members of staff, contractor or public.	Single fatality of staff, contractor or public.	Multiple fatalities of staff, contractors or public.
Public Health	Temporary but non-serious health impacts.	Localised serious health impact on one person.	Localised serious health impact on more than 20 people.	Localised or widespread serious health impact on more than 100 people.	Localised or widespread serious health impact on more than 1,000 people.
Asset Performance	Asset failure impacting on one or more persons.	Asset failure impacting more than 4 people/day.	Asset failure impacting more than 40 people/day.	Asset failure impacting more than 400 people/day.	Asset failure impacting more than 4,000 people/day.
Environment and Legal Compliance	Short term and temporary impact requiring no remedial action.	Medium term environmental impact with immaterial effects on environment or community.	Measurable environmental harm to an internationally or nationally significant site. Loss of public access or conservation value of the site.	Major environmental damage with long-term recovery significant investment. High profile legal challenge. Loss of public access or conservation value of a significant environment.	Permanent environmental damage to an internationally or nationally significant site. Large scale class action.
Historical or Cultural	Loss of important records about a site. Work required restoring them.	Unsympathetic development compromising the integrity of a registered historical, cultural or archaeological site.	Damage to a registered historical, cultural or archaeological site, but capable of restoration.	Loss or permanent damage to a registered historical, cultural or archaeological site.	Permanent loss of national icon.

Areas of Impact	Consequence				
	Negligible (10)	**Minor (30)**	**Moderate (50)**	**Major (70)**	**Catastrophic (100)**
Financial	Capital cost/ loss <$100k.	Capital cost/loss $100k - $500k.	Capital cost/loss $500k - $1million.	Capital cost/loss $1million- $5million.	Capital cost/loss > $5 million.
Customer Perception	Service Request.	Minor complaint.	Justifiable complaint / information request.	Ministerial questions /third party investigations.	Public or ministerial enquiry.

The estimated level of risk is expressed as a combination of its likelihood and consequence and is determined by utilising the Risk Priority Rating Matrix shown in the table below. This ranks the significance of the various combinations of likelihood and consequence into extreme, high, moderate and low risks.

Table A.4.3: Nelson City Council Risk Priority Rating Matrix (Semi-Quantitative)

Risk Score	Level of Risk	Risk Response
> 200	Extreme	Awareness of the event to be highlighted to Council
150-200	High	Risk treatment required. Risk eliminated or mitigated by a programmed date in risk treatment schedule
100-150	Moderate	Risk treatment required
0-100	Low	Manage by routine procedures

Table A.4.4: Risk Assessment carried out for York Valley landfill

Item	Risk Location	Risk Event	Consequence or Outcome	Mitigation Strategy	Gross Risk											Action Plan Description	Action Plan (IP) Ref	Operational	Residual Risk										
					Likelihood	Areas of Impact							Impact	Gross Risk	Risk Assessment				Control Effectiveness	Likelihood	Areas of Impact							Impact	Residual Risk	Risk Assessment
						H & S	Public Health	Asset Performanc	Environmen t & Legal	Historical & Cultural	Financial	Customer Perception									H & S	Public Health	Asset Performanc	Environmen t & Legal	Historical & Cultural	Financial	Customer Perception			
1	Landfill	Earthquake	Causing structural failure of landfill and/or toe buttress, roads and services	Alternative landfill site available	0.3	30	100	100	50	10	70	50	410	123	Mod	EVLF has capacity for 1 year for the region.		No	2	0.3	10	50	50	10	50	10	50	230	69	Low
2	Landfill	Landslide	Causing disturbance to landfill working face	Alternative landfill site available	0.3	10	10	30	30	10	30	10	130	39	Low	EVLF has capacity for 1 year for the region.		Yes	2	0.3	10	10	30	30	10	30	10	130	39	Low
3	Landfill	Leachate pipe failure	Causing downstream leak to ground		0.3	10	30	30	30	10	10	30	150	45	Low	Undertake environmental monitoring; do frequent inspections of pipe assets.		Yes	2	0.3	10	30	10	30	10	10	30	130	39	Low
4	Landfill	Gas flare system failure	Landfill gas leakage to air		0.3	30	50	50	50	10	30	50	270	81	Low	Flare system has shut-off valves when flare is not burning.		Yes	2	0.3	30	50	50	50	10	30	50	270	81	Low
5	Landfill	Gas collection system failure	Landfill fire		0.3	30	30	100	50	10	10	50	280	84	Low	LMP outlines requirements for dealing with fires.		Yes	3	0.3	10	30	50	30	10	10	50	190	57	Low
6	Landfill	Non-compliance with resource consent	Resulting in remedial action to ensure compliance		0.7	10	10	10	30	10	30	50	150	105	Mod	Operate according to the LMPs.		Yes	2	0.5	10	10	10	30	10	30	50	150	75	Low
7	Landfill	Competition from alternative landfill	Could affect level of service, service delivery model and increase cost to residents		0.1	10	10	100	30	10	50	50	260	26	Low	Councils to maintain control of refuse stream through continuing to offer collection services.		Yes	2	0.1	10	10	50	30	10	30	50	190	19	Low
8	Landfill	Hazardous waste not identified	Causing H&S hazards or environmental effects		0.7	10	30	10	30	10	10	30	130	91	Low	Operate according to LMPs, carry out frequent inspections of loads; train operators to identify hazardous wastes.		Yes	2	0.7	10	30	10	30	10	10	30	130	91	Low
9	Landfill	Increase in ETS charges	Increase cost to residents, could affect level of service,		0.7	10	30	10	10	10	50	50	170	119	Mod	Inform public of changes; offer alternative		Yes	2	0.7	10	30	10	10	10	50	50	170	119	Mod

			increased fly-tipping													solutions from waste minimisation													
10	Landfill	Increase in National Waste Levy Disposal charges	Increase cost to residents, could affect level of service, increased fly-tipping		0.7	10	30	10	10	10	70	50	190	133	Mod	Inform public of changes; offer alternative solutions from waste minimisation		Yes	2	0.7	10	30	10	10	10	70	50	190	133	Mod
11	Landfill	Rapid use of airspace	Limited available capacity; need to develop additional airspace sooner	Alternative landfill site available	0.7	10	10	70	30	10	70	50	250	175	High	EVLF has capacity for 1 year for the region. Options for extending capacity are being investigated		Yes	2	0.3	10	10	20	20	10	50	40	160	48	Low
12	Landfill	External event causes significant reduction in tonnages	Reduced landfill revenue may require an increase in user charges		0.3	10	10	10	10	10	50	50	150	45	Low	Inform public of possible increases; adapt operations to suit lower tonnages.		Yes	3	0.3	10	10	10	10	10	50	50	150	45	Low
13	Landfill	Stormwater damage to landfill	Cause disturbance to landfill working face; result in discharges of sediment/leachate off site		0.3	30	50	50	70	10	30	50	290	87	Low	Follow LMP requirements; conduct regular site visits to check on adequacy of stormwater infrastructure.		Yes	3	0.3	30	30	20	50	10	30	30	200	60	Low
14	Landfill	Fire in the landfill	Site closure; release of noxious fumes		0.7	70	50	70	30	30	50	50	350	245	Extreme	Follow LMP requirements; train operators to deal with fire emergencies, install thermal imaging cameras.		Yes	3	0.7	50	30	50	30	30	30	30	250	175	High

APPENDIX 5 – ASSET LIFE EXPECTANCY / NOMINAL LIFE

Table A5.1: Asset Life Expectancy/Nominal life assumed for York Valley Landfill Assets

Asset Description	Asset Component	Material	Base Life(1)	Average remaining life(1)
Earthworks			No depreciation	
Roads			25	4
Chip seal			12	4
Vehicle wash			49	23
Resource consent			24	23
Leachate	Monitoring wells		50	38
	Drain		100	91
	Pipes		80	73
Piezometers			10	2
Stormwater	Open channel cut off drains		15	3
	Settling ponds	Concrete	100	88
	Pipes	Helcoil Aluminium	90	64
	Pipes	Plastic	60	36
	Pipes		80	65
	Manholes		90	64
	Sumps		90	64
	Intakes		80	54
	Wingwalls		80	54
Gas collection	Pipes		70	62
	Wells		70	62
	Flare		20	9
Water supply	Pipes	Asbestos cement	80	52
	Pipes	PVC	85	52
	Hydrants		80	52
	Valves		80	52
Sewer	Pipes PVC		80	58
	Manholes		80	74

Notes:

(1) "Base Life" and "Average remaining life" for each asset component are to be reassessed based on the asset conditions, to be established from site assessments.

The following tables have been taken from Tasman District Council's asset valuation report for refuse assets (pages 26 and 27).

Table A5.2: Asset Life Expectancy/Nominal life assumed for Eves Valley Landfill Assets [1]

Feature Type	Useful Life (years)	Minimum Remaining Useful Life (years)
REF-Building	50	5
REF-Compactor	25	2
REF-Electrical	5-50	2
REF-Fencing	50	2
REF-Humeceptor	50	2
REF-Landfill	No Depr-100	5
REF-Miscellaneous	No Depr-80	5
REF-Recycling / rubbish bin	10	2
REF-Road / carpark	No Depr-50	5
REF-Stormwater	80	5
REF-Wastewater	20-80	5
REF-Wastewater pipe	80	5
REF-Water	80	5
REF-Weighbridge	60	5
SW-Chamber	80	5
SW-Channel	No Depr	
SW-Cleaning eye	80	5
SW-Collection pond	No Depr	
SW-Culvert	120	5
SW-Flapgate	50	5
SW-Inlet structure	80	5
SW-Manhole	120	5
SW-Outlet structure	80	5
SW-Pipe	See SW table	5
SW-Soakpit	80	5
SW-Sump	80	5
WS-Miscellaneous item	15	2
WS-Pipe	See WS table	5
WS-Pump	20	2
WS-Reservoir / dam	80	5

Feature Type	Useful Life (years)	Minimum Remaining Useful Life (years)
WS-Tank	50	5
WS-Valve	50	5
WW-Air valve	50	5
WW-Building structure	50	5
WW-Chamber	80	5
WW-Cleaning eye	80	5
WW-Control cabinet	15	2
WW-Electrical	15	2
WW-Flowmeter / meter	20	2
WW-Manhole	100	5
WW-Miscellaneous item	15	2
WW-Monitoring point	80	5
WW-Oxidation pond	No Depr	
WW-Pipe	See WW table	5
WW-Pump	20	2
WW-Pump station	80	5
WW-Structure	50	5
WW-Telemetry	15	2
WW-Valve	50	5
WW-Valve chamber	80	5
WW-Vent	50	5
REF-Wastewater pipe or REF-Wastewater at Eves Valley Landfill		13

Notes:

(1) "Useful Life" and "Minimum Remaining Useful Life" for each asset component are to be reassessed based on the asset conditions, to be established from site assessments.

York Valley Landfill Stage 1 Airspace forecast

	Volume m3
Original capacity of landfill 1986	2,700,000
30-Apr-20	1,700,000
Remaining capacity	1,000,000

Consent expires Dec 2034	2034
Current year	2020
Life of landfill	14

Waste Tonnage across weighbridge per year	Volume at 0.8t/m3	Volume at 0.9t/m3	Volume at 1.0t/m3
40000	50000	44444	40000
50000	62500	55556	50000
60000	75000	66667	60000
70000	87500	77778	70000
80000	100000	88889	80000
90000	112500	100000	90000

Estimated years remaining			
	20.0	22.5	25.0
	16.0	18.0	20.0
	13.3	15.0	16.7
	11.4	12.9	14.3
	10.0	11.3	12.5
	8.9	10.0	11.1

Estimated date when full			
	2040	2043	2045
	2036	2038	2040
	2033	2035	2037
	2031	2033	2034
	2030	2031	2033
	2029	2030	2031

APPENDIX 6 – YORK VALLEY LANDFILL GULLY 1 AIRSPACE FORECAST