Absolutely Positively **Wellington** City Council
Me Heke Ki Pōneke

ORDINARY MEETING OF **PŪRORO WAIHANGA** - INFRASTRUCTURE COMMITTEE AGENDA

Time: 9:30am
Date: Thursday, 14 October 2021
Venue: **Virtual Meeting**

MEMBERSHIP

Mayor Foster
Deputy Mayor Free
Councillor Calvert
Councillor Condie (Deputy Chair)
Councillor Day
Councillor Fitzsimons
Councillor Foon
Liz Kelly
Councillor Matthews
Councillor O'Neill
Councillor Pannett
Councillor Paul
Councillor Rush (Chair)
Councillor Sparrow
Councillor Woolf
Councillor Young

Have your say!
You can make a short presentation to the Councillors at this meeting. Please let us know by noon the working day before the meeting. You can do this either by phoning 04-803-8334, emailing public.participation@wcc.govt.nz or writing to Democracy Services, Wellington City Council, PO Box 2199, Wellington, giving your name, phone number, and the issue you would like to talk about. All Council and committee meetings are livestreamed on our YouTube page. This includes any public participation at the meeting.

AREA OF FOCUS

The Pūroro Waihanga | Infrastructure Committee has the following responsibilities:

- Council Infrastructure and infrastructure strategy, including:
    - Transport
    - Waste
    - Water (three waters)
    - Council property (buildings)
    - Relationships with other non-council infrastructure.
- The Road Corridor
- 30-year infrastructure strategy
- Asset management plans
- Capital Works Programme Delivery, including CCO's and Wellington Water Limited
- capital works programmes
- Three waters reform.

The Committee has the responsibility to discuss and approve a forward agenda.

To read the full delegations of this committee, please visit wellington.govt.nz/meetings.

Quorum: 9 members

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1. Meeting Conduct

1.1 Karakia

The Chairperson will open the meeting with a karakia.

Whakataka te hau ki te uru,	Cease oh winds of the west
Whakataka te hau ki te tonga.	and of the south
Kia mākinakina ki uta,	Let the bracing breezes flow,
Kia mātaratara ki tai.	over the land and the sea.
E hī ake ana te atākura.	Let the red-tipped dawn come
He tio, he huka, he hauhū.	with a sharpened edge, a touch of frost,
Tihei Mauri Ora!	a promise of a glorious day

At the appropriate time, the following karakia will be read to close the meeting.

Unuhia, unuhia, unuhia ki te uru tapu nui	Draw on, draw on
Kia wātea, kia māmā, te ngākau, te tinana, te wairua	Draw on the supreme sacredness To clear, to free the heart, the body
I te ara takatū	and the spirit of mankind
Koia rā e Rongo, whakairia ake ki runga	Oh Rongo, above (symbol of peace)
Kia wātea, kia wātea	Let this all be done in unity
Āe rā, kua wātea!	

1.2 Apologies

The Chairperson invites notice from members of apologies, including apologies for lateness and early departure from the meeting, where leave of absence has not previously been granted.

1.3 Conflict of Interest Declarations

Members are reminded of the need to be vigilant to stand aside from decision making when a conflict arises between their role as a member and any private or other external interest they might have.

1.4 Confirmation of Minutes

The minutes of the meeting held on 9 September 2021 will be put to the Pūroro Waihanga | Infrastructure Committee for confirmation.

1.5 Items not on the Agenda

The Chairperson will give notice of items not on the agenda as follows.

Matters Requiring Urgent Attention as Determined by Resolution of the Pūroro Waihanga | Infrastructure Committee.

The Chairperson shall state to the meeting:

1. The reason why the item is not on the agenda; and

2. The reason why discussion of the item cannot be delayed until a subsequent meeting.

The item may be allowed onto the agenda by resolution of the Pūroro Waihanga | Infrastructure Committee.

Minor Matters relating to the General Business of the Pūroro Waihanga | Infrastructure Committee.

The Chairperson shall state to the meeting that the item will be discussed, but no resolution, decision, or recommendation may be made in respect of the item except to refer it to a subsequent meeting of the Pūroro Waihanga | Infrastructure Committee for further discussion.

1.6 Public Participation

A maximum of 60 minutes is set aside for public participation at the commencement of any meeting of the Council or committee that is open to the public. Under Standing Order 31.2 a written, oral or electronic application to address the meeting setting forth the subject, is required to be lodged with the Chief Executive by 12.00 noon of the working day prior to the meeting concerned, and subsequently approved by the Chairperson.

Requests for public participation can be sent by email to public.participation@wcc.govt.nz, by post to Democracy Services, Wellington City Council, PO Box 2199, Wellington, or by phone at 04 803 8334, giving the requester's name, phone number and the issue to be raised.

2. Petitions

PETITION - BUS SHELTER INSTALLATION

Summary

Primary Petitioner:	Amarnath PR
Total Signatures:	31
Presented by:	Amarnath PR

Recommendation

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.

Background

1. Wellington City Council operates a system of online petitions whereby people can conveniently and electronically petition the Council on matters related to Council business.
2. Amarnath PR opened a petition on the Wellington City Council website on 12 August 2021.
3. The petition details are as follows:

   I would like to petition for a bus shelter to be installed at Stop 3297 & 3279

   There is no natural shielding around the current stop and the stop is exposed to high winds and rain.

   If there is a plan already set for this, can you share the time frame
4. The petition closed on 26 August 2021 with 31 authenticated signatures. The list of authenticated signatures is presented as **Attachment 1**.

Officers' response

5. Bus stops on core routes will be addressed within the scope of the LGWM programme, and in particular the City Streets programme. The rest (non-core routes) are the responsibility of WCC and GWRC.
6. Our approved expenditure in the LTP provides for between 2 to 3 bus stop improvement projects on non-core routes per year.

7. Optimal locations for new bus shelters and bus stop balancing are assessed against criteria such as bus stop usage numbers and passenger volumes.
8. Those with the highest cost/benefit ratio are deemed the most feasible and are selected to proceed.
9. Based on shelter prioritisation for improvements, stop #3297 (Melksham Drive near 92) is 84th on our list for shelters and stop #3279 (Melksham Drive near 95) is 455th.
10. Based on the priority ranking of these stops, the Council is unlikely to proceed with any improvements at these locations within the foreseeable future.

Attachments

Attachment 1. Authenticate Signatures - Bus Shelter Installation ⇩ Page 10

Author	Brad Singh, Transport Assets Manager
Authoriser	Mike Mendonca, Acting Chief Infrastructure Officer

SUPPORTING INFORMATION

Engagement and Consultation

Engagement and consultation are usually undertaken when improvement works are planned to occur.

Treaty of Waitangi considerations

There are no Treaty considerations.

Financial implications

The approved expenditure for bus stop improvements limits the number of stops that can be improved per year.

Policy and legislative implications

There are no policy or legislative implications.

Risks / legal

There are no legal implications.

Climate Change impact and considerations

There are no climate change implications.

Communications Plan

N/A

Health and Safety Impact considered

There are no health and safety implications.

Verified Petition Signatures	
Name	**Suburb**
Sharmila Dias	Churton Park
Helen Wilson	Churton Park
Mark Blair	Churton Park
Shankar Krishnan	Churton Park
Sue Beard	Churton Park
Chathura Kariyawasam	Churton Park
Kathryn Henderson	Churton Park
Lynne Rawlins	Churton Park
Emerson Pothagar	Churton Park
Atul Gupta	Churton park
Jack Downes	Churton park
Elliot C	Churton Park
Nalin Kumar	Churton Park
Diana Young	Churton Park
Stephen Young	Churton Park
Caitlin Gill	Churton park
Mavis Downes	Churton Park
Craig Go	Churton Park
Sunil Peiris	Churton Park
Richard Downes	Churton Park
Beverley Downes	Churton Park
Ying Zhao	Churton Park
Hongsheng Gao	Churton Park
Rhoda Correa	Churton Park
Margaret Davidson	Churton Park
Terry Kaffes	Churton Park
Tina Kaffes	Churton Park
Nathan Kaffes	Churton Park
Carole Kaffes	Churton Park
Madhu Nathan	Churton Park
Arvind Candadai	Churton Park
Thomas Kaffes	Churton Park
Mona Lourdes	Churton Park
Sudesh Lourdes	Churton Park
Mounika Kyatam	Churton Park
Amarnath PR	Churton Park

3. General Business

STORM EVENT 17-18 JULY 2021

Kōrero taunaki

Summary of considerations

Purpose

This report provides the Committee with an overview of the storm event from 17th and 18th July 2021, and outlines some of the ongoing consequences for the City and its infrastructure.

Strategic alignment with community wellbeing outcomes and priority areas

	Aligns with the following strategies and priority areas: ☒ Sustainable, natural eco city ☒ People friendly, compact, safe and accessible capital city ☐ Innovative, inclusive and creative city ☒ Dynamic and sustainable economy
Strategic alignment with priority objective areas from Long-term Plan 2021–2031	☒ Functioning, resilient and reliable three waters infrastructure ☒ Affordable, resilient and safe place to live ☒ Safe, resilient and reliable core transport infrastructure network ☐ Fit-for-purpose community, creative and cultural spaces ☐ Accelerating zero-carbon and waste-free transition ☐ Strong partnerships with mana whenua
Relevant Previous decisions	Outline relevant previous decisions that pertain to the material being considered in this paper.

Financial considerations

☐ Nil	☐ Budgetary provision in Annual Plan / Long-term Plan	☒ Unbudgeted $X

Risk

☐ Low	☒ Medium	☐ High	☐ Extreme

Author	Mike Mendonça, Acting Chief Infrastructure Officer
Authoriser	Barbara McKerrow, Chief Executive Officer

Taunakitanga
Officers' Recommendations

Officers recommend the following motion.

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.
2. Notes that overland flow paths on public and private land are designed to convey water, and that the presence of water in these areas is not necessarily considered flooding.
3. Notes that more intense rainfall will result in more events of this nature, further placing pressure on infrastructure.
4. Notes that the draft District Plan incorporates a Natural Hazards Chapter, including flood risk layers.

Whakarāpopoto

Executive Summary

5. This storm event caused significant damage around the City, and in places exceeded the design capacity of the stormwater network. It tested our operational capability, and highlighted the risks of habitation in the vicinity of streams and low lying areas.
6. While investment in infrastructure and planning can help to adapt the City to some of these effects, there are some areas where this may not be possible. As we plan for more intense rainfall events there is likely to be an increasing focus on insurance and liability.
7. The event highlighted some misconceptions about overland flow paths and responsibilities for the maintenance of streams; these are areas where better communication might result in enhanced understanding of the issues.

Takenga mai

Background

8. On the weekend of 17th and 18th July a weather event from the Tasman Sea hit the West Coast and other parts of New Zealand. This storm had been forecast to primarily hit the West Coast but Wellington City also experienced heavy rainfall in areas. For the 24-hour period of 17th July, the MetService recorded 97mm of rainfall in Wellington City – the historic monthly average for July is 133mm for the entire month.
9. While the event had been well forecast, and proactive measures had been taken, the event resulted in flooding, slips, fallen trees, wastewater overflows, damage to private property and Council infrastructure.
10. Wellington City Council and Wellington Water Limited (WWL) contractors and crews were very busy, along with emergency services and private citizens.
11. In some parts of Khandallah the intensity of rainfall was that which might be expected once every thirty years (1-in-30) and in Miramar as high as 1-in-60, and stormwater infrastructure was under stress in many areas.

Flooding

Roles and Responsibilities

12. Rain in Wellington is channelled into our harbour and streams via a series of stormwater intakes, sumps, pipes, open channels and streams. Generally, the

infrastructure in older developed areas can cope with up to 1-in-5 year events. Under the Regional Standard for Water Services, newer infrastructure in greenfields development is designed to cope with a 1-in-10 year event.

13. Where stormwater flows exceed pipe capacity, overland flow paths are designed to transport excess water. Usually this involves the roading network, which is specifically designed with kerbs, channels and sumps (road drainage) that are connected to stormwater pipes, open channels, streams and direct to the coast. Often overland flow-paths are on private land - anecdotally there is a low level of understanding of how this infrastructure functions.

14. A map showing an example of flood risk areas (1-in-100 year event + 20% Climate Change Intensity) is attached at Appendix 1. These flood risks are available in Land Information Memoranda and are a proxy for overland flow paths.

15. Wellington City Council's Transport team is responsible for road drainage and stormwater sumps. Wellington Water Limited (WWL) is responsible for maintenance of the pipe network.

16. On private land, owners are responsible for ensuring that rain that falls on their property is properly conveyed away. In Wellington this can be a complex property issue, involving multiple parties and often dictated by the contour of the land. Legally, geographically lower landowners must accept the natural flow of water from a higher landowner and the higher landowner may discharge, onto the lower land, water that would normally fall there (as long as it is in the natural use of the land). Lower landowners may conduct works to mitigate effects of received water.

17. During heavy rainfall, typically stormwater enters the sewage system via gully traps. Stormwater can also enter via private downpipes and parts of the public system where pipes are cross-connected. This can cause discharges of sewage, typically surcharging via a manhole. Wellington has 75 places where the sewage system is designed to overflow into the stormwater system in heavy rain.

18. WWL's *Know Your Pipes* programme is designed to address some of these issues.

Streams

19. The maintenance of streams is governed by a 1977 agreement on riparian responsibilities. Simply, the agreement outlines that:

    - An asset owner (for example pipe, intake, or the land over which a stream flows) must keep the asset free of debris.
    - A riparian landowner must manage debris within that land parcel.
    - A land or asset owner that has accumulated debris is responsible for mitigating wider flood risk.

20. This can be complex where debris flows from one parcel into another. It is especially challenging for road and parks reserve, and where this abuts private land.

21. Work in streams is regulated by rules set out in the Greater Wellington Regional Council's (GW) Natural Resources Plan.

Response

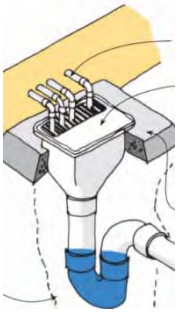
22. During this event, the City responded to more than 1,400 requests for service via the Contact Centre. WWL responded to some 570 enquiries across the region with 336 incidents in Wellington City Council. 67 habitable spaces in Wellington City were compromised, with 44 from stormwater flooding, 12 from wastewater and 11 from both

waters. Many other calls were network related, with stormwater and wastewater network blockages, surcharging and overflows resulting in dislodged manhole lids.

23. The main causes of property flooding included:

- Stormwater flows exceeding the piped network capacity resulting in surcharging from manholes.
- Surcharging of wastewater from gully traps and manholes.
- Partial blockages of the reticulated stormwater network intakes including road sumps.
- Partial blockages of culverts from debris.
- Blockages of intakes caused by landslips.
- Properties located across overland flow paths with their floor levels below flood level.
- Overland flow paths obstructed due to existing structures (such as fences, elevated roads, flower beds) and debris generated during the storm event.

24. Generally the wastewater network can cope with some wet weather flows, but becomes overwhelmed in storm events with high inflow caused by cross connections and infiltration, and through cracked pipes and joint displacement.



25. Overflows from the wastewater network also occur where stormwater enters wastewater gully traps (right) that are not sufficiently above the piped network.

26. The clusters of flooding hotspots identified from the event include Miramar shopping centre, Onepu Road and Tirangi Road along Lyall Bay Parade, Awarua Street, Ottawa Road, Simla Crescent, Cockayne Road/Calcutta Street in Khandallah and Ngaio. Elsewhere in the city individual properties were flooded - generally these were within the overland flow paths.

27. The majority of the observed flooded sites in the same catchment (such as the Khandallah and Ngaio area) are part of an interconnected stormwater network system and therefore will require a catchment level approach to developing any solutions. This is to avoid isolated solutions that only serve to shift the flooding impact downstream.

28. The Tawa catchment saw three properties flooded. Previous flood events in May 2015 and November 2016 identified a significant number of commercial and residential properties at risk of flooding. $18m has been allocated in the Long-Term Plan to reduce this risk, and six significant stormwater improvement areas have been identified:

- Tawa School – completed.
- Woodman Drive - in progress.
- Main Road - design completed and works planned this FY subject to private property agreements.
- Lincoln Avenue, Collins Avenue/Beauchamp Street and Central Tawa (with Lyndhurst Park as detention area) are at the planning and investigation stage.

29. WWL has a programme of minor capital works to address potential safety concerns with surcharging manholes. The manholes surcharging during this flood event will be

added to this programme, and where required a hinged lid with limited opening ability will be installed to make them safer.

30. Road Flooding. The Council's Transport team was equally busy responding to road drainage issues.

- Takarau Gorge Road, which follows the path of the Makara stream, was significantly damaged by floodwaters. Damage included the road surface being lifted in places, the road being significantly undermined and damage to other infrastructure such as culverts. This left the road in a very dangerous state for users and as a result the road was closed whilst repairs were made. It was identified that a root cause of the flooding was a blocked culvert on private property. GW has investigated this culvert, and Council staff have since worked with the property owner to mitigate further flooding risk.



- Makara Beach Road, where up to seven properties adjacent to the river were flooded. Issues in this area were dealt with by private insurance, with minimal Council input, although property owners were visited by a Building Officer following the event.
- Hutt Road, a known hotspot for surface flooding, where two traffic lanes were closed whilst staff cleared sumps that had been blocked by debris conveyed by the very intense rainfall.
- Parts of Miramar, Monorgan Road, Weka Street, Camperdown Road and other low lying areas, where known surface ponding occurs, particularly when the sea level is high and there is nowhere for storm water to drain.
- On a section of State Highway 2 people were trapped between flooded areas, resulting in a 40 minute trip turning into a several hour journey for some drivers.

Other Flooding.

- Churton Park, where three slips from reserve land impacted third party property by way of flooding and debris inundation.
- Lyndhurst Park where an open drainage channel caused flooding of Tawa Rugby club and significant overland flow.

Slope Stability

Roles and Responsibilities

31. Heavy rain can cause unstable land to slip. Where a slip occurs on private property, the landowner is responsible. Typically owners approach their insurer, who will in turn liaise with EQC to seek guidance to address the issue. The Council's Building Officers may be called on if the building is directly affected and needs to be assessed as to its or the ongoing safety of occupants. The manner in which Council Officers engage with EQC has changed due to legislative amendments following the Canterbury earthquakes.

32. The Council's responsibilities are:

- To identify if there is a danger to a building from the slope stability.
- Where there is a slip on Council land, often in road reserve or parks reserve, Council has an obligation to investigate any impacts from the slope stability and to make it right.
- Where a building has become dangerous, the Council has a regulatory function under the Building Act requiring the owner to mitigate the danger.

33. This becomes complex where a slip crosses property boundaries as owners may need to work together for an outcome. It is not uncommon for the Council's own assets to be damaged or threatened by slips on private land.

Response

34. During this event and in the days immediately following, there were numerous minor slips and three more significant clusters that affected dwellings. These were evacuated as a precautionary measure by Fire and Emergency NZ (FENZ) using the Fire and Emergency New Zealand Act 2017. These were located at:

- Ladbrook Terrace Newlands. A slip occurred on private property blocking the driveway and causing some minor impacts with two dwellings. The occupants vacated on the night of the slip on FENZ advice. Council inspectors visited and observed that the risk did not warrant the issuing of a formal notice. The Council welfare team arranged for immediate accommodation for affected residents, and owners worked with their insurers to investigate reoccupation.
- Waikowhai Street Ngaio. A slip on private land was assessed by geotechnical engineers, initiated by the Council. While a dwelling was affected, it was allowed to remain occupied with restrictions in place. At the time of writing the owners had not engaged their insurer and were not seeking to stabilise the slip. A Council pipe is at risk from this slip. Slip material has fallen into the stream and the Council has received environmental complaints.
- Two properties on Oriental Parade and one on Oriental Terrace were affected by slips on private property. Inspectors identified danger of further slippage and requested the occupants to vacate. Geotechnical engineers undertook a risk assessment and formal notices were issued requiring owners to address the risks. Ongoing co-ordination between owners is required at this site.
- Along Old Porirua Road a slip affected two properties. Insurers, EQC and geotechnical engineers agreed that the risk warranted the properties being vacated. Land was found to have slumped against the rear of the dwelling with large tension cracks in the bank above the dwelling. The insurer has agreed that owners' insurance covers temporary accommodation, and formal notices were issued.

35. In all, notices were placed on six buildings requiring that the occupants vacated either part or the entire building. These decisions were taken following geotechnical advice, and welfare support was made available if required.

Insurance

36. Where damage occurred, residents who owned their own home were less likely to request assistance from the Council than renters. In some cases the presence of officers was uncomfortable for residents, who were concerned about 'red stickers', and that the presence of Council Officers might in some way constrain their ability to access insurance in future.

37. As the Mayoral Taskforce into insurance found, insurers are increasingly sensitive to seismic and flood risk, and are increasingly responding to these risks through higher premiums and in some cases through no longer providing cover.

38. During this event some insurers were quick to respond and clients were happy. But some insurers did not respond adequately, leading residents (usually renters) to contact the Council for private response work and social support. Sometimes insurers advised residents to contact the Council. Where water assets were affected by slips on private land, the lack of insurer response added pressure on the Council to step in.

Staff

39. The nature of the event meant that calls related to the high rainfall overwhelmed the Wellington City Council contact centre. Over the weekend 680 calls were answered and 775 digital tickets were received, an increase over average activity of around 300% and 800% respectively.

40. This massive spike in effort was very demanding on front line staff. Primarily for the Council this means contact centre staff, transport engineers and building inspectors, and of course WWL staff and contractors. These staff are the 'face' of the Council, and are often expected to be expert in water management, geotechnical issues, structural issues, welfare and property law.

41. This additional workload can remain high for weeks and even months after the actual event. This can be particularly stressful as the City seeks to rapidly return to business as usual, while staff are still dealing with the tail of the event. For this event, there are several sites still requiring officer attention.

42. Issues with sewage and stormwater are particularly complex and challenging when questions of liability are involved. Council staff are generally resilient, and perform admirably in responding to these crises, but is it important that staff welfare is monitored and placed front and centre.

Discussion

43. Many parts of Wellington are either low lying relative to sea, to streams, at the base of catchments or without overland flow paths. The piped storm water network is designed to cope with up to 1-in-5 (for older parts of the network) and 1-in-10 year rain events, with overland flow paths available for more intense rainfall events in newer parts of the network. Overland flow paths are manifested via ponding and water moving along streets and sometimes through private land. While this is often seen as 'flooding', in reality it is the system at work.

44. Our investment in stormwater is designed to prevent the flooding of habitable floors (as per the Building Act and regulations), and not gardens, garages and pathways. The 17

July event for Miramar was close to a 1-in-60 year event for which the network was not designed. Designing for this level of protection would require significant investment in pump stations and introduces a dependency on high demand electricity supply for managing flood risk.

45. The Long-Term Plan does not contain significant investment in stormwater, with around 12% of three waters budgets ($83m over ten years) allocated for upgrades, growth and renewals. This is consistent with WWL advice in March 2020 signalling that seismic resilience and urban flooding would be deprioritised for to other strategic investment priorities.[1]

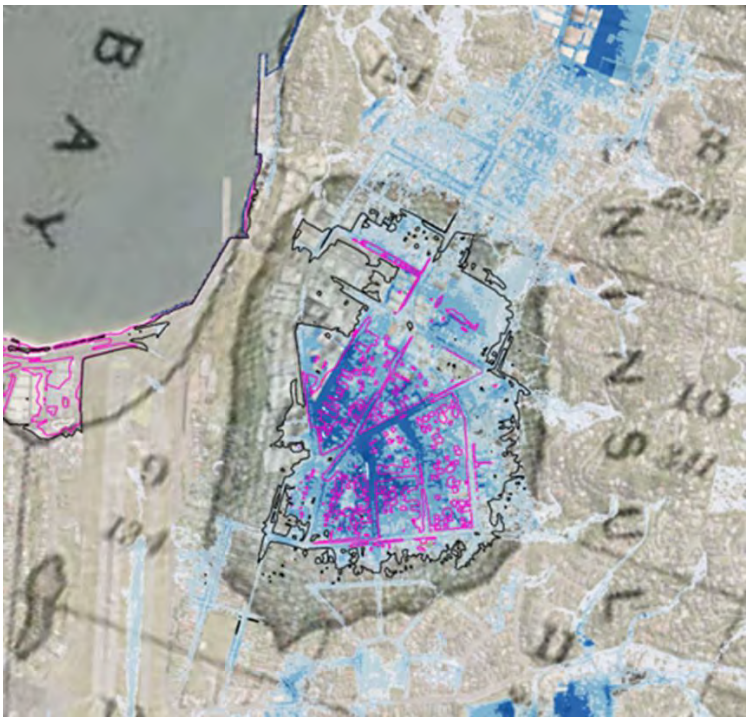
46. Since 2019 Council has been investing approximately $300k annually to upgrade road drainage. For this particular event, historically there would have been flooding in Salamanca Road, Karori Road near Tringham Street, Byron Street, Ingestre Street and Cashmere Avenue. However, due to this investment there was no reported flooding.

47. WWL has undertaken community engagement on flooding and flow paths. This can be complemented through future messages around overland flow paths and roles and responsibilities being more strongly communicated, along with messaging around how to drive vehicles and behave safely around surface flooding, and asking residents to avoid using infrastructure during intense events. The safety of staff, contractors and members of the public must be paramount in these events.

48. Hotspot areas described above flood regularly, and climate change will increase the frequency and severity of flooding and slips. In order to mitigate flood risks in future, choices will need to be made. While some of these will no doubt involve the upgrading of infrastructure, for some areas this may not be possible or practicable. Wellingtonians are going to have to learn to live with more water, and to plan our City accordingly.

49. In some areas infrastructure will not be able to ‘solve’ the problem. Development in the lowest lying areas, adjacent to streams or in former lakes will increasingly be at risk. Below is an example of a former lake in Miramar.

[1] On 5 March 2020 the Wellington Water Committee agreed 5 investment priorities: looking after existing assets, enabling growth, sustainable drinking water supply, healthy urban water and climate change, and that less focus would be on seismic resilience and flooding.



50. More slips and floods will be part of Wellington's future, we will need to adapt our infrastructure and our expectations as this occurs with increasing frequency in the coming decades. The draft District Plan incorporates a Natural Hazards Chapter, including flood risk layers. When adopted this could help adapt the City to the new normal of living with more water through specifying how development should occur and better stormwater management.

51. In turn this highlights the need for any future Water Services Entity under the Government's proposed reforms to be cognisant of the local planning needs of Councils and communities. Should reform proceed, a future model is likely to require greater clarity around the various roles, responsibilities and interfaces around stormwater management.

Whai whakaaro ki ngā whakataunga
Considerations for decision-making
Alignment with Council's strategies and policies

52. Fundamentally this report is about adapting Wellington City to the inevitable effects of a changing climate.

Implications for Māori

53. There are no known implications that are specific to Maori that are not covered off in other planning documents

Financial implications

54. As outlined in the report the Long-Term Plan does not adequately provide funding to match the need tom invest in stormwater. This has been discussed at length in the Government's proposal to reform the Three Waters sector.

Legal considerations

55. There are significant legal and liability consequences associated with more intense rainfall, flooding and climate change. These are national issues that the Government is currently looking to address.

Ngā mahinga e whai ake nei
Next actions

56. Officers will continue to monitor the performance of infrastructure during rain events, and will continue to report to the committee.

57. Officers will liaise with EQC and the Insurance Council to provide feedback on emerging issues identified in this report.

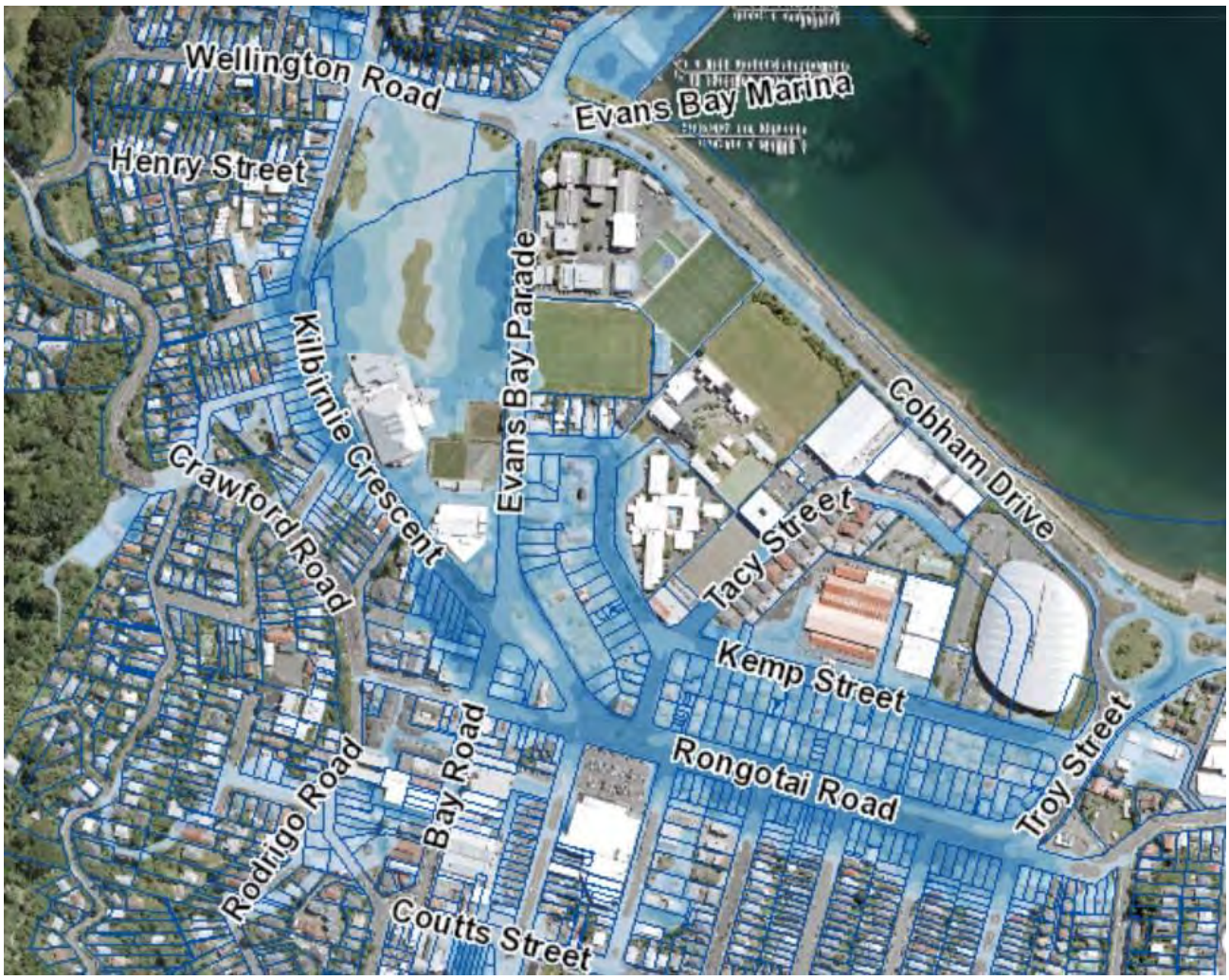
58. More events of this nature can be reasonably anticipated. It is proposed to refine response capabilities so that the lessons are embedded in planning and processes as far as reasonably practical.

Attachments

Attachment 1. Examples of Flood Risks ⇩  Page 23

Examples of Flood Risks

(1-in-100 year event + 20% climate change intensity)



Absolutely Positively Wellington City Council
Me Heke Ki Pōneke

RESIDUAL WASTE DISPOSAL OPTIONS

Kōrero taunaki

Summary of considerations

Purpose

1. This report asks Te Pūroro Waihanga | Infrastructure Committee to agree to advance public consultation on residual waste management and disposal options set out in this report.

Strategic alignment with community wellbeing outcomes and priority areas

	Aligns with the following strategies and priority areas: ☒ Sustainable, natural eco city ☐ People friendly, compact, safe and accessible capital city ☐ Innovative, inclusive and creative city ☐ Dynamic and sustainable economy
Strategic alignment with priority objective areas from Long-term Plan 2021–2031	☐ Functioning, resilient and reliable three waters infrastructure ☒ Affordable, resilient and safe place to live ☐ Safe, resilient and reliable core transport infrastructure network ☐ Fit-for-purpose community, creative and cultural spaces ☒ Accelerating zero-carbon and waste-free transition ☐ Strong partnerships with mana whenua
Relevant Previous decisions	The Stage 4 landfill extension has been noted in the LTP since 2006. A consent application was submitted in 2012, but subsequently put on hold in 2013, until 2018. Engagement on a revised design in 2019 faced public opposition and the project was put on hold mid-2020, pending the decision on sludge minimisation infrastructure. Sludge minimisation infrastructure was included in the 2021-2031 LTP, although a decision on this is pending.
Significance	The decision is rated high significance in accordance with schedule 1 of the Council's Significance and Engagement Policy. The decision on waste management and disposal is significant because running the Southern landfill is a significant Council service and one of the options potentially for consideration is to cease this service. A decision to cease undertaking such a service can only be made if it is provided for in the Long-Term Plan. If closure is a reasonably practicable option, then this will need to be progressed through an amendment to the LTP prior to a final decision. The landfill is a strategic asset listed in the significance and engagement policy. Decision making in respect of the landfill has previously received a high level of community interest. Retiring the landfill would

have an impact on Council finances. The public is interested in issues of waste disposal. The current landfill site involves important natural resources, particularly the mauri of streams running through the site.

Financial considerations

☐ Nil	☒ Budgetary provision in Annual Plan / Long-term Plan	☐ Unbudgeted $X

2. The 2021-2031 Long Term Plan includes a $57m placeholder for Stage 4 landfill extension. Financial implications for other options have not been included in the LTP, and will vary depending on a final decision following the consultation. With the exception of not having any residual waste facility, all other options will require additional funding.

Risk

☐ Low	☒ Medium	☐ High	☐ Extreme

Author	Mike Mendonça, Acting Chief Infrastructure Officer
Authoriser	Barbara McKerrow, Chief Executive Officer

Taunakitanga

Officers' Recommendations

Officers recommend the following motion

That Pūroro Waihanga - Infrastructure Committee:

1. Receives the information.
2. Notes that the City is on a pathway to minimal waste, but that this will take time and investment and, in the meantime, residual waste must still be disposed safely.
3. Notes that the current consents for the Southern landfill expire in 2026 and that it is important that plans are progressed to ensure the safe disposal of residual waste beyond 2026.
4. Notes that five residual waste management options are set out in this report: landfill extension, export to a landfill outside the City, and three technological disposal options able to reduce waste by between 15% and 75%.
5. Notes that alternative waste disposal options other than a landfill were assessed, and all the short-listed options resulted in by-product that require landfill disposal. There is currently no waste disposal option that removes the need for a landfill.
6. Notes the anticipated four year lead in and construction time periods for a possible extension of the Southern landfill, and any significant capital projects undertaken for waste minimisation.
7. Directs officers to progress two parallel work streams (in order to ensure that all reasonably practicable options are available for the Council's consideration of the issue of the disposal of residual waste beyond 2026):
    - Continue to investigate and analyse further waste minimisation and waste disposal options and consultation requirements, reporting to Te Pūroro Waihanga | Infrastructure Committee in early 2022.
    - Undertake the work to initiate and lodge the necessary resource consent applications to extend the Southern landfill.
8. Notes that a decision to retire the Southern landfill will require community consultation and an amendment to the Long-Term Plan.
9. Notes that this report should be read in conjunction with the Future Waste Management Options Report prepared by Beca Limited (attached at Appendix 1).
10. Notes that the landfill option is specifically referencing the development of previous landfill areas (stage 2) within Careys Gully (the 'piggy back' option), and not extending into the gully (stage 4), which was commercially preferable and had positive outcomes on the mauri of the stream, by lifting the headwaters above the landfill, but which moved waste closer to Zealandia.

Whakarāpopoto

Executive Summary

1. A waste minimisation roadmap for the City is currently under development. It is anticipated that this roadmap will provide a pathway for Wellington City Council to become a leader in waste minimisation.

2. The Southern landfill is a critical piece of Wellington's infrastructure and is the only facility in Wellington City that accepts the city's municipal solid waste (MSW), special waste (including dewatered sewage sludge), contaminated soil and asbestos-containing materials. It is a strategic asset listed in the significance and engagement policy. It provides the city with a significant service (although not all of the City's municipal waste is disposed there). A decision to retire the landfill can only occur if it has been provided for in the Long-Term Plan.

3. The existing consents for the Southern landfill expire in mid-2026. Given consenting and construction lead in times, Officers will need to prepare and lodge the application to extend the landfill by early 2022, unless the current consent is allowed to expire. This would result in waste currently disposed at the Southern landfill being exported to other landfills.

4. Officers commissioned an extensive review of options for disposing the Southern landfill's residual waste. These options resulted in a five-option shortlist: closure of the Southern landfill and export, the redevelopment of the Southern landfill on a brownfield site (the piggyback), and three technology-based solutions. These technology-based solutions do not remove all waste, and therefore must be operated in tandem with landfill operations, either at the current site through a landfill extension or exported to landfills such as the Spicer Valley landfill (Porirua), or Silverstream landfill (Upper Hutt). It is however clear that further work is required to understand the impact the waste minimisation policy settings and investments as described in the roadmap might have on these potential options.

This report provides a summary and analysis of each of these options.

Takenga mai

Background

5. In 2019, the Council engaged with the community on a proposed extension of the landfill after the existing consents expire. This attracted a high level of interest and resistance, including:

   - Concerns the engagement process didn't follow provisions of the Local Government Act 2002.
   - Community concerns about the potential effects on the environment.
   - Residents groups concerned about traffic and other potential local effects.
   - Concerns that the engagement process wasn't sufficiently extensive.
   - Concerns that the Council might be seeking to maximise waste and revenue.
   - Residents seeking a better understanding of the relationship between the landfill and sludge.

6. These concerns were heard and it was agreed to delay formal consultation until more information was available on the roadmap for waste minimisation, on alternative technologies and a decision on sludge was reached.

7. In the 2021 Long-Term Plan, the Council committed to the path for a sludge minimisation solution. A final decision is still pending in the near future, although it is only the first step in a long process until delivery.

8. We have now reached a critical point as we have the shortest viable timeframe to consult, design and implement the future waste disposal facility before the current consents for the Southern landfill expire in April 2026.
9. Refer to the Future Waste Management Options Report prepared by Beca Limited (see Appendix 1) for a more detailed discussion of the potential residual waste management options 1-4 identified for Council consideration.
10. Subject to the suite of respective waste minimisation initiatives suggested in the waste minimisation roadmap, and the subsequent funding and successful execution by the Council and Central Government, it is estimated that waste volumes to the Southern landfill could be reduced by around half within the next 15 years.
11. This would mark a step change for the achievement of the City's environmental goals, and see Wellington City at the forefront of whakamahianō - reuse and recovery.
12. While this would be positive for Wellington City, it would be necessary to phase in the implementation and funding of this new waste programme over the next decade or more.
13. During this phase in period, there will be a continued need to dispose of the City's residual municipal waste. The potential for ongoing residual forms of waste, such as hazardous waste and non-recoverable forms of residential waste is also noted.
14. As canvassed below, there is a range of options available to the Council for managing and disposing of residual waste over the next 10 to 20+ years.

Kōrerorero

Discussion

15. As noted above, the Southern landfill is a critical piece of Wellington's infrastructure for the city's waste including household and commercial waste alongside dewatered sewage sludge, contaminated soil and asbestos-containing materials.
16. The Southern landfill follows a self-sustaining business model, and user fees cover operational and infrastructure costs. Landfill fees subsidise the Council's kerbside recycling services and processing of the collected recyclables.
17. Landfill revenue is also used to subsidise waste minimisation personnel, initiatives and activities. This means that the management of waste, provision for kerbside recycling and existing waste minimisation initiatives and activities (such as waste education, the Tip Shop and composting operations) have no impact on rates.

Key issues facing the Council

18. The most significant issues currently facing the Council in this area are:

- The link between Wellington's sewage sludge and waste. There is currently an operational and regulatory requirement to mix sludge with other material (currently household waste) due to land stability and consent conditions. In the 2021 Long-Term Plan, the Council decided to investigate alternate sewage sludge disposal technologies to break the link between the Southern landfill and sewage. It is anticipated that alternative treatments for sludge will be in place by 2026, thereby removing approximately 20% of the waste going to the landfill. This will fulfil a secondary target of the current Regional Waste Minimisation and Management Plan. Further, breaking this link means we can now start to focus on waste minimisation – something we haven't previously been able to do.

- Stronger focus on waste minimisation. Any future waste disposal method will need to be able to accommodate falling waste volumes, without jeopardising existing waste diversion activities. That is, complementing waste minimisation initiatives whilst still being financially viable.
- Financial pressures. Increasing costs of recycling, the landfill's carbon liability through the New Zealand Emissions Trading Scheme, and limited ability to recoup all the costs due to market competition for other landfills has put strain on the existing business model.

19. We have now reached a critical point as we have the shortest viable timeframe to consult, design and implement the future waste disposal facility before the current consents for the Southern Landfill expire in April 2026. If we do not act now, we will not have any choice but to transport waste to another landfill outside of Wellington City.

20. In light of the recognised need for programme level change in waste minimisation, and as a consequence of the limited life of the existing resource consent necessary to operate the Southern landfill (expiring in 2026), the residual waste management and disposal options are discussed below.

Kōwhiringa

Options

21. In 2020, consultants were engaged to identify and assess alternative technologies for disposing of Wellington City's waste. Detailed information about these technologies and the assessment process can be found on line[2].

22. A long list of options was evaluated and refined, and relative advantages and disadvantages of applying each technology within the Wellington context were considered. The longlist of 14 options was assessed and scored against the following criteria:

    - Can the technology be successfully implemented by the time the existing landfill consents expire or by the time the current landfill reaches capacity (whichever occurs first)?
    - Is the technology mature, and has it been successfully implemented before in New Zealand or internationally?
    - Is the technology scalable, and will it be able to adapt given the uncertainty in waste volumes going forward?

23. From these criteria, four options were shortlisted. All of these demonstrated:

    - Strong international track record for handling solid waste, although none of the technical options are currently consented in New Zealand.
    - Minimal effects on surrounding communities in terms of odour and particulate emissions.
    - With the exception of landfill extension, all options reinforce a circular approach to waste management where material is diverted from landfill and generates value.

24. Following a briefing of shortlisted options on 24th August, Councillors requested that officers include a fifth option of no residual waste facility in Wellington to be included in the consultation.

[2] In the documents section at wcc.nz/waste-options

25. In light of the recognised need for programme level change in the way the Council acts to minimise municipal waste, and as a consequence of the limited life of the existing resource consent necessary to operate the Southern landfill (expiring in 2026), the following residual waste management and disposal options were identified for consideration:

    - Energy from waste.
    - Material Recycling Facility.
    - Mechanical Biological Waste Treatment.
    - Landfill redevelopment (involving the brownfield redevelopment of an existing landfill site).
    - No residual waste facility in Wellington City (with the Southern landfill's municipal waste being disposed out of district).

26. As noted above, the report shows that under current policy settings there is no reasonably practicable option for disposing of waste that removes the need for a landfill. The technological solutions all provide opportunities for reducing waste but require a landfill to receive residual waste. Understanding future policy settings will significantly impact upon the appropriateness of these technological solutions. For example, a 50% reduction in organic waste undermines the business case for an Energy from Waste Plant (EfW) but increases the efficiencies of a Materials Recovery Facility (MRF). See appendix at pp 38 to 41.

27. Refer to Appendix 1 for a more detailed discussion of the potential residual waste management options.

28. In turn, the short list of options were selected for their potential ability to handle and process waste generated in the Wellington region, and for the extent to which they may potential align with the goal to promote a more sustainable, circular operation aligned with Te Ao Maori.

Option 1 – Establishment of a Waste to Energy Plant:

29. This option involves the combustion of waste material and uses the heat generated to produce electricity (and possibly heat). The output of this process is an ash, which has a significantly reduced mass and volume compared to the input waste.

30. The hot flue gases produced from the combustion of waste are passed through a boiler which superheats steam to a high pressure which drives a turbine to generate electricity. The flue gases are then treated to remove any pollutants before they are emitted to the atmosphere.

31. It is noted that no municipal energy from waste plants are currently consented in New Zealand.

32. The primary positive and negative considerations associated with the establishment of a Waste to Energy Plant are summarised in Table 7 (below).

Table 7: Establishment Waste to Energy Plant – Key Considerations

Pros	Cons
Considered a higher tech solution. WCC seen as a leader.	Up to 25% of waste will still have to go to a form of landfill.

Less water quality impacts but increased air quality impacts on the local environment.	Requires a minimum tonnage of waste to make the facility economically viable. – least flexible.
	Untested from consenting and operational in a New Zealand context. While effects like discharge to air are well studied abroad – it is not tested in New Zealand.
	Highest costs to construct and operate resulting in it almost certainly requiring rates funding and increased gate fees to operate. Rates funding will be required for other waste diversion services such as kerbside recycling service.

Option 2 - Material Recycling Facility

33. This option is often referred to as a Dirty MRF. In this scenario it is assumed that the facility would be commissioned at the Southern landfill site.

34. At a Material Recycling Facility, waste materials are sorted into different streams of recyclable materials. The equipment involved can be tailored to the specification of the input material and the required quantity and quality of output streams.

35. Typically, municipal solid waste can be sorted into ferrous, non-ferrous, glass, paper and card, and plastics which can be further processed elsewhere.

36. The left-over non-recyclable material would then need to be sent to landfill or energy from waste plant. As such, landfill redevelopment (option 4) has the potential to be integrated for consideration alongside this option.

37. The primary positive and negative considerations associated with the establishment of a Material Recycling Facility are summarised in Table 5 (below).

Table 5: Establishment of a Material Recycling Facility – Key Considerations

Pros	Cons
If sized correctly, can tolerate reduction of waste volumes. More flexible.	Up to 85% of outputs will still have to go to landfill. (this would reduce if organic waste were diverted).
More aligned with circular economy concept.	Moderate costs to construct and operate resulting in a high chance of requiring rates funding and increased gate fees to operate.
Water quality and air quality impacts to the local environment significantly reduced if residual waste is exported.	Some rates funding required to subsidise other waste diversion services such as kerbside recycling.
	Element of increased manual handling resulting in higher health and safety risks.
	Changes to existing service level – no disposal of contaminated soil and asbestos contaminated material.

Option 3 - Mechanical Biological Waste Treatment Plant

38. This scenario is similar to the Material Recycling Facility option discussed above, but includes the added step of biological treatment (such as bio-drying, composting or anaerobic digestion).

39. This approach is more common when the input material has a high organic content. In terms of bio-drying, the waste is put into piles with a controlled air flow which decomposes the waste, heating it in the process which reduces the moisture content and produces a more homogenous material.

40. The primary positive and negative considerations associated with the establishment of Mechanical Biological Waste Treatment Plant are summarised in Table 6 (below).

Table 6: Establishment of a Mechanical Biological Waste Treatment Plant – Key Considerations

Pros	Cons
If sized correctly, can tolerate reduction of waste volumes. More flexible.	Up to 65% of outputs will still have to go to landfill.
Can tolerate waste with high organic content.	Moderate costs to construct and operate resulting in a high chance of requiring rates funding and increased gate fees to operate. Some rates funding likely required to subsidise other waste diversion services such as kerbside recycling.
More aligned with circular economy.	Element of increased manual handling resulting in higher health and safety risks.
Water quality and air quality impacts to the local environment significantly reduced if residual waste is exported to other landfills.	Changes to existing service level – No disposal of contaminated soil and asbestos contaminated material.

Option 4 - Landfill development (involving the brownfield redevelopment of an existing closed landfill site)

41. The Beca reports discusses two options for landfill development.

42. One option refers to the original Stage 4 design which progresses filling up the gully. This option has benefits for the mauri of the stream which is lifted above the headwaters of the landfill, enabling the decommissioning of the existing tunnel that runs beneath. This option is also commercially attractive. However it brings the active tip face to within 500m of Zealandia and requires the stripping of regenerating bush in the gully.

43. The other option involves the redevelopment of an existing landfill area and is otherwise referred to as the 'piggy back option'. In this scenario, waste would be placed on top of a previously decommissioned stage of the landfill (known as 'stage 2'). Based on existing landfill rates, this would give the Southern landfill an additional life of 15-20 years. Waste minimisation technologies and policies will increase this life expectancy.

44. Due to strong opposition to stage 4, the piggyback development has been put forward as the landfill option to be included in the consultation.

45. This redevelopment area is currently being used for the Council's green waste composting operations, and as a storage area (see **Image 2**).

Image 2: Piggyback landfill redevelopment site

46. Due to the redevelopment and recommissioning of existing landfill area involved in this scenario, this option would not require any further stream reclamation or vegetation removal.

47. This redevelopment option would additionally establish a buffer zone of approximately 1.2km between the potential landfill redevelopment area, and Zealandia located to the north of the site.

48. This redevelopment option does not however remove the continued reliance on the current stream diversion tunnel running under the existing landfill, nor mitigate the potential and existing risk or consequences of stream diversion tunnel collapse.

49. The primary positive and negatives considerations associated of the development of the Southern Landfill are summarised in Table 4 (below).

Table 4: Development of the Southern Landfill – Key Considerations

Positive	Negative
Filling rates can be adjusted depending on waste volumes.	Facility does not directly provide increased diversion.
Most flexible - additional waste facilities can be added if space allows, and the cost can be justified.	Perception that it is old tech and less progressive.
No change in current service level – asbestos and contaminated soils still can be disposed of.	Does not align with circular economy concept.
Least costs to construct and operate resulting in the least chance of requiring additional rates funding or increased gate fees to operate.	Effects on the local environment largely as existing but at a slightly smaller scale.
Least amount of rates funding required to fund other Council waste diversion services such as kerbside recycling.	
Council retains market share in waste disposal giving it influence to enact change.	

Option 5 - No landfill (with the Southern landfill's municipal waste being disposed at an out of district landfill)

50. The retirement of the Southern landfill as a residual waste disposal facility is an option for the Council. The ending of commercial landfill disposal activity at the Southern landfill could be achieved following the appropriate forms of community consultation, and by subsequently allowing the resource consent for landfill disposal to lapse. Should such a decision be made by the Council, it would effectively close the landfill from 2026.

51. In the scenario of landfill closure, it would be necessary to transport Southern landfill's municipal waste to an alternate landfill/s, either within or outside of the Region. Most likely the alternate landfill would be Silverstream in Hutt City or Spicer landfill in Porirua.

52. Should Wellington City redirect Southern' s waste to an alternate site, this would increase the respective filling rates and shorten the operational life of the receiving landfill. Porirua is currently seeking to extend Spicer landfill.

53. While the closure of the Southern landfill would not itself reduce waste, it would reduce the adverse impacts of traffic on the Brooklyn community to a degree. A large number of trucks would continue to travel to the Landfill Road area to dispose material at neighbouring facilities.

54. Any decision to retire the Southern landfill would also result in significant financial and budget implications for the Council and ratepayers. The Southern landfill currently operates as a commercial enterprise. In 2021, the landfill generated a revenue stream of approximately $17m per annum for the Council.

55. The closure of the landfill would immediately remove the cost of ETS liabilities from the Council and shift the responsibility for carbon liabilities to the entity receiving the waste. This would be offset by approximately $1.6m of stranded overheads that would need to be reallocated.

56. In the scenario landfill retirement, the absence of the revenue stream from the landfill would result in the Council needing to secure alternative funding to continue the existing level of waste minimisation staff resourcing, as well as alternative funding to provide for the continuation of a kerbside recycling service.

57. Preliminary estimates suggest that maintaining the same level of service for kerbside recycling collection, and providing the same level of resourcing necessary to support existing waste minimisation initiatives, would likely equate to a 2.5% increase in rates. (Alternatively, kerbside recycling could become user pays).

58. Any alternative level of service increase, or waste and resource recovery infrastructure development identified through the roadmap would also require additional funding sources.

59. The primary positive and negatives considerations associated of the closure of the Southern Landfill are summarised in Table 3 (below).

Table 3: Retirement of the Southern Landfill – Key Considerations

Pros	Cons
Least cost option in terms of capital costs.	Southern's waste is still ultimately being landfilled – just somewhere else..
If Council exits the landfilling business	Council has no share in waste disposal market

completely there would be no further costs	which reduces influences to enact change.
No negative environmental effects on the local environment.	Other Territorial Authorities could prioritise capacity for their own waste over Wellington's so security of service becomes an issue.
No further ongoing health and safety liabilities with managing/operating a waste disposal facility.	Wellington could be perceived as exporting some of the waste it produces.
	Rates or user pays will be required to fund other Council provided waste diversion services such as kerbside recycling.

Summary of Options

60. The Future Waste Management Options Report (**Appendix 1**) concludes that there are several valid and technically sound options for the Council to consider when establishing their future residual waste management and disposal strategy.

61. To assist comparison, a high-level summary of the Capex, Opex and waste treatment/disposal efficiency considerations for options 1-3 is set out in Table 8 (below).

Table 8: High-level Cost & Efficiency Summary of Residual Waste Options 2-4

Residual Waste Management (Options 2-5)	Capex	Opex	By-product
Landfill redevelopment	$57m	$4m	-
Materials recycling facility	$43m	$27m	85%
Mechanical biological treatment	$78m	$24m	65%
Energy from waste	$214m	$15m	25%
No landfill	-	-[3]	-

62. Carbon. Further Analysis of the embedded and operational carbon of each option has been commissioned and is expected in mid October 2021. Early indications are that the options do not vary greatly with respect to carbon emissions. This will be confirmed with further advice.

63. Technological options other than landfill would appear to align with the Council's objectives to promote a more circular economy and reduce the social and environmental impacts of waste management. However, these options are significantly more expensive and often require consistent high-level waste inputs to be viable technologies. The impacts of waste minimisation policies and investments will need to be understood for these potential options to be taken to the community for endorsement.

64. Furthermore, the three technological options are not easily modified to scale within the Wellington context and will still result in variable waste outputs that will need to be disposed of at the end of the treatment process. A landfill somewhere will still be necessary.

65. Finally, it is acknowledged that all of the options outlined above sit towards the bottom of the waste hierarchy, as they all provide a convenient means for the disposal of waste that does not necessarily require behaviour change for implementation.

Conclusion

66. Wellington is on a trajectory to become a leader in whakamahianō - reuse and recovery. A Waste Minimisation Roadmap is being submitted for Council consideration, with the intention that an associated range of progressive waste minimisation initiatives be funded and implemented across Wellington City.

67. In the meantime, as the Council takes steps to establish and phase in a new pathway towards a low waste and low emissions future, the Council must decide on a strategy for the management and disposal of residual municipal waste.

68. Officers initially were of the view that given the importance of community values underpinning waste minimisation a preferred option might be unhelpful and that the technological options should be presented on the same footing as the landfill options. However, it is apparent that a landfill is required, regardless of the technological options, and it is a resilient backstop. The real decision is on the policy settings that support waste minimisation, rather than a simple technical disposal solution. It is also

[3] While there is opex associated with this option, it is dispersed across waste generators and is not borns directly by the Council.

apparent that the landfill extension is likely to be the officer preferred option for the following reasons:

- All the technological waste disposal options require a landfill to receive un-processible waste, and by-product. These technological options are not alternatives to a landfill on their own.
- Technological options require a minimum level of feedstock to operate and are not easily scalable.
- Technological options make it convenient to continue to dispose instead of more preferred options higher in the waste hierarchy.
- The landfill extension is the most cost-effective option, particularly given the financial impacts of operating waste minimisation services without this revenue if all waste was exported.
- By retaining control of a landfill, the Council can implement tip-face waste minimisation policies, as well as directing revenue from the landfill into supporting general waste minimisation policies.
- Exporting waste will reduce regional landfill capacity and incentivise the development of further regional landfills.
- Exporting waste risks Wellington City being perceived as being unwilling to deal with its own waste.
- The landfill can always be closed before it is full if it is unnecessary.

However further work on the scope for policy settings to support the technological options is required before a concluded view can be arrived at.

69. It is also noted that within the scope of this report, doing nothing has not been identified as an option for Council consideration. This is due to the consequences of not acting, which include: the lapsing of the existing resource consent necessary for landfill activity in 2026; the subsequent loss of the landfill as a significant service without the necessary requirement of public consultation; and the potential loss of landfill redevelopment as a residual waste management option being available for Council consideration.

Whai whakaaro ki ngā whakataunga

Considerations for decision-making

Alignment with Council's strategies and policies

70. The waste minimisation focus of this report is consistent with the Council's intent as signalled in the Wellington Region Waste Management and Minimisation Plan (2017).

Engagement and Consultation

71. The landfill is a strategic asset and there are consultation requirements to meet our obligations under the RMA and the LGA.

72. If Council decides not to reconsent the landfill, this will be signalled via the 2022 Annual Plan.

73. A proposed communications plan will be drafted following consideration of this report.

Implications for Māori

74. Mana Whenua is actively engaged with the process to date and will be kept abreast of progress, noting the specific interest in the mauri of the streams that run through the site.

Financial implications

75. The recommendations outline the financial implications associated with the future of the landfill.

Legal considerations

76. The legal consultation requirements are set out in the report.

Risks and mitigations

77. Risks are outlined in the report.

Disability and accessibility impact

78. At this stage there are no disability and accessibility impacts.

Climate Change impact and considerations

79. This is outlined in the advice. Climate mitigation is at the heart of waste minimisation and management.

Communications Plan

80. An outline of the draft communications plan is to support consultation is attached.

Health and Safety Impact considered

81. While waste is an area with specific health and safety needs, the impacts are not directly related to this report.

Ngā mahinga e whai ake nei

Next actions

82. The proposed next steps are to:

- Continue to investigate and analyse further waste minimisation and waste disposal options and consultation requirements, reporting to Te Pūroro Waihanga | Infrastructure Committee in early 2022.
- Undertake the work to initiate and lodge the necessary resource consent applications to extend the Southern landfill.

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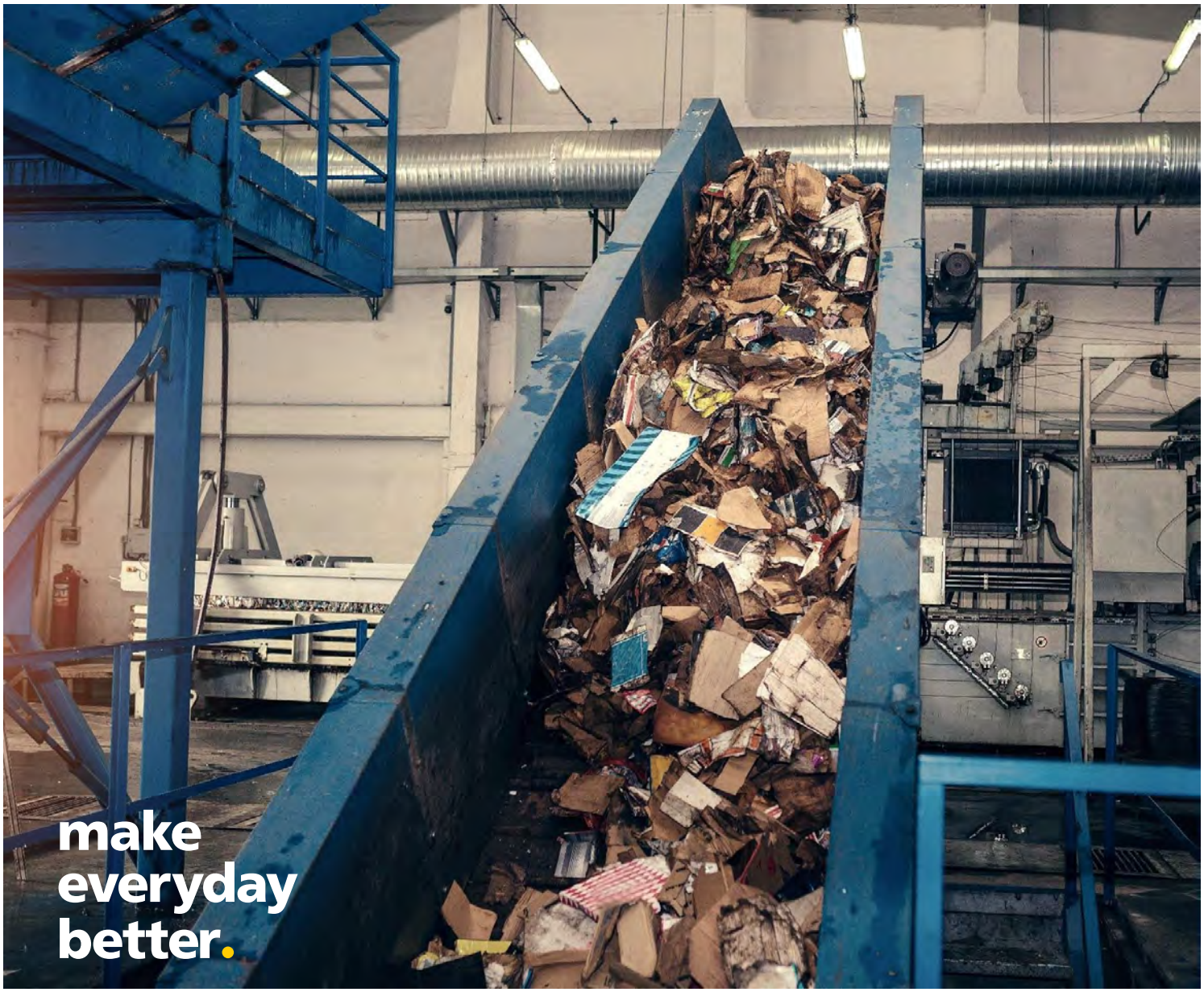
Attachments

Attachment 1. Beca Future Waste Management Options ⇩ Page 41

Future Waste Management Options

Prepared for Wellington City Council
Prepared by Beca Limited

4 October 2021



Revision History

Revision Nº	Prepared By	Description	Date
A	Jack Timings	Draft for Discussion	02/08/21
1	Jack Timings	Issued for Approval	24/08/21
2	Jack Timings	Updated to include additional sensitivities	30/08/21
3	Jack Timings	Updated as per WCC comments	04/10/21

Document Acceptance

Action	Name	Signed	Date
Prepared by	Jack Timings		04/10/21
Reviewed by	Eleanor Grant		04/10/21
Approved by	Nathan Baker	 pp	04/10/21
on behalf of	Beca Limited		

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Executive Summary

Introduction

The Wellington City Council (WCC) owns and manages the Southern Landfill. The landfill is considered key infrastructure for the city, and is listed as a strategic asset in WCC's Significance and Engagement Policy, as required under the Local Government Act 2002 (LGA). The landfill operates under a resource consent issued by the Greater Wellington Regional Council.

The landfill's consent expires in June 2026, and is projected to reach current consented capacity at the same time. Therefore, WCC is assessing the possibilities presented by alternative waste management technologies to manage Wellington city's waste. This assessment needs to show how the adoption of alternative waste management solutions could align with its objectives and responsibility to handle and process waste generated in the Wellington region, and also align with its aims to promote a more sustainable, circular operation aligned with Te Ao Maori.

Beca and Fichtner were engaged by WCC to perform a technical and suitability assessment of a long list of possible waste management solutions (including extension of the current landfill) for WCC to implement post-2026, and evaluate the relative advantages and disadvantages of applying each technology in a WCC context.

Wellington's Waste and Future Requirements

The landfill currently receives 60,000 tonnes of municipal solid waste (MSW) and 15,000 tonnes of Sewage Sludge from the city's sewage treatment plant per annum. It also serves as a location for the disposal of contaminated soil and asbestos contaminated material generated from development activity within the city.

There are very few alternatives to landfilling the contaminated soil and asbestos-containing waste that the landfill receives, which confirms that some waste will always be required to be landfilled, but over 60% of the waste received by WCC (domestic waste, commercial waste, sludge solids) could be processed using different technologies.

There are many factors that could affect the volume of waste generated in the Wellington region in future decades e.g. the parallel Wellington Water Sludge Minimisation Project, increased waste minimisation and diversion activities and the impact of population growth in the Wellington region, so any future solution must be capable of dealing with this uncertainty in waste generation.

Option Scoring and Evaluation Process

To evaluate the opportunities for Wellington City Council presented by alternative waste management technologies, a two-stage assessment process was designed by WCC in partnership with Beca and Fichtner.

Firstly, each option would be assessed against three non-negotiable criteria:

1. Could the technology be successfully implemented prior to the expiry of the consent of the Southern Landfill (June 2026) or by the time the current landfill reaches capacity, whichever occurs first?
2. Is the technology mature, and are there sufficient examples of this technology being applied at scale either in New Zealand or internationally?
3. Is the technology scalable, and will it be able to adapt given the uncertainty in waste generation in Wellington city going forward?

Secondly, each option that successfully passed the three absolute criteria was evaluated against a set of general criteria. These criteria were developed to make sure each option was aligned with WCC's aims to:

- Minimise the impacts of the technology on the surrounding environment and communities;
- Provide a proven, reliable and economic method for managing waste in the Wellington region; and
- Promote a sustainable and regenerative approach to waste management.

The results of this assessment can be seen on the following page:

Evaluation Process Results

Absolute Criteria				
Technology	**Programme**	**Technical Maturity**	**Scalability**	**Results**
Landfill	✓	✓	✓	PASS
Export (No collection)	✓	✓	✓	PASS
Export (Transfer Station)	✓	✓	✓	PASS
Energy from Waste	✓	✓	✓	PASS
Incineration w/o energy recovery	✓	✓	✓	PASS
Gasification	✓	✗	✓	FAIL
Pyrolysis	✓	✗	✓	FAIL
Anaerobic digestion	✓	✓	✓	PASS
Material Recycling Facility	✓	✓	✓	PASS
Mechanical Biological Treatment	✓	✓	✓	PASS
Composting	✓	✓	✓	PASS
Autoclave	✓	✓	✓	PASS
Vermiculture	✓	✗	✓	FAIL
Insect food cycle	✓	✗	✓	FAIL

Assessment Criteria
Local Community Effects
Environmental Effects (water)
Environmental Effects (land)
Environmental Effects (air)
Alignment with Circular Economy
Alignment with Te Atakura First to Zero
Consenting and Planning
Value for money
Robustness/reliability
Maturity of offtake market
Size
Resilience

Summary		
Technology	**Total Score**	**Shortlist**
Landfill	**79**	✓
Export (No collection)	**64**	
Export (Transfer Station)	**61**	
Energy from Waste	**78**	✓
Incineration w/o energy recovery	**70**	
Gasification		
Pyrolysis		
Anaerobic digestion	**76**	
Material Recycling Facility	**82**	✓
Mechanical Biological Treatment	**82**	✓
Composting	**72**	
Autoclave	**58**	
Vermiculture		
Insect food cycle		

Final Technologies Shortlisted

After the fourteen waste management technologies had been assessed and scored, four technologies were shortlisted as suitable options for Wellington City Council to assess in more detail. These were:

1. Energy from Waste (EfW)
2. Materials Recycling Facility (MRF)
3. Mechanical Biological Treatment (MBT)
4. Landfilling

Common features of the four technologies selected is that they all demonstrate:

- Strong international track record for handling solid waste
- Minimal effects on surrounding communities in terms of odour and particulate emissions
- With the exception of landfilling, all options reinforce a more circular approach to waste management where a portion of residual mixed waste material is diverted from landfill and generates value.

These four technologies all have relative advantages and disadvantages in the context of Wellington's current and future waste generation and should be carefully assessed against each other to decide on an appropriate solution for WCC to adopt.

Each of the technologies also have different cost profiles with respect to capital cost to build and operating cost throughout its life.

Waste Technology	Waste Treated	Residual Waste (not treated)	Capex ($NZD)	Opex (NZD/year)	Social / Env Impacts
Energy from Waste (EfW)	Combustible Waste from Domestic, Commercial and WWTP Sludge	Non-combustible wastes, Contaminated Soil and Special Waste	$214M	$4.99M + $9.7M for offsite disposal of Residual Waste streams	Increased particulate emissions, reduced land/water emissions, generation of energy/ash products.
Materials Recycling Facility (MRF)	Domestic and Commercial Waste	WWTP sludge, Contaminated Soil and Special Waste	$43M	$17.6M + $12.7M for offsite disposal of Residual Waste streams	More circular waste management solution, reduced GHG emissions
Mechanical Biological Treatment (MBT)	Domestic and Commercial Waste	WWTP sludge, Contaminated Soil and Special Waste	$78M	$14.6M + $12.7M for offsite disposal of Residual Waste streams	More circular waste management solution, reduced GHG emissions
Landfilling	All waste	N/A	$111M or $33.6M for decreased lifetime option	$3.68M	Same as current operations

In each of EfW, MRF and MBT, a portion of the waste is required to be sent to landfill and cannot be treated, and a portion of the waste that is treated (usually a large portion) still requires landfilling post-treatment. This means that alternatives to landfilling still need to consider how residual and treated wastes need to be handled, and whether there are advantages to co-locating these facilities on a landfill should be considered.

Next Steps

This analysis has revealed that there are several valid and technically sound options for WCC to consider when analysing its future waste management strategy and operations following the expiry of the Southern landfill's existing consents in 2026.

The next step for Wellington City Council will be to engage with the public on this analysis and conduct a more detailed assessment to determine which technology should be pursued and implemented between now and 2026. Following this assessment, the most suitable technology will be selected by WCC and implemented between now and 2026.

Following this, WCC will need to undertake and impact assessment to select the best location for this chosen technology; the current landfill location is a strong possibility but there may be advantages placing facility elsewhere when considering community impacts, traffic effects, implementation timeline etc.

1 Introduction

The Wellington City Council (WCC) owns and manages the Southern Landfill. It is considered a key infrastructure for the city. and is listed as a strategic asset in WCC's Significance and Engagement Policy, as required under the Local Government Act 2002 (LGA). The landfill operates under a resource consent issued by the Greater Wellington Regional Council.

The landfill currently receives 60,000 tonnes of municipal solid waste (MSW) and 15,000 tonnes of Sewage Sludge from the city's sewage treatment plant per annum. It also serves as a location for the disposal of contaminated soil and asbestos contaminated material generated from development activity within the city.

Currently, all landfill fees are used to offset the cost of waste collection and disposal services, recycling collection and processing services and waste minimisation activities. No additional funding from rates is required.

With the current landfill consent expiring in April 2026, and capacity expected to be reached at the same time WCC is assessing the possibilities presented by alternative waste management technologies after the current consent expires. WCC wishes to assess how the adoption of other options could align with its objectives and charter to handle and process waste generated in Wellington City, and also align with its aims to promote a more sustainable, circular operation aligned with Te Ao Maori. In addition the technology needs to be compatible with the long term needs for the disposal of waste in the Wellington region.

Beca and Fichtner were engaged by WCC to perform a technical and suitability assessment of a long list of possible waste technology options for WCC to implement post-2026, and evaluate the relative advantages and disadvantages of applying each technology in a WCC context.
After the long list options had been assessed at a high-level and the best options identified, a more detailed comparative assessment for the four technologies best suited to WCC and wider Wellington region's requirements was performed. This information would then be used by WCC to develop a public engagement process and create a residual waste solution for the city.

1.1 Underpinning the Assessment Process with a Māori World View

A key aim for Wellington City Council was to underpin the decision making process with consideration of their obligations to the people and environment within the Wellington region, and apply a Māori World View when evaluating the benefits and limitations of different options. This directed their selection process to encompass many criteria above and beyond technical and economic benefits, including:

- Their responsibilities as kaitiaki of the proposed development site and surrounding waterways, environment and communities;
- Whether the technology being assessed aligned with their Te Atakura First to Zero plan to reduce the climate change impacts of Wellington City Council's operations; and
- Whether implementation of each technology would promote more regenerative and circular management of waste products, and support the development of more sustainable waste management practices.

2 Waste Characteristics

The waste received by WCC at the Southern Landfill comes from a variety of different sources and contains multiple streams with different components. A summary of these is below:

Table 1: Landfilled Waste Characteristics

Stream	Category	Tonnage (average of prev. 3 yrs)	Rough %	Information
A	Domestic to Transfer Station	8383	9%	This is general waste received at our transfer station - usually residential customers
B	Mixed Commercial	55874	58%	This is generally mixed commercial tonnages
C	Sludge/Screenings to Tip Face	14286	15%	De-watered sludge
D	Special Waste	17750	18%	Other types of unusual waste (approval upon application) - generally Asbestos contaminated material

Separate from the waste that is landfilled onsite, the site also receives contaminated soil which is placed into dry cells instead of being mixed and landfilled with the other waste streams:

Stream	Category	Tonnage (average of prev. 3 yrs)	Information
E	Contaminated Soil	28297	This material linked to the amount of construction activity in the city - material uncovered is generally one-off - once contaminated material is gone; it is not reproduced

As seen in the tables above, around 37% of the total waste received is contaminated soil and special waste (generally asbestos-containing material) which fluctuates depending on construction activity in the city, and just over half of the total waste is mixed commercial and domestic wastes. Wastewater treatment sludges make up 11% of the total waste received and 18% of landfilled waste, but this is expected to decrease in coming years. WCC has consulted, via the Long Term Plan, on options for treatment of sludge, which will have the likely result of reducing the amount of sludge that will be required to be landfilled. A preferred solution has been identified, and funding is currently being sought for new infrastructure to support this.

Waste treatment solutions are limited for streams D and E, due to the hazardous nature of these wastes. These streams cannot be processed to remove contaminants or recycled without extremely careful processing, so it is realistic to assume that for the foreseeable future these streams will need to continue being disposed of in sealed, well-managed landfills.

However for other streams (especially streams A and B), there are a number of alternatives to landfilling.

2.1 Characteristics of Streams A and B

Streams A and B (domestic and commercial waste) contain a mixture of organic and non-organic wastes, approximately distributes as below:

Table 2: A and B Stream Components

Waste Category	A + B Tonnage	A + B %
Paper	6118	10%
Plastics	7611	13%
Organics	22804	39%
Ferrous Metals	1683	3%
Non-ferrous Metals	663	1%
Glass	1720	3%
Textiles	4769	8%
Sanitary paper	4367	7%
Timber	8608	15%

The largest components of this waste are organics (39%), timber (15%), plastics (13%) and paper + sanitary paper (10% and 7% respectively). Many of these waste streams are potentially recyclable or can be processed in other ways. Additionally, many of these streams strongly contribute to emissions from the landfill as they decompose into methane and carbon dioxide under anaerobic conditions in sealed landfill cells.

2.2 Waste Volume Projections over Time

2.2.1 Wellington Region Waste Management and Minimisation Plan

In 2017, WCC collaborated with other councils in the Wellington Region to produce a ten-year plan for aligning waste reduction targets and initiatives across councils in the wider Wellington area.
As part of this project, a Joint Governance Committee was established with members from each council to oversee the development and implementation of the regional Waste Management and Minimisation Plan. The key aim of this plan was to reduce the quantity of waste sent to class 1 landfills by 50%; from 600 to 400 kilograms per person per year by 2026, which approximately lines up with the expiry of WCC's current landfill consent. The key actions identified to implement this plan include:

- Developing and implementing consistent waste bylaws
- Investigate a region-wide resource recovery network
- Develop more consistent and effective forms of communication and education on waste services and waste minimisation
- Collaborate with external parties to undertake research, lobbying and other actions on e-waste, product stewardship and other waste management issues.

2.2.2 Impact of Waste Reduction Projects over Time

a. Wellington Water Sludge Minimisation Project

Waste Stream C, or sludge material from the local municipal wastewater treatment plant, is expected to decline in future years as Wellington Water implements a preferred solution to decrease material needing to be landfilled from its water treatment plant. The preferred technological solution for this is a new thermal hydrolysis and digestion plant, which would decrease the amount of WWTP sludge generated by the plant by 82%, and could also divert this material from being landfilled. To this end, Stream C is likely to significantly decrease in volume after completion of the identified projects.

In the past, WCC has composted WWTP sludge material as part of its previous landfill volume minimisation projects. However, this processing operation led to odour issues at the current landfill site and was discontinued.

b. Other Waste Minimisation Projects

WCC is in the process implementing a number of projects that will shape the way waste is manageA and Benerated in Wellington City:

- WCC is in the process of a strategic waste review, which will determine a roadmap of initiatives around reducing waste;
- Costs for disposal of waste to landfill are being increased to disincentivise landfilling;
- The new Waste Management & Minimisation Bylaw 2020 is coming into effect, with new requirements to separate different types of waste, restricting the proportion of green waste in Council bags and requiring contractors to create construction/demolition waste plans etc
- WCC are separately investing in behavioural change initiatives to divert recyclable and reusable materials from landfill.

It is difficult to estimate the size of the reductions associated by these initiatives and other future initiatives.

2.2.3 Impact of Population Growth over Time

The population of Wellington city is expected to increase by 50,000 to 80,000 people over the next 30 years. From data received in the GWRC Compliance Report for Southern Landfill, commercial and industrial waste volumes to the landfill have remained fairly consistent over the last five years even when considering the population growth in the city during this time period. With current and future waste reduction projects, it is reasonable to expect this trend to continue as a minimum.

3 Multi Criteria Assessment Process

A two stage evaluation process was used to assess potential options and score their suitability. This included completing an initial 'absolute criteria' assessment on a long list of options before scoring against a wider range of objectives.

These options were assessed in a process summarised in Figure 1 and explained below.

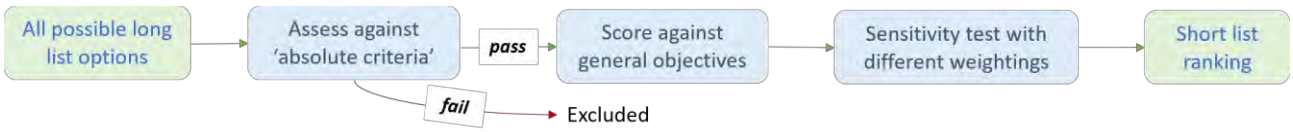


Figure 1: Assessment Process Summary

3.1 Absolute criteria

Three 'absolute criteria' were developed as bottom-lines for option inclusion, namely; technical maturity, programme and scalability (see Table 3). These were informed by what WCC considered to be fundamental to the aims of the project and so were included as a first check for inclusion of any technology. Scores were categorised under 'yes' (complies), 'marginal' and 'no' (does not comply). Technologies that did not align with any of the absolute criteria were not investigated further because:

- If the technology is not mature or well-established it could not be relied on to be a resilient solution for Wellington.
- Technology would not be fit for purpose if it were not fully operational by the time the Southern Landfill reaches capacity or before June 2026; whichever occurs first.
- Technology must be able to adjust for future tonnage or composition shifts as Wellington's needs change.

Table 3: Absolute Criteria for Option Assessment

Absolute criteria	Rationale
Programme	The consent for the Southern Landfill expires in June 2026 and as such future waste management options must be constructed and operational before this date. Alternatively, should the Southern Landfill reach capacity before June 2026 it would be expected that new technology could operate by this point. Yes = Likely operational within timeframe Marginal = Likely operational with an acceptable interim solution of 1-2 years No = Not likely to be operational within timeframe
Technical Maturity	Implementing a process that is already established will reduce the technical risks involved. Where a technology has had 10 or more successful uses it is likely to be well understood with suitable parts, operators and expertise. Any option that has been implemented in less than five sites globally or is still in the research phase indicates that this process is novel and so presents a higher risk for Wellington City Council. Where this is the case, the technology has been eliminated from further analysis. Yes = 10 or more successful references globally

Absolute criteria	Rationale
	Marginal = 5 or more successful references globally No = Fewer than 5 successful references globally
Scalability	Some future waste solutions can be specific to certain tonnages and compositions (e.g. amount of sludge or organics) which can make them more challenging to scale. However, to meet Wellington's needs, technology needs to be able to adapt to possible shifts in waste disposal needs. Yes = Easily scalable/no requirements in terms of tonnages or composition Marginal = With some additional infrastructure/commitment the option can be adapted No = Cannot be scaled

These three objectives align with Wellington City Council's mission to provide a future-proofed solution for Wellington's waste. It is crucial that all options that proceed for consideration are able to deliver on these absolute requirements.

3.2 General objectives

For those options that passed the absolute criteria, they would then be scored against the general objectives developed by Beca and WCC. These objectives reflect the outcomes wanted by WCC alongside the considerations required under the Local Government Act 2002 and Resource Management Act 1991. These objectives also incorporate WCC's responsibilities as caretakers of the land and communities within the Wellington region, and are underpinned by a Māori World View.

In general, the below measurable Criteria work together to accomplish three main overall Objectives:

- Minimise the effects of the waste management technology on the surrounding community and environment, including odour and air, water, land pollution as well as social impacts like noise and traffic
- Provide a proven, sensible and fiscally-responsible method for managing waste created in the Wellington region, including prioritising reliability and resilience, value for money spent on implementing and operating the plant, and likelihood of success of planning/consenting and offtake markets in a New Zealand setting
- Align with WCC's future vision for Wellington City, where sustainable and regenerative economies are encouraged and the city transitions to net zero emissions by 2050 in line with science-based emissions reduction targets.

Table 4: Assessment Criteria and Project Objectives

Criteria	Rationale/Description
Local Community Effects	• Including odours, noise, and traffic impacts that will disrupt residents, workers and visitors of the surrounding area • Part of consenting process to avoid/minimise/mitigate adverse effects
Environmental Effects (water)	• Emissions to watercourses • Part of consenting process to avoid/minimise/mitigate adverse effects
Environmental Effects (land)	• Emissions to land • Part of consenting process to avoid/minimise/mitigate adverse effects

Criteria	Rationale/Description
Environmental Effects (air)	• Emissions to air (including from transport) • Part of consenting process to avoid/minimise/mitigate adverse effects
Alignment with Circular Economy	• Whether options contribute to a circular economy model
Alignment with Te Atakura First to Zero	• Te Atakura First to Zero is WCC's blueprint for reducing emissions produced in Wellington City to zero by 2050 • As such, consideration of the greenhouse gas emissions from waste for each option
Consenting and Planning	• Likelihood of approval given existing policies • Track record for similar consents in NZ
Value for money	• Total cost over project life including capex, opex, and revenues (e.g. electricity, heat, recycled products, etc.)
Robustness/reliability	• Operational management requirements • Availability of equipment
Maturity of offtake market	• Whether there is an existing mature market for this technology in NZ, a market in development in some areas of New Zealand/mature market overseas or if it is a new/unknown market both overseas and in New Zealand.
Size	• Whether options fits within the existing site.
Resilience	• The resilience for day-to-day waste transport corridors including whether the solution is based locally or outside the Wellington region

The long list was initially scored by Beca and Fichtner before a workshop was held with WCC to test the analysis used. Scores were supported using international best practise knowledge as well as an understanding of the applicability of each technology in a New Zealand context.

With regard to the 'size' category, for the purpose of this assessment we are using the boundaries of the existing site as a way to measure if the options are an effective use of land. The final location of any chosen technology will need to be separately assessed, with the current landfill location being a candidate location.

For each category, options were given a score between 1 and 10 which represented its relative performance against other options on the shortlist for said metric. The meaning of different scores is detailed below:

Table 5: Scoring Categories

Score	Meaning
1	Much worse than other options
3	Slightly worse than other options
5	Neutral
7	Slightly better than other options
10	Much better than other options

4 Technologies on Long List

As mentioned in Section 2, there are few waste technologies available to handle WCC's contaminated soil and special waste streams. Most of the options featured below will be focused on handling WCC's domestic and commercial wastes, as well as sludge from Wellington Water's WWTP.

4.1 Energy from Waste

4.1.1 Description of Technology

Energy from waste is a method adopted to combust waste material instead of sending it to landfill and use the heat generated to produce electricity (and possibly heat). The output is ash which has a significantly reduced mass and volume compared to the input waste. Some of the ash can be used as building material.

The hot flue gases produced from the combustion of waste are passed through a boiler which superheats steam to a high pressure which drives a turbine to generate electricity.

The flue gases are then treated to remove any pollutants before they are emitted to the atmosphere.

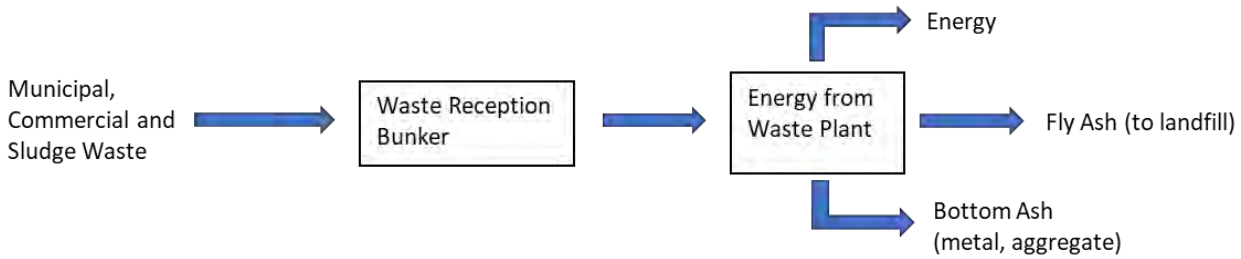


Figure 2: Energy from Waste Schematic

4.1.2 Applicability for WCC Waste Streams

Energy from Waste is able to successfully treat and process the combustible portion of WCC's domestic, commercial and WWTP sludge wastes (streams A, B and C). Other streams and large quantities of bulky wastes like rubble or large metal items are unable to be processed via EfW. Minimal upstream processing of these streams is required to prepare the waste for an EfW plant, and the resultant bottom ash can either be re-used for the production of construction materials or landfilled.

4.2 Incineration without energy recovery

4.2.1 Description of Technology

Incineration without energy recovery uses the same combustion techniques as mentioned in the energy from waste description, but without the boiler and turbine. The sole purpose of the incineration is to reduce the volume and mass of the material to form ash. The flue gases from the incineration are treated as with the energy from waste technique before being emitted to the atmosphere.

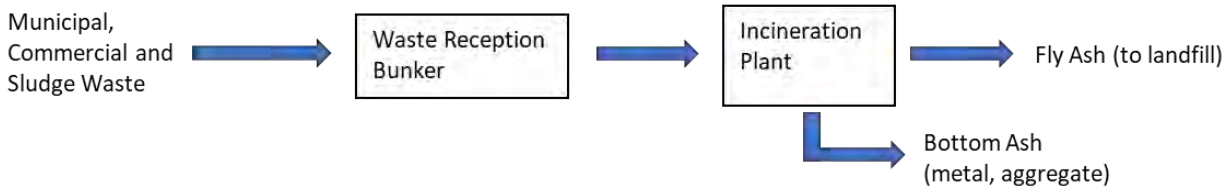


Figure 3: Incineration Schematic

4.2.2 Applicability for WCC Waste Streams

Incineration is able to successfully treat and process the combustible portion of WCC's domestic, commercial and WWTP sludge wastes (streams A, B and C). Other streams and large quantities of bulky wastes like rubble or large metal items are unable to be processed via incineration. Minimal upstream processing of these streams is required to prepare the waste for an incineration plant, and the resultant ash can either be re-used for the production of construction materials or landfilled.

4.3 Anaerobic digestion

4.3.1 Description of Technology

Anaerobic digestion is a process where bacteria break down organic matter in a sealed reactor which is starved of oxygen. The input material can be a mixture of organic matter such as garden and food waste, paper and card, sludge, and sewage. The process generates a biogas, primarily made up of methane, carbon dioxide, and hydrogen sulphide. The biogas can be burnt to produce heat and electricity via gas engines, or purified and injected into the natural gas network. This process requires a small amount of energy input but is generally supplied by the energy produced by the digestion process.
The process also leaves a solid digestate which is may be used as fertiliser depending on the quality of the input material.

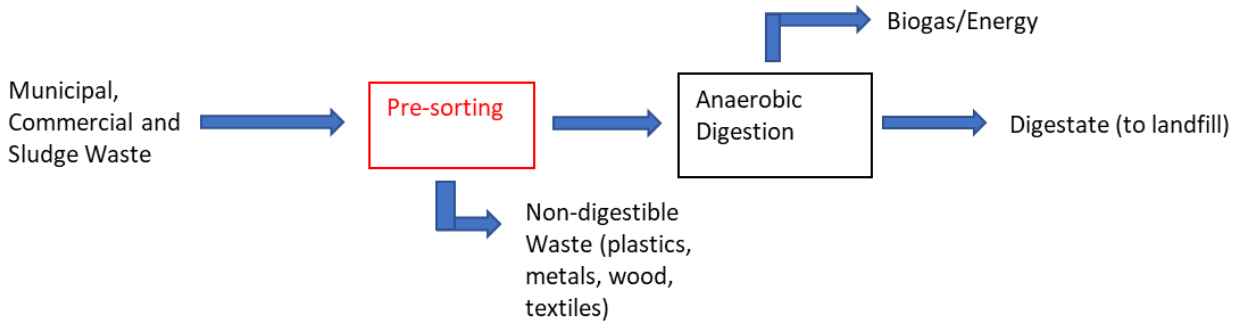


Figure 4: Anaerobic Digestion Schematic

4.3.2 Applicability for WCC Waste Streams

Anaerobic digestion is able to process a fraction of the organic material contained in WCC's domestic, commercial and WWTP sludge wastes (streams A, B and C). Paper, timber and any woody organic wastes will likely not be able to be successfully treated via AD.
To prepare these waste streams for AD, pre-sorting will be required to separate our unsuitable materials e.g. via a sorting process like an MRF. After AD, the organic material would need to be landfilled given the low quality separation of incoming waste.

4.4 Material recycling facility

4.4.1 Description of Technology

Material recycling facilities (MRFs) take in a combination of waste materials and sort them into different streams of recyclable materials. The equipment involved can be tailored to the specification of the input material and the required quantity and quality of output streams. Typically, municipal solid waste is sorted into ferrous, non-ferrous, glass, paper and card, and plastics which can be sent off the be recycled at another facility. The left-over non-recyclable material can then be sent to landfill or energy from waste. This process requires power to sort the materials.

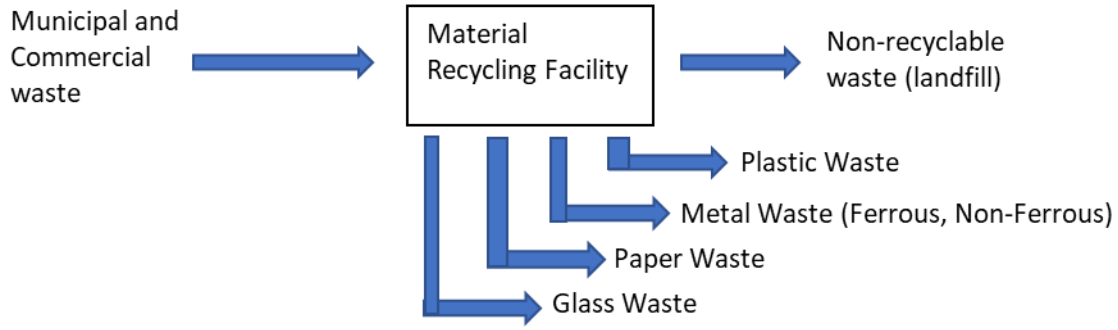


Figure 5: Material Recycling Facility Schematic

4.4.2 Applicability for WCC Waste Streams

An MRF would be able to completely process WCC's domestic and commercial waste streams (streams A and B), segregating them into separate materials streams to be processed separately. The remaining streams would not be able to be treated in an MRF. The quality of these outputs would be lower relative to material sorted from commingled recyclables streams and therefore may be challenging to market within New Zealand.

4.5 Mechanical biological treatment

4.5.1 Description of Technology

Mechanical biological treatment is similar to the material recycling facility but with an added step of biological treatment such as bio-drying, composting or anaerobic digestion. This approach is more common when the input material has a high organic content. In terms of bio-drying, the waste is put into piles with a controlled air flow which decomposes the waste, heating it in the process which reduces the moisture content and produces a more homogenous material. This process requires more power than an MRF. This material is then sorted as in the material recycling facility.

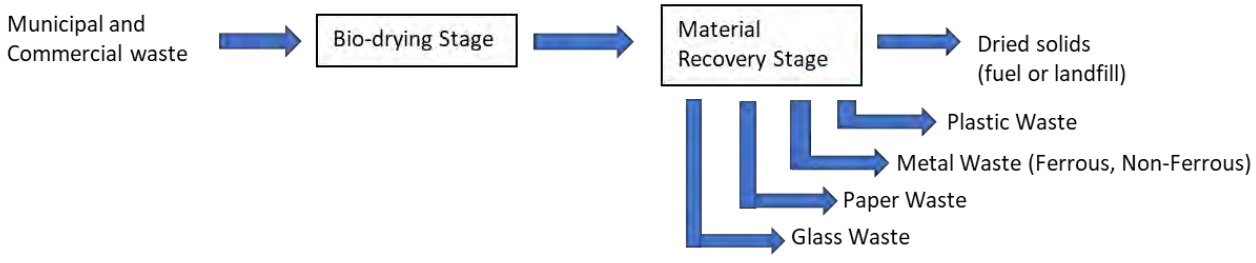


Figure 6: Mechanical Biological Treatment Schematic

4.5.2 Applicability for WCC Waste Streams

An MBT would be able to completely process WCC's domestic and commercial waste streams (streams A and B), segregating them into separate materials streams to be processed separately. The remaining waste streams would not be able to be treated in an MBT. The quality of these outputs would be lower relative to material sorted from commingled recyclables streams and therefore may be challenging to market within New Zealand.

4.6 Composting

4.6.1 Description of Technology

Composting is a method used to biodegrade organic waste materials such as garden and food waste, paper and card, and manure to produce compost. The input material is shredded and organised into piles which are regularly turned using front-end loader vehicles. The exposure to oxygen naturally biodegrades the organic waste into compost, but can result in odour issues.

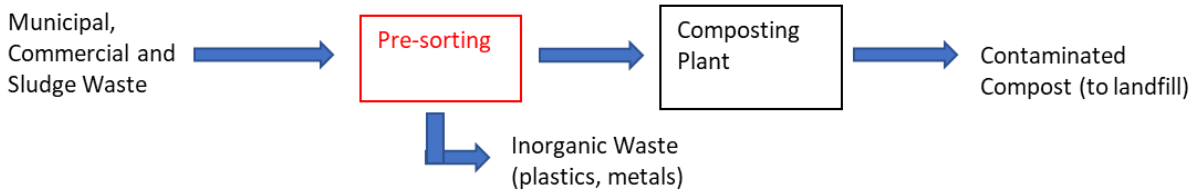


Figure 7: Composting Schematic

4.6.2 Applicability for WCC Waste Streams

Composting is able to process the organic material contained in WCC's domestic, commercial and WWTP sludge wastes (streams A, B and C). To prepare these waste streams for composting, pre-sorting will be required to separate our unsuitable materials e.g. via a sorting process like an MRF. After composting, even with pre-sorting the organic material will contain contaminants making it unsuitable for land application and would likely need to be landfilled. This is markedly different from the composting operation already run by WCC which processes source-segregated green waste material.

4.7 Autoclave

4.7.1 Description of Technology

An autoclave system uses superheated steam to treat waste. Generally, with municipal solid waste, inert materials and metals are removed from the input stream before being fed to the autoclave chamber. The material is fed via a conveyor and the output material has a volume reduced by up to 60%. Plastics are removed from the output to be recycled. The end product has no elements that will decompose to produce methane so can be sent to landfill without any emissions of methane. This process is highly energy-intensive.

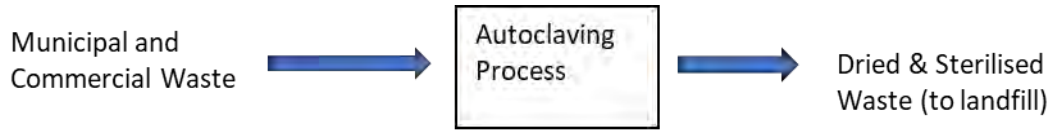


Figure 8: Autoclaving Schematic

4.7.2 Applicability for WCC Waste Streams

Autoclaving is generally applied to biological and clinical waste only, which makes up a fraction of WCC's municipal and commercial waste streams. The autoclaved waste will need to be sent to landfill or another of the listed technologies after autoclaving.

4.8 Waste Export

4.8.1 Description of Technology

An option also considered as part of this assessment was the collection and export of WCC's waste out of the Wellington are to other regional landfills. In our assessment this was treated similarly to landfilling, but with lower upfront investment for consenting/capital expenditure and lower impact on surrounding communities, but higher ongoing operational costs to account for increased transportation and the loss of WCC's gate fees.

4.8.2 Applicability for WCC Waste Streams

Exporting waste is valid for all waste streams considered a part of this assessment, although different wastes may need to be transported to different final locations.

4.9 Gasification

4.9.1 Description of Technology

Gasification is a process that converts carbon-based materials into fuel gas or synthesis gas (syngas). The feed material is put into a gasifier where it is combined with air and steam causing a series of chemical reactions, creating syngas and ash/slag.
The syngas can then be turned into hydrogen or methane, or burnt in a syngas turbine to create heat and power. The process requires energy to run, but a fraction of the energy produced can generally supply this.

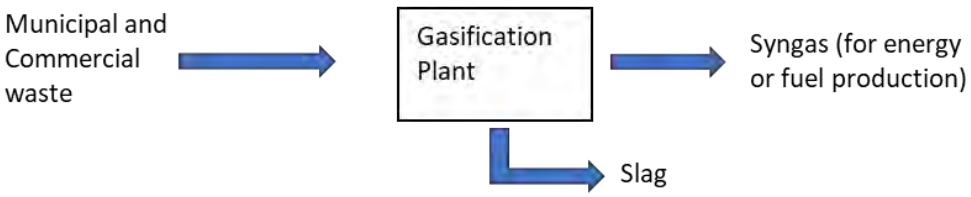


Figure 9: Gasification Schematic

4.9.2 Applicability for WCC Waste Streams

Gasification may be able to treat and process the combustible portion of WCC's domestic and commercial wastes (streams A and B). Other streams and large quantities of bulky wastes like rubble or large metal items are unable to be processed. This technology is not well developed for handling municipal waste streams.

4.10 Pyrolysis

4.10.1 Description of Technology

Pyrolysis is a process in which combustible materials are heated in the absence of oxygen which causes them to break down and produce combustible gases/oil and charcoal. This oil can then be burned or refined to create fuel products. The process requires energy to run, but a fraction of the energy produced can generally supply this process.

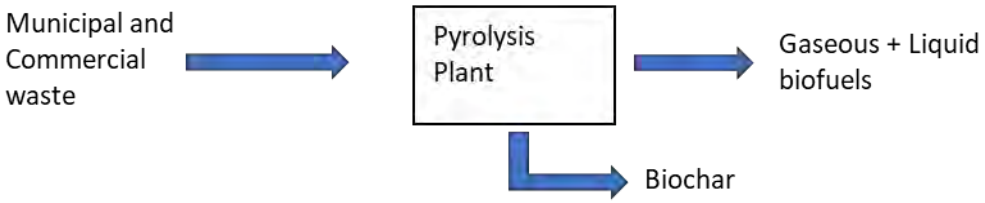


Figure 10: Pyrolysis Schematic

4.10.2 Applicability for WCC Waste Streams

Pyrolysis may be able to treat and process the combustible portion of WCC's domestic and commercial wastes (streams A and B). Other streams and large quantities of bulky wastes like rubble or large metal items are unable to be processed. This technology is not well developed for handling municipal waste streams.

4.11 Vermiculture

4.11.1 Description of Technology

Vermiculture is process where organic waste is broken down into a compost-like material via the use of worm farming. The worms biodegrade the organic material present in food waste, wastewater treatment sludges, woody biomass etc. to turn the waste into a soil improver and a liquid compost material.

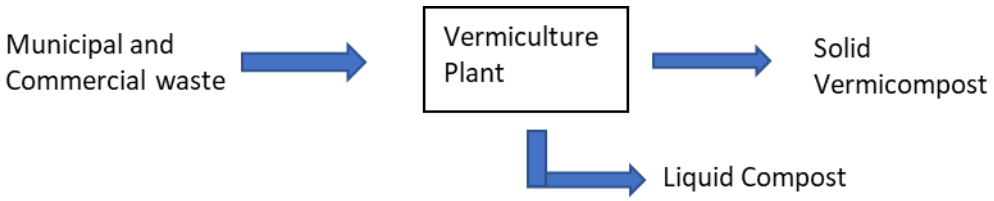


Figure 11: Vermiculture Plant Schematic

4.11.2 Applicability for WCC Waste Streams

Vermiculture represents a possible treatment pathway for the organic materials in WCC's domestic, commercial and sludge waste streams. Pre-treatment would be required to separate out unsuitable materials. Vermiculture has not been widely applied to non-segregated organic waste streams and it is likely that it would not be suitable for mixed wastes.

4.12 Insect Food Cycle

4.12.1 Description of Technology

Insect food cycle is a developing technology for organic waste management where the waste material is supplied to insect farms. The insects that consume the organic waste and breed in these farms are harvested to create protein products for consumption.

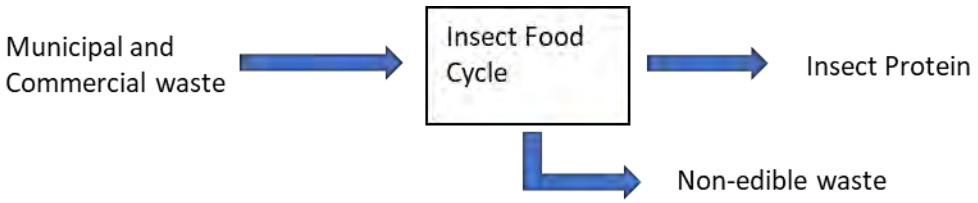


Figure 12: Insect Food Cycle Schematic

4.12.2 Applicability for WCC Waste Streams

Insect food cycle represents a possible treatment pathway for some of the organic materials in WCC's domestic, commercial and sludge waste streams. Non-consumable organic wastes would need to be diverted, and pre-treatment would be required to separate out unsuitable materials. IFC has not been widely applied to non-segregated organic waste streams and it is likely that it would not be suitable for sorted mixed wastes.

5 Core Criteria Assessment Process

Prior to assessing each Option against all of the long list scoring criteria, an initial assessment was done against the three core criteria for WCC. Please see below for the results of this assessment:

Table 6: Core Criteria Assessment

	Core Criteria		
	A	**B**	**C**
Option	*Programme: Will be fully operational by the time the Southern Landfill reaches capacity or before June 2026; whichever occurs first?*	*Technical Maturity – has the technology been successfully applied overseas in similar cases?*	*Can be easily scaled up or down to meet Wellington City's future waste disposal needs*
Energy from waste	Marginal (financial close in June 2022 would give you operation by 2026)	Yes	Marginal
Incineration w/o energy recovery	Marginal (financial close in June 2022 would give you operation by 2026)	Yes	Marginal
Anaerobic digestion	Yes	Yes	Marginal
Material Recycling Facility	Yes	Yes	Yes
Mechanical Biological Treatment	Yes	Yes	Yes
Composting	Yes	Yes	Yes
Autoclave	Yes	Yes	Marginal
Export (No collection)	Yes	Yes	Yes
Export (Transfer Station)	Yes	Yes	Yes
Gasification	Marginal (financial close in June 2022 would give you operation by 2026)	No	Marginal
Pyrolysis	Marginal (financial close in June 2022 would give you operation by 2026)	No	Marginal
Vermiculture	Yes	No	Marginal
Insect food cycle	Yes	No	Marginal
Landfill	Yes	Yes	Yes

Based on the above assessment Gasification, Pyrolysis, Vermiculture and Insect Food Cycle were removed from the long list of options prior to scoring on account of the lack of successful examples of these technologies internationally on waste similar to that managed by WCC.

6 Long List Scoring

Based on our assessments of each technology, the ranking of each identified option is shown In Appendix A.

The final scores were not intended to assign final rankings to the long list options; the scores were only used to select the four options that would be evaluated in detail.

Table 7: Long Lost Scoring Summary

Option	Strengths	Weaknesses	Score (out of 120)
Energy from waste	• Recovery of energy/ash product • Slightly reduced GHG emissions (compared with landfill) • Reduced emissions to land/water • Well-proven technology	• High capital cost • Some air/particulate emissions • Difficult to consent	78
Incineration w/o energy recovery	• Slightly reduced GHG emissions (compared with landfill) • Reduced emissions to land/water • Well-proven technology	• Some air/particulate emissions • Difficult to consent • Non-circular waste solution	70
Anaerobic Digestion (AD)	• More circular waste solution • Reduction in waste emissions	• High capital cost • Not suitable for waste without treatment, less reliable • AD solids will still need to be landfilled due to contaminants	76
Material Recycling Facility (MRF)	• More circular waste management solution • Creation of potentially saleable material streams	• Lack of NZ market maturity for recycled material	82
Mechanical Biological Treatment (MBT)	• More circular waste management solution • Creation of potentially saleable material streams	• Lack of NZ market maturity for recycled material •	82
Composting	• More circular waste solution • Reduction in waste emissions	• Compost will still need to be landfilled due to contaminants • More expensive to operate for contaminated materials	72
Autoclave	• Decreased land and water pollution • Decreased waste volumes	• Increased energy consumption without GHG emissions benefits • Not a standalone technology • Technically challenging and expensive	58

Option	Strengths	Weaknesses	Score (out of 120)
Export (No collection)	• No effects on local community • No consenting required • Mature market in NZ for this service	• Not resilient • Higher operational cost • Non-circular waste solution • Increased GHG emissions	64
Export (Transfer Station)	• Few odour/traffic effects on local community • No consenting required • Mature market in NZ for this service	• Not resilient • Higher operational cost • Non-circular waste solution • Increased GHG emissions	61
Landfill	• High value for money • Mature market in NZ for this service • Resilient	• Non-circular waste solution • Will create GHG emissions • Water/land emissions	79

7 Sensitivity Analysis

Initially, all objectives were weighted equally with options scored out of 10 for each (giving a maximum of 120 points). This allowed for comparison between initiatives across all objectives. To account for relative importance of objectives as identified by WCC, five different weighting scenarios were applied to understand the sensitivity of the findings and gain a better understanding of what the preferred options were. These scenarios were:

- Raw score (all objectives equal)
- Weighted for value for money
- Weighted for carbon emissions
- Weighted for consentability
- Weighted for offtake markets.

The results of this comparison are given below:

Table 8: Shortlist Weighting Comparison

Option	Landfill	Energy from waste (EfW)	Anaerobic Digestion (AD)	Material Recycling Facility (MRF)	Mechanical Biological Treatment (MBT)
Raw Score (%)	66 - Shortlisted	68 - Shortlisted	63 – Not Shortlisted	68 - Shortlisted	68 - Shortlisted
Weighted for value for money (%)	71 - Shortlisted	63 - Shortlisted	61 – Not Shortlisted	69 - Shortlisted	69 - Shortlisted
Weighted for carbon emissions (%)	61 – Not Shortlisted	66 - Shortlisted	62 - Shortlisted	69 - Shortlisted	69 - Shortlisted

Option	Landfill	Energy from waste (EfW)	Anaerobic Digestion (AD)	Material Recycling Facility (MRF)	Mechanical Biological Treatment (MBT)
Weighted for Consentability (%)	66 - Shortlisted	60 – Not Shortlisted	64 - Shortlisted	69 - Shortlisted	69 - Shortlisted
Weighted for Offtake Markets (%)	71 - Shortlisted	66 - Shortlisted	61 – Not Shortlisted	66 - Shortlisted	66 - Shortlisted

In effect, a focus on consentability moves Energy from Waste down the list of best options, and a focus on carbon emissions pushes landfill (the incumbent technology) off the top four options. MRF and MBT retain their shortlisted positions in all weighting scenarios.

Anaerobic Digestion is a close fifth option in these scenarios, only becoming a top four, removing Landfilling when carbon emissions are weighed more heavily, and from Energy from Waste when the focus is put on consentability. This technology is worthy of consideration, but is not well suited to the kinds of mixed wastes WCC receives so loses marks compared to other shortlisted technologies designed to handle highly mixed wastes. Combined with technology like MRF or MBT, AD or composting could present an option to handle the residual organic components of WCC's waste.

8 Final Short List

After the completion of the scoring and review of the leading technologies under both the non-weighted and weighted scenarios, four technologies emerged as frontrunners for further consideration. These were:

1. Energy from Waste (EfW)
2. Materials Recycling Facility (MRF)
3. Mechanical Biological Treatment (MBT)
4. Landfilling

These four technologies represent the options that, when the four Absolute Criteria and Project Objectives are considered, fulfil the requirements of WCC's future strategy best. Below we have presented a more detailed summary of the four chosen technologies that were scored the highest in the Long List Scoring process.

Common features of the four technologies selected is that they all demonstrate:

- Strong international track record for handling solid waste
- Minimal effects on surrounding communities in terms of odour and particulate emissions
- With the exception of landfilling, all technologies reinforce a circular approach to waste management where material is diverted from landfill and generates value.

Under direction from Wellington City Council through Councillor feedback, Waste Exporting has also been included as an option for consideration. We have included a summary of this option in the section below following the four shortlisted options.

9 Detailed Descriptions of Shortlisted Technologies

9.1 Energy from Waste

9.1.1 Summary of Technology

In this report we use the term “Energy from Waste” (EfW) with reference to the combustion of waste, as opposed to pyrolysis, gasification, or biological processes such as anaerobic digestion.

There are three types of waste combustion technology in wide-scale operation:

- grate fired systems;
- rotary kilns; and
- fluidised bed combustors.

Figure 13 shows a diagram of a grate fired system which is the most developed for the combustion of municipal solid waste (MSW) and commercial and industrial (C&I) waste. However, the overall process is very similar for all three combustion technologies.

The waste is deposited into a bunker where it is mixed by a crane. The crane then drops the waste onto a feeding chute which feeds the grate located in the lower part of the furnace, where the waste is combusted. The furnace is designed to ensure that the flue gas are raised to a minimum of 850 °C, with a minimum of 2 seconds flue gas residence time at this temperature to ensure the destruction of dioxins, furans, polycyclic aromatic hydrocarbons (PAHs) and other organics. The hot flue gas is then passed through the boiler, raising the steam which drives the turbine to produce electricity.

The flue gas is then passed through a flue gas treatment (FGT) system which removes pollutants from the gas before it is released to the atmosphere. Ash streams area collected from the furnace, boiler and the FGT and stored before being removed from site.

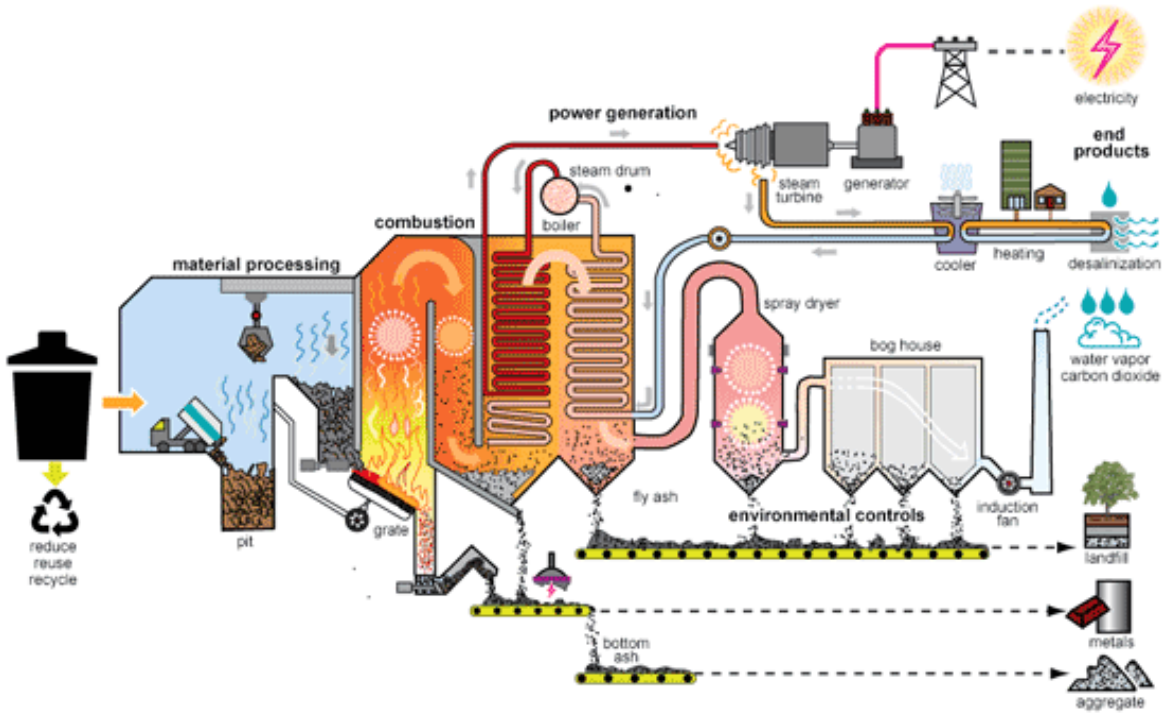


Figure 13: Energy from Waste Process Illustration (Source: Deltaway Energy, 2020)

9.1.2 Technology Maturity

Waste combustion systems, and in particular grate fired systems, have been used worldwide for decades and there are several hundred such plants operating worldwide.

9.1.3 Summary of waste processed and residual streams

The combustion units are designed to handle a wide range of calorific values which is important with the inhomogeneous nature of the waste. Grate based systems and rotary kilns are capable of processing municipal solid waste (MSW), commercial and industrial (C&I) waste, and fuel derived from MSW and C&I waste (called refuse derived fuel) with very little or no pre-treatment required. Grate based systems are also capable of co-firing sludge and clinical waste, although the unit would have to be designed specifically to handle such material. Fluidised bed combustors are more sensitive to particle size and metal content so would require the material to be mechanically pre-treated to remove such material before they enter the furnace.

Ash is extracted from the furnace, boiler and from the FGT. Ash from the furnace and the boiler, called “bottom ash” is generally non-hazardous and can be used in building materials such as aggregate and filling materials. Ash from the FGT system, called “air pollution control residue” (APCR), is hazardous and is generally sent to landfill.

There are also wastewater streams from various processes, such as boiler blowdown and drains. These are collected and treated on site by an effluent treatment plant before being discharged to sewer.

9.1.4 Flow Diagram and Mass Balance

Below is a flow diagram for the waste streams needing treatment, and what portion of this waste can be treated by the EfW.

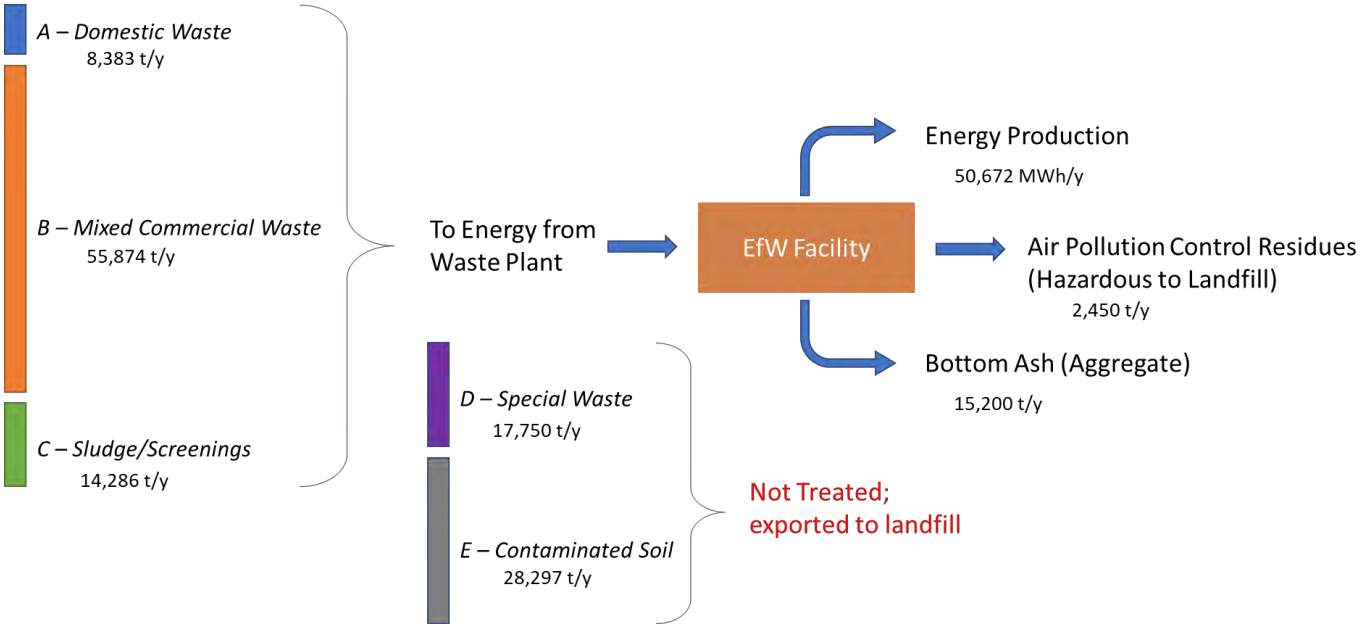


Figure 14: EfW Material Flow Balance

The Energy from Waste plant is able to treat the combustible wastes from streams A, B and C, but cannot treat streams D and E. The Energy from waste plant reduces the volume of treated waste significantly, but there will still be residues from the plant that will need to be disposed of to landfill.

9.1.5 Emissions

In the European Union the directive applicable to the regulation, process controls, emissions and management of the environmental impact of EfW plants is the Industrial Emissions Directive (IED). Chapter IV of the IED applies to activities that involve the incineration and co-incineration of waste. Furthermore, the European Union has also published a revised Best Available Techniques Reference Document for Waste Incineration (BREF), which will determine a further reduction in emission limits for new plants in the near future. The table in Appendix B shows the pollutant limits in the flue gas under the current IED and the BREF document. There is a daily average limit and a half-hourly average limit for these substances which requires continuous monitoring of the flue gas.

In addition to the pollutants that are to be measured continuously, periodic monitoring is required for heavy metals, dioxins, and furans. The second table in Appendix B sets out the limits for the heavy metals in the flue gas.

There is also a limit on the dioxins and furans in the gas that is emitted to the atmosphere of 0.1 mg/Nm^3.

Whilst emission limits are low, there are many plants operating within these limits. This will require standard equipment such as lime and activated carbon injection, ammonia injection, and a bag filter.

9.1.6 Alignment with Circular Economy

The Energy from Waste process is not a fully circular waste management technology. Compared with other technologies like improved material recycling or regeneration systems, Waste to Energy does not allow processed materials to be converted back into their pre-disposal form. However, it does allow the production of energy in the form of heat or power, and the ash product generated by a Waste to Energy plant can be used in industries like construction. In this way, Waste to Energy is still much more circular than traditional linear waste management strategies; it minimises the amount of waste that will end its life in landfills and enables the generation of valuable by-products from wastes.

9.1.7 Alignment with Te Atakura First to Zero

Combustion of biogenic wastes greatly reduces the global warming potential of these wastes, especially compared to disposing of these materials in landfills. This is primarily achieved by preventing the organic materials from decomposing into biogenic methane in landfills, which is a much more potent greenhouse gas than carbon dioxide.

In the case on non-biogenic wastes i.e. plastics, combustion of these materials in Energy from waste plants greatly increases the global warming potential of these wastes. Normally, these wastes do not decompose naturally in landfills and have little greenhouse gas emissions associated with them, but when combusted they produce large quantities of non-biogenic CO_2.
Based on Wellington Waste's indicative waste profile, even with the increased emissions from the combustion of plastic wastes the overall reduction in carbon emissions from preventing organic wastes generating biogenic methane is still a net benefit, but only a slight one and does therefore present a challenge long term when considering a goal of zero carbon emissions.

9.1.8 Capex and Opex

a. Capital Costs

Based on examples of Energy from Waste facilities installed in Europe incl. the UK and the anticipated waste volumes for the Wellington region going forward, an Energy from Waste facility would cost around $214M NZD to design, consent and construct in a New Zealand context.

Table 9: Energy From Waste Facilities - Capital Cost Summary

Energy from Waste Facilities – Capital Cost Summary	$ (NZD)
Process/Mechanical works incl. Indirects	$153.4M
Civil Works incl. Indirects	$60.4M
Total	**$213.8M**

A full breakdown of this estimate can be found in Appendix C.

b. Operational Costs

Energy from Waste facilities require staff to operate and maintain equipment (around 22 FTEs for a plant of this size), and there is a cost associated with disposing of the generated fly ash and bottom ash. The facility does generate revenue from the electrical power it generates, which helps offset other operational costs.

The waste streams that the EfW lant cannot treat (contaminated soil and special waste) will need to be disposed of at a separate landfilling facility. A cost for this disposal is included below.

Table 10: Energy from Waste Facilities - Operational Cost Summary

Energy from Waste Facilities – Operational Cost Summary	$ (NZD)
Power Consumption	$0M
Power Generation	($4.8M)
Annualised Maintenance Costs	$5.7M
Staffing Costs	$1.7M
Residue Disposal Costs	$1.5M
Total	**$5M**
Offsite Disposal Costs for Non-treatable Waste	$9.7M
Total	**$14.7M**

To reduce these offsite residual waste disposal costs, EfW plants are often situated near a landfill which can accept the plant residues and non-treatable waste streams. This model could decrease the overall operational costs considerably.

c. Cost Sensitivity

i. Power Prices

A large portion of the operational costs of an EfW plant are offset by the sale of generated electricity. In recent years, spot prices on the wholesale electricity market have varied by large amounts, and there are many predictions for long-term stabilised power prices as the grid becomes more renewable. To this end we have analysed the impacts of power sale prices increasing or decreasing by 25%.
A change in power price of 25% represents a $1.2M variation in annual operational revenue for this facility, which is equivalent to a 25% change in overall operational costs before accounting for disposal of non-treatable wastes.

ii. Bottom Ash Disposal Costs

In our operational cost estimate, we assumed that bottom ash produced by the plant could be used in aggregate applications like construction or roading and therefore would only cost $50/t to dispose of allowing for transportation to users etc. If this material would have to be landfilled instead, the operational cost for the facility would increase by $2.4M. If the bottom ash could be sold at a higher price making the bottom ash cost-neutral to sell to customers, the operational costs would decrease by $760K.

9.2 MRF

9.2.1 Summary of Technology

A materials recovery facility (MRF) is a facility which sorts MSW and/or C&I waste into different streams of recyclable materials.

The waste is deposited into a hall where it is fed through a series of separating equipment via conveyors. The equipment normally used includes:

- trommel screens to remove paper and card materials;
- overband magnets to remove ferrous materials;
- eddy-current separators to remove non-ferrous materials;
- air classifiers to remove glass materials;
- NIR sorter to remove plastic materials; and/or
- manual picking stations.

The recyclable materials are stored on site in skips before being collected and taken to their respective recycling facilities. The remaining non-recyclable materials are then removed from site for further processing or disposal, such as EfW or landfill.

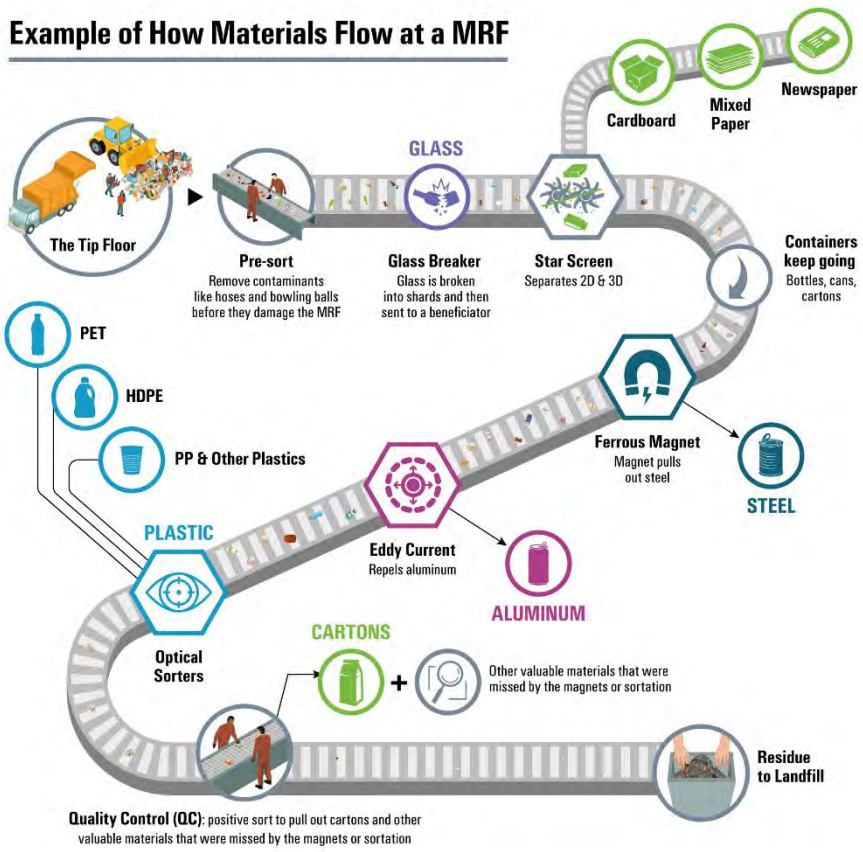


Figure 15: MRF Process Diagram (source: ASTRX)

9.2.2 Technology Maturity

MRF technology has been used worldwide for decades and there are several hundred such plants operating worldwide. Visy Recycling NZ in partnership with Auckland Council operate an advanced MRF facility in Onehunga. This Auckland facility processes pre-sorted recyclable waste streams in contrast to this proposed solution, which would process unsorted residual waste.

9.2.3 Summary of waste processed and residual streams

MRFs are capable of processing a wide range of input materials such as municipal solid waste (MSW) and commercial and industrial (C&I) waste. The configuration and equipment, however, shall be selected based on the expected input material composition and target recyclables to be recovered.

The quality of the output materials can vary. If low contamination is required in the output then multiple passes of the equipment may be necessary.

The non-recyclable material is the only waste stream from the facilities.

9.2.4 Flow Diagram and Mass Balance

Below is a flow diagram for the waste streams needing treatment, and what portion of this waste can be treated by the MRF.

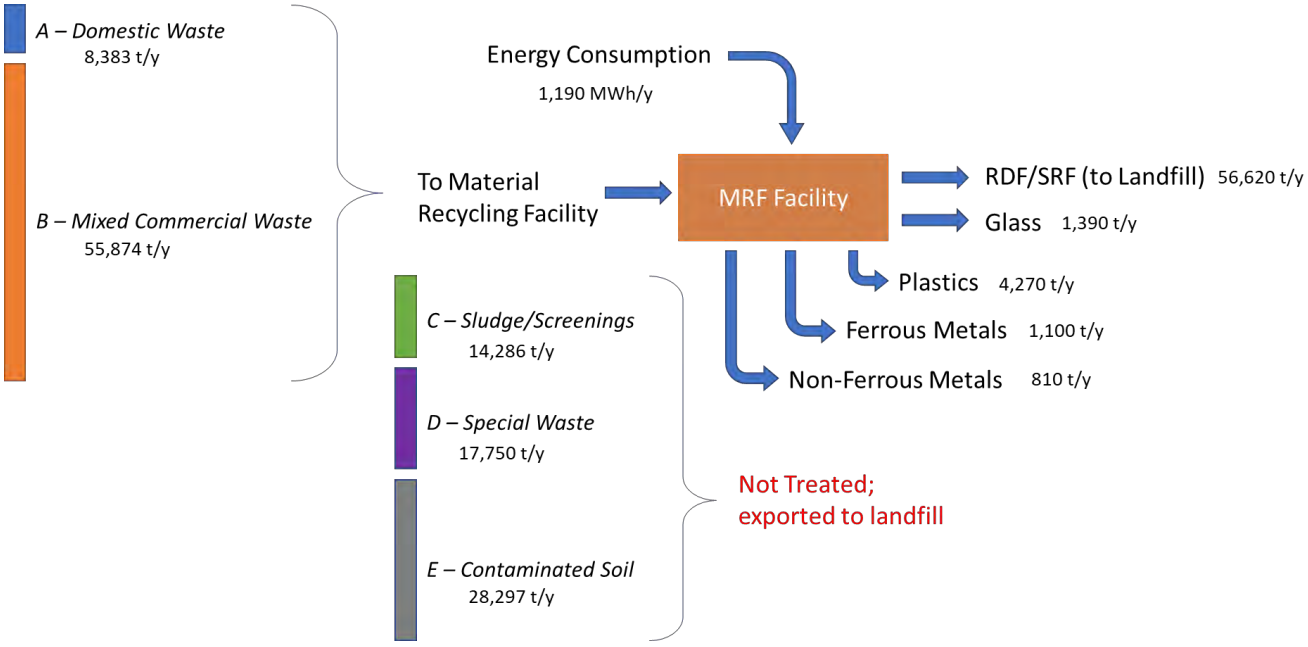


Figure 16: MRF Material Flow Balance

The MRF is able to treat wastes from streams A and B, but cannot treat streams C, D and E. The MRF reduces the volume of treated waste by removing recyclable materials from these streams, but the majority of the waste will still be sent to landfill after recyclables are removed.

9.2.5 Emissions

Dust is extracted from the facility using extraction hoods on some equipment and the conveyors. This air is sent through a bag filter to remove the dust before being discharged to the atmosphere.

Odour control systems may also be required.

9.2.6 Alignment with Circular Economy

Material Recycling Facilities are well aligned with the implementation of circular economies. These produce sorted waste streams that can be separately collected, processed and in the case of plastics, metals, glass, paper and organic wastes. These allow the diversion of material from landfill and regeneration of waste products into new high-quality materials.

Generation of segregated materials streams from current waste streams is a key enabler for the adaptation of circular material economies in New Zealand. The challenge with processing residual waste in this manner will be the quality of the output materials.

9.2.7 Alignment with Te Atakura First to Zero

By sorting and separating out recyclable wastes from general municipal wastes, this allows the total waste volume to be reduced before entering landfill or other end-of-life disposal options. Particularly, the diversion of wood wastes and paper wastes from landfill can greatly reduce the total amount of greenhouse gases generated in the sealed landfills.
Diversion of wood and paper products in domestic and mixed commercial wastes from landfill could decrease the total emissions from these waste sources by up to 50%.
In addition, creating of high quality recyclable waste streams allows the materials to be recycled with greater ease, reducing requirements for virgin plastic or paper materials in consumer goods manufacturing. These processes can often be carbon-intensive, especially in the case of plastic manufacturing from fossil fuel sources.

9.2.8 Capex and Opex

a. Capital Costs

Based on examples of Materials Recycling Facility plants installed in Europe incl. the UK and the anticipated waste volumes for the Wellington region going forward, a Materials Recycling Facility plant would cost around $43M NZD to design, consent and construct in a New Zealand context.

Table 11: Materials Recycling Facility - Capital Cost Summary

Materials Recycling Facility – Capital Cost Summary	$ (NZD)
Process/Mechanical works incl. Indirects	$20.4M
Civil Works including Indirects	$22.7M
Total	**$43.1M**

A full breakdown of this estimate can be found in Appendix C.

b. Operational Costs

Materials Recycling Facilities require staff to operate the plant including a picking station and maintain equipment (around 35 FTEs for a plant of this size), and there is a cost associated with disposing of the residual non-recyclable wastes (around 88% of incoming waste volumes).

The waste streams that the MRF plant cannot treat (contaminated soil and special waste) will need to be disposed of at a separate landfilling facility. A cost for this disposal is included below.

Table 12: Materials Recycling Facilities - Operational Cost Summary

Materials Recycling Facilities – Operational Cost Summary	$ (NZD)
Power Consumption	$0.15M
Annualised Maintenance Costs	$1.1M
Staffing Costs	$2.3M
Residue Disposal Costs	$14M

Materials Recycling Facilities – Operational Cost Summary	$ (NZD)
Total	**$17.6M**
Offsite Disposal Costs for Non-treatable Waste	$12.7M
Total	**$30.3M**

To reduce these offsite residual waste disposal costs, MRF plants are often situated near a landfill which can accept the plant residues and non-treatable waste streams. This model could decrease the overall operational costs.

c. Cost Sensitivity

The major portion of the operational costs for the MRF option is in the disposal of RDF/SRF material left over from the processing operation. We have assumed in our calculations that this material would need to be landfilled, but if a buyer for this fuel could be found and the material could be supplied to users (like a cement kiln) at a reduced cost of $120/t as seen in overseas case studies, the annual operational cost for the plant would decrease by $5.6M.

9.3 MBT

9.3.1 Summary of Technology

Mechanical biological treatment (MBT) is designed to remove recyclable materials from input waste material and carry out biological treatment of the waste prior to final disposal of the residual waste stream elsewhere.

The process combines mechanical sorting as detailed in section 7.1 with a biological treatment such as:

- bio-drying/bio-stabilisation;
- composting; or
- anaerobic digestion.

In this section of the report we consider MBT with bio-drying, as composting and anaerobic digestion have been assessed separately. The purpose of bio drying is to reduce the dry mass and bio-degradability of the residual waste stream and create a more homogenous material prior to final disposal, such as EfW or landfill.

The specifics of the process vary between plants but in general, waste is deposited on site and shredded. The shredded material is placed in piles on a floor through which air is drawn in at a controlled rate. This decomposes the waste producing heat which dries the waste.

The dry waste is then refined further through mechanical sorting to produce a number of output streams usually consisting of:

- Refuse-derived fuel (RDF), or Solid recovered fuel (SRF) – the term given to the dried organic waste material recovered from the plant;
- ferrous metals;
- non-ferrous metals;
- glass; and
- other inert materials.

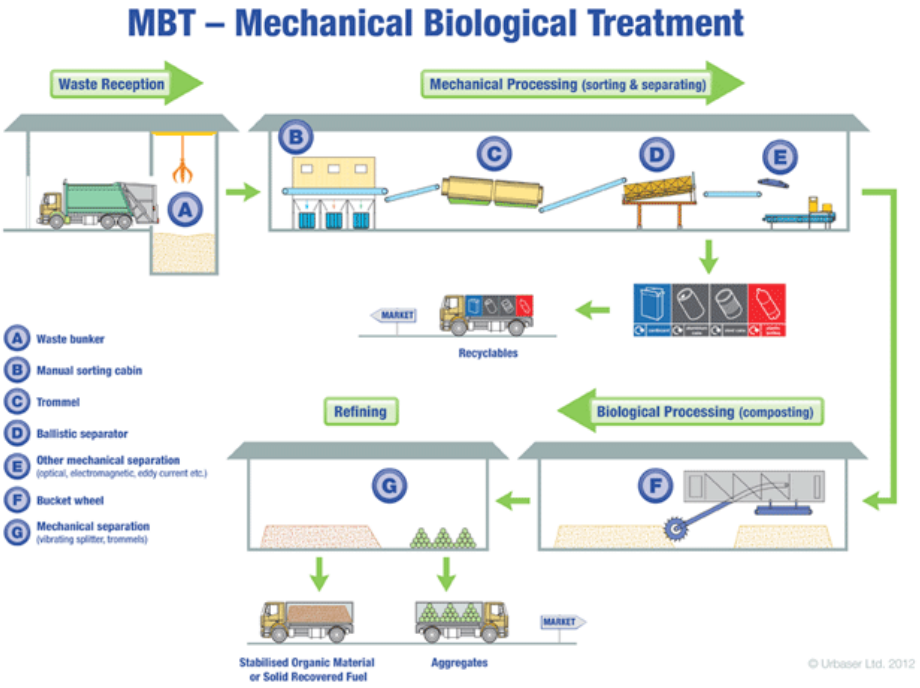


Figure 17: MBT Process Diagram (source: Urbaser Ltd. 2012)

The use of an MBT is generally seen as an effective approach when there is a high proportion of organic material within the input waste stream.

9.3.2 Technology Maturity

MBT technology has been used worldwide for decades and there are several hundred such plants operating worldwide.

9.3.3 Summary of waste processed and residual streams

MBT plants are capable of processing a wide range of input materials such as municipal solid waste (MSW) and commercial and industrial (C&I) waste. The configuration and equipment, however, shall be selected based on the expected input material composition and target recyclables to be recovered.

The quality of the output materials can vary. If low contamination is required in the output then multiple passes of the equipment may be necessary.

The non-recyclable material is the only solid waste stream from the facilities.

Leachate is formed from the piles of waste in the bio-drying phase and the bio-filters. This is fed into leachate tank before being removed from site.

9.3.4 Flow Diagram and Mass Balance

Below is a flow diagram for the waste streams needing treatment, and what portion of this waste can be treated by the MBT.

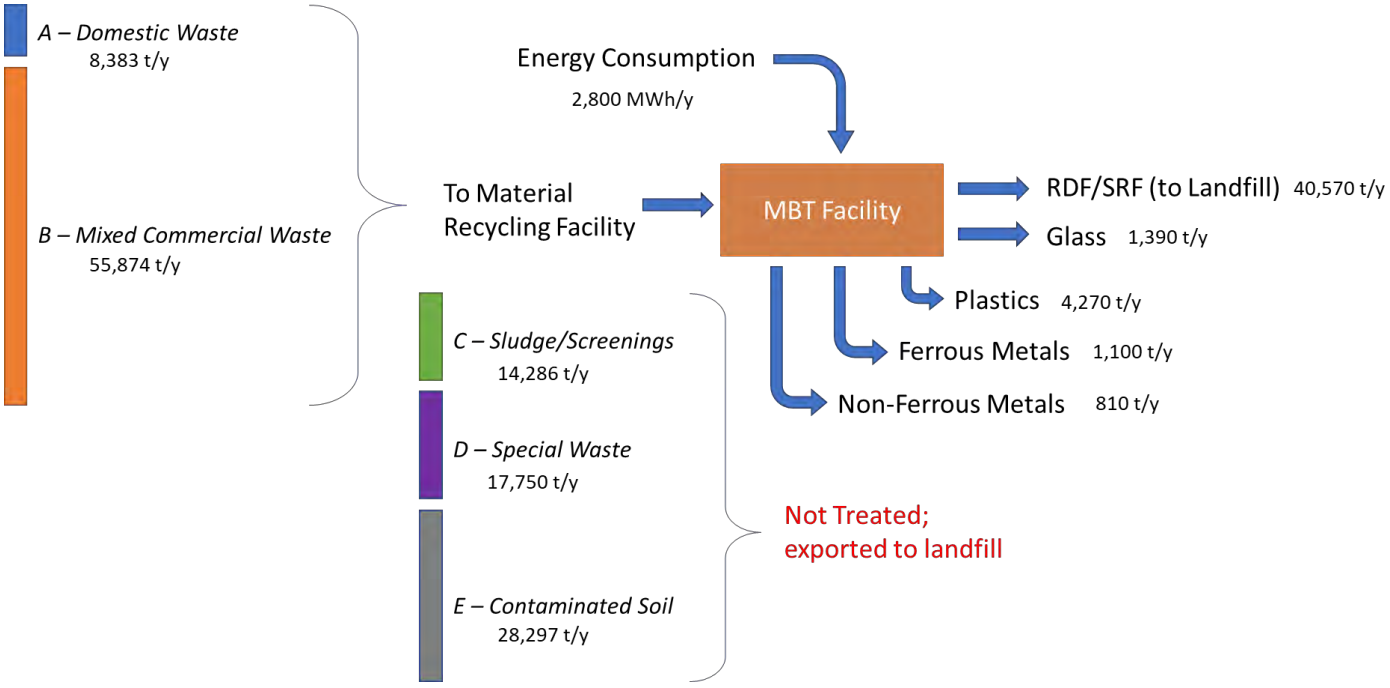


Figure 18: MBT Material Flow Balance

The MBT is able to treat wastes from streams A and B, but cannot treat streams C, D and E. The MBT reduces the volume of treated waste by removing recyclable materials from these streams and drying the residual materials, but the majority of the waste will still be sent to landfill after recyclables are removed and drying is complete.

9.3.5 Emissions

Air is removed from the bio-drying area using a fan. The air is cleaned in a bio-filter to remove organic compounds and odour before being emitted to the atmosphere.

Dust is extracted from the mechanical sorting area using extraction hoods on some equipment and the conveyors. This air is sent through a bag filter to remove the dust before being discharged to the atmosphere.

9.3.6 Alignment with Circular Economy

Mechanical Biological Treatment Facilities are well aligned with the implementation of circular economies. These produce sorted waste streams that can be separately collected, processed and in the case of plastics, metals, glass, paper and organic wastes. These allow the diversion of material from landfill and regeneration of waste products into new materials.

Generation of segregated materials streams of high quality from current waste streams is a key enabler for the adaptation of circular material economies in New Zealand. The challenge with processing residual waste in this manner will be the quality of the output materials.

9.3.7 Alignment with Te Atakura First to Zero

By sorting and separating out recyclable wastes from general municipal wastes, this allows the total waste volume to be reduced before entering landfill or other end-of-life disposal options. Particularly, the diversion of wood wastes and paper wastes from landfill can greatly reduce the total amount of greenhouse gases generated in the sealed landfills.
Diversion of wood and paper products in domestic and mixed commercial wastes from landfill could

decrease the total emissions from these waste sources by up to 50%.
In addition, creating of recyclable waste streams allows the materials to be recycled with greater ease, reducing requirements for virgin plastic or paper materials in consumer goods manufacturing. These processes can often be carbon-intensive, especially in the case of plastic manufacturing from fossil fuel sources.

9.3.8 Capex and Opex

a. Capital Costs

Based on examples of Mechanical Biological Treatment facilities installed in Europe incl. the UK and the anticipated waste volumes for the Wellington region going forward, a Mechanical Biological Treatment facility would cost around $77M NZD to design, consent and construct in a New Zealand context.

Table 13: Mechanical Biological Treatment Facilities - Capital Cost Summary

Mechanical Biological Treatment Facilities – Capital Cost Summary	$ (NZD)
Process/Mechanical works incl. Indirects	$43.2M
Civil Works including Indirects	$34.2M
Total	**$77.4M**

A full breakdown of this estimate can be found in Appendix C.

b. Operational Costs

Mechanical Biological Treatment Facilities require staff to operate the plant and maintain equipment (around 21 FTEs for a plant of this size), and there is a cost associated with disposing of the residual non-recyclable wastes (around 63% of incoming waste volumes).

The waste streams that the MBT plant cannot treat (contaminated soil and special waste) will need to be disposed of at a separate landfilling facility. A cost for this disposal is included below.

Table 14: Mechanical Biological Treatment Facilities - Operational Cost Summary

Mechanical Biological Treatment Facilities – Operational Cost Summary	$ (NZD)
Power Consumption	$0.35M
Annualised Maintenance Costs	$2.3M
Staffing Costs	$1.6M
Residue Disposal Costs	$10.3M
Total	**$14.6M**
Offsite Disposal Costs for Non-treatable Waste	$12.7M
Total	**$27.3M**

To reduce these offsite residual waste disposal costs, MBT plants are often situated near a landfill which can accept the plant residues and non-treatable waste streams. This model could decrease the overall operational costs.

c. Cost Sensitivity

The major portion of the operational costs for the MBT option is in the disposal of RDF/SRF material left over from the processing operation. We have assumed in our calculations that this material would need to be landfilled, but if a buyer for this fuel could be found and the material could be supplied to users at a reduced cost of $120/t as seen in overseas case studies (like a cement kiln), the annual operational cost for the plant would decrease by $4M.

9.4 Landfill

9.4.1 Summary of Technology

Landfill is the most common method for disposal of waste internationally. Residual waste, after any waste diversion activities, is buried in a suitable parcel of land, sealed with earth cover and left to degrade over time.

Landfills generally house transfer stations to assist with safe disposal of domestic waste from a variety of sources as well as coordinate other waste diversion activities nearby. This option can handle a variety of filling rates to mirror the waste volumes received, and can be combined with other waste handling technologies to receive waste that cannot be recycled or reused.

It is generally considered a 'low-tech' approach which means expertise to build and operate landfills are more readily available and operations are less reliant on highly skilled operators.

Upon closure of a landfill, there is a general requirement to allocate resources to monitor and maintain these parcels of land over a period of 30 -50 years. Based on monitoring, intervention may be required to ensure contaminants that may be entering the environment are controlled.

Once closed, old landfill sites will have limited usage for residential, commercial, and agricultural activities and are generally turned into recreational fields or open spaces.

9.4.2 Technology Maturity

Landfills are the most commonly used method of waste disposal both in New Zealand and internationally. Given its wide usage, innovation in engineering materials to support landfills. such as engineered liners to prevent ground water contamination and gas capture pipes to mitigate landfill gas releases, are easily accessible, well-understood and proven in New Zealand.

9.4.3 Summary of waste processed and residual streams

Landfills, with appropriate controls and liners, can receive a wide range of waste; from contaminated material, MSW and asbestos contaminated material. Contaminated soils can be disposed of in dry cells, separate from mixed waste in general landfill cells.

9.4.4 Emissions

When sealed, modern landfills produce minimal emissions to air and/or odours due to gas capture systems. Landfills require properly designed liners and leachate management systems to prevent emissions to surrounding land and/or waterways but this is achievable with sufficient design and engineering. The risk of liner leakage and emissions to water or land is a risk for the operating and non-operating lifetime of the landfill, so requires continual monitoring to minimise and eliminate these risks.

9.4.5 Alignment with Circular Economy

Fundamentally, as a solution landfilling does not align with the circular economy when used to manage organic and recyclable waste streams. However, landfilling is necessary when handling harmful or toxic wastes that cannot currently be reused or recycled, and therefore is the default option when this waste must be disposed of safely.

9.4.6 Alignment with Te Atakura First to Zero

Organic material buried in the landfill will degrade over time under anaerobic conditions, producing methane and carbon dioxide. Methane is approximately 25 times for potent than carbon dioxide as a GHG.

Modern landfills have methane capture systems installed where methane is captured and used as fuel for

electric generation or upgraded to be used as a natural gas substitute. On average, New Zealand landfills with landfill gas capture systems capture approximately 60% of the theoretical methane they produce. Manufacturers of gas capture technology have claimed that new systems can produce higher capture rates but this has yet to be seen in a New Zealand context.

9.4.7 Landfilling options at the Southern Landfill.

Considering the land is designated for landfill under the current district plan the Council have proposed 2 options for landfilling.

Each will be described below with a CAPEX and OPEX review for each option.

a. Option 1: The 'Up Valley' filling option known as Southern Landfill Stage IV.

This option was consulted on in 2019 – where the landfill would continue north of the current stage of landfill into undeveloped land. The new landfill would require extensive earthworks as well as the extension of the current stream diversion tunnel further up the valley that runs under the existing landfill stages.

This concept allowed for the eventual daylighting of the stream via a man-made stream running the perimeter of the landfill. This man made stream would eventually join up with Careys stream upon closure. This eliminates the reliance of the stream diversion tunnel that runs under the existing stages of the landfill to continuously divert water - thus, removing any future risk of a tunnel failure that could result in creating an artificial lake buttressed against a landfill. This would have severe environmental consequences to the lower reaches of the stream.

The landfill would have a high cost with approximately 25-30 year asset life based on current waste volumes. The following capital estimate is taken from WCC's previous landfill optioneering works:

Table 15: Southern Landfill Stage IV Capital Cost Summary

Southern Landfill Stage IV – Capital Cost Summary	$ (NZD)
Preliminary & General Costs	$25.2M
Earthworks and Site Preparation	$41.4M
Groundwater and Stormwater	$6.3M
Lining and Leachate Systems	$21.1M
Other Costs (incl. storage ponds, gas capture, landscaping etc.)	$17M
Total	**$111M**

Based on current landfill operations, operational costs (based on long-term annual contracts to operate the landfill) come to **$3.68M** annually.

b. Option 2: The infill of the closed stage 2 option known as the 'Piggy back' option.

This option was considered as part of the 2019 consultation process but was not consulted on. A new landfill would effectively be built over a closed stage of the existing landfill (Stage 2). The area is currently being used as a storage area for the council as well as for the current council green waste composting operations.

This option does not require removal of vegetation from undeveloped land and reclamation of the stream further north of the current stage 3 area. However, it does not remove continued reliance on the current stream diversion tunnel or mitigate the consequences of a tunnel collapse and the resulting accidental lake forming north of the existing stage 3 landfill.

This landfill option would have a lower capital cost and a smaller asset life of approximately 12 – 15 years based on current waste volume generation. The following capital estimate is taken from WCC's previous landfill optioneering works:

Table 16: Southern Landfill Piggy Back Extension Capital Cost Summary

Southern Landfill 'Piggy back' Extension – Capital Cost Summary	$ (NZD)
Preliminary & General Costs	$6.3M
Earthworks and Liner System	$17.2M
Leachate and Stormwater	$1.4M
Site Preparation and Landfill Capping	$4.9
Other Costs (incl. weighbridge, compost relocation, landscaping etc.)	$3.9M
Total	**$33.6M**

Based on current landfill operations, operational costs (based on long-term annual contracts to operate the landfill) come to **$3.68M** annually.

9.4.8 Compatibility with Other Options

The three previous technical solutions (EfW, MRF, MBT) were assessed separately from landfilling but commonly these technologies are combined with some form of landfilling to allow reception and treatment of all kinds of residual wastes in a single site, with the added benefit of minimising the final volume of residual waste to the onsite landfill.

9.5 Waste Export to Landfill

9.5.1 Summary of Technology

Landfill is the most common method for disposal of waste internationally. Residual waste, after any waste diversion activities, is buried in a suitable parcel of land, sealed with earth cover and left to degrade over time.

Outside of Wellington City there are a number of existing, consented landfills that could be used to receive waste generated in the Wellington region. Today, the majority of Wellington City's C&D waste is disposed of outside of the city in landfills not operated by WCC (as an example).
This approach could be scaled up for all other kinds of waste if WCC does not want to invest in local waste treatment and disposal, and waste generated in Wellington City could be exported to other regions for treatment and disposal instead.

9.5.2 Technology Maturity

See Section 9.4.2 of the main report.

9.5.3 Summary of waste processed and residual streams

In this scenario, there are a number of landfills around Wellington City and further afield that could receive the wastes generated and exported.

9.5.4 Emissions

As in Section 9.4.4 of the main report, advanced landfills can mitigate the majority of emissions to land and waterways and odour effects can be minimised. This is highly dependent on the landfill being selected to receive wastes in the export option, and likely emissions from previously constructed regional landfills around the Wellington region would not be as effective at preventing these emissions as a newly-constructed landfill.

9.5.5 Alignment with Circular Economy

See Section 9.4.5 of the main report.

9.5.6 Alignment with Te Atakura First to Zero

Landfilling of waste generates carbon emissions as discussed in Section 9.4.6 of the main report. Depending on the landfill selected to receive this waste and the level of landfill gas capture installed, the associated emissions could be better or worse than if the waste was disposed of at a new landfill development at the Southern landfill facility.

In addition to carbon emissions from waste degrading in landfill, transportation of this waste via vehicle to landfills located outside of Wellington City would lead to additional carbon emissions. The exact location of alternative landfill locations will determine the quantity of additional carbon emissions.

9.5.7 Landfilling Capacity around Wellington City

There are two publicly-owned Class A landfills within 30km of Wellington City that could receive all categories of waste currently received at the Southern Landfill. Of these landfills, the first is currently consented until 2030 and is preparing a new consent application to increase its available capacity by 400%, equal to around 60% of the capacity that could be provided by the possible SLF extension. This new consent may require new designation which could affect its ability to accept all categories of waste. The second landfill is consented until 2039, with a capacity under consent similar to the volume that the possible SLF extension could provide.

However, these landfills are likely to prioritise waste disposal from their local municipalities before making capacity available to receive waste from Wellington City, so these interactions need to be explored in detail.

There are also a number of private waste services around the Wellington region including several C&D/Cleanfill Class C landfills which are currently utilised for Wellington City's C&D waste, as well as two green waste processing operations that would not be suitable for mixed wastes.

9.5.8 Operational Costs of Waste Exporting

Based on discussions between WCC and other Wellington region landfill operators, costs for transportation and disposal of municipal waste outside of Wellington City would be approximately $210/tonne of waste. The cost for disposal of contaminated materials and/or special waste would likely be even higher, around $300/tonne. Based on these approximations and the annual waste totals in Table 1, the annual cost to export all of WCC's waste would be $27.8M.

9.5.9 Compatibility with Other Options

Exporting of waste could be utilised to manage waste streams that cannot be treated by other waste technologies e.g. contaminated soil or special waste if WCC decide to implement an MRF/MBT.

10 Effects of Waste Volume Sensitivity on Shortlist

As mentioned in Section 2, there are a number of uncertainties surrounding future volumes of waste that will need to be treated. These have the potential to affect the suitability of the shortlisted options, and need to be considered when choosing a best-fit option. Four likely sensitivities we will explore in more detail are given below:

- 90% reduction in sewage sludge generation (on account of successful implementation of the Wellington Water sludge volume reduction project
- 30% reduction in C&D waste streams based on the C&D waste SLF currently receives (note: most C&D waste generated in Wellington City goes to other landfills)

- 50% reduction in C&D waste streams based on the C&D waste SLF currently receives (note: most C&D waste generated in Wellington City goes to other landfills)
- 50% reduction in Organics to the SLF (on account of successful implementation of green waste/organic waste diversion programmes).

The high-level effects of these four scenarios on the shortlisted options are given in the following section.

We have not included commentary on the effects of waste volume sensitivity on the two landfilling options identified in our shortlist or on waste exporting. At a high level, landfills are developed and constructed at a rate relative to incoming waste generation. All of the following sensitivities where waste volumes to the SLF are decreased will have the effect of slowing landfill development/required capital spend, and extending the total lifespan of the planned landfill developments relative to the proportion of total landfill waste avoided.

10.1 Reduction in Sewage Sludge by 90%

A 90% reduction in sewage sludge would be roughly equal to 13,500 tonnes per annum avoided.

Table 17: Impacts of 90% sewage sludge reduction on shortlisted options

Scenario	EfW Impacts	MRF Impacts	MBT Impacts
90% reduction in sewage sludge	Since the thermal input from dewatered sludge is assumed to be negligible, the main effect of this scenario would be a simpler EfW design (no need for a dedicated sludge feeding system for example). The plant thermal input (which is the key parameter used for sizing EfW facilities) would remain the same. Therefore, the Capital costs may decrease (in the order of $1-2M) but this quantity is not significant within the capex estimate uncertainty (-20/+35%). Ash generation and consumables dosing would reduce by less than 10%. The other operational costs would remain approximately the same.	This waste stream is not suitable for MRF and in the base case was assumed it would be directly landfilled and not processed. Therefore, it would have no impact on CAPEX but would have an associated OPEX reduction of $2.7M in avoided out of region landfill costs.	This waste stream is not suitable for MBT and in the base case was assumed it would be directly landfilled and not processed. Therefore, it would have no impact on CAPEX but would have an associated OPEX reduction of $2.7M in avoided out of region landfill costs.

10.2 30% Reduction in C&D Waste

The majority of Wellington City's C&D waste is disposed of in specialised C&D landfills within the region, but the Southern Landfill still receives around 6,800 tonnes of mixed rubble and timber per year. A 30% reduction would reduce this by 2,040 tonnes per annum, of which around 20% would be rubble, 70% timber and 10% other miscellaneous waste.

Table 18: Impacts of 30% C&D waste reduction on shortlisted options

Scenario	EfW Impacts	MRF Impacts	MBT Impacts
30% reduction in C&D waste streams based on the C&D waste SLF currently receives	Rubble is not suitable for EfW and has been assumed to be directly landfilled and not processed however as the tonnages are so low the opex saving is negligible. Timber could be used as long as large items are shredded. Overall, the reduction in tonnage to the EfW would be of circa 1,400 tpa, which is not particularly significant (2% of the plant size) and falls well within the capex and opex cost uncertainty this scenario is unlikely to impact costs.	This waste stream is not suitable for MRF and in the base case has been assumed to be directly landfilled. Reduction in offsite waste disposal volumes would decrease non-treated waste disposal costs by 5% (approximately $500k).	As per MRF.

10.3 50% Reduction in C&D Waste

As above, a 50% reduction would reduce C&D waste by 3,400 tonnes per annum, of which around 20% would be rubble, 70% timber and 10% other miscellaneous waste.

Table 19: Impacts of 50% C&D waste reduction on shortlisted options

Scenario	EfW Impacts	MRF Impacts	MBT Impacts
50% reduction in C&D waste streams based on the C&D waste SLF currently receives	Rubble is not suitable for EfW and has been assumed to be directly landfilled and not processed however as the tonnages are so low the opex saving is negligible. Timber could be used as long as large items are shredded. Overall the reduction in tonnage to the EfW would be of circa 2,400 tpa, which is not particularly significant (3.4% of the plant size) and falls well within the capex and opex cost uncertainty.	This waste stream is not suitable for MRF. Reduction in offsite waste disposal volumes would decrease non-treated waste disposal costs by 8% (approx. $700k).	As per MRF.

10.4 50% Reduction in Organic Waste

The Southern Landfill receives approximately 30,000 tonnes of organic waste annually. A 50% percent reduction in this stream would be significant, representing a 15,000 tpa decrease.

Table 20: Impacts of 50% organic waste reduction on shortlisted options

Scenario	EfW Impacts	MRF Impacts	MBT Impacts
50% reduction in Organics to the SLF	This would reduce the estimated EfW tonnage from 70,000 to 55,000 tpa while slightly increasing the average NCV or net calorific value of the (remaining) feedstock. This would reduce the plant thermal input by approximately 17%, which may reduce the size of the plant below the minimum viable size for an EfW	This would reduce the estimated MRF size from 70,000 to 55,000 tpa. The capex may reduce by 10-15%. Maintenance cost would reduce proportionally to capex. Staffing levels would remain the same.	As per MRF. Because the biodrying process further decreases the amount of organics needing to be

Scenario	EfW Impacts	MRF Impacts	MBT Impacts
	plant. Capital Costs may reduce by 10%, however at this scale the plant could need bespoke technology and the overall change to capex may not be significant. Due to the small size, technologies like rotary kiln (as opposed to grate) may start becoming more relevant. Consumables, residues, would reduce proportionally to the tonnage (-21%). Electricity consumption and electricity generation would reduce proportionally to the thermal input (-17%). Maintenance cost would reduce by 10%. Staffing costs would remain the same. As a result, total opex could decrease by 1%, so a marginal change.	Power consumption would reduce proportionally to tonnage. The reduction in organics would result in a similar reduction in RDF/SRF tonnage (50%) and associated residue disposal costs. Recovery of residues other than RDF/SRF (e.g. plastics, glass) would remain roughly the same. As a result, operational costs (not including disposal costs for non-treatable waste) would decrease by 38% (approx. $6.7M).	disposed, total operational costs (not including disposal costs for non-treatable waste) would decrease by 34% (approx. $5M).

11 Conclusions and Next Steps

This analysis has revealed that there are several valid and technically sound options for WCC to consider when analysing its future waste management strategy and operations in light of the Southern landfill consent expiry date, and capacity constraints.

Of the fourteen waste management technologies investigated, ten were assessed to be viable options for Wellington City Council when assessed against their absolute criteria for implementation. Of the ten selected, an assessment of the technologies against general project criteria highlighted four frontrunner technologies: Energy from Waste, Material Recycling Facility, Mechanical Biological Treatment, and the incumbent technology landfilling.

While landfilling is still a competitive technology for managing waste due to its value for money and resilience, there are other technologies worth considering that align better with WCC's objectives to promote more circular economies and reduce the social and environmental impacts of waste management in the Wellington region. In addition, these technologies can be combined with same-site landfilling and this should be a key consideration of the validity of all options going forward.

The next step for Wellington City Council will be to undertake public engagement on this analysis, and conduct a more detailed assessment to determine which technology should be pursued and implemented between now and 2026. Following this, a spatial impact assessment should be undertaken to determine the best location for any future waste treatment infrastructure in Wellington City. This assessment could further consider social and environmental impacts of the proposed technology on the surrounding area, as well as logistical challenges/opportunities.

11.1 Preferred Option Commentary

11.1.1 Notes on Selecting a Preferred Option

Based on the material presented in this report, it is difficult to recommend a best-fit solution for the future waste treatment needs of Wellington City. There are multiple advantages and disadvantages for each shortlisted option when compared against the others, and for this reason we feel it is not appropriate to pre-empt the possible recommendations before this material is publicly consulted on.

Below is a brief summary of the key conflicts and uncertainties:

11.1.2 Balancing Competing Objectives

A key finding of the option long list Multi-Criteria Analysis section of this report is that no single option can fulfil each major objective nominated by WCC. A key conflict is seen in options like EfW, MRF and MBT facilities that can deliver reduced carbon emissions (in line with WCC's carbon reduction strategy), reduced environmental effects and promote more circular economies of waste materials, but ultimately cost significantly more to build and operate than extending the current landfill.

11.1.3 Maturity of Offtake Markets

When considering options like EfW, MRF and MBT facilities in New Zealand, it is important to recognise that the reason these facilities excel in countries overseas is due to the presence of developed markets for products generated from wastes processed in these facilities. Without local customers for residual aggregate products from an Energy from Waste plant, or Refuse-Derived Fuel from an MRF or MBT, these material streams change from an important financial revenue stream to a cost for the operation as they must be landfilled instead.

It is hard to predict whether domestic markets for these products may develop in coming decades. If they did, the economics for landfill-alternatives would certainly improve.

11.1.4 Types of Waste Needing Treatment

A major advantage of landfilling over alternate waste treatment technologies is that it is able to receive almost any kind of waste. The other shortlisted options are all unable to receive and process Contaminated Soil and Special Waste streams and therefore they will need to be employed in tandem with landfilling to provide appropriate coverage for the different wastes generated in Wellington City.

11.1.5 Source-Segregation vs. Residual Waste Treatment

Residual waste or combined municipal and commercial waste is more difficult to process into valuable material streams than pre-sorted materials streams (like commingled recyclables that are collected separately to residual waste). In addition, material recovery plants like MRFs or MBTs need to be sized larger and are more expensive to construct when plastic waste, glass waste, metal waste etc. is contaminated with organic and other non-recyclable material streams.

Pre-sorted or source-segregated waste streams are much easier and likely more cost-effective to process and divert from landfill compared with mixed or contaminated waste streams. It may be that WCC is better to invest in upstream activities to reduce waste to landfill. The opportunities to do this is outside the scope of this assessment.

A

Appendix A – Waste Technologies Assessment Matrix

	Absolute Criteria			Main Objectives													
	A	B	C	1	2	3	4	5	6	7	8	9	10	11	12	Total Score	Ranking
Subject	*Programme: Will be fully operational by the time the Southern Landfill reaches capacity or before June 2026; whichever occurs first*	*Technical Maturity*	*Can be easily scaled up or down to meet Wellington City's future waste disposal needs*	*Local Community Effects*	*Environmental Effects (water)*	*Environmental Effects (land)*	*Environmental Effects (air)*	*Alignment with Circular Economy*	*Alignment with Te Atakura First to Zero*	*Consenting and Planning*	*Offers good value for money*	*Robustness/reliability (operational management)*	*Maturity of offtake markets (if applicable)*	*Size*	*Resilience*		
sub-criteria and assessment	Either: - Yes, can be operational by June 2026 - Marginal (with an acceptable interim solution 1-2 years) - No, not achievable	Either - Yes: 10 or more successful references globally - Marginal: 5 or more successful references globally - No: fewer than 5 successful references globally	If the future tonnages or composition change e.g. the removal of organics or sludge. Is the technology scalable / adjustable for composition shifts?	Can the facility operate without affecting the surrounding local communities? Things to consider: - odour - noise - traffic etc	Could the technology lead to discharges to surrounding waterways?	Will the technology lead to land discharges or have negative impacts of the surrounding land due to leaching etc.?	Will the technology maintain safe levels of particulate and pollutant emissions to air e.g. dust, ash, suphates or nitrates?	Does the technology support a circular materials economy, and divert materials from linear lifecycles?	Consideration of greenhouse gas emissions from waste for the option	An assessment on likelihood of approval given existing policies and track record for similar consents in NZ	Total cost over project life including capex, opex, and revenues (e.g. electricity, heat, recycled products, etc.)	Score against availability of equipment (e.g. maintenance etc.)	- Mature market in existence in NZ - Market in development in some areas of NZ / Mature market exists overseas - Unknown market overseas and in NZ	Does it fit on existing site?	Score for resilience for day to day waste transport corridors		
Landfill	Yes	Yes	Yes	5	3	3	7	1	3	7	10	10	10	10	10	79	3
Export (No collection)	Yes	Yes	Yes	10	3	3	5	1	1	10	3	7	10	10	1	64	8
Export (Transfer Station)	Yes	Yes	Yes	7	3	3	5	1	1	10	3	7	10	10	1	61	9
Energy from waste	Marginal (financial close in June 2022 would give you operation by 2026)	Yes	Marginal	7	7	7	3	5	7	3	5	7	7	10	10	78	4
Incineration w/o energy recovery	Marginal (financial close in June 2022 would give you operation by 2026)	Yes	Marginal	7	7	7	3	1	7	1	3	7	7	10	10	70	6
Gasification	Marginal (financial close in June 2022 would give you operation by 2026)	No	Marginal	Excluded													
Pyrolysis	Marginal (financial close in June 2022 would give you operation by 2026)	No	Marginal	Excluded													
Anaerobic digestion	Yes	Yes	Marginal	7	5	5	7	5	5	7	5	5	5	10	10	76	5
Material Recycling Facility	Yes	Yes	Yes	5	5	5	7	7	7	7	7	7	5	10	10	82	1
Mechanical Biological Treatment	Yes	Yes	Yes	5	5	5	7	7	7	7	7	7	5	10	10	82	1
Composting	Yes	Yes	Yes	5	5	5	7	5	5	7	5	7	1	10	10	72	6
Autoclave	Yes	Yes	Marginal	7	5	5	7	3	1	5	1	3	1	10	10	58	10
Vermiculture	Yes	No	Marginal	Excluded													
Insect food cycle	Yes	No	Marginal	Excluded													

B

Appendix B – Energy From Waste Discharge Limits

Pollutant	IED Daily average limit (mg/Nm^3)	IED Half-hourly average limit (mg/Nm^3)	IED 10-minute average limit (mg/Nm^3)	BREF Daily average limit (mg/Nm^3)
Total dust	10	30	N/A	5
Total organic carbon (TOC)	10	20	N/A	10
Hydrogen chloride (HCl)	10	60	N/A	6
Hydrogen fluoride (HF)	1	4	N/A	1
Sulphur dioxide (SO_2)	50	200	N/A	30
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	200	400	N/A	120
Carbon monoxide (CO)	50	100	150	50
Ammonia (NH_3)	N/A	N/A	N/A	10

Table 22: Energy from Waste Heavy Metals Discharge Limits

Heavy metal	IED Total Limit (mg/Nm^3)	BREF Total Limit (mg/Nm^3)
Cadmium (Cd)	0.05	0.02
Thallium (Tl)	0.05	0.02
Mercury (Hg)	0.05	0.02
Antimony (Sb)	0.5	0.3
Arsenic (As)	0.5	0.3
Lead (Pb)	0.5	0.3
Chromium (Cr)	0.5	0.3
Cobalt (Co)	0.5	0.3
Copper (Cu)	0.5	0.3
Manganese (Mn)	0.5	0.3
Nickel (Ni)	0.5	0.3
Vanadium (V)	0.5	0.3
Polychlorinated dibenzo-dioxins and furans (PCDD/F)	0.1 (ng I-TEW/Nm^3)	0.04 (ng I-TEW/Nm^3)
PCDD/F and dioxin-like polychlorinated bi-phenyls (PCBs)	N/A	0.06 (ng WHO-TEQ/Nm^3)

C

Appendix C – Capital Cost Estimates

Project:	FUTURE WASTE MANAGEMENT OPTIONS	**Details:**	FUTURE WASTE MANAGEMENT OPTIONS
Building:	FUTURE WASTE MANAGEMENT OPTIONS		

Code	Description	Unit	Quantity	Rate	Total
	FUTURE WASTE MANAGEMENT OPTIONS - CAPEX COSTS FOR 70,000 tpa PLANT				
	CONCEPT DESIGN ESTIMATES OF PROBABLE COST FOR COMPARISON OF THE DIFFERENT PROJECTS - AUGUST 2021			Currency:	**(NZD)**
	It should be noted that the cost estimates provided as part of the Services are not a statement of absolute cost, rather they will have an accuracy range commensurate with various factors such as the extent of relevant information provided, the certainty of data and the level of detail available at the time of preparation.				
	The high level cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, new and historical quotes for some equipment items, industry unit rates and Beca's general experience. The estimates are based on incomplete design and other information and are not warranted or guaranteed by Beca. The accuracy of these estimates is not expected to be better than approximately -20% to +35% for the scope of work described in this document and are not suitable for final Capex approval. Further design should be undertaken if a more reliable estimate is required.				
1	**EFW (ENERGY FROM WASTE) - 70,000 tpa**				
1.1	Process / Mechanical including Indirects				153,450,000
1.2	Civil Works including Indirects				60,380,000
	EFW TOTAL (Excluding GST and Escalation)	**$**			**213,830,000**
2	**MRF (MATERIALS RECYCLING FACILITY) - 70,000 tpa**				
2.1	Process / Mechanical including Indirects				20,380,000
2.2	Civil Works including Indirects				22,710,000
	MRF TOTAL (Excluding GST and Escalation)	**$**			**43,090,000**
3	**MBT (MECHANICAL BIOLOGICAL TREATMENT) - 70,000 tpa**				
3.1	Process / Mechanical including Indirects				43,160,000
3.2	Civil Works including Indirects				34,200,000
	MBT TOTAL (Excluding GST and Escalation)	**$**			**77,360,000**
	NOTES				
	These estimates are based on the costs and general plant plans provided by Fichtner Consulting Engineers Ltd (London) for similar plants in the UK.				
	A contingency has been included in the estimate to cover items of unforeseen detail and design development. This contingency is expected to be converted to scope, and therefore should not be regarded as discretionary. The accuracy range indicated above reflects the accuracy after and including the contingency.				

Project:	FUTURE WASTE MANAGEMENT OPTIONS	**Details:**	FUTURE WASTE MANAGEMENT OPTIONS
Building:	FUTURE WASTE MANAGEMENT OPTIONS		

Code	Description	Unit	Quantity	Rate	Total
	Note that the indicated accuracy above is based on the scope of the mentioned information only and there are no allowances for work outside these boundaries or for scope changes.				
	Costs are in August 2021 $NZD				
	ASSUMPTIONS				
	The project will be procured on a competitive basis.				
	The Contractor will be given free access to the Contract Works site.				
	Relative flat building site with no existing buildings.				
	Assume no piling or other ground improvement measures necessary.				
	EXCLUSIONS				
	Demolition of any existing structure				
	Relocation of existing services / utilities				
	Asbestos removal / disposal				
	Piling or other ground improvement measures.				
	Spares				
	Training				
	GST				
	FOREX fluctuations				
	Hedging				
	Escalation				
	Capitalised interest				
	Costs to date				
	Operating cost				
	Insurance costs				
	Legal and finance fees				
	Risk items				
	Covid-19 related costs				
	Property costs				

Project: FUTURE WASTE MANAGEMENT OPTIONS
Building: FUTURE WASTE MANAGEMENT OPTIONS
Details: FUTURE WASTE MANAGEMENT OPTIONS

Code	Description	Unit	Quantity	Rate	Total
	1.1 - EFW PROCESS AND MECHANICAL WORKS				
	Process and Mechanical Works				
1	Note: This equipment will cost the same as in Europe. Factor of 2 used to convert to NZD from Pounds				
2	Total plant cost including indirects	sum	1	64,000,000.00	128,000,000
3	Allowance for transport to NZ	%	128,000,000	0.08	10,240,000
	Subtotal				**138,240,000**
	Preliminaries & General				
4	Allowance for contractors on-site and off-site overheads (say 15%)	%			Included
5	Allowance for contractors profit (say 10%)	%			Included
	Subtotal				**-**
	Indirect Costs				
6	Allowance for engineering, design, project management, etc. (say 15%)	%			Included
7	Allowance for consents (say 1%)	%	138,240,000	0.01	1,382,400
8	Allowance for design development contingency (say 10%)	%	138,240,000	0.10	13,824,000
	Subtotal				**15,206,400**
	TOTAL				**153,446,400**

To Collection 153,446,400

Project: FUTURE WASTE MANAGEMENT OPTIONS
Building: FUTURE WASTE MANAGEMENT OPTIONS
Details: FUTURE WASTE MANAGEMENT OPTIONS

Code	Description	Unit	Quantity	Rate	Total
	1.2 - EFW CIVIL WORKS				
	Civil Works				
1	Tipping Hall building (2 levels)	m2	4,720	3,500.00	16,520,000
2	Process building (approximately 20m high)	m2	936	12,000.00	11,232,000
3	Ash, etc. handling building (2 levels)	m2	1,761	3,500.00	6,161,750
4	External heavy duty paving areas and bases	m2	544	450.00	244,800
5	Allow for general site works	sum	1	2,000,000.00	2,000,000
	Subtotal				**36,158,550**
	Preliminaries & General				
6	Allowance for contractors on-site and off-site overheads (say 15%)	%	36,158,550	0.15	5,423,783
7	Allowance for contractors profit (say 10%)	%	41,582,333	0.10	4,158,233
	Subtotal				**9,582,016**
	Indirect Costs				
8	Allowance for engineering, design, project management, etc. (say 15%)	%	45,740,566	0.15	6,861,085
9	Allowance for consents (say 2%)	%	45,740,566	0.02	914,811
10	Allowance for design development contingency (say 15%)	%	45,740,566	0.15	6,861,085
	Subtotal				**14,636,981**
	TOTAL				**60,377,547**

To Collection 60,377,547

Project: FUTURE WASTE MANAGEMENT OPTIONS
Building: FUTURE WASTE MANAGEMENT OPTIONS
Details: FUTURE WASTE MANAGEMENT OPTIONS

Code	Description	Unit	Quantity	Rate	Total
	2.1 - MRF PROCESS AND MECHANICAL WORKS				
	Process and Mechanical Works				
1	Note: This equipment will cost the same as in Europe. Factor of 2 used to convert to NZD from Pounds				
2	Total plant cost including indirects	sum	1	8,500,000.00	17,000,000
3	Allowance for transport to NZ	%	17,000,000	0.08	1,360,000
	Subtotal				**18,360,000**
	Preliminaries & General				
4	Allowance for contractors on-site and off-site overheads (say 15%)	%			Included
5	Allowance for contractors profit (say 10%)	%			Included
	Subtotal				**-**
	Indirect Costs				
6	Allowance for engineering, design, project management, etc. (say 15%)	%			Included
7	Allowance for consents (say 1%)	%	18,360,000	0.01	183,600
8	Allowance for design development contingency (say 10%)	%	18,360,000	0.10	1,836,000
	Subtotal				**2,019,600**
	TOTAL				**20,379,600**

To Collection 20,379,600

Project: FUTURE WASTE MANAGEMENT OPTIONS
Building: FUTURE WASTE MANAGEMENT OPTIONS
Details: FUTURE WASTE MANAGEMENT OPTIONS

Code	Description	Unit	Quantity	Rate	Total
	2.2 - MRF CIVIL WORKS				
1	Note: Assume 50% area of 170k tpa facility on drawing				
	Civil Works				
2	Main building	m2	6,077	2,500.00	7,596,563
3	Transformer and compressor buildings	m2	176	3,000.00	528,750
4	External heavy duty paving areas and bases	m2	2,233	400.00	446,600
5	Allow for general site works	sum	1	1,800,000.00	1,800,000
	Subtotal				**10,371,913**
	Preliminaries & General				
6	Allowance for contractors on-site and off-site overheads (say 15%)	%	18,415,075	0.15	2,762,261
7	Allowance for contractors profit (say 10%)	%	21,177,336	0.10	2,117,734
	Subtotal				**4,879,995**
	Indirect Costs				
8	Allowance for engineering, design, project management, etc. (say 15%)	%	23,295,070	0.15	3,494,260
9	Allowance for consents (say 2%)	%	23,295,070	0.02	465,901
10	Allowance for design development contingency (say 15%)	%	23,295,070	0.15	3,494,260
	Subtotal				**7,454,422**
	TOTAL				**22,706,330**

To Collection 22,706,330

Project: FUTURE WASTE MANAGEMENT OPTIONS
Building: FUTURE WASTE MANAGEMENT OPTIONS
Details: FUTURE WASTE MANAGEMENT OPTIONS

Code	Description	Unit	Quantity	Rate	Total
	3.1 - MBT PROCESS AND MECHANICAL WORKS				
	Process and Mechanical Works				
1	Note: This equipment will cost the same as in Europe. Factor of 2 used to convert to NZD from Pounds				
2	Total plant cost including indirects	sum	1	18,000,000.00	36,000,000
3	Allowance for transport to NZ	%	36,000,000	0.08	2,880,000
	Subtotal				**38,880,000**
	Preliminaries & General				
4	Allowance for contractors on-site and off-site overheads (say 15%)	%			Included
5	Allowance for contractors profit (say 10%)	%			Included
	Subtotal				**-**
	Indirect Costs				
6	Allowance for engineering, design, project management, etc. (say 15%)	%			Included
7	Allowance for consents (say 1%)	%	38,880,000	0.01	388,800
8	Allowance for design development contingency (say 10%)	%	38,880,000	0.10	3,888,000
	Subtotal				**4,276,800**
	TOTAL				**43,156,800**
				To Collection	43,156,800

Project: FUTURE WASTE MANAGEMENT OPTIONS
Building: FUTURE WASTE MANAGEMENT OPTIONS
Details: FUTURE WASTE MANAGEMENT OPTIONS

Code	Description	Unit	Quantity	Rate	Total
	3.2 - MBT CIVIL WORKS				
	Civil Works				
1	Biodrying hall (50% 2 levels)	m2	4,002	2,000.00	8,004,000
2	Fines stabilisation and recyclate buildings	m2	2,500	2,200.00	5,500,000
3	Process building	m2	1,712	2,500.00	4,278,750
4	Office building	m2	65	3,000.00	195,000
5	External heavy duty paving areas and bases	m2	2,800	250.00	700,000
6	Allow for general site works	sum	1	1,800,000.00	1,800,000
	Subtotal				**20,477,750**
	Preliminaries & General				
7	Allowance for contractors on-site and off-site overheads (say 15%)	%	20,477,750	0.15	3,071,663
8	Allowance for contractors profit (say 10%)	%	23,549,413	0.10	2,354,941
	Subtotal				**5,426,604**
	Indirect Costs				
9	Allowance for engineering, design, project management, etc. (say 15%)	%	25,904,354	0.15	3,885,653
10	Allowance for consents (say 2%)	%	25,904,354	0.02	518,087
11	Allowance for design development contingency (say 15%)	%	25,904,354	0.15	3,885,653
	Subtotal				**8,289,393**
	TOTAL				**34,193,747**

To Collection 34,193,747

STRATEGIC WASTE REVIEW UPDATE
HE ARA, HE PARA ITI/A PATHWAY, MINIMAL WASTE

Kōrero taunaki
Summary of considerations

Purpose

1. This report to Pūroro Waihanga - Infrastructure Committee provides an update on the progress of the strategic waste review and outlines a draft Waste Minimisation Roadmap for consideration.

Strategic alignment with community wellbeing outcomes and priority areas

	Aligns with the following strategies and priority areas: ☒ Sustainable, natural eco city ☐ People friendly, compact, safe and accessible capital city ☐ Innovative, inclusive and creative city ☐ Dynamic and sustainable economy
Strategic alignment with priority objective areas from Long-term Plan 2021–2031	☐ Functioning, resilient and reliable three waters infrastructure ☐ Affordable, resilient and safe place to live ☐ Safe, resilient and reliable core transport infrastructure network ☐ Fit-for-purpose community, creative and cultural spaces ☒ Accelerating zero-carbon and waste-free transition ☐ Strong partnerships with mana whenua
Relevant Previous decisions	
Significance	The decision is rated medium significance in accordance with schedule 1 of the Council's Significance and Engagement Policy. It may potentially generate medium to high levels of community interest.

Financial considerations

☐ Nil	☐ Budgetary provision in Annual Plan / Long-term Plan	☒ Unbudgeted

2. Potential financial implications of the draft Roadmap are currently unquantified. However, significant forms of financial investment will be required if the Council is to deliver on the breadth of projects detailed in the proposed Roadmap.

Risk

☒ Low	☐ Medium	☐ High	☐ Extreme

Author	Emily Taylor-Hall, Waste Operations Manager

Authoriser	Mike Mendonça, Acting Chief Infrastructure Officer Barbara McKerrow, Chief Executive Officer

Taunakitanga

Officers' Recommendations

Officers recommend the following motion

That Pūroro Waihanga - Infrastructure Committee:

1) Receives the information.

2) Notes that a Strategic Waste Review has been undertaken, and that the draft Waste Minimisation Roadmap (**Attachment 1**) is the final deliverable from the Review.

3) Notes that the draft Waste Minimisation Roadmap, He Ara, He Para Iti, provides a pathway for Wellington to become a leader in waste minimisation.

4) Notes that this report should be read in conjunction with the draft Waste Minimisation Roadmap, and Te Pūroro Waihanga Infrastructure Committee report on Residual Waste Disposal Options.

5) Notes that estimates suggest that, together, potential national-level and Council-level initiatives have the potential to reduce the waste stream entering the Southern landfill by half over the next 15 years.

6) Notes it will be necessary to phase in the implementation (and funding) of a new waste minimisation programme over the next decade or more.

7) Agrees to adopt in principle the draft Waste Minimisation Roadmap.

Whakarāpopoto

Executive Summary

1. Over the past 12 months, Wellington City has commenced the transition towards a low waste and low carbon emissions future. As part of this process, officers engaged independent consultants to undertake a critical review of the existing waste programme.

2. As a result of this work, a draft Waste Minimisation Roadmap has been developed (otherwise referred to as He Ara, He Para Iti, or the draft Roadmap). The draft Roadmap includes a proposed waste minimisation work programme that includes 51 workstream projects. Amongst other things, these projects include targeted behaviour change initiatives, service-related investigations, and several high-investment and significant waste reduction initiatives.

3. The draft Roadmap presents the Council with an opportunity to critically reflect on the current waste minimisation work programme, and to reposition Wellington as a leader in waste minimisation.

4. It is estimated that the development of a revised and funded waste minimisation work programme has the potential to reduce waste volumes entering the Southern landfill by more than half within the next 15 years. The implementation and funding of the programme is subject to future decision making. Because these initiatives are reliant in some cases on Government policies, or investment decisions that are not currently in

the Long-Term Plan, it would be necessary to phase in implementation over the next decade or more.

5. While the draft Roadmap raises the focus of waste minimisation to a more strategic level, it is acknowledged that such work programme considerations sit alongside the more immediate issue of residual waste management and disposal.

6. As context, it is noted that detailed consideration of residual waste management options has been addressed for Council in a separate report.

Takenga mai

Background

7. Over the past 12 months, Wellington City has commenced the transition towards a low waste and low carbon emissions future

8. In June 2020 the Council declared an ecological and climate emergency, accepting scientific evidence that there remains around a decade to take urgent action to reduce greenhouse gas emissions in order to avoid disastrous consequences for the environment and society. The Council also adopted and implemented Te Atakura First to Zero, which aims to ensure that Wellington is a net zero emission city by 2050 and commits to making the most significant carbon reductions in the first 10 years.

9. Within this time, the Council has made significant progress into a strategic review of the existing waste programme. The primary purpose of this review has been to objectively analyse the effectiveness of the existing waste programme in line with the City's environmental and carbon aspirations, identifying both opportunities for improvement and a pathway for achieving any areas of necessary change.

10. To date, the waste programme review process has involved:

- Evaluation of the effectiveness of the existing Waste Management and Minimisation Plan (2017-2023).
- Examination of relevant Council policy directives and resolutions.
- Consideration of the existing waste work programme.
- Interviews with Councillors and officers.
- Kōrerorero/discussion with Taranaki Whānui ki te Upoko o te Ika and Ngāti Toa Rangatira Iwi representatives.
- Initial engagement with the Sustainability Trust and Waste Free Wellington.

11. The phase 1 findings of the Strategic Waste Review have revealed the need for critical reflection and change in terms of the way we manage and minimise waste across the City. In part, this need for change is due to the fact that the disposal of waste received at the Southern landfill accounts for approximately 64% of Wellington City Council's own carbon emissions, and 4% of the City's emissions profile. More intrinsically, it is recognised that unnecessary resource use and sub-optimal waste management practices do not have a place in Wellington's future as an inclusive, sustainable and creative capital.

12. In order to shift to this low waste future, the Strategic Waste Review has established that the following issue areas exist as drivers for programme change:

- Leadership: Wellington City wants to be a leader in waste minimisation, but this is not possible under the constraints of current policy settings, including funding policy
- Investment: Significant funding will be required to underpin implementation and provision of enhanced waste services for the City
- Stakeholder expectations: The current business model and focus does not meet expectations from stakeholders or the public that the Council represents, with the existing business model limiting the City's progress towards a low waste future.
- Best practice: The current model does not reflect best practice and is not in line with changing legislative, national and international policy direction.
- Focus of effort: Resources and effort are focused on waste collection and disposal, rather than waste minimisation and recognising opportunities for change.

13. Feedback has consequently signalled that Wellington City Council seeks to make step changes in the approach to the management of waste.

14. In response, a draft Roadmap has been developed - He Ara, He Para Iti. This document identifies a pathway, and aspirational vision, for the City to become a leader in minimising use of resources and maximisation of whakamahianō - reuse and recovery.

15. This vision is further underpinned by the following objectives:

- Ōhanga āmiomio (circular economy) - To mitigate the environmental impacts of Wellington City by reducing resources used and increasing reuse and recovery of resources.
- Kaitiakitanga whakanaonga (product stewardship) - To enable and partner with communities and businesses to reduce resource use and waste.
- Whakahaere hūrokuroku i te para (sustainable waste management) - Manage any remaining waste in the most sustainable way according to the principles of the pūnaha whakarōpū para (see Image 1).

Image 1: **The Waste Hierarchy**

16. The following section provides an overview of the local waste minimisation context, and outlines the waste minimisation focus areas proposed within the draft Roadmap.

Kōrerorero

Discussion

17. In line with the Council's Long-Term Plan 2021-31, accelerating the transition to zero-carbon and waste free future is a priority objective for the Council in the next three years. However, currently Wellington's potential to become waste free is constrained by the Council's waste operations model, which primarily funds waste minimisation using landfill operating surpluses, and by the disposal of sewage sludge at the Southern landfill.

18. The extent to which the Council is currently progressing towards the existing Waste Management and Minimisation Plan waste reduction goal, being to reduce waste into

municipal landfills by a third by 2026, is also uncertain. This is due to the Council's limited access to waste sector data, which reduces the Council ability to measure progress and performance relating to waste reduction. While there are initiatives to address this lack of data in future, the constraints of the current framework mean that we do not know the real quantity of industrial, commercial, manufacturing, or household waste being generated within Wellington City, nor the amount of waste transported for disposal outside of Wellington City to Spicer landfill in Porirua, Silverstream in Hutt City, or elsewhere.

19. As a result, the City has tended to measure waste entering the Southern landfill as a proxy for the waste picture across the City. However, this proxy does not provide a complete picture. Two privately operated construction and demolition fills are located immediately to the north and south of the Southern landfill, and it is considered that the volumes of material entering those fills are greater than those entering the Southern landfill, although it is not possible to be sure.

20. Despite landfill waste only representing a portion of waste in the City, waste tonnages to Southern Landfill provide a useful baseline for the Council. Currently, approximately 75,000 tonnes per annum (tpa) of municipal waste is accepted into the landfill[4].

21. It is anticipated that the sewage sludge initiative consulted through the 2021 Long-Term Plan will reduce this waste by 13,500 tpa. Only once sludge is removed will other waste minimisation initiatives will be possible. If a large-scale commercial organics diversion scheme was to be introduced, it is possible that such a scheme could further reduce Southern Landfill's waste volumes by an additional 7,500 tpa.

22. Concurrently, the Government is considering introducing product stewardship schemes for plastic packaging, tyres, e-waste, agrichemicals and their containers, refrigerants and farm plastics. Co-design of schemes for most of these priority products is underway or has been completed and the Government states that joined up progress in hard-to-recycle and single use plastics is planned for 2021-2022. If these schemes proceed, they will further reduce waste quantities over the next 5-7 years. The scope of waste reduction will be dependent on the scope of initiatives advanced by the government.

23. It is also noted that the behaviour change necessary for large-scale waste reduction within society will take time. As we have already seen, it is only when behaviour change is supported by regulation that it becomes more widespread, immediate and impactful (such as the banning of single use shopping bags).

24. In summary, if a suite of initiatives addressing the areas of waste minimisation discussed above were to be funded and advanced, it is estimated that municipal solid waste reduction tonnages entering the Southern landfill could be reduced by an estimated 41,000 tonnes by 2036. This amount would vary relative to the extent and timing of any new product stewardship and behaviour change-related regulation implemented by Central Government.

Table 1: **Potential Scope for Waste Reduction at the Southern Landfill by 2036**

High-level areas for potential waste reduction	2021 (Tonnes per annum)	2026 (Tonnes per annum)	2031 (Tonnes per annum)	2036 (Tonnes per annum)
Sludge removed		(13,500)		

[4] This excludes contaminated soil and asbestos contaminated material

Organics removed		(7,500)		
Product stewardship			(5,000)	
Behaviour change		(5,000)	(5,000)	(5,000)
Southern Landfill (Tonnes per annum)	75,000	49,000	39,000	34,000

Note: Table 1 does not allow for construction and demolition waste, which is expected to increase significantly as the City's construction programme steadily increases over the next decade. However, most construction and demolition waste is currently disposed at private facilities and not the Southern landfill.

Waste Reduction Focus Areas

25. Building on phase 1 of the Strategic Waste Review, the draft Roadmap (contained in **Attachment 1**) sets out five key areas of focus if the City is to become a leader in minimising the use of resources and maximising reuse and recovery, as follows:

26. Behaviour Change and Education: The Council alone cannot change ingrained wasteful habits, behaviours and culture. We will need to bring others on the journey through targeted behaviour change and community engagement. We will need to engage with key stakeholders and Mana Whenua in ramping up waste minimisation education.

27. Service Delivery: We know that the current model of kerbside collections does not fit how the City will look in the future. Work is already underway in this area. This includes different procurement, funding and revenue models and innovation to fund activities like organic material management.

28. Assets and Infrastructure: Resource recovery centres will have a bigger role to play in the future, and the City will need to invest in better collection and processing infrastructure, including emergency waste management. The City is already looking to invest in sludge management, which will be a major focus for the next 24 months.

29. Partnerships, Advocacy and Manaakitanga: The Council cannot be solely responsible for progress and change in advancing waste minimisation, and in some instances, will not the best agency to undertake or drive waste minimisation-related initiatives. Waste streams such as construction and demolition waste reduction, and commercial and industrial waste management will often be influenced by Central Government in partnership with the private sector. However, the Council will need to carefully consider the levers available to effect change in this area, including the advocacy and the limits to the regulatory remit relating to implementation.

30. Regulation, Enforcement and Assurance: The Council has a suite of regulatory mechanisms available to support the above focus areas. These can help through compliance and enforcement, but also to collect data to inform decisions, and for evaluation and assurance.

31. From these focus areas, a total of 36 core work initiatives have been identified, resulting in a total of 51 work stream projects being proposed for implementation. Amongst other things, these projects include targeted behaviour change initiatives, service-related investigations and reporting, and several high-investment and /or significant projects.

32. Of note, the following high-investment and/or significant projects have been identified:

    - Review of the kerbside waste service arrangements with a goal to incentivise recycling and support waste diversion activities.

- Investigation into organic processing technology options and end markets, including community-based composting and technology-based processors.
- Assessment of feasibility of a community Resource Recovery Facilities and/or expansion of existing facilities supported by a review of available Council infrastructure and catchment mapping.
- Assess options to recover construction and demolition debris and make material available to contractors.

33. The draft Roadmap further provides a project implementation timeframe, proposing an immediate 1-3 year work programme, framed by a longer 4-10 year and 10+ year planning trajectory.

34. As the Council's current, formally adopted, Waste Management and Minimisation Plan (WMMP) will lapse in 2023, the attached Roadmap exists as a strategic waste planning tool, that will allow the Council to plan and potentially secure funding for future WMMP projects.

35. The following are identified as key performance measures within the roadmap. These measures are considered necessary for proxies for assessing waste programme effectiveness:

- Reduce whole of life carbon impacts of waste
- Reduce household waste
- Reduce commercial and industrial waste
- Reduce the waste generated from council activities

36. Councillors will additionally have an opportunity to consider, and set, detailed waste reduction targets related to each performance measure. This opportunity to set these targets will come following the completion of the next Regional Waste Assessment in 2022.

37. As the next Regional Waste Assessment will provide the Council with a comprehensive summary of the most up to date waste data available to Wellington City, it will help ensure that the Council is well placed to consider and set targets related to the new waste programme.

Kōwhiringa

Options

38. As this paper is primarily intended to outline the initial findings of the Strategic Waste Review process, and to signal the related role of the formal financial and WMMP planning processes, the identification of alternate strategy or work programme options is not appropriate at this time.

Whai whakaaro ki ngā whakataunga

Considerations for decision-making

Alignment with Council's strategies and policies

39. During the development of the draft Roadmap, a review of the following documents, reports and policies was carried undertaken to inform linkages with wider Council strategic plans, policies and key drivers with the potential to influence and shape the implementation pathway for the draft Roadmap:

    - Wellington Region Waste Management and Minimisation Plan (2017-2023)
    - Wellington City Council Vision 2040, Community Outcomes and Long-Term Direction
    - Te Atakura – First to Zero (2019)
    - Kōrero mai - Annual Plan 2020-21
    - Long-Term Plan 2021-31

40. As a result of this policy review, the draft Roadmap is highly consistent with the strategic documents identified above.

41. For a more detailed social, environmental, cultural and economic breakdown of the level of alignment of the workstreams contained within the roadmap in relation to the Council's Vision 2040, Community Outcomes and Long Term Direction, see Attachment 1, Appendix 3.

Engagement and Consultation

42. Key areas that will require detailed engagement are likely to be:
    - The review of the kerbside waste service arrangements with a goal to incentivise recycling and support waste diversion activities.
    - Investigation into organic processing technology options and end markets, including community-based composting and technology-based processors.
    - Assessment of feasibility of a community Resource Recovery Facilities and/or expansion of existing facilities supported by a review of available Council infrastructure and catchment mapping.

Implications for Māori

43. During preliminary discussions with Taranaki Whānui ki te Upoko o te Ika and Ngāti Toa Rangatira, respective Iwi representatives have indicated general support for the Strategic Waste Review and Roadmap development work.

44. As the draft Roadmap is implemented, the Council will seek to partner further with Iwi to ensure the potential implications for Māori are fully understood, and to ensure Iwi have early opportunities to provide input into, and feedback on draft provisions.

45. Te Tiriti o Waitangi principles of Waka hourua/Partnership, Tiakitanga/Protection, and Whai wāhi/Participation, are recognised as being principles that are highly relevant to the draft Roadmap.

46. As it is the intent of the draft Roadmap/He Ara, He Para Iti, to value and incorporate Te Ao Māori when giving effect to proposed waste minimisation work programme, the principles of Partnership, Protection and Participation have also more broadly been recognised as principles that should guide how the Council will work with both mana whenua and the community to deliver the Roadmap. This working approach commits the Council to:

- Endeavour to act as kaitiakitanga to protect and enhance the mauri of resources by working towards a circular economy approach.
- Engage with, empower and involve our community in changing behaviour and solutions.
- Apply a waste hierarchy approach, to increasingly shift our effort and focus towards enabling redesign, reduction and reuse.

Financial implications

47. A detailed implementation plan will be developed to set out the investment requirements, funding model implications and potential funding options for each initiative. In turn this will be integrated into Council planning processes.

Legal considerations

48. Collectively, the Local Government Act (2002), the Waste Minimisation Act (2008), the Litter Act (1979), the Climate Change Response Act (2002), the Resource Management Act (1991), and the Health Act (1956), provide a legislative framework for waste management and minimisation in New Zealand.

49. While the Council is not required to provide any waste or recycling facility or service, in accordance with the Waste Minimisation Act, it is required to promote effective and efficient waste management and minimisation within its city or district. The Council is also required to adopt a Waste Management and Minimisation Plan, and to review this plan at least every 6 years.

50. It is noted that the draft Roadmap has been informed by a critical review of the Council's existing Wellington Region Waste Management and Minimisation Plan, and that it is intended to inform the development of the next Council Waste Management and Minimisation Plan in 2023.

51. In summary, the draft Roadmap provides the Council with a critical framework for rethinking the current waste minimisation work programme, and it is anticipated to inform inputs into the 2022/2023 Waste Management and Minimisation Plan process. As such, these formal plan making processes will ensure that appropriate levels of engagement and consultation will be undertaken on any new waste minimisation programme advanced by the Council.

52. For the reasons above, there are no known legal risks associated with either the strategic waste review update report, or the draft Roadmap contained in Attachment 1.

Risks and mitigations

53. Overall, the strategic waste review update report and associated draft Roadmap are considered low risk.

Disability and accessibility impact

54. There will be no adverse disability or accessibility impacts as a result of the strategic waste review update report or the associated draft Roadmap.

Climate Change impact and considerations

55. The draft Roadmap sets out a range of projects that have the potential to reduce Council's and City's greenhouse gas emissions. The Roadmap also proposes the

reducing the whole of life carbon impacts of waste be considered as a future waste programme performance measure.

56. The actual extent to which the proposed waste minimisation projects will support greenhouse gas reduction will depend on the scope of new projects that are advanced and funded.

Communications Plan

57. No Communications Plan is necessary at this point in time. However, an associated Communications Plan will be required at the time of WMMP development in 2022/2023.

Health and Safety Impact considered

58. No health and safety implications will result of the Council receiving the information contained within this report.

Ngā mahinga e whai ake nei

Next actions

59. If adopted in principle, officers will develop an implementation plan.

.

Attachments

Attachment 1. Draft Wellington City Council Waste Minimisation Roadmap ⇩ Page 113

Attachment 2. WCC High Level Roadmap ⇩ Page 163

Draft Wellington City Council Waste Minimisation Roadmap

He Ara, He Para Iti | A Pathway, Minimal Waste

Draft Version 8.0

04 October 2021

Kupu Taka: Glossary of Terms and Abbreviations

Glossary of Terms

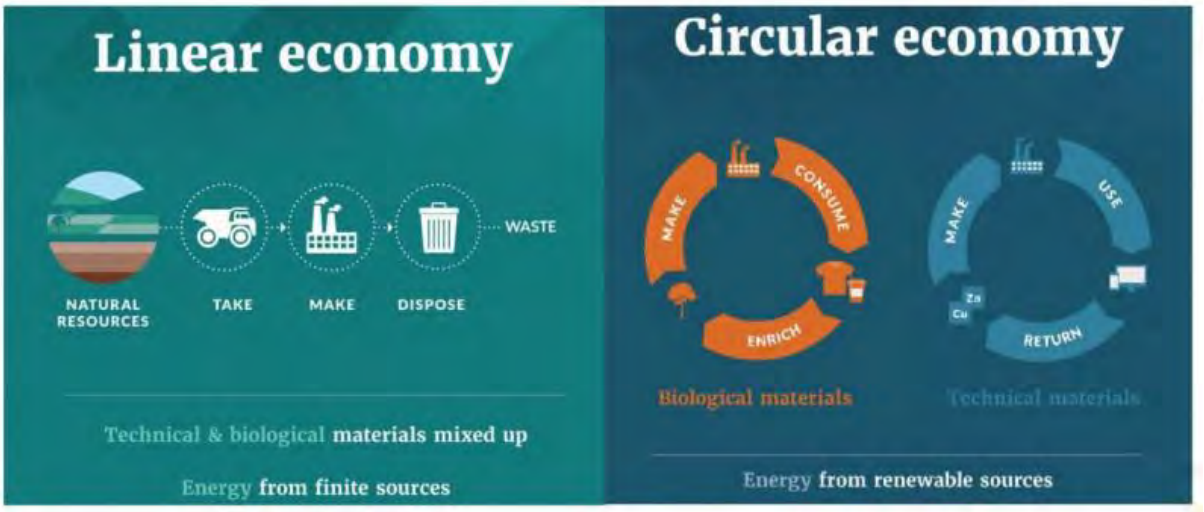
He Ara, He Para Iti. A Pathway, Minimal Waste

Kaitiakitanga whakanaonga - Product stewardship. To enable and partner with communities and businesses to reduce resource use and waste

Manaakitanga - The expression of wellbeing, nurturing relationships and engaging with one another. Manaakitanga also extends to the land that needs care in order to ensure sustainability for future generations. Manaakitanga is derived from two words: 'mana' and 'aki'. Mana is a condition that holds everything in the highest regard. Aki means to uphold or support. Extending Manaakitanga requires respect, humility, kindness and honesty[1].

Ōhanga āmiomio - Circular economy. A circular economy is an alternative to the traditional linear economy in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life. When a product is designed for the longest use possible, and can be easily repaired, remanufactured or recycled (or used, composted and nutrients returned) we consider it to have a circular life cycle. A circular economy is fuelled by renewable energy (e.g., solar, hydro, wind and tidal power, and biofuels)[2]

Diagram 1: Linear economy and Ōhanga āmiomio circular economy[3]



Pitomata - Potential

Pūnaha whakarōpū para - Waste hierarchy. A decision-making tool which assists with determining the best approach to take during the assessment of options. It is based on the concept that that reducing, reusing, recycling and recovering waste is preferable to disposal, which in New Zealand generally means a landfill site. Enabling a waste hierarchy approach requires investment in the necessary infrastructure.

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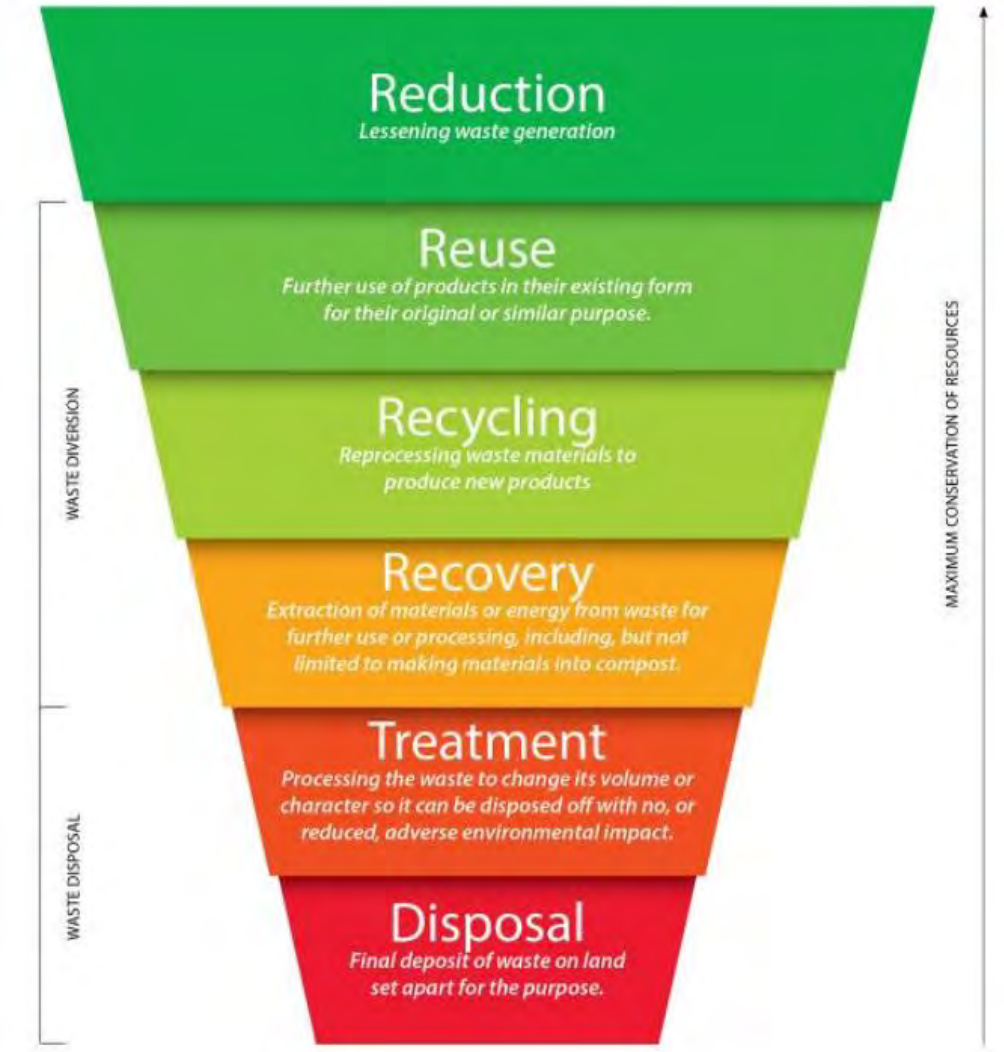
[1] Manaakitanga — Independent Māori Statutory Board (imsb.maori.nz)
[2] Zero Waste International Alliance http://zwia.org/standards/zw-definition/
[3] Diagram from Ministry for the Environment https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/ohanga-amiomio-circular-economy/

Diagram 2: Pūnaha whakarōpū para - Waste hierarchy



Rawa taiao - Environmental resources

Te Aronga – Purpose

The Roadmap - Wellington City Council Waste Minimisation Roadmap

Tiakitanga - Protection

Whai wāhi - Participation

Waka hourua - Partnership

Whakahaere rauemi - Resource management

Whakahaere hūrokuroku i te para - Sustainable waste management

Whakamahi anō -Reuse and recovery

Abbreviations

CAPEX – Capital Expenditure

C&D – Construction and Demolition Debris

KPI – Key Performance Indicator

KPM – Key Performance Measure

MCA – Multi-Criteria Analysis

OECD – Organisation for Economic Co-operation and Development

OPEX – Operating Expenditure

SWAP - Solid Waste Analysis Protocol

WCC – Wellington City Council

WMMP - Waste Management and Minimisation Plan

Te Aronga: Purpose of the Waste Minimisation Roadmap

The Wellington City Council Waste Minimisation Roadmap (the Roadmap) provides a strategic 30-year framework for the management and minimisation of waste and waste-resources within Wellington City.

A key focus of this Roadmap is to support Wellington City's goal to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery; and rethinking how Wellington City manages waste and how this material should be managed into the future. In line with the waste hierarchy, this Roadmap presents a new Council waste programme, which places more emphasis on waste prevention and behaviour change and maximising the benefits and use of materials over disposal.

The Roadmap identifies the key workstreams, infrastructure projects, and high-level funding implications that will need to be considered for the Council to effect change and achieve desired waste minimisation goals. Together this provides a suite of short, medium and long-term pathways that can be applied to change behaviours and influence societal waste norms within Wellington City.

The projects and initiatives presented in this document consequently include contractual and procurement considerations, the role of partnerships and advocacy, service delivery, infrastructure, regulation and enforcement. It also points to new opportunities for rethinking the Council's existing waste operations business model, which as it stands, both funds and constrains waste reduction within Wellington City.

The Roadmap has been informed by a critical review of the Council's existing Wellington Region Waste Management Plan (2017-2023) and the current waste programme operating model.

As a strategic revisioning document, the Roadmap is intended to provide a bridge to, and foundation for the development of the next Council Waste Management and Minimisation Plan in 2023.

This Roadmap is structured around the following:

- He Ara Hou: Developing the Roadmap – What is the need for change and what we are trying to achieve?
- He Whāinga, He Mātāpono: Our Waste Minimisation Goal, Objectives and Guiding Principles – Where should we focus our effort?
- Ara Whakatinana: Implementation pathway – How can we get there?

He Ara Hou: Developing the Roadmap

The **Council's Vision** and Role of the Roadmap

The Roadmap has been developed in the context of Council's vision for 'Wellington 2040', as an inclusive, sustainable and creative capital for people to live, work and play.

This vision is supported by four community outcomes that reflect the four dimensions of wellbeing. The outcomes below provide a long-term outlook for the City and form the basis for all the Council's activities, including the provision of waste-related servicing and the delivery of waste minimisation projects within the community (see Image 1 below).

Image 1: Wellington City's Community Outcomes (2021-2031)

(Image from the Long Term Plan 2021-2031, Vol 1, p14).

The Council has further worked in partnership with the community to identify the need to prioritise the following waste and carbon-related action over the next 3-years:

- **An accelerating zero-carbon and waste-free transition** – with communities and the city economy adapting to climate change, development of low carbon infrastructure and buildings, and increased waste minimisation.

Given the Council's recognition and declaration of an ecological and climate emergency in 2020, and the more recent adoption of Te Atakura First to Zero Implementation Plan (which aims to ensure that Wellington is a net zero emission city by 2050), the Roadmap exists as a mechanism through which the Council can accelerate the zero-carbon and waste-free transition for the community.

The Roadmap does this by creating a new policy framework for rethinking Council operational waste management and minimisation planning and delivery, and connecting waste issues and concerns with climate change concerns.

The Roadmap also aligns with, or enables the delivery of the following policy documents:

- The Wellington Region Waste Management and Minimisation Plan (2017-23)
- Wellington Towards 2040: Smart Capital
- The Spatial Plan
- Council Procurement Strategy
- Wellington City Council Vision 2040, Community Outcomes and Long-Term Direction
- Te Atakura – First to Zero (2019)
- Kōrero mai - Annual Plan 2020-21
- Long-Term Plan 2021-31
- Waste Operations Team work programme

A review of these reports and policies was carried out to help inform linkages with wider Council strategic plans, policies and key drivers that may influence and shape the implementation pathway for this Roadmap. As well as WCC reports and documents, a review of current central government activities helped inform and shape the timeframe to support the Roadmap implementation, including climate change activities, waste work programme to help transition Aotearoa New Zealand to a low emissions economy, expansion of the landfill levy, revision of the Waste Minimisation Act 2008, revision of the Waste Strategy and product stewardship scheme developments.

International and National Context

Aotearoa New Zealand has one of the highest rates of household waste production per capita in the OECD[4]. Many of the products used for every-day life are often designed with limited thought for the life cycle of the product meaning the majority of products currently produced and the behaviours by which consumers purchase and use these products is linear (take-make-dispose) in nature.

Along with international drivers including the China National Sword policy and the COVID-19 global health pandemic impacts on the recycling markets, there is now growing awareness and acceptance that countries must look at reducing the impacts of manufactured products on our environment through a circular (make-use-return) economy. To help progress this transition, the New Zealand Government is encouraging producers, brand owners, importers, retailers and consumers to take greater responsibility to transition from a linear to a ōhanga āmiomio - circular economy. This might include improved recovery potential of products, designing products that have greater recyclable content or ensuring there is a responsible means of recycling a product.

As global economies and populations grow, continued pressure is put on Papatūānuku and rawa taiao - natural resources to produce the wide range of products available on the

[4] https://www.mfe.govt.nz/consultations/priorityproducts

market. The Platform for Accelerating the Circular Economy[5] reported that the global increase in material resource use is predominantly due to several factors including global reliance on virgin materials rather than making better use of existing resources, ongoing addition to the global stock of housing, infrastructure and machinery to service a growing population and lack of end-of-life processing as well as the poor design of products.

It is clear that continued population growth and demand for products and services will continue to place pressure on rawa taiao - environmental resources, and to limit this, it will require countries to implement policies that improve whakahaere rauemi - resource management and ensure sustainable materials management building on the principles of the pūnaha whakarōpū para - waste hierarchy of reduce, reuse and recycle.

Regulatory Context

Collectively, the Local Government Act (2002), the Waste Minimisation Act (2008), the Litter Act (1979), the Climate Change Response Act (2002), the Resource Management Act (1991), the Health Act (1956) and Te Tiriti o Waitangi – The Treaty of Waitangi, provide a legislative framework for waste management and minimisation in New Zealand. These Acts provide legislative direction to support the implementation of the New Zealand Waste Strategy (2010), which is currently under review.

While the Council is not required to provide any waste or recycling facility or service, in accordance with the Waste Minimisation Act, it is required to promote effective and efficient waste management and minimisation within its city or district.

The Council is also required to adopt a Waste Management and Minimisation Plan, and to review this plan at least every 6-years. The Roadmap provides a foundation for the review and development of the next Council Waste Management and Minimisation Plan in 2023.

See Appendix 1 for a wider discussion on the evolving regulatory context within New Zealand, as well as a summary of the global drivers influencing the transition towards a circular economy.

Strategic Waste Review

To inform the development of the Roadmap, a strategic review of the Council's waste programme commenced in mid-2021. The primary purpose of this review is to consider the effectiveness of the existing waste programme in line with the City's environmental and carbon aspirations, identifying both opportunities for improvement and a pathway for achieving any areas of necessary change. This work has led to the identification of a revised set of waste programme goals and objectives which guide the priorities in this Roadmap.

The preliminary findings of the review highlighted that there is a need for Wellington City to refocus its role and efforts in relation to waste minimisation and management. The key drivers for change are as follows:

- **Leadership**: Wellington City wants to be a leader in waste minimisation, but this is not possible under the constraints of current policy settings, including funding policy.
- **Investment**: significant funding will be required to underpin the implementation and provision of enhanced waste services for the City.

[5] The Platform for Accelerating the Circular Economy (PACE) is a public-private collaboration mechanism and project accelerator for the circular economy. The Platform aims to: Develop blended financing models for circular economy projects, in particular in developing and emerging economies.

- **Stakeholder expectations**: The current business model and focus do not meet expectations from stakeholders or the Wellington community, with the existing business model limiting the City's progress towards a low waste future.
- **Best practice**: The current model does not reflect best practice and is not in line with changing legislative, national and international policy direction (see Appendix 1).
- **Focus of effort**: Resources and effort are focused on waste collection, recycling and disposal, rather than waste minimisation and realising opportunities for change.

The review process confirmed that in response to these challenges, there was a need to develop a clear and actionable plan for what Wellington City aims to achieve from waste and resource management, including how this will be delivered and funded. This plan has emerged in the form of a Roadmap, which provides a framework that will guide and integrate the decisions that will shape and inform the Council's waste programme. Such matters and decisions will include:

- Identification of opportunities to change the waste operations business model
- Modelling and decisions that will inform the review and extent of any Council kerbside collections contracts
- Investigating waste infrastructure and capacity issues
- Investment plan mapping to support waste service provision
- Utilisation of Council procurement processes to enable change
- Focus and opportunities for regional collaboration and partnerships
- Opportunities arising from changes to waste levy and government policy/legislation
- Reviewing and addressing waste-related enforcement issues
- Review of the existing Regional Waste Management and Minimisation Plan (WMMP), and a foundation for the next WMMP

He Whāinga, He Mātāpono: Our Waste Minimisation Goal, Objectives and Guiding Principles

In line with the Council's 2040 vision and informed by the strategic waste review, the following **goal** has been developed to set the strategic direction for the Roadmap.

Waste Minimisation Goal

Wellington City is a leader in minimising use of resources and maximisation of whakamahi anō - reuse and recovery

In support of this goal, the draft Roadmap sets out three **objectives and a suite of guiding principles** that have informed the initiatives contained in the Implementation Plan and Workstreams contained in Appendix 2.

The following objectives seek to promote a holistic approach to waste minimisation planning and delivery in line with Te Ao Māori. Accordingly, these objectives attempt to reflect the significance of the interconnectedness and interrelationship between all living and non-living things that is essential within the Māori world view.

Objectives

- ***Ōhanga āmiomio (circular economy)*** *- To mitigate the environmental impacts of Wellington City by reducing resources used and increasing reuse and recovery of resources*[6]
- ***Kaitiakitanga whakanaonga (product stewardship)*** *- To enable and partner with communities and businesses to reduce resource use and waste*
- ***Whakahaere hūrokuroku i te para* (*sustainable waste management)*** *– Manage any remaining waste in the most sustainable way and in accordance with the principles of the pūnaha whakarōpū para (waste hierarchy)*

[6] The 2021 circularity gap report has found that a circular economy is key to ensuring we stay within 1.5 degrees of global warming. https://www.circularity-gap.world/2021

When giving effect to programme of work contained in the Roadmap, the following guiding principles of Te Tiriti o Waitangi – The Treaty of Waitangi are proposed to guide how the Council will work with both Mana Whenua and the community to deliver the Roadmap.

'He tirohanga Māori i te para me te mahi hangarua (Māori views on waste and recycling) emphasise whakapapa (genealogical) connections between humans and the natural world.

The respect for natural resources and the materials made from them is demonstrated by maintaining their value for as long as possible before they reach the end of their life, at which point they are disposed of in a way that causes the least harm to Papatūānuku. In this way, he tirohanga Māori i te para precedes the concept of a circular economy (ōhanga āmiomio) but similarly acknowledges the mauri (life force) of natural resources'.

WasteMINZ, 2020, Recommendations for standardisation of kerbside collections in Aotearoa, p10

Guiding Principles

- **Waka hourua: Partnership** – Council will look to partner and enable delivery of outcomes by working with and through others
- **Tiakitanga: Protection** – we will endeavour to act as kaitiaki to protect and enhance the mauri of resources by working towards a circular economy approach
- **Whai wāhi: Participation** – we will engage with, empower and involve our community in changing behaviour and solutions
- **Pitomata: Potential** – we will apply a waste hierarchy approach to our approach, to increasingly shift our effort and focus towards enabling redesign, reduction and reuse

This working approach with Mana Whenua and the community commits WCC to:

- Endeavour to act as kaitiakitanga to protect and enhance the mauri of resources by working towards a circular economy approach
- Engage with, empower and involve our community in changing behaviour and solutions
- Apply a waste hierarchy approach, to increasingly shift our effort and focus towards enabling redesign, reduction and reuse

Key Performance Measures, Focus Areas, Initiatives and Workstreams

To support Wellington City's goal to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery, it was necessary to establish a clear understanding of the elements required to achieve this goal. This meant rethinking how Wellington City should manage its waste, and what should be characterised as waste.

As a result of the WMMP review process, it also become apparent that the establishment of key performance measures were also necessary for the Council to track, and periodically assess, the effectiveness of the waste programme in establishing Wellington City Council as a leader in waste minimisation.

The following sections subsequently outline the Key Performance Measures, Focus Areas, Priorities and Initiatives, each in turn influencing and shaping the range of Workstreams/Programmes that form the foundation of this Roadmap. These workstreams/programmes have been developed to incorporate the current Council waste work programme and future programmes that are either in the development phase and/or will be shaped by, for example, Aotearoa New Zealand's changing waste regulatory framework (e.g., updated Waste Minimisation Act 2008, updated National Waste Strategy, implementation of mandatory product stewardship schemes). By doing so, this Roadmap builds on the considerable amount of work already underway by the WCC and provides a guide to maximise the recovery of products and materials that would otherwise be disposed of at landfills.

Key Performance Measures

Four Key Performance Measures (KPMs) are proposed as proxies for ongoing assessment waste programme effectiveness. These measures as described in Table 1 below provide critical assessment measures that target varying aspects of the waste stream. As appropriate, they can be applied to maintain momentum in waste minimisation efforts and framework when considering the development of services and infrastructure scoped within the Roadmap.

In turn, the following KPMs have informed waste programme focus areas, key priorities, initiatives and specific workstream contained in the Roadmap (see Appendix 2).

Table 1: Key performance measures

Key Performance Measure	Why this is important
Reduce whole of life carbon impacts of waste	Aligned to the Council's declaration of a climate change and ecological emergency, the primary focus for the Roadmap is to reduce the whole of life carbon impacts from waste. This means reducing not only the carbon of waste that going into landfills, but also the carbon from production and consumption of goods[7].

[7] Roughly half of global emissions are generated by the production and consumption of goods. Source: Completing the Picture—How the Circular Economy Tackles Climate Change"; Ellen MacArthur Foundation (2019)

Key Performance Measure	Why this is important
	According to the 2019/20 City Emissions Inventory, waste comprises about 7.5% of city emissions (compared to 48% for Transport and 36% for Stationary Energy). Emissions at the Southern Landfill makes up 64% of the Council's carbon inventory, however this may change as the inventory is updated over the next two years to include a broader range of supply chain emissions. While Council has an important infrastructure and service delivery role to play as the manager of waste for the community, influencing the upstream creation of waste, and changing consumption decision-making and habits, is a challenging area and relies on behaviour change both from the community purchasing and disposing of products, and the industry creating the products. Achievement of the other three target areas will also help deliver on this carbon reduction target. The key initiative identified in the Long-Term Plan to deliver on waste minimisation and reduce carbon impacts is investment in a major new sludge minimisation facility at Moa Point. This facility will be effective in breaking the link between sludge disposal and municipal solid waste disposal at the Southern Landfill. This project is now proceeding through feasibility and investigation phases.
Reduce household waste	Residents in Wellington City are estimated to be generating approximately 141 kilograms of kerbside waste per person per annum[8]. However, overall, the general per capital disposal rate of waste to Class 1 landfill in Wellington City is approximately 507kg of waste per capita/per year[9]. These waste rates reflect the consumer nature of our economy and lifestyle and a challenge of changing how we will move towards consuming less as well as reusing and recycling more. Council has a statutory duty to not only ensure waste is managed effectively and efficiently, but also to minimise it. Our community has a strong expectation that Council will support and enable a reduction in household waste. Key areas of opportunity include: • Advocating for change in national level settings such as legislative settings and packaging to enable redesign and reduction in what we buy • Supporting and enabling people's choices through the services and infrastructure we provide or enable, including kerbside collections of waste and recycling

[8] Based on WCC Kerbside Waste Swap findings, 2018.

[9] In contrast to kerbside waste, this calculation additionally includes industrial, commercial, and manufacturing waste.

Key Performance Measure	Why this is important
	• Increasing our focus on the reuse of food and garden waste which is the biggest category of household waste at nearly 60 percent of what goes into Class 1 landfills • Encouraging people to change their approach to purchasing decisions, to avoid the upstream creation of downstream waste, and to enable more products to be in line with a circular economy approach
Reduce commercial and industrial waste	Waste generated by commercial and industrial uses includes that from construction and demolition, infrastructure projects and businesses. Much of this waste is disposed of at class 2-4 landfills which largely take inert material like soil and rock, from construction and roading projects. Class 2 landfills can take some construction waste like wood, plastic or glass, while Class 4 fills are essentially only allowed to take soil and rock etc. Neither of these landfills can legally accept any household or hazardous waste for disposal. We have less accurate data on how much waste goes into class 2-4 landfills from the City, however in 2015 it was estimated at around 525,000 tonnes of material went into Wellington region's class 2-4 landfills. While much of this material is inert and has potentially lower environmental impacts from disposal, the embodied emissions created in the production of these materials is still significant. By reducing the overall volume of waste through encouraging resource recovery, we can contribute to lowering whole of life carbon impacts Key areas of opportunity include: • Construction and demolition: Every new house constructed produces an estimated 4.5 tonnes of waste[10][11], with significant waste also being generated from every new commercial building and infrastructure projects. There is an opportunity to work with the sector to reduce and reuse this material • Business and commercial waste: a significant volume of waste is generated by businesses and other organisations like hospitals, schools and universities. There is an opportunity to support and enable changes to reduce this waste stream
Reduce the waste generated from council activities	Council activities span a very wide range of areas including planning and building regulation, roading management, parks and reserves management, construction and management of public buildings and community facilities including swimming pools, libraries and housing. Through operations and investment, there is relatedly an opportunity to demonstrate leadership in waste minimisation within this space.

[10] https://www.stuff.co.nz/environment/125829093/we-are-extremely-wasteful-is-it-time-to-dump-the-dumps

[11] https://www.level.org.nz/material-use/minimising-waste/

Key Performance Measure	Why this is important
	Key areas of opportunity include: • Ensuring a waste minimisation approach is reflected through our range of strategy and policy functions • Using our procurement processes to ensure we support and enable waste minimisation • Working with major events to reduce waste

It is acknowledged that to achieve each of the above KPMs a series of long-term disposal targets and key performance indicators will need to be established that will provide quantifiable measurements to assess performance. These targets and key performance indicators will be established after completion of the next waste assessment in 2022 and will inform the review and development of the next Council Waste Management and Minimisation Plan in 2023.

Focus Areas

Acknowledging the breadth of management responsibilities of the WCC Waste Operations Team, including oversight of disposal activities and waste diversion programs, the Roadmap needed to facilitate and support placing more emphasis on waste prevention and behaviour change and maximising the benefits and use of materials over disposal. Additionally, it was important to consider the wider implications of the Roadmap at both the Wellington City and wider Wellington Region level. This resulted in five recommended focus areas:

1. Behaviour Change and Education
    - *Develop and incorporate proactive and appropriate communication tools to engage and empower stakeholders and further promote a sustainable waste management future*
2. Service Delivery
    - *Develop, expand and enhance Council waste management programs and services while striving to reduce the amount of waste generated and disposed of*
3. Assets and Infrastructure
    - *Incorporate sustainability practices and develop more advanced waste management facilities and infrastructure in a fiscally, socially, culturally and environmentally responsible manner*
4. Partnerships, Advocacy and Manaakitanga
    - Develop*, enhance and maintain relationships with stakeholders to maximise resource recovery use, develop pull through product demand and establish end markets for recovered materials*
5. Regulation, Enforcement and Assurance
    - *Use* objectives*, monitoring, evaluation and enforcement compliance to measure the effectiveness of programs and services, facilities and infrastructure, and behaviour change and education to strive for continuous improvement*

It is also acknowledged that the population of Wellington City and economic growth will continue to increase coupled with decreasing landfill capacity over time. To minimise the impact of this growth on WCC's waste minimisation and management activities, reducing waste generation and increasing diversion from landfills will be a critical step through

measures such as regulation and enforcement, working in partnership with a range of stakeholders and government agencies and establishing a range of assets and infrastructure that support waste minimisation activities.

As such, five focus areas were established to provide the foundation for the development of a range of priorities areas and initiatives to maximise the recovery of products and materials that would otherwise be disposed of to landfill. These priority areas are discussed further in the following section.

Priority Areas

Within the Roadmap Focus Areas, a range of priority areas have been identified to reduce waste and divert material from landfills. The Priorities have been developed using the principals of the Pūnaha whakarōpū para - waste hierarchy and incorporate current WCC waste minimisation and management activities. The priority areas include a mix of "upstream" actions that identify ways to reduce materials entering the waste stream and "downstream" actions that manage materials currently entering landfills. Another critical priority includes behaviour change and community engagement related to establishing a future connected to waste minimisation behaviours. The priority areas also include providing for the development of suitable regulations, enforcement measures and assurance frameworks.

Within each focus area, 17 priority areas have been identified. The priority areas are detailed in Table 2 below.

Table 2: Roadmap focus and priority areas

Focus Area	Priority Areas
Behaviour Change and Education	Behaviour change and community engagement
	Stakeholder and Mana Whenua engagement and waste minimisation education
Service Delivery	Kerbside waste management
	Waste programme funding and revenue
	Organic material management
	Procurement
	Innovation
Assets and Infrastructure	Community resource recovery centre(s) to maximise social value and local economic development
	Sludge management
	Emergency waste management
	Collection and processing infrastructure options
Partnerships, Advocacy and Manaakitanga	Construction and demolition debris
	Commercial and industrial waste management
	Market development
	Central Government Advocacy
Regulation, Enforcement and Assurance	Regulation, compliance and enforcement
	Data, evaluation and assurance

Each priority area is discussed broadly below and will require further investigation and expansion to support implementation of this Roadmap.

- ***Behaviour change and community engagement***

Focused and relevant behaviour change and community engagement is needed to support WCC waste minimisation goals and objectives. Effective behaviour change and community engagement will support behavioural change that will support a reduced waste future for Wellington City and help educate stakeholders on opportunities to minimise waste, save money and have a benefit to the wider environment. Engagement with community also has the benefit of establishing strong relationships to support the effective implementation of WCC waste work programme.

- ***Stakeholder and Mana Whenua engagement and waste minimisation education***

Engaging with stakeholders and Mana Whenua is a critical component to support WCC goal to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery. Engagement with a range of stakeholders is key to ensuring feedback is incorporated into programmes/workstreams that facilitate buy-in and acknowledge the cultural identity of Mana Whenua. Waste minimisation education is another key element in establishing relevant information for stakeholders to engage with and influence waste minimisation behaviours.

- ***Kerbside waste management***

An important step in understanding the future of waste minimisation in Wellington City includes assessing WCCs role in future waste management. For example, this could include all kerbside waste services delivered by the Council rather than private contractors, development of a community resource recovery network, establishment of a kerbside food scrap collection service, approval or not of the current Southern Landfill, development a community resource recovery facility(ies), etc. This information will be critical to understanding which options will best support WCC's waste minimisation goals and objectives.

- ***Waste programme funding and revenue***

Ensuring adequate funding and investment is available to support WCC goal to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery and ensure the success of programmes/workstreams. Without adequate investment, delivery of the range of programmes/workstreams will be challenging.

- ***Organic material management***

Organic material, including green waste and food scraps represents a significant volume of material currently being disposed of to landfill. Acknowledging existing composting activities, the volume of food scraps currently disposed of to landfill presents an opportunity for collection and processing. Diverting the volume of food scraps from landfill disposal is a challenging task and may require significant investment in both collection and processing infrastructure. Further investigations will be required to support this including end-market investigations.

- ***Procurement***

Evaluating WCC procurement and purchasing processes is a step towards integrating waste minimisation activities into new contracts, including for example, reviewing purchasing policies to require a focus on reuse of Construction and Demolition materials, or to include recyclable or reusable/repairable products. Establishment of key performance indicators that encourage waste minimisation behaviours is another opportunity particularly in outcome-based contracts that include penalties/bonus payments as appropriate.

- ***Innovation***

Consistently driving for continued improvement is a key component in innovation, including consistently seeking opportunities and advocating for external and internal innovation to be embedded within delivery of WCC waste work programme.

- ***Community resource recovery centre(s) to maximise social value and local economic development***

Resource recovery centres are locations where materials can be dropped off for donation and provides a place to co-locate diversion related activities including composting, reuse, recycling, storage, processing and distribution. Resource recovery centres are well established internationally and nationally and provide an opportunity to collect items such as unwanted household items (e.g., furniture, whiteware, electronics, renovation materials) and surplus construction materials (e.g., timber, masonry) and on-sell these to customers. The benefit of such facilities is the recovery of items from landfill disposal as well as helping to extend the life of landfills, providing an alternative revenue stream, and creating employment and education opportunities.

- ***Sludge management***

WCC is currently investigating the removal of sludge from landfill for processing elsewhere, also supporting both environmental objectives and extending the life of the landfill.

- ***Emergency waste management***

Wellington City and the wider Aotearoa New Zealand is subject to natural disaster events from time to time and with this the generation of waste debris. Partnership with central government agencies and local government authorities throughout Aotearoa New Zealand is key to coordinating and establishing an efficient network of facilities to manage emergency waste debris as and when required.

- ***Collection and processing infrastructure options***

Cost and convenience are two of the most significant drivers of waste generation and disposal. Access to easy disposal methods is a key method by which consumers engage with waste minimisation activities (e.g., consistent kerbside collections) whilst supporting behaviour change initiatives. Establishing relevant processing infrastructure is critical in waste management activities as is the connection to collection methodologies and access to end-markets. WCC is making great progress towards improving waste management practices and continues to actively seek, develop and implement mechanisms to support continued improvement.

- ***Construction and demolition debris***

Construction and demolition (C&D) debris includes materials such as plasterboard, timber, masonry (bricks, concrete, ceramics, etc), carpet, plastics, pipes, soil. C&D represents a significant volume of material currently disposed of to landfills and represents an opportunity to work with industry organisations to facilitate deconstruction, sorting and on-selling to local markets to reduce this volume. Working with central government to advocate for the C&D sector to actively pursue collection and reuse of these materials as well as opportunities to set, diversion rates for C&D materials will potentially save developers money while benefiting the local economy and wider environment. The private sector will be critical in establishing and encouraging the collection and reuse of C&D materials.

- ***Commercial and industrial waste management***

As described above for C&D debris, the same process will be required for commercial and industrial waste management. To influence and help WCC to achieve the goal to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery, a holistic view incorporating all waste streams is required.

- ***Market development***

Additional materials recovered from the waste stream will result in more products and commodities for the market. Partnerships with central government regional local government, waste sector industries and organisations, community organisations and Mana Whenua to promote the development of remanufacturing and recycling businesses in Wellington City or the wider Wellington Region will help to create new markets while supporting the creation of meaningful employment opportunities. Materials presenting opportunities include, construction and demolition debris, food scraps, reuse of unwanted home items (e.g., furniture, whiteware).

- ***Central Government Advocacy***

Establishing a partnership relationship with central government is an important component in supporting WCC to become a leader in minimising the use of resources and maximising whakamahi anō – reuse and recovery. Establishing an open and trusted relationship will support advocacy on matters including but not limited to, product stewardship and encouraging manufacturers to rethink packaging and the subsequent implications on waste management activities.

- ***Regulation, compliance and enforcement***

Identifying and understanding the range of regulatory instruments to support programmes/workstreams that underpin compliance and enforcement activities is key to managing resources and efforts to minimise waste.

- ***Data, evaluation and assurance***

Identifying and understanding the waste environment (e.g., volumes, collection and disposal methods) will help to identify where resources and efforts are needed to support and measure progress towards WCC waste minimisation goals and objectives. This will help WCC to maximise short-term implementation programmes/workstreams while informing those that require greater time to implement.

Each of the identified priority areas provide the basis from which detailed initiatives have been established. The range of initiatives are discussed further in the following section.

Initiatives

Within the Priority Areas, a range of Initiatives were identified that provide the basis for further review, assessment and expansion into a list of programmes/workstreams. To support Wellington City in becoming a leader in minimising the use of resources and maximising whakamahi anō – reuse and recovery, the range of initiatives were identified to broadly:

- build on the success of the current WCC waste minimisation and management work programme
- provide for effective internal WCC and external behaviour change and community engagement

- facilitate effective stakeholder and Mana Whenua engagement
- integrate continuous improvement and innovation
- further develop and enhance existing waste minimisation and management programs and services
- identify new opportunities to recover resources and maximise social value and economic development
- provide for effective evaluation of waste quantities

The 36 Initiatives were identified through a review of existing WCC waste information, including an understanding of key waste volumes from quantitative waste assessments (e.g., organic volumes, construction and demolition debris (C&D)) as well as existing waste minimisation activities (e.g., review of kerbside collections). Alongside the review of the current state of waste in Wellington City, was the inclusion of a look ahead to the future based on a review of current central government activities, including climate change, activities to help Aotearoa New Zealand transition to a low emissions economy, expansion of the landfill levy, revision of the Waste Minimisation Act 2008 and the Waste Strategy. The outcome of this review was the identification of the 36 Initiatives which were then consulted and engaged on with internal WCC and external stakeholders.

For ease of reading and for clarity, the following pages condense and summarise the range of Initiatives, by Priority Area and Focus Area. Each page can be read independently of the other and provides the reader with an easy reference guide to the management and minimisation of waste within Wellington City.

Each of the Initiatives are further expanded in more detailed programmes/workstreams which are discussed in the following section.

The process by which these initiatives will be implemented and the timeframe for when each will be actioned is further detailed in the “Ara Whakatinana: Implementation Pathway” section.

Focus Area 1

Behaviour Change and Education

Develop and incorporate proactive and appropriate communication tools to engage and empower stakeholders and further promote a sustainable waste management future

Priority 1: Behaviour Change and Community Engagement

Develop a targeted community engagement plan to support waste minimisation activities including behaviour change and consumer consumption attitudes

- Develop a targeted community engagement plan to support waste minimisation activities including behaviours change and consumer consumption attitudes
- Support existing and encourage the establishment of community awards competition programs to encourage community waste reduction initiatives

Establish partnership relationships with Mana Whenua to encourage Iwi to work with their networks to pursue waste reduction

- Embed the Māori worldview into waste activities, project planning and delivery

Develop a targeted community communication plan with usability for a range of audiences including schools

- Develop education material focussed on Zero Waste, waste hierarchy and waste minimisation activities focussed on for example, acknowledging culture and ethnic diversity in waste minimisation activities

Priority 2: Stakeholder and Mana Whenua Engagement and Waste Minimisation Education

Engage with and educate local businesses and organisations on recycling programs that can reduce their waste volumes, increase recycling and reduce waste management costs

- Develop targeted education materials to support engagement with local business organisation

Educate the public on waste minimisation activities and wider sustainability initiatives to raise awareness and understanding of Council activities

- Produce education material collateral including for example, social media updates, educational material for processing/recycling options

Integrate awareness and knowledge of waste minimisation throughout all Wellington City Council departments and teams

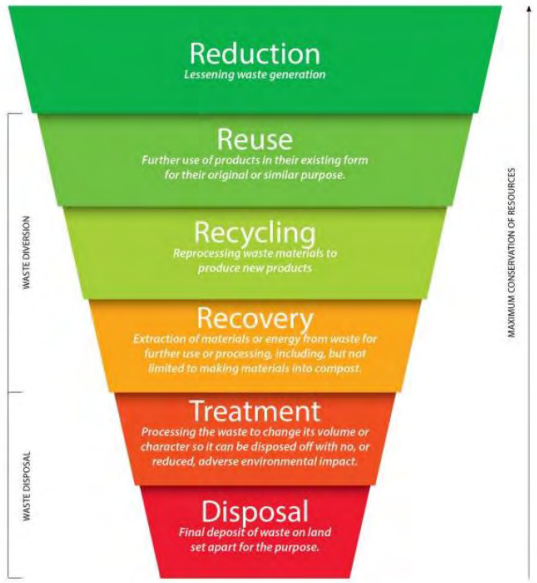
- Provide technical input and training into WCC projects and programmes and lead training sessions to educate staff
- Waste minimisation to be integrated into all WCC procurements supported by technical input

Provision of waste minimisation initiatives at events

- WCC to become leaders in event waste management best practice
- Provide consistent recycling materials
- Work with event organisers to encourage and facilitate uptake of recycling, reuse and waste minimisation initiatives

Internal Wellington City Council behaviour change

- Embed waste minimisation activities throughout WCC plans including Annual Plan, WMMP vision, goals and objectives



Focus Area 2

Service Delivery

Develop, expand and enhance Council waste management programs and services while striving to reduce the amount of waste generated and disposed of

Priority 1: Kerbside Waste Management

Assess current revenue arrangements to align with WCC waste minimisation efforts

- Review current kerbside waste service arrangements with a goal to incentivise recycling and support waste diversion activities and providing options for service delivery and funding

Priority 2: Waste Programme Funding and Revenue

Identify funding sources to support projects and programmes acknowledging potential future changes to current waste funding model

- Understand where efficiencies can be gained and/or where additional funding is needed to support successful project and programme outcome and identify alternative funding sources to support projects and programmes to augment revenue that may be lost from waste reduction efforts

Annually review program expenditures and revenues

- Annual review of waste programme and projects for Ministry for the Environment Waste Minimisation Funding

Priority 3: Organic Material Management

Council to support and maximise where possible residential organic and food scrap diversion and recovery

- Investigate options to maximise diversion and recovery of residential food scraps and residential green waste
- Investigate organic processing technology options and end-markets, including community-based composting and technology-based processors

Evaluate options to support commercial businesses including the hospitality and restaurant sector to manage food scrap volumes

- Support those businesses that produce large amounts of food scraps a to identify ways to reduce volumes and/or identify opportunities for collection and processing to reduce food scrap volumes

Encourage and incentivise the use of processed organic material for Council application to supplement commercial fertilisers and help to reduce expenditure

- Work with internal teams responsible for managing parks, gardens, sports fields to:
    - identify areas where processed organic material can supplement commercial fertilisers
    - assess financial benefits of using processed organics across the Council portfolio

Priority 4: Procurement

Collaborate with construction companies to identify areas to incorporate waste reduction behaviours

- Investigate opportunities to establish procurement Key Performance Indicators (KPIs) encouraging waste minimisation behaviours

Evaluate WCC procurement and purchasing processes

- Investigate areas to minimise waste by assessing internal resource consumption that would normally be disposed to landfill
- Review purchasing policies to include purchasing of products that are recyclable, compostable, reusable, repairable, supportive of being locally or nationally manufactured

Initiative 5: Innovation

Consistently seek opportunities and advocate for external and internal innovation to be embedded within delivery of WCC waste work programme

- Evaluate and confirm the range of mechanisms to support innovation

Focus Area 3

Assets and Infrastructure

Incorporate sustainability practices and develop more advanced waste management facilities and infrastructure in a fiscally, socially, culturally and environmentally responsible manner

Priority 1: Community Resource Recovery Centre(s) to Maximise Social Value and Local Economic Development

Explore development of a Community Resource Recovery Facility(ies) and/or expansion of existing facilities in Wellington City to increase residential reuse and recycling of unwanted items and divert waste from landfill

- Carry out a due diligence exercise to assess feasibility of a Community Resource Recovery Facility(ies) and/or expansion of existing facilities supported by a review of available Council infrastructure and catchment mapping with suitable sites identified
- Investigate opportunities for community led facility(ies) or working in partnership with social enterprise organisations to create local employment, create local economic development opportunities and to empower the community
- Explore investment options for a facility and/or network of facilities

Priority 2: Sludge Management

Investigate options to remove sludge disposal to landfill

- Investigate options to remove sludge disposal to landfill and process via alternative treatment technologies

Priority 3: Emergency Waste Management

Establish an emergency waste management plan in partnership and in alignment with central government agencies and national approaches

Priority 4: Collection and Processing Infrastructure Options

Evaluate options to encourage the development of a range of collection and processing infrastructure options and which are aligned to social, cultural, economic and environmental outcomes

- Assess city and regional waste forecasts including central government waste programme developments and evaluate collection and processing options
- Engage with manufacturers and producers to evaluate feedstock capacity needs, product requirements and feedstock volume constraints

Focus Area 4

Partnerships, Advocacy and Manaakitanga

Develop, enhance and maintain relationships with stakeholders to maximise resource recovery use, develop pull through product demand and establish end markets for recovered materials

Priority 1: Construction and Demolition Debris

Maximise diversion of construction and demolition debris

- Assess incentives to promote deconstruction and the use of salvaged materials
- Assess options to recover construction and demolition debris and make material available to contractors
- Set diversion requirements for construction and demolition materials and incorporate within contracts
- Engage with construction industry stakeholders to identify tangible opportunities for the use of sorted C&D materials and actively encourage use of recycled and repurposed materials within Wellington City and the wider region
- Support the preparation of a deconstruction guide in collaboration with, for example, construction industry stakeholders, waste management providers and central government

Priority 2: Commercial and Industrial Waste Management

Engage with and partner with developers and construction contractors to establish tangible outcomes to ensure the principles of the waste hierarchy are built into the development process and reduce waste generated from construction activities

- Support and encourage developers to ensure new waste management plans incorporate suitable mechanisms to measure, minimise and collect waste from sites

Priority 3: Market Development

Determine how to incentivise the use of recycled products or reuse for businesses

- Support Central Government engagement with stakeholders including businesses and manufacturers to understand barriers to reuse and develop incentives to encourage reuse behaviour and opportunities

Encourage and foster new sustainable businesses and remanufacturing facilities to locate/establish within Wellington City/Region

- Develop relationships with local businesses, producers, manufacturers, central government agencies, business agencies to understand what is needed to support local remanufacturing opportunities

Evaluate options to include recycled material KPIs within contracts - outcome-based contracts

- To encourage suppliers to focus on reducing waste production and where possible include the use of recycled materials in projects

Work in partnership with central government agencies to advocate for mechanisms to support waste reduction activities aligned with the principals of the waste hierarchy

- Evaluate the range of mechanisms and/or legislative instruments needed from central government to support waste minimisation activities in Wellington City including activities to support and encourage pull-through demand of recycled products

Priority 4: Central Government Advocacy

Actively engage with central government agencies via a range of mechanisms including partnership relationships, representation on working groups, support/lead submissions to government on specific topics

Work with central government departments to provide clarity on legislative developments influencing regional and national waste minimisation activities

Focus Area 5

Regulation, Enforcement and Assurance

Use objectives, monitoring, evaluation and enforcement compliance to measure the effectiveness of programs and services, facilities and infrastructure, and behaviour change and education to strive for continuous improvement

Priority 1: Regulation, Compliance and Enforcement

Council regulations reflect waste minimisation goals and objectives

- Provide strategic guidance and information to internal Council teams ensuring regulations and policies are consistent with and integrate waste minimisation goals and objectives

Confirm available enforcement options to incentivise waste minimisation behaviours

- Review Council legislative instruments and evaluate enforcement options - waste bylaw, contractual arrangements

Establish a compliance and enforcement monitoring work programme

Confirm and secure capacity and capability to support compliance and enforcement requirements

- Provide any additional resourcing and capability necessary to support an effective waste compliance and enforcement programme

Priority 2: Data, Evaluation and Assurance

Evaluate and measure the success of existing programs and consider new programs

- Review the effectiveness of both regulatory and non-regulatory actions and establish and/or update appropriate frameworks where required to monitor progress against agreed outcomes

Establish targets linked to waste reduction goals and objectives which may include targets for recycling, diversion, organics collection

- Procurement contracts to include, for example, Key Performance Indicators and/or Performance Measures for contractors to provide transparent data on recycling, diversion and waste reduction activities, and require contractors to report on wider operational climate change impacts (where applicable) to report on material end-fate

Develop waste data calculations including waste estimates to provide the basis for waste management plans

- Use waste management data to establish estimates of waste generation during demolition, construction and ongoing use of the site and how these waste types are stored and removed for recycling and/or disposal to inform future related policies and regulation for C&D waste

Understand the quantities of waste moving through the waste management systems

- Establish a regionally aligned system of Waste Operator Licensing (in 2023) for improved data capture
- Establish waste licensing criteria
- Establish collaborative relationships with organisations including retailers, businesses, schools etc to understand waste production quantities and flows
- Undertake regular waste audits at points throughout the waste management system, including establishing waste licensing criteria and regular Solid Waste Analysis Protocol (SWAP) audits

Workstreams

The ability for this Roadmap to support the targeted implementation of the specific workstreams for each of the initiatives, priorities and focus areas, is a critical element to the success of this Roadmap. In doing so, Wellington City Council hopes to become a leader in minimising the use of resources and maximising whakamahi anō – reuse and recovery.

For each of the 36 Initiatives, there are a range of ways that these can be delivered. These have been identified as potential workstreams that may require further expansion in detailed implementation plans, including budgets, resourcing and delivery timeframes as appropriate. After consultation and engagement with internal WCC stakeholders, 51 workstreams were identified; with some that can be acted on now and with others that will require implementation over a longer timeframe. The list of workstreams is extensive, so for ease of reading the reader is referred to Appendix 2 which clearly sets out the focus areas, priority areas, initiatives and workstreams; including a look at the implementation timeframe.

The range of workstreams identified and included in this Roadmap include and build on the existing WCC extensive waste work programme with the intent to not 'reinvent the wheel' but rather to incorporate and build on existing knowledge and project work. The workstreams included in this Roadmap also acknowledge the evolving waste management sector in Aotearoa New Zealand and the Wellington Region and so include workstreams that address current issues (e.g., kerbside collections, disposal to landfill) and take a view on preparing for the future (e.g., Community Resource Recovery Facility(ies), mandatory product stewardship schemes (e.g., Container Return Scheme)). By doing so, the identified workstreams included in this Roadmap are built on a strong foundation which has been expanded on to help Wellington City place more emphasis on waste prevention and behaviour change and maximising the benefits and use of materials over disposal.

Further, the range of workstreams included in this Roadmap are not intended to be all-inclusive; with some that can be acted on now and with others that will be implemented over a longer timeframe. With this in mind, the Roadmap sets out a clear implementation pathway for the identified workstreams established over three realistic and achievable time periods (0-3 years, 4-10 years, 10+ years). The implementation pathway is discussed further in the following section.

Ara Whakatinana: Implementation pathway

The Roadmap sets out an informed, achievable and deliverable implementation pathway to deliver on the Goal and Key Performance Measures. This is based on recognition that not all priority areas and initiatives can be achieved immediately and the role of the Roadmap, to provide an achievable long-term plan to transition Wellington into becoming a leader in waste minimisation.

The Roadmap implementation pathway was developed by assessing the Priority Areas, Initiatives and Workstreams through a semi-quantitative multi-criteria analysis (MCA) approach; developed in consultation with WCC internal stakeholders. The MCA criterion included:

- Alignment with the Roadmap goal, objectives and principles, including applying a waste hierarchy approach
- The impact the workstreams would have on the delivery of the focus areas (e.g., the likely level of benefits)
- High-level qualitative cost and investment required (i.e., CAPEX and OPEX)
- Timeframes, including lead times required
- Responsibility (e.g., the Council, partnership, community, business or government)
- Ease of implementing the respective workstreams
- Alignment with WCC 2040 Community Outcomes and Long-Term Direction[12]

A critical criteria is ensuring sufficient investment is allocated and secured to ensure the successful implementation of the Roadmap. It is important to note that for WCC to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery, significant investment will be required to support the range of programmes/workstreams which form the foundation of this Roadmap.

Further, it was clear from the extensive list of workstreams that not all could be achieved at the same time due to the considerable workload, resourcing implications and investment required to achieve this. Acknowledging these constraints, three implementation timeframes were established to align with several key WCC strategic programmes of work, including the next RWMMP, Long-Term Plan and Annual Plan. The three agreed timeframes were as follows:

- Within the next 3-years
- Between the 4- to 10-year period
- Beyond 10-years

Each workstream was then assigned against the respective timeframe resulting in a clear implementation pathway (Appendix 2).

The result of the measurement framework assessment process is detailed in Appendix 3 and should be read alongside this section for greater detail.

In summary, Table 3 below provides a high-level overview of each focus and priority area across these implementation timeframes. See Appendix 2 for a more detailed breakdown of each timeframe programme phase, and Appendix 3 for information on respective delivery timeframes, workstream prioritisation rankings and cost implications for the Council.

[12] About the Council - Vision - Wellington City Council

Table 3: Focus areas and priorities by implementation timeframe

Implementation Timeframe	Focus Area	Priority Area
1-3 years	Behaviour Change and Education	Behaviour change and community engagement
		Stakeholder and Mana Whenua engagement, and waste minimisation education
	Service Delivery	Kerbside waste management
		Organic material management
		Procurement
		Waste programme funding and revenue
	Assets and Infrastructure	Community resource recovery centre(s) to maximise social value and local economic development
		Sludge management
	Partnerships, Advocacy and Manaakitanga	Central Government Advocacy
	Regulation, Enforcement and Assurance	Regulation, compliance and enforcement
		Data, evaluation and assurance
4-10 years	Behaviour Change and Education	Stakeholder and Mana Whenua engagement and waste minimisation education
	Service Delivery	Organic material management
	Assets and Infrastructure	Collection and processing infrastructure options
	Partnerships, Advocacy and Manaakitanga	Construction and demolition debris
		Commercial and industrial waste management
		Market development
	Regulation, Enforcement and Assurance	Regulation, compliance and enforcement
		Data, evaluation and assurance
10+ years	Behaviour Change and Education	Behaviour change and community engagement
	Service Delivery	Organic material management
		Innovation
	Assets and Infrastructure	Emergency waste management
	Partnerships, Advocacy and Manaakitanga	Construction and demolition debris

While this Roadmap sets out a new approach for minimising waste within Wellington City, it is important to recognise that not all workstreams can be achieved immediately. In itself, this highlights the role of the Roadmap, to provide an achievable long-term plan to transition Wellington into becoming a leader in waste minimisation.

Investment and Delivery Planning

Investment, resources and detailed planning will be required for the Council to deliver on the breadth of the projects and workstreams detailed within the proposed work programme. The costs of delivering the Roadmap will therefore need to be clearly scoped and identified in the Council associated financial planning processes commencing in 2022.

A more detailed investment plan will be developed, setting out the investment requirements, funding model implications and potential funding options for Council consideration. This Plan will be developed in early 2022.

Planning and implementation of the Roadmap and specific initiatives will require a comprehensive and coordinated programme approach rather than just the delivery of individual projects to ensure interdependencies are managed. Specific initiatives will require project plans within this framework and more complex initiatives may also need further business cases or feasibility investigations to ensure that these are fully scoped and tested before final commitments are made to implementation.

Delivery planning will be developed in parallel with the investment plan and will confirm how the initiatives in the Roadmap will be resourced, timing, sequencing and integration of initiatives, engagement requirements, risk management, procurement processes and benefits realisation.

Kupu Whakamutunga: Conclusion and Next Steps

Conclusion

Achieving a waste minimisation future for Wellington City is a complex and challenging goal but there are considerable benefits, including:

- Facilitating community and Mana Whenua based waste minimisation programs
- Protecting the environment
- Facilitating behaviour change
- Reducing the dependence on landfills and exporting waste
- Creating meaningful employment
- Motivation to establish a cost-effective and equitable waste management service for Wellington City

This Roadmap provides the strategic direction for WCC to become a leader in minimising use of resources and maximising whakamahi anō - reuse and recovery and sets out the implementation pathway to support WCC to effectively and efficiently deliver the range of workstreams.

Next Steps

To support the effective delivery of the range of workstreams, there are several key steps that will require further development, including but not limited to:

- establishment of a series of long-term disposal targets and key performance indicators to provide quantifiable measurements to assess performance. These targets and key performance indicators will be established after completion of the next waste assessment in 2022 and completion of the next Wellington Waste Management and Minimisation Plan.
- detailed implementation plans identifying funding, resourcing, timeframes and identification of any dependencies with related workstreams
- detailed investment plans, including CAPAX/OPEX and other funding allocations

Further, it is recommended that the Roadmap be considered a ‘living document’ supported by regular reviews and updates.

Tāpiritanga: Appendix 1: International drivers and national change

As part of the strategic waste review, a high-level assessment was undertaken of how waste is managed globally as well as international drivers and enablers of change. This was to inform best practice as well as contextual opportunities or challenges that will enable the delivery of the Roadmap.

Globally, there is growing awareness and recognition that economies must transition from a linear (make-use-dispose) economy to ōhanga āmiomio - circular (make-use-return) economy. Recent international market changes including restrictions by China on the importation on waste and recyclables has highlighted the need to take a closer look at the way New Zealand manages its waste, including current onshore processing and recycling. To achieve this, Government has established and enacted several key legislative documents that set the requirements for waste minimisation and management. In addition, the Government has ratified several international agreements to manage New Zealand's impact on the global waste sector.

Within New Zealand, key changes and enablers impacting on the future of waste minimisation include:

- **National waste strategy**[13] - development of a new waste strategy for New Zealand that will set the direction and guide investment. The draft strategy is expected to be released for consultation in late 2021.
- **Review of the waste legislation**[14] - Ministry for the Environment have recognised the need to strengthen various legislative provisions to support the broad waste work programme, including regulated product stewardship schemes and a national plastics action plan. The intent of the review will also support the new national waste strategy by providing tools and incentives to transform the waste sector and help transition to a more circular and resource-efficient economy. Draft legislation is expected to follow consultation on the national waste strategy.
- **Product stewardship:** The Government has declared six priority products for regulated product stewardship which are part of the plan to reduce the amount of waste being disposed of to landfills or polluting the environment. Ministry for the Environment is currently working with stakeholders on the scope of these schemes.
- Plastic packaging
- Tyres
- Electrical and electronic products (e-waste)
- Agrichemicals and their containers
- Refrigerants
- Farm plastics
- **Waste levy**: Progressive increases and expansion of application of the waste disposal levy is underway[15] - starting on 01 July 2021 and will run to July 2024. At present the waste levy only applies to municipal landfills (Class 1) that receive household waste with no levy on the remaining approximate 90% of nationwide landfills (e.g., construction and demolition fills). The levy will increase from $10/tonne to $20/tonne for Class 1 municipal landfills followed by a staged increase for the remaining Class 2

[13] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/national-waste-strategy-under-development/
[14] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/waste-legislation-review/
[15] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/waste-disposal-levy/

(construction and demolition fill), Class 3 (managed fill) and Class 4 (controlled fill) beginning on 01 July 2022.

- **Container Return Scheme** - Internationally, container return schemes incentivise the return of beverage containers for recycling and/or refilling through the inclusion of a refundable deposit (e.g., 10-cents or more) applied at the point of purchase. Consumers receive their deposit back when the container is returned empty to a selected recycling drop-off location. Consultation on a potential scheme may occur in early 2022.
- **Standardise kerbside collection** - To make it easier for households to recycle, the government is considering options to standardise kerbside collection systems as well as packaging labelling. Consultation on potential options may occur in early 2022.
- **Rethinking plastics**[16] - The 2019 'Rethinking Plastics in Aotearoa New Zealand' report produced by the Office of the Prime Minister's Chief Science Advisor sets out an aspirational vision for 2030 where 'New Zealanders are innovative world leaders in reducing plastic use and in limiting the amount of plastics found in our environment'. The report made 51 recommendations with many underway.

[16] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/actions-underway-in-response-to-the-rethinking-plastics-report/

Tāpiritanga: Appendix 2: Implementation Plan and Workstreams

IMPLEMENTATION PLAN: 1-3 Year Programme

Focus Area	Priority Area	Initiative	Workstream
Behaviour Change and Education	Behaviour change and community engagement	Develop a targeted community engagement plan	Support waste minimisation activities including behaviour change and consumer consumption attitudes
		Establish partnership relationships with Mana Whenua to encourage Iwi to work with their networks to pursue waste reduction	Embed the Māori worldview into waste activities, project planning and delivery
		Develop a targeted community communication plan with usability for a range of audiences including schools	Develop education material focussed on Zero Waste, waste hierarchy and waste minimisation activities
	Stakeholder and Mana Whenua engagement, and waste minimisation education	Educate the public on waste minimisation activities and wider sustainability initiatives to raise awareness and understanding of Council activities	Produce education material collateral
		Integrate awareness and knowledge of waste minimisation throughout all Council departments and teams	Provide technical input and training into Council projects and programmes and lead training sessions to educate staff
			Waste minimisation to be integrated into all Council procurements supported by technical input
		Provision of waste minimisation initiatives at events	Council to become leaders in event waste management best practice
			Provide consistent recycling materials at all Council run events
			Work with event organisers to encourage and facilitate uptake of recycling, reuse and waste minimisation initiatives
		Internal Council behaviour change	Embed waste minimisation activities throughout Council plans
Service Delivery	Kerbside waste management	Assess current revenue arrangements to align with Council waste minimisation efforts	Review current kerbside waste service arrangements with a goal to incentivise recycling and support waste diversion activities
	Organic material management	Council to support and maximise where possible residential organic and food scrap diversion and recovery	Investigate options to maximise diversion and recovery of residential food scraps
			Investigate organic processing technology options and end-markets, including community-based composting and technology-based processors
		Encourage and incentivise the use of processed organic material for Council	Work with Council teams responsible for managing parks, gardens, sports fields to:

Focus Area	Priority Area	Initiative	Workstream
		application to supplement commercial fertilisers and help to reduce expenditure	o identify where processed organic material can supplement commercial fertilisers o assess financial benefits of using processed organics across the Council portfolio
	Procurement	Collaborate with construction companies to identify areas to incorporate waste reduction behaviours	Investigate opportunities to establish procurement KPIs encouraging waste minimisation behaviours
		Evaluate Council procurement and purchasing processes	Investigate areas and ways to minimise waste production
			Review purchasing policies to include products that are recyclable, compostable, reusable, repairable, supportive of being locally or nationally manufactured
	Waste programme funding and revenue	Annually review program expenditures and revenues	Understand where efficiencies can be gained and/or where additional funding is needed to support successful project and programme outcome and identify alternative funding sources
		Identify funding sources to support projects and programmes acknowledging potential future changes to current waste funding model	Annual review of waste programme and projects for Ministry for the Environment Waste Minimisation Funding
Assets and Infrastructure	Community resource recovery centre(s) to maximise social value and local economic development	Explore development of a Community Resource Recovery Facility(ies) and/or expansion of existing facilities in Wellington City to increase residential reuse and recycling of unwanted items and divert waste from landfill	Carry out a due diligence exercise to assess feasibility of a Community Resource Recovery Facility(ies) and/or expansion of existing facilities supported by a review of available Council infrastructure and catchment mapping with suitable sites identified
			Investigate opportunities for community led facility(ies) or working in partnership with social enterprise organisations to create local employment, create local economic development opportunities and to empower the community
			Explore investment options for a facility and/or network of facilities
	Sludge management	Investigate options to remove sludge disposal to landfill	Investigate options to remove sludge disposal to landfill and process via alternative treatment technologies
Partnerships, Advocacy and Manaakitanga	Central Government Advocacy	Central government advocacy on a range of issues, including but not limited to: o producer and manufacturer responsibility o recycled material market demand and end-markets o application of waste levy funding	Actively engage with central government agencies including partnership relationships, representation on working groups, support/lead submissions to government on specific topics
			Work with central government departments to provide clarity on legislative developments influencing regional and national waste minimisation activities

Focus Area	Priority Area	Initiative	Workstream
		o provision of foundation legislative instruments that are workable at a regional level	
Regulation, Enforcement and Assurance	Regulation, compliance and enforcement	Council regulations reflect waste minimisation goals and objectives	Waste Team to provide strategic guidance and information to internal teams ensuring regulations and policies are consistent with and integrate waste minimisation goals and objectives
		Confirm available enforcement options to incentivise waste minimisation behaviours	Review Council legislative instruments and evaluate enforcement options - waste bylaw, contractual arrangements
		Establish a compliance and enforcement monitoring work programme	Establish a monitoring framework including: o educating/engaging and incentivisation to promote and encourage compliance o identification of waste programme efficiencies o ongoing programme improvements/developments o identification and investigation of potential compliance breaches o establishment of appropriate enforcement action where a breach is confirmed
	Data, evaluation and assurance	Establish targets linked to waste reduction goals and objectives - targets for recycling, diversion, organics collection	Procurement contracts to include, for example, KPIs, Performance Measures for contractors to provide transparent data on recycling, diversion and waste reduction activities, reporting on wider operational climate change impacts (where applicable) such as material end-fate
		Understand the quantities of waste moving through the waste management systems	o Establish a regionally aligned system of Waste Operator Licensing (in 2023) for improved data capture o Establish waste licensing criteria o Establish collaborative relationships with organisations including retailers, businesses, schools etc to understand waste production quantities and flows o Undertake regular waste audits at points throughout the waste management system, including establishing waste licensing criteria and regular Solid Waste Analysis Protocol (SWAP) audits

IMPLEMENTATION PLAN: 4-10 Year Programme

Focus Area	Priority Area	Initiative	Workstream
Behaviour Change and Education	Stakeholder and Mana Whenua engagement and waste minimisation education	Engage with and educate local businesses and organisations on recycling programs to reduce waste volumes, increase recycling and reduce management costs	Develop targeted education materials to support engagement with local business organisations
Service Delivery	Organic material management	Evaluate options to support commercial businesses including the hospitality and restaurant sector to manage food scrap volumes	Support those businesses that produce large amounts of food scraps to identify ways to reduce volumes and/or identify opportunities for collection and processing
Assets and Infrastructure	Collection and processing infrastructure options	Evaluate options to encourage the development of a range of collection and processing infrastructure options and which are aligned to social, cultural, economic and environmental outcomes	Assess city and regional waste forecasts including central government waste programme developments and evaluate collection and processing options
			Engage with manufacturers and producers to evaluate feedstock capacity needs, product requirements and feedstock volume constraints
Partnerships, Advocacy and Manaakitanga	Construction and demolition (C&D) debris	Maximise diversion of C&D debris	Assess incentives to promote deconstruction and the use of salvaged materials
			Assess options to recover C&D debris and make material available to contractors
			Set contractual diversion requirements for C&D materials
			Engage with construction industry stakeholders to identify tangible opportunities to recycle and repurpose sorted C&D materials
	Commercial and industrial waste management	Engage with and partner with developers and construction contractors to reduce waste generated from construction activities	Support and encourage developers to ensure new waste management plans measure, minimise and collect waste from sites
	Market development	Determine how to incentivise the use of recycled products or reuse for businesses	Support Central Government engagement with stakeholders including businesses and manufacturers to understand barriers to reuse and develop incentives to encourage reuse opportunities
		Encourage and foster new sustainable businesses and remanufacturing facilities to locate/establish within Wellington City/Region	Develop relationships with local businesses, producers, manufacturers, central government agencies, business agencies to understand what is needed to support local remanufacturing opportunities
		Evaluate options to include recycled material KPIs within contracts	Encourage suppliers to focus on reducing waste production and where possible include the use of recycled materials in projects

Focus Area	Priority Area	Initiative	Workstream
		Work in partnership with central government agencies to support waste reduction activities aligned with the principals of the waste hierarchy	Evaluate the range of mechanisms and/or legislative instruments needed from central government to support waste minimisation activities in Wellington City including activities to support and encourage pull-through demand of recycled products
Regulation, Enforcement and Assurance	Regulation, compliance and enforcement	Confirm and secure capacity and capability to support compliance and enforcement requirements	Provide any additional resourcing and capability necessary to support an effective waste compliance and enforcement programme
	Data, evaluation and assurance	Evaluate and measure the success of programs	Review the effectiveness of both regulatory and non-regulatory actions and establish and/or update appropriate frameworks where required to monitor progress against agreed outcomes
		Develop waste data calculations including waste estimates to provide the basis for waste management plans	Use waste management data to establish estimates of waste generation during demolition, construction, stored/removed for recycling/disposal

IMPLEMENTATION PLAN: 10+ Year Programme

Focus Area	Priority Area	Initiative	Workstream
Behaviour Change and Education	Behaviour change and community engagement	Develop a targeted community engagement plan to support waste minimisation activities	Support existing and encourage the establishment of a community awards competition program
Service Delivery	Organic material management	Support and maximise where possible residential organic and food scrap diversion and recovery	Investigate options to maximise diversion and recovery of residential green waste
	Innovation	Consistently seek opportunities and advocate for external and internal innovation to be embedded within delivery of Council waste work programme	Evaluate and confirm the range of mechanisms to support innovation including: o embed innovation within waste procurements and contracts o encourage innovation in reducing waste through engagement with a range of stakeholders o encourage, promote and facilitate integration of waste hierarchy principles
Assets and Infrastructure	Emergency waste management	Establish an emergency waste management plan in partnership and in alignment with central government agencies and national approaches	Establish the following information sources: o establish lines of communication and responsibilities o storage areas for stockpiling of emergency waste debris o identify suitably qualified contractors o identify and confirm facilities to recycle/ dispose of debris o support recovery and reuse of debris as far as practicable
Partnerships, Advocacy and Manaakitanga	Construction and demolition debris	Maximise diversion of construction and demolition debris	Support the preparation of a deconstruction guide

Tāpiritanga: Appendix 3: Workstream Programme Against Semi-Quantitative Multi-Criteria Analysis - KEY

Workstream Priority		Definition
H	High	High alignment with Waste Roadmap KPMs and objectives High alignment to achieving significant waste reduction
MH	Moderately High	Moderately high alignment with Waste Roadmap KPMs and objectives Moderately high alignment to achieving significant waste reduction
ML	Moderately Low	Moderately low alignment with Waste Roadmap KPMs and objectives Moderately low alignment to achieving significant waste reduction
L	Low	Low alignment with Waste Roadmap KPMs and objectives Low alignment to achieving significant waste reduction

Ease of Implementation		Definition
HC	High Complexity	High number of stakeholders involved and complexity High resourcing required
MC	Moderate Complexity	Moderate number of stakeholders involved and complexity Moderate resourcing required
LC	Low Complexity	Limited number of stakeholders involved and complexity Implementation can primarily be managed in-house by staff and minimal additional resources required

Indicative High-Level Cost (CAPEX and OPEX)	
$	< $1 Million
$$	< $5 Million
$$$	< $10 Million
$$$$	< $20 Million
$$$$$	< $30 Million
$$$$$$	> $30 Million

Alignment with Roadmap Key Performance Measures, Council 2040 Vision and Long-Term Direction		Definition
+++	High	High alignment with Council pillars
++	Moderate	Moderate alignment with Council pillars
+	Neutral	Neutral alignment with Council pillars

Roadmap Key Performance Measures	
KPM 1	Reduced whole of life carbon impacts from waste
KPM 2	Reduced household waste
KPM 3	Reduce commercial and industrial waste
KPM 4	Reduce the waste generated from council activities

Wellington City Council Vision 2040	
Environmental Wellbeing	A city where the natural environment is being preserved, biodiversity improved, natural resources are used sustainably, and the city is mitigating and adapting to climate change – for now and future generations
Social Wellbeing	An inclusive, liveable and resilient city where people and communities can learn, are connected, well housed, safe and healthy
Cultural Wellbeing	Wellington is a vibrant, creative city with the energy and opportunity to connect, collaborate, explore identities and openly express, preserve and enjoy arts, culture and heritage
Economic Wellbeing	The city is attracting and developing creative talent to enterprises across the city, creating jobs through innovation and growth while working towards an environmentally sustainable future

Wellington City Council Long-Term Direction	
Environmental	Our natural ecosystem health is being restored, with a growing native biodiversity and innovative nature-based solutions to climate change. A quality natural environment is attractive and accessible to all Wellingtonians and visitors. An increasingly waste free city with more responsible disposal and accelerating reuse. A functioning, resilient and reliable three waters network with improving harbour and waterway quality and, reducing water usage and waste. A sustainable urban environment incorporating water sensitive urban design.
Social	Children and young people are thriving in diverse and inclusive neighbourhoods. Communities and cultures are connected, thriving, have a sense of identity and enjoy access to open public spaces. Access to affordable, good quality and resilient homes. Our older, disabled or most vulnerable
Cultural	Our cultures, community diversity and inclusive city life are nurtured celebrated and enriched. Wellington's history and built heritage is celebrated and supports a strong sense of identity and place. Sites of significance to mana whenua are preserved and recognised as part of city's identity. There is a vibrant, thriving, and creative, arts and cultural sector with pathways for emerging creative talent. The city has resilient and fit-for-purpose community, creative and cultural spaces for people to connect, develop and express their arts, culture and heritage.
Economic	A recovering city economy is diversified, growing sustainably, and resilient. Talent and businesses are attracted and retained to the city where it is easy to start, develop skills, innovate and grow. A compact central city that is the economic heart of the region with thriving suburban centres. The city offers opportunities for education, employment and experiences that contribute to residents' high quality of life. The city's core transport infrastructure is a safe, resilient, reliable and efficient network that supports active transport choices, and an efficient, productive and sustainable economy. A thriving Māori economy is generating incomes, jobs, and opportunities for rangatahi, iwi, hapū and whānau Māori to grow.

1-3 Year Programme Against Multi-Criteria Analysis Criterion – Roadmap Key Performance Measures, Council 2040 and Long-Term Directions

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
Behaviour Change and Education	Behaviour change and community engagement	Develop a targeted community engagement plan	30+ years	Support waste minimisation activities including behaviour change and consumer consumption attitudes	30+ years	In development	H		$	Council-Community / Mana Whenua Partnership	MC	++	+++	+	+	+++	+++	+++	++
		Establish partnership relationships with Mana Whenua to encourage Iwi to work with their networks to pursue waste reduction	30+ years	Embed the Māori worldview into waste activities, project planning and delivery	30+ years	To be initiated	H		$$	Council-Community / Mana Whenua Partnership	HC	++	+++	++	++	+++	+++	+++	++
		Develop a targeted community communication plan with usability for a range of audiences including schools	30+ years	Develop education material focussed on Zero Waste, waste hierarchy and waste minimisation activities	30+ years	In progress	H		$$	Council	MC	++	+++	+	+	+++	+++	+++	++
	Stakeholder and Mana Whenua engagement, and waste minimisation education	Educate the public on waste minimisation activities and wider sustainability initiatives to raise awareness and understanding of Council activities	30+ years	Produce education material collateral	30+ years	In progress	H		$$$	Council	MC	++	+++	+++	++	+++	+++	+++	+
		Integrate awareness and knowledge of waste minimisation throughout all Council departments and teams	10+ years	Provide technical input and training into Council projects and programmes and lead training sessions to educate staff	10+ years	In development	H		$$	Council	LC	+++	+	++	++	+++	++	+++	+
				Waste minimisation to be integrated into all Council procurements supported by technical input	10+ years	To be initiated	H			Council	MC	+++	++	++	++	+++	++	+++	+
		Provision of waste minimisation initiatives at events	10+ years	Council to become leaders in event waste management best practice	0-5 years	In progress	H		$	Council	LC	+++	+	+	++	+++	++	+++	+
				Provide consistent recycling materials at all Council run events	10+ years	In progress	MH		$$	Council	MC	+++	+	+	++	+++	++	+++	+
				Work with event organisers to encourage and facilitate uptake of recycling, reuse and waste minimisation initiatives	5+ years	In development	MH			Council-Industry Partnership	MC	+++	+	+	++	+++	++	+++	+
		Internal Council behaviour change	30+ years	Embed waste minimisation activities throughout Council plans	30+ years	In progress	H		$$	Council	MC	+++	++	++	++	+++	++	+++	+
Service Delivery	Kerbside waste management	Assess current revenue arrangements to align with Council waste minimisation efforts	0-5 years	Review current kerbside waste service arrangements with a goal to incentivise recycling and support waste diversion activities	0-5 years	In progress	H		$$	Council	HC	+++	+++	++	+	+	+	+	+++

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
	Organic material management	Council to support and maximise where possible residential organic and food scrap diversion and recovery	5+ years	Investigate options to maximise diversion and recovery of residential food scraps	5+ years	In progress	H	$$$$$	$$$$	Council	HC	+++	+++	+	+	+++	+++	+++	+++
				Investigate organic processing technology options and end-markets, including community-based composting and technology-based processors	5+ years	To be initiated	H			Council	HC	+++	+++	++	+	+++	+++	+++	+++
		Encourage and incentivise the use of processed organic material for Council application to supplement commercial fertilisers and help to reduce expenditure	5+ years	Work with Council teams responsible for managing parks, gardens, sports fields to: *identify where processed organic material can supplement commercial fertilisers *assess financial benefits of using processed organics across the Council portfolio	5+ years	To be initiated	ML		$$	Council	HC	+++	+	+	++	+++	+	+	+++
	Procurement	Collaborate with construction companies to identify areas to incorporate waste reduction behaviours	20+ years	Investigate opportunities to establish procurement KPIs encouraging waste minimisation behaviours	20+ years	To be initiated	H		$$	Council-Industry Partnership	HC	+++	+	++	+	+++	+	+	+++
		Evaluate Council procurement and purchasing processes	20+ years	Investigate areas and ways to minimise waste production	20+ years	In progress	H		$$	Council	MC	+++	+	+	++	+++	+	+	+++
				Review purchasing policies to include products that are recyclable, compostable, reusable, repairable, supportive of being locally or nationally manufactured	20+ years	In progress	H			Council	LC	+++	+	+	++	+++	+	+	+++
	Waste programme funding and revenue	Annually review program expenditures and revenues	10+ years	Understand where efficiencies can be gained and/or where additional funding is needed to support successful project and programme outcome and identify alternative funding sources	10+ years	To be initiated	H		$	Council	LC	+++	+++	+++	++	+++	+	+	+++
		Identify funding sources to support projects and programmes acknowledging potential future changes to current waste funding model	30+ years	Annual review of waste programme and projects for Ministry for the Environment Waste Minimisation Funding	30+ years	To be initiated	MH		$	Council	LC	+++	+++	+++	++	+++	++	+++	+++
Assets and Infrastructure	Community resource recovery centre(s) to maximise social value	Explore development of a Community Resource Recovery Facility(ies) and/or expansion of existing facilities in Wellington City to	0-5 years	Carry out a due diligence exercise to assess feasibility of a Community Resource Recovery Facility(ies) and/or expansion of existing	0-5 years	In development	H	$$$$	$$$$	Council	HC	+++	++	++	++	+++	++	+++	+++

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
	and local economic development	increase residential reuse and recycling of unwanted items and divert waste from landfill		facilities supported by a review of available Council infrastructure and catchment mapping with suitable sites identified															
				Investigate opportunities for community led facility(ies) or working in partnership with social enterprise organisations to create local employment, create local economic development opportunities and to empower the community	0-5 years	In development	H			Council-Community / Mana Whenua Partnership	HC	+++	++	++	++	+++	+++	+++	+++
				Explore investment options for a facility and/or network of facilities	0-5 years	In development	H			Council	HC	+++	++	++	++	+++	+++	+++	+++
	Sludge management	Investigate options to remove sludge disposal to landfill	0-5 years	Investigate options to remove sludge disposal to landfill and process via alternative treatment technologies	0-5 years	In progress	H	$$$$$	$$$	Council	HC	+++	+	+	++	+++	++	++	+++
Partnerships, Advocacy and Manaakitanga	Central Government Advocacy	Central government advocacy on a range of issues, including but not limited to: o producer and manufacturer responsibility o recycled material market demand and end-markets o application of waste levy funding provision of foundation legislative instruments that are workable at a regional level	30+ years	Actively engage with central government agencies including partnership relationships, representation on working groups, support/lead submissions to government on specific topics	30+ years	In progress	H		$$	Council-Central Government Partnership	MC	+++	+	+	+	+++	+++	+++	+
				Work with central government departments to provide clarity on legislative developments influencing regional and national waste minimisation activities	30+ years	In development	H		$$	Council Advocacy	HC	+++	++	++	++	+++	++	++	+++
Regulation, Enforcement and Assurance	Regulation, compliance and enforcement	Council regulations reflect waste minimisation goals and objectives	5+ years	Waste Team to provide strategic guidance and information to internal teams ensuring regulations and policies are consistent with and integrate waste minimisation goals and objectives	5+ years	In progress	H		$	Council	MC	+++	+	+	++	+++	+++	+++	+
		Confirm available enforcement options to incentivise waste minimisation behaviours	5+ years	Review Council legislative instruments and evaluate enforcement options - waste bylaw, contractual arrangements	5+ years	In progress	H		$$	Council	LC	+++	+	+	++	+++	++	+++	++
		Establish a compliance and enforcement monitoring work programme	0-5 years	Establish a monitoring framework including: *educating/engaging and incentivisation to promote and encourage compliance	0-5 years	In development	H		$$	Council	MC	+++	+	+	++	+++	++	++	++

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
				*identification of waste programme efficiencies *ongoing programme improvements/developments *identification and investigation of potential compliance breaches establishment of appropriate enforcement action where a breach is confirmed															
	Data, evaluation and assurance	Establish targets linked to waste reduction goals and objectives - targets for recycling, diversion, organics collection	0-5 years	Procurement contracts to include, for example, KPIs, Performance Measures for contractors to provide transparent data on recycling, diversion and waste reduction activities, reporting on wider operational climate change impacts (where applicable) such as material end-fate	0-5 years	In progress	MH		$$	Council-Industry Partnership	HC	+++	++	++	+++	+++	++	+++	+++
		Understand the quantities of waste moving through the waste management systems	30+ years	*Establish a regionally aligned system of Waste Operator Licensing (in 2023) for improved data capture *Establish waste licensing criteria *Establish collaborative relationships with organisations including retailers, businesses, schools etc to understand waste production quantities and flows *Undertake regular waste audits at points throughout the waste management system, including establishing waste licensing criteria and regular SWAP audits	30+ years	In progress	H		$$	Council-Industry Partnership	MC	+++	+	+	++	+++	++	++	++

4-10 Year Programme Against Multi-Criteria Analysis Criterion – Roadmap Key Performance Measures, Council 2040 and Long-Term Directions

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
Behaviour Change and Education	Stakeholder and Mana Whenua engagement and waste minimisation education	Engage with and educate local businesses and organisations on recycling programs that can reduce their waste volumes, increase recycling and reduce waste management costs	30+ years	Develop targeted education materials to support engagement with local business organisations	30+ years	To be initiated	MH		$$	Council-Industry Partnership	LC	++	++	+++	+	+++	++ +	+++	+
Service Delivery	Organic material management	Evaluate options to support commercial businesses including the hospitality and restaurant sector to manage food scrap volumes	10+ years	Support those businesses that produce large amounts of food scraps to identify ways to reduce volumes and/or identify opportunities for collection and processing	10+ years	To be initiated	MH	$$	$$	Council Advocacy	MC	+++	+++	+	+	+++	+	+	+++
Assets and Infrastructure	Collection and processing infrastructure options	Evaluate options to encourage the development of a range of collection and processing infrastructure options and which are aligned to social, cultural, economic and environmental outcomes	30+ years	Assess city and regional waste forecasts including central government waste programme developments and evaluate collection and processing options	30+ years	To be initiated	MH		$$	Council	HC	+++	++	++	++	+++	++ +	+++	+++
				Engage with manufacturers and producers to evaluate feedstock capacity needs, product requirements and feedstock volume constraints	30+ years	To be initiated	L		$$	Council Advocacy	MC	+++	+	++	++	+++	++ +	+++	+++
Partnerships, Advocacy and Manaakitanga	Construction and demolition debris	Maximise diversion of construction and demolition (C&D) debris	20+ years	Assess incentives to promote deconstruction and the use of salvaged materials	20+ years	To be initiated	MH	$$$$$	$$$$	Council-Industry Partnership	HC	+++	+	+++	++	+++	+	+	+++
				Assess options to recover construction and demolition debris and make material available to contractors	10+ years	To be initiated	MH			Council-Industry Partnership	MC	+++	+	+++	++	+++	+	+	+++
				Set contractual diversion requirements for C&D materials	10+ years	To be initiated	MH			Council-Industry Partnership	MC	+++	+	+++	++	+++	+	+	+++
				Engage with construction industry stakeholders to identify tangible opportunities to recycle and repurpose sorted C&D materials	20+ years	To be initiated	MH			Council Advocacy	MC	+++	+	+++	++	+++	+	+	+++

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
	Commercial and industrial waste management	Engage with and partner with developers and construction contractors to reduce waste generated from construction activities	5+ years	Support and encourage developers to ensure new waste management plans measure, minimise and collect waste from sites	5+ years	To be initiated	MH		$$	Council-Industry Partnership	HC	+++	+	+++	++	+++	+	+	+++
	Market development	Determine how to incentivise the use of recycled products or reuse for businesses	30+ years	Support Central Government engagement with stakeholders including businesses and manufacturers to understand barriers to reuse and develop incentives to encourage reuse opportunities	30+ years	To be initiated	MH		$$	Council Advocacy	HC	+++	+	+++	+	+++	++	++	+++
		Encourage and foster new sustainable businesses and remanufacturing facilities to locate/establish within Wellington City/Region	30+ years	Develop relationships with local businesses, producers, manufacturers, central government agencies, business agencies to understand what is needed to support local remanufacturing opportunities	30+ years	To be initiated	ML	$$$	$$$	Council Advocacy	HC	+++	+	+++	+	+++	+++	+++	+++
		Evaluate options to include recycled material KPIs within contracts - outcome-based contracts	30+ years	Encourage suppliers to focus on reducing waste production and where possible include the use of recycled materials in projects	30+ years	To be initiated	H		$$	Council Advocacy	MC	+++	+	+++	+	+++	++	++	+++
		Work in partnership with central government agencies to advocate for mechanisms to support waste reduction activities aligned with the principals of the waste hierarchy	30+ years	Evaluate the range of mechanisms and/or legislative instruments needed from central government to support waste minimisation activities in Wellington City including activities to support and encourage pull-through demand of recycled products	30+ years	To be initiated	H		$$	Council Advocacy	MC	+++	+	+	+	+++	+++	+++	+++
Regulation, Enforcement and Assurance	Regulation, compliance and enforcement	Confirm and secure capacity and capability to support compliance and enforcement requirements	0-5 years	Provide any additional resourcing and capability necessary to support an effective waste compliance and enforcement programme	0-5 years	To be initiated	H		$$	Council	MC	+++	+	+	+	+++	+++	+++	+++
	Data, evaluation and assurance	Evaluate and measure the success of existing programs and consider new programs	0-5 years	Review the effectiveness of both regulatory and non-regulatory actions and establish and/or update appropriate frameworks where required to monitor progress against agreed outcomes	0-5 years	To be initiated	H		$$	Council	MC	+++	+	+	+	+++	++	++	++

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
		Develop waste data calculations including waste estimates to provide the basis for waste management plans	10+ years	Use waste management data to establish estimates of waste generation during demolition, construction, stored/removed for recycling/disposal	10+ years	To be initiated	ML		$$	Council	HC	+++	+	++	++ +	+++	++	++	++

10+ Year Programme Against Multi-Criteria Analysis Criterion – Roadmap Key Performance Measures, Council 2040 and Long-Term Directions

Focus Area	Priority Area	Initiative	Initiative Delivery Timeframe	Workstream	Workstream Delivery Timeframe	Workstream Status	Workstream Priority	Indicative Qualitative High-Level Initiative Investment		Lead / Partnership	Ease of Implementation	Alignment with Roadmap Key Performance Measures				Alignment with Wellington City Council 2040 Community Outcomes & Long-Term Direction			
								CAPEX ($ millions)	OPEX ($ millions)			Carbon	Household	Commercial	WCC	Environmental	Social	Cultural	Economic
Behaviour Change and Education	Behaviour change and community engagement	Develop a targeted community engagement plan to support waste minimisation activities including behaviour change and consumer consumption attitudes	30+ years	Support existing and encourage the establishment of a community awards competition program	5+ years	To be initiated	ML		$	Council-Community/ Mana Whenua Partnership	LC	++	+++	+	+	+++	+++	+++	++
Service Delivery	Organic material management	Council to support and maximise where possible residential organic and food scrap diversion and recovery	5+ years	Investigate options to maximise diversion and recovery of residential green waste	5+ years	To be initiated	H	$$$$$$	$$$$	Council	HC	+++	++	+	+	+++	+++	+++	+++
	Innovation	Consistently seek opportunities and advocate for external and internal innovation to be embedded within delivery of WCC waste work programme	30+ years	Evaluate and confirm the range of mechanisms to support innovation	30+ years	To be initiated	ML		$$	Collective Partnership	MC	+++	+++	+++	+++	+++	+++	+++	+++
Assets and Infrastructure	Emergency waste management	Establish an emergency waste management plan in partnership and in alignment with central government agencies and national approaches	10+ years	Establish the following information sources: *establish lines of communication and responsibilities *storage areas for stockpiling of emergency waste debris *identify suitably qualified contractors *identify and confirm facilities to recycle/ dispose of debris *support recovery and reuse of debris as far as practicable	10+ years	In development	ML		$	Council-Central Government Partnership	MC	+++	+	+	++	+++	+	+	+++
Partnerships, Advocacy and Manaakitanga	Construction and demolition debris	Maximise diversion of construction and demolition debris	20+ years	Support the preparation of a deconstruction guide	10+ years	To be initiated	L	$$$$$$	$$$$	Council Advocacy	HC	+++	+	+++	++	+++	+	+	+++

He Ara, He Para Iti: Waste Minimisation Roadmap

Our waste minimisation Goal: Wellington City is a leader in minimising use of resources and maximisation of whakamahi anō - reuse and recovery

Absolutely Positively **Wellington** City Council
Me Heke Ki Pōneke

Objectives

- **Ōhanga āmiomio: circular economy** - To mitigate the environmental impacts of Wellington City by reducing resources used and increasing reuse and recovery of resources
- **Kaitiakitanga whakanaonga: product stewardship** - To enable and partner with communities and businesses to reduce resource use and waste
- **Whakahaere hūrokuroku i te para: Sustainable waste management** – Manage any remaining waste in the most sustainable way and in accordance with the principles of the pūnaha whakarōpū para (waste hierarchy)

Principles

- **Waka hourua: Partnership** – Council will look to partner and enable delivery of outcomes by working with and through others
- **Tiakitanga: Protection** – we will endeavour to act as kaitiakitanga to protect and enhance the mauri of resources by working towards a circular economy approach
- **Whai wāhi: Participation** – we will engage with and involve our community in changing behaviour and solutions
- **Pitomata: Potential** – we will apply a waste hierarchy approach to our approach, to increasingly shift our effort and focus towards enabling redesign, reduction and reuse

Key Performance measures	Focus Areas	1 - 3 Year initiatives	4-10 Year initiatives	Longer Term initiatives
Reduce whole of life carbon impacts	**Behaviour change and education** *Develop and incorporate proactive and appropriate communication tools to engage and empower stakeholders and further promote a sustainable waste management future*	• Develop targeted community engagement plan • Establish partnership relationships with Mana Whenua to encourage Iwi to work with their networks to pursue waste reduction • Develop a targeted community communication plan with usability for a range of audiences including schools • Educate the public on waste minimisation activities and wider sustainability initiatives to raise awareness and understanding of Council activities • Integrate awareness and knowledge of waste minimisation throughout all WCC departments and teams and behaviour change • Provision of waste minimisation initiatives at events • Internal Council behaviour change	• Engage with businesses and organisations on recycling to reduce their waste volumes, increase recycling and reduce waste management costs	• Develop a targeted community engagement plan to support waste minimisation activities
Reduce household waste	**Service delivery** *Develop, expand and enhance Council waste management programs and services while striving to reduce the amount of waste generated and disposed of*	• Review current kerbside waste service arrangements with a goal to incentivise recycling and support waste diversion activities • Council to support and maximise where possible residential organic and food scrap diversion and recovery • Encourage and incentivise the use of processed organic material for Council application to supplement commercial fertilisers and help to reduce expenditure • Collaborate with construction companies to identify areas to incorporate waste reduction behaviours • Evaluate Council procurement and purchasing processes • Annually review program expenditures and revenues • Identify funding sources to support projects and programmes acknowledging potential future changes to current waste funding model	• Evaluate options to support commercial businesses including the hospitality and restaurant sector to manage food scrap volumes	• Support and maximise where possible residential organic and food scrap diversion and recovery • Consistently seek opportunities and advocate for external and internal innovation to be embedded within delivery of Council waste work programme
	Delivery of infrastructure *Incorporate sustainability practices and develop more advanced waste management facilities and infrastructure in a fiscally, socially, culturally and environmentally responsible manner*	• Explore development of a Community Resource Recovery Facility(ies) and/or expansion of existing facilities in Wellington City to increase residential reuse and recycling of unwanted items and divert waste from landfill • Investigate options to remove sludge disposal to landfill	• Evaluate and delivery of options to encourage the development of a range of collection and processing infrastructure options and which are aligned to social, cultural, economic and environmental outcomes	• Establish an emergency waste management plan in partnership and in alignment with central government agencies and national approaches

Reduce commercial and industrial waste	**Partnerships, advocacy and manaakitanga**
	Develop, enhance and maintain relationships with stakeholders to maximise resource recovery use, develop pull through product demand and establish end markets for recovered materials
		• Central government advocacy on a range of issues, including but not limited to:
		  • producer and manufacturer responsibility
		  • recycled material market demand and end-markets
		  • application of waste levy funding
		  • provision of foundation legislative instruments that are workable at a regional level
			• Maximise diversion of C&D debris
			• Engage with and partner with developers and construction contractors to reduce waste generated from construction activities
			• Determine how to incentivise the use of recycled products or reuse for businesses
			• Encourage and foster new sustainable businesses and remanufacturing facilities to locate/establish within Wellington City/Region
			• Evaluate options to include recycled material KPIs within contracts
			• Work in partnership with central government agencies to support waste reduction activities aligned with the principals of the waste hierarchy
				• Maximise diversion of construction and demolition debris

Reduce waste generated from Council activities	**Regulation, enforcement and assurance** *Use objectives, monitoring, evaluation and enforcement compliance to measure the effectiveness of programs and services, facilities and infrastructure, and behaviour change and education to strive for continuous improvement*	• Council regulations reflect waste minimisation goals and objectives • Confirm available enforcement options to incentivise waste minimisation behaviours • Establish a compliance and enforcement monitoring work programme • Establish targets linked to waste reduction goals and objectives - targets for recycling, diversion, organics collection • Understand the quantities of waste moving through the waste management systems	• Confirm and secure capacity and capability to support compliance and enforcement requirements • Evaluate and measure the success of programs • Develop waste data calculations including waste estimates to provide the basis for waste management plans	

WASTEWATER LATERALS POLICY (2021)

Kōrero taunaki
Summary of considerations

Purpose

1. This report asks the Pūroro Waihanga | Infrastructure Committee to agree the steps to implement the Long-term Plan 2021-31 initiative for the Council to be responsible for wastewater laterals in the road, by:
   - declaring the portion of wastewater laterals in the road to be public drains owned by the Council, and
   - approving the Wastewater Laterals Policy (2021) containing definitions and descriptions to support the declaration (Attachment 1).

Strategic alignment with community wellbeing outcomes and priority areas

	Aligns with the following strategies and priority areas: ☒ Sustainable, natural eco city ☐ People friendly, compact, safe and accessible capital city ☐ Innovative, inclusive and creative city ☐ Dynamic and sustainable economy
Strategic alignment with priority objective areas from Long-term Plan 2021–2031	☒ Functioning, resilient and reliable three waters infrastructure ☐ Affordable, resilient and safe place to live ☐ Safe, resilient and reliable core transport infrastructure network ☐ Fit-for-purpose community, creative and cultural spaces ☐ Accelerating zero-carbon and waste-free transition ☐ Strong partnerships with mana whenua
Relevant Previous decisions	Long-term Plan 2021-31 agreement to take ownership of, and responsibility for, wastewater laterals in the road.
Significance	Wastewater laterals are considered strategic assets under the Significance and Engagement Policy, so the change of ownership needed to be considered in a Long-term Plan consultation. This paper is about implementation and does not have further public consultation requirements.

Financial considerations

☐ Nil	☒ Budgetary provision in Annual Plan / Long-term Plan	☐ Unbudgeted $X

Funding for the implementation was approved in the Long-term Plan and there are no additional cost implications.

Risk

☒ Low	☐ Medium	☐ High	☐ Extreme

Author	Leila Martley, Senior Policy Advisor
Authoriser	Stephen McArthur, Chief Strategy & Governance Officer

Taunakitanga
Officers' Recommendations

2. Officers recommend the following motion

That Pūroro Waihanga - Infrastructure Committee:

1) **Agree** to recommend to Council that it declare pursuant to the Local Government Act 1974 section 462 and the Long-term Plan 2021-31, that the portion of wastewater laterals in the road, between a property boundary and a wastewater main, as specified in the proposed Wellington City Council Wastewater Laterals Policy (2021), are public drains owned by the Council.
2) **Agree** to the specifications for the portion of wastewater laterals considered to be in the road, as defined and described in the proposed Wellington City Council Wastewater Laterals Policy (2021) (Attachment 1).
3) **Note** that under the proposed declaration at (1) and proposed policy at (2):
    a. the Council will be responsible for maintenance and renewal of any part of the wastewater lateral in the road, and
    b. property owners remain responsible for the maintenance and renewal of the parts of the wastewater lateral on their property, or on an adjacent private property or other land (for example, a recreation reserve).
4) **Agree** to adopt the proposed Wellington City Council Wastewater Laterals Policy 2021 (Attachment 1).
5) **Agree** to withdraw the Lateral Policy 2005 (applying to wastewater laterals connected to public mains).
6) **Note** the Local Government Act 1974 Section 462 requires at least 14 days' public notice of the meeting to consider the declaration at recommendation (1), and a public notice was published on 30 September 2021.
7) **Agree** to delegate to the Chief Executive and the Chair of the Committee to sign off on any minor amendments discussed and agreed by the Committee.

Whakarāpopoto
Executive Summary

3. Wastewater laterals are pipes connecting the plumbing from a property to Council wastewater mains. These have been the responsibility of property owners under the Council Lateral Policy 2005 (applying to wastewater laterals).

4. The Council consulted with the public and subsequently agreed an option to take ownership of, and responsibility for, the portion of wastewater laterals in the road as part of the Long-term Plan 2021-31 (the LTP). Under this option agreed in the LTP, practices in Wellington City will:
    a. align with the approach at many other Councils
    b. provide for more efficient maintenance, and
    c. manage issues and costs for private owners associated with working in the road (for example traffic management and road reinstatement).

5. The Council needs to do two things to implement the LTP initiative:
   - declare the part of wastewater laterals in the road to be public drains owned by the Council under Local Government Act 1974 (LGA 1974) Section 462 - the recommendations in this paper provide this declaration for the agreement of the Infrastructure Committee
   - specify the parts declared public in a policy document - the attached proposed Wastewater Laterals Policy (2021) provides definitions and descriptions to do this.
6. Subject to approval of the declaration and policy at this meeting, the Council will work with Wellington Water to communicate the revised responsibilities for wastewater laterals in Wellington City.

Takenga mai
Background

Status quo and issues that the LTP initiative addresses

7. Wastewater laterals are pipes that connect wastewater from a property to the Council wastewater mains. There have been two approaches to responsibility for wastewater laterals in the last 30 years:
   - From 1992 to 2005 the Council took care of wastewater laterals in road reserve - the Laterals Policy 1992 that recognised the 'private' nature of drainage laterals, but while the policy was in effect the Council voluntarily met the cost of clearing blockages or repairing damage in legal road. The Council's intentions were to reduce infiltration through damaged pipes.
   - In 2005, the Council revoked the 1992 policy and replaced it with the Lateral Policy 2005 (applying to wastewater laterals connected to public mains) - the 2005 policy required owners to repair any damage to the wastewater lateral including under road reserve. The Council would fund a once-only root clearing. The public had to arrange any repairs required, including in road reserve.
8. In February 2016 the Council Environment Committee considered a report about issues associated with the Laterals Policy 2005. Key points in the report were about perceived unfairness of the 2005 policy based on;
   - damage coming from the roots of public trees located in the road reserve
   - damage arising from work on other utilities in the road
   - the high cost to private owners of work in the road, especially work requiring traffic management, and
   - lack of control over work in the road reserve for property owners.
9. The report also noted that the policy was out of step with regional practice, to either be clearer, or repair laterals in road reserve at the council's expense. Other issues raised were:
   - a deteriorating private network and associated costs from leakage, inflow and infiltration, and lack of network resilience,
   - missed opportunities for low cost repairs and renewal options, particular those using emerging technology

- multiple operators working in the road on various services and complexity managing damage, and
- a lost opportunity for more prudent asset management through better information (given no need to record information on assets Council does not own).

Options to address the issues were considered by the Council and consulted on

10. The matter of changing laterals policy was subsequently considered in the Annual Plan 2016 / 17 based on the Council either assuming ownership and / or responsibility for maintenance and renewal (without assuming ownership). This consultation found significant public support for the Council to take responsibility.

11. Following consultation on the Annual Plan it was confirmed that proposed Council ownership of the laterals needed to be consulted in the Long-term Plan, the LGA 2002 Section 97(1)(a) refers). A study on costs was completed by Opus, "Wastewater Laterals Economic Analysis", October 2017 to inform the cost implications. Consultation then progressed in the Long-term Plan 2021-31, to either retain the status quo or:

> *Take ownership: Change the Council's policy to be consistent in the region and New Zealand. This would result in the Council taking responsibility for the section of the wastewater lateral beneath the legal road to the property boundary. This will create efficiencies in maintenance by allowing us to plan their renewal alongside wastewater mains. Operational costs: $5 million over 10 years, Rates impact: 0.17% 3 year average increase, Capital cost and debt impact: $27m over 10 years.*

12. Taking ownership was identified as the preferred Council option because ownership provides clearer benefits with the Council being able to plan and manage renewals alongside wastewater mains.

13. The Annual Plan / Long-term Plan Committee considered feedback on the proposal on 27 May 2021. Support for the ownership option was expressed in 80 percent of consultation submissions, and at 79 percent in a public survey. These comments were indicative of the range of views expressed in consultation:

> *"This should always have been the responsibility of Council. How can individuals dig up the road and excavate down to public sewers in order to do this*
>
> *Great idea to remove the ambiguity and confusion around the wastewater laterals*

Ownership should sit with the property holder, there could be a lot of preventative things homeowners can do and if owned by the Council this will shift preventative care".

14. The Council then agreed on 30 June 2021[5] to take ownership of laterals in road reserve with this statement in the Long-term Plan 2021-31:[6]

We will also progress the policy change on the ownership of wastewater laterals (private wastewater drains) consulted on for this plan. This will see Council take responsibility for the renewal and maintenance of the section of the wastewater lateral beneath the legal road to the property boundary. This will take effect in the first year of this plan following formal Council adoption of the policy change.

Kōrerorero
Discussion

15. In order to implement the new policy approach agreed in the LTP 2021-31, the Council needs to formally take ownership of laterals in road reserve by resolution under the LGA 1974 Section 462(1): "the Council may, by resolution passed at a meeting of which as least 14 days' public notice has been given, declare any specified private drain to be a public drain".

16. This resolution is provided at recommendation a), and may take effect if the Council agree the recommendation. The meeting was publicly notified on 30 September 2021.

17. The resolution on it's own is not likely to be sufficient as the drains also need to be specified. There are two options, either:
    - map all the relevant wastewater laterals, or
    - agree a policy that defines and describes the Council's responsibilities and private owner responsibilities.

18. Maps are not be practical to produce and understand as records may be incomplete and detailed maps would need to be provided to show responsibility. Use of a policy is proposed as a clearer more concise way to define and describe responsibilities (refer Supporting Information, Risks and Legal) and the proposed Wastewater Laterals Policy (2021) (Attachment 1) has been developed to complement the resolution. The policy:
    - provides definitions (for example; wastewater lateral, owner, wastewater, road)
    - describes responsibilities in text and in illustrations
    - covers the topics of responsibility in private roads and private access ways (where ownership and responsibility will remain with private owners and will not transfer to the Council), and state highway

[5] Accessed from: Council - 30 June 2021, 9.30AM - Meetings - Wellington City Council, 10 August 2021
[6] Accessed from: Our 10-Year Plan 2021-2031 (wellington.govt.nz), p55, 2 August 2021

- provides for additional guidance to be issued,
- notes key existing Council policies and guidance that will continue to apply, and transition information based on the LTP taking effect 1 July 2021.

19. The Committee is asked to agree the proposed policy alongside recommending to Council that it make the declaration.

Kōwhiringa
Options

20. The Council could re-consider options; but because ownership of the laterals has been agreed and funding committed (to Wellington Water) in the LTP, a change would need to be considered in a new LTP consultation.

21. The Council could make a resolution without agreeing a policy, or vice versa, but without agreeing them both at the same time there could be lack of clarity about responsibilities for wastewater laterals in Wellington City.

Whai whakaaro ki ngā whakataunga
Considerations for decision-making

Alignment with Council's strategies and policies

22. The Wastewater Laterals Policy (2021) will replace the Lateral Policy 2005. There are no further policy or legislative implications.

Engagement and Consultation

23. Public consultation is required on the change of ownership of a strategic asset (LGA Section 97(1)(b) refers)[7], and this consultation took place through the LTP 2021-31 consultation. No further public consultation has been required.

24. There has been targeted consultation with Wellington Water and Greater Wellington Regional Council to ensure the proposed Wastewater Laterals Policy (2021) is practical and workable. Waka Kotahi NZ Transport Agency and Consentium (the consenting agency for Kainga Ora) have also had the opportunity to comment.

Implications for Māori

25. There are no Treaty of Waitangi considerations, with no specific implications for mana whenua and Māori owned property in regard to wastewater laterals.

Financial implications

26. Funding has been allocated through the LTP 2021-31 and there are no additional cost implications.

[7] Local Government Act 2002, "Section 97 Certain decisions to be taken only if provided for in long-term plan (…)(1)(b) a decision to transfer the ownership or control of a strategic asset to or from the local authority"

Legal considerations

27. The proposed approach to implement taking ownership of wastewater laterals in the road was provided in legal advice sought by the Council on the matter in 2016. This advice considered two options, mapping (considered unviable based on incomplete records and accessibility of complex maps), and the approach of making a declaration under the LGA supported by a policy to specify the drains the declaration applied to. This second option is the approach proposed in this paper. The advice also considered whether the Council could be charged a fee for taking ownership, or be legally challenged. The risks of this are considered to be very low, given the Council is taking on costs, and change has been appropriately consulted on through the LTP.

Risks and mitigations

28. Council ownership may increase private owner expectations for maintenance, renewal and associated work. These expectations can be managed through application the proposed policy, and other Council policies that set rules and standards for work, including the Verges Policy, Code of Practice for Working in the Road, and the Regional Standard for Water Services.

Disability and accessibility impact

29. There is no disability and accessibility impact.

Climate Change impact and considerations

30. The LTP decision and implementation will over time contribute to lower infiltration of stormwater into the wastewater network and improved network condition overall. This is important in view of climate change and potentially changing rainfall patterns with more extreme events.

Communications Plan

31. The Council will work with Wellington Water to inform the public and the plumbing and drainlaying sector about the change.

32. The Building Compliance and Consents team have been managing enquiries related to new builds and related reconfigurations and upgrades (Section 4 of the proposed new policy), and have provided information in newsletters (for example, for architects).

Health and Safety Impact considered

33. The LTP decision and implementation may have health and safety benefits as private contractors may not need to work in the road to undertake wastewater lateral renewals and repairs.

Ngā mahinga e whai ake nei
Next actions

34. Subject to the agreement of the Committee wastewater laterals will be declared public drains and the Wastewater Laterals Policy (2021) will be published and take effect. The Council will work with Wellington Water to ensure industry are aware of the change and that public information is accessible and up-to-date.

Attachments

Attachment 1. Wastewater Laterals Policy (2021) Page 173

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Wastewater Laterals Policy 2021

1. Introduction

The Wastewater Laterals Policy (2021) (this policy) describes responsibilities for wastewater laterals in Wellington City. Under this policy:

- the Council is responsible for any part of the wastewater lateral in public roads, and
- property owners continue to own, and remain responsible for, the parts of the wastewater lateral on their property, or on an adjacent private property or other public land (for example, a reserve).

This policy was adopted on 14 October 2021 and replaced the Lateral Policy 2005 (applying to wastewater laterals connected to public mains).

2. Background

This policy reflects a new approach, previously property owners were responsible for the full length of wastewater laterals, including the portion in the road.

Change was agreed through Long-term Plan 2021-31 – that the Council take ownership of, and be responsible for, maintaining and renewing wastewater laterals in public road in Wellington City. The Long-term Plan 2021-31 was approved by the Council on 30 June 2021. To implement the approved change, the Council has:

i. declared wastewater laterals in the road to be public drains by resolution under the Local Government Act 1974 (Section 462 refers)[1], and
ii. developed this policy to provide definitions and descriptions to specify the Council's ownership and responsibility, and describe the private owner's responsibility.

Council responsibility aligns with the approach at many other Councils, provides for more efficient maintenance, and manages issues and the costs for private owners of working in the road (for example, traffic management and road reinstatement).

3. Scope

This policy applies where a wastewater lateral joins the Council main outside the property boundary, and the join is in the road. This situation may apply to around 70 percent of the properties in Wellington city. Property owners remain responsible for any parts of a wastewater lateral in:

- their property
- a neighbouring property
- a reserve or other public land that is not a public road
- a private way, and
- a private road.

[1] Wellington City Council Infrastructure Committee, 14 October 2014 refers.

4. Definitions

Term	Definition
Council	the Wellington City Council or delegated representative of the Council such as a Council Controlled Organisation or other agency (for example Wellington Water).
owner	owner is defined in the Land Transfer Act 2017 and means the owner of a legal or an equitable estate or interest in the land, and includes a person who has a future estate or interest in land.
wastewater lateral	a wastewater lateral is the pipe from an individual property to the Council wastewater main, the wastewater lateral is a continuous pipe which may cross from private, to other private, and / or to public land (such as a road or recreation reserve), and may serve more than one property.[2] for avoidance of doubt: • the term "lateral" is also used to describe pipes that transfer stormwater or water, this policy only applies to wastewater laterals • although wastewater laterals in road have been declared public drains (refer Section 2 of this policy) the building and design specifications for wastewater laterals (for example, as set out in the Regional Standard for Water Services[3]) continues to apply – wastewater mains that are "public drains" have different technical requirements.
road	has the same meaning as in the Local Government Act 1974 and, for the purpose of this policy, includes the carriageway (formed road), and any footpath or berm adjacent to the legal property boundary. for avoidance of doubt: • this definition of road may include state highway and the Council will work in accordance with Waka Kotahi NZ Transport agency directions and guidance on any work in state highway • a wastewater lateral in a private road or private way, as defined in the Local Government Act 1974, is considered to be on private land and the responsibility of the property owner / s.
wastewater	wastewater is defined in the Regional Standard for Water Services[4] and means water that has been used and contains unwanted dissolved and/or suspended substances from communities, including homes businesses.

[2] Wellington Water, What's a lateral? - Wellington Water?
[3] Wellington Water, https://www.welingtonwater.co.nz/assets/uploads/Regional-Standard-for-Water-Services-May-2019.pdf
[4] Wellington Water, https://www.welingtonwater.co.nz/assets/uploads/Regional-Standard-for-Water-Services-May-2019.pdf

5. Construction, consent requirements, transfer of ownership

The construction of new wastewater laterals is the responsibility of property owners (both on their property and in the road if the main is located in the road).

If, as part of a building consent or resource consent, an existing wastewater lateral needs to be upgraded or reconfigured, the responsibility for this work is with the property owner (both on their property and in the road if the main is located in the road).

If an existing wastewater lateral can be used to support new development or a renovation project, but has durability issues identified in regard to the proposed development, the Council will be responsible for the repair or renewal of the part of the wastewater lateral in the road, and the property owner for the part in their property.

Property owners and / or developers are responsible for obtaining any necessary consents, approvals and certificates that may be required from the Council for construction, upgrades and reconfiguration of wastewater laterals.

Ownership of the part of the wastewater lateral in the road, for the purposes of maintenance and renewal, will automatically transfer to the Council after the Code of Compliance is issued.

The Council will not be responsible for a wastewater lateral that has not been appropriately consented or permitted.

6. Transition

The Long-term Plan 2021-31 took effect on 1 July 2021. In case of maintenance and renewal between 1 July 2021 and the adoption of this policy on 14 October 2021, work on repair and renewal may be completed or reimbursed on a case-by-case basis by the Council and Wellington Water.

7. Wastewater lateral responsibility illustrations[5]

These illustrations show responsibility for wastewater laterals in three different scenarios.

[5] Images have been adapted from Watercare document, Who is reponsible for pipes?, accessed, 18 August 2021.

Illustration 1: Single property with wastewater lateral and main located in the property - the property owner is responsible for the wastewater lateral to the join with the main (and / or the first joint from the main) and as there is no part in the road it is out of scope of this policy

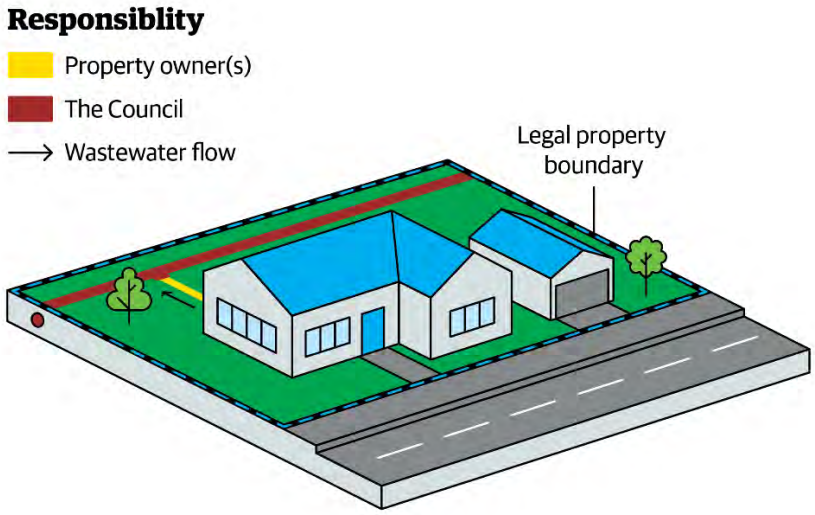


Illustration 2: Single property connecting to a wastewater main in the road - the property owner is responsible to the legal property boundary, the Council is responsible for the part in the road.

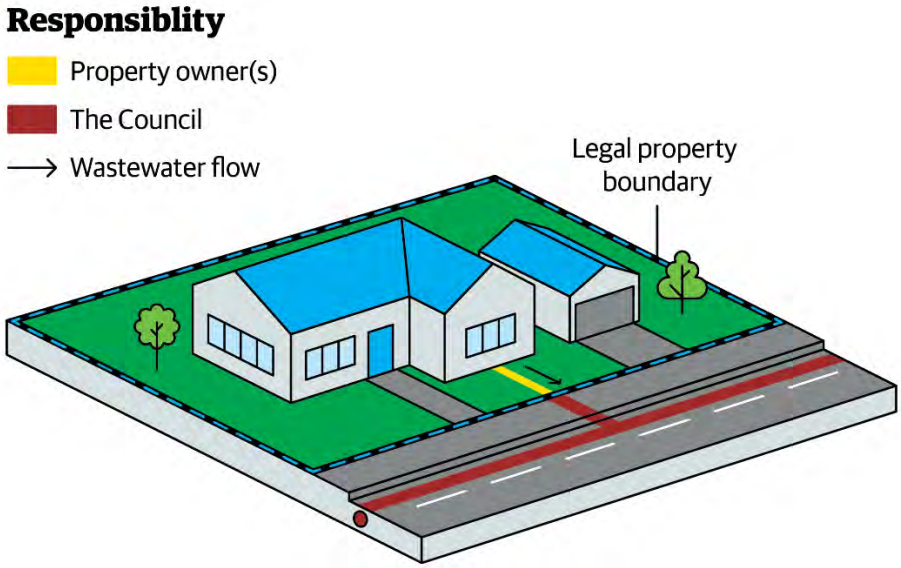
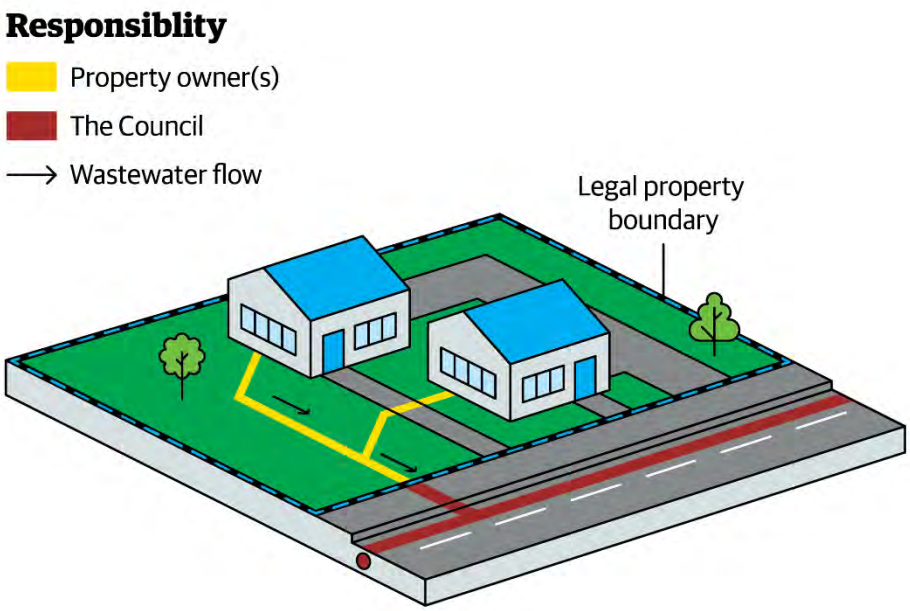


Illustration 3: Two properties connecting to a wastewater main in the road - the property owners are responsible for the shared wastewater lateral in their properties, subject to any easements and private agreements in place, and the Council is responsible for the part in the road.



8. Operational policy and other Council policies

The Council or delegated representative may issue operational policy and public guidance for; reporting and identifying issues, and making repairs and undertaking maintenance under this policy (for example, issuing supplementary illustrations for different scenarios and outlining processes for identifying a fault).

All other Council policies continue to apply to work in the road, for example, the Wellington City Council Code of Practice for Working in the Road, and Wellington City Council Verges Policy and related guidance.

Other policies about laterals are unchanged, for example, responsibilities for water supply laterals are at the defined point of supply in the Wellington City Council Consolidated Bylaw Part 8 Water Services (generally the water toby), and for stormwater at the point of discharge, typically the gutter.

9. Third party damage

Utility operators are required to pay for repairs to or replacement of wastewater laterals in the road that result from damage they cause.

END

FORWARD PROGRAMME

Kōrero taunaki

Summary of considerations

Purpose

1. This report provides the Forward Programme for the Pūroro Waihanga | Infrastructure Committee for the next two months.

Strategic alignment with community wellbeing outcomes and priority areas

	Aligns with the following strategies and priority areas: ☐ Sustainable, natural eco city ☐ People friendly, compact, safe and accessible capital city ☐ Innovative, inclusive and creative city ☐ Dynamic and sustainable economy
Strategic alignment with priority objective areas from Long-term Plan 2021–2031	☐ Functioning, resilient and reliable three waters infrastructure ☐ Affordable, resilient and safe place to live ☐ Safe, resilient and reliable core transport infrastructure network ☐ Fit-for-purpose community, creative and cultural spaces ☐ Accelerating zero-carbon and waste-free transition ☐ Strong partnerships with mana whenua
Relevant Previous decisions	Not applicable.

Financial considerations

☒ Nil	☐ Budgetary provision in Annual Plan / Long-term Plan	☐ Unbudgeted $X

Risk

☒ Low	☐ Medium	☐ High	☐ Extreme

Author	Sean Johnson, Senior Democracy Advisor
Authoriser	Mike Mendonca, Acting Chief Infrastructure Officer

Taunakitanga

Officers' Recommendations

Officers recommend the following motion

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.

Whakarāpopoto

Executive Summary

2. The Forward Programme sets out the reports planned for Pūroro Waihanga meetings in the next two months that require committee consideration.
3. The Forward Programme is a working document and is subject to change on a regular basis.

Kōrerorero

Discussion

4. Tuesday 2 November and Thursday 4 November 2021:
    - Three Waters Resilience (Chief Infrastructure Officer)
    - Earthquake prone buildings (Chief Infrastructure Officer)
    - Mayoral Taskforce: Three Waters (Chief Infrastructure Officer)
    - Insourcing traffic management (Chief Infrastructure Officer)
    - LTP Capital Programme scheduling (Chief Financial Officer)
5. Thursday 9 December 2021
    - Priority Investments – Health Check (Chief Infrastructure Officer)
    - Omaroro Reservior (Chief Infrastructure Officer)

Attachments

Nil

ACTIONS TRACKING

Kōrero taunaki

Summary of considerations

Purpose

1. This report provides an update on the past actions agreed by the Pūroro Waihanga - Infrastructure Committee at its previous meetings.

Strategic alignment with community wellbeing outcomes and priority areas

	Aligns with the following strategies and priority areas: ☐ Sustainable, natural eco city ☐ People friendly, compact, safe and accessible capital city ☐ Innovative, inclusive and creative city ☐ Dynamic and sustainable economy
Strategic alignment with priority objective areas from Long-term Plan 2021–2031	☐ Functioning, resilient and reliable three waters infrastructure ☐ Affordable, resilient and safe place to live ☐ Safe, resilient and reliable core transport infrastructure network ☐ Fit-for-purpose community, creative and cultural spaces ☐ Accelerating zero-carbon and waste-free transition ☐ Strong partnerships with mana whenua
Relevant Previous decisions	Not applicable.

Financial considerations

☒ Nil	☐ Budgetary provision in Annual Plan / Long-term Plan	☐ Unbudgeted $X

Risk

☒ Low	☐ Medium	☐ High	☐ Extreme

Author	Sean Johnson, Senior Democracy Advisor
Authoriser	Mike Mendonca, Acting Chief Infrastructure Officer

Taunakitanga

Officers' Recommendations

Officers recommend the following motion

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.

Whakarāpopoto

Executive Summary

2. This report lists the dates of previous committee meetings and the items discussed at those meetings.
3. Each clause within the resolution has been considered separately and the following statuses have been assigned:
   - No action required: Usually for clauses to receive information or note information, or actions for committee members rather than council officers.
   - In progress: Resolutions with this status are currently being implemented.
   - Complete: Clauses which have been completed.
4. All actions will be included in the subsequent monthly updates, but completed actions and those that require no action will only appear once.

Takenga mai

Background

5. At the 13 May 2021 Council meeting, the recommendations of the Wellington City Council Governance Review (the Review Report) were endorsed and agreed to be implemented.
6. The Review Report recommended an increased focus on monitoring the impletmetation of Council resolutions and delivery of the work programme. As part of the implementation of this recommendation, each committee will be provided with an update on its previous decisions at every meeting.
7. The purpose of this report is to ensure that all resolutions are being actioned over time. It does not take the place of performance monitoring or full updates. The committee could resolve to receive a full update report on an item if it wishes.

Kōrerorero

Discussion

8. Of the 11 resolutions of the Pūroro Waihanga | Infrastructure Committee in August 2021:
   - 9 require no action from staff.
   - 2 are complete.
9. 2 in progress actions were carreid forward from the last action tracking report. Of these:
   - 1 is still in progress.
   - 1 is complete.
10. Further detail is provided in Attachment One.

Attachments

Attachment 1. Actions Tracking October ⇩ Page 185

Meeting Date	Item	Clause	Status	Comments
Wednesday, 23 June 2021	2.1 Te Ngākau General Update	3. Note that a reporting dashboard will be developed that encompasses the range of workstreams across Te Ngākau Civic Precinct covering the status of each workstream for future reporting to the Infrastructure Committee	In progress	Still a work in progress.
Wednesday, 23 June 2021	2.2 Sludge Minimisation	7. Note that officers will report to the Finance and Performance Committee in September, and will provide further updates as required and via the Quarterly Report.	Complete	This was reported to the Pūroro Tahua | Finance and Performance Committee meeting of 16 September 2021.
Thursday, 12 August 2021	2.1 Three Waters Asset Conditions Assessments	1. Receive the information.	No action required	
Thursday, 12 August 2021	2.1 Three Waters Asset Conditions Assessments	2. Note that further work is required on an ongoing basis for asset condition assessments.	No action required	
Thursday, 12 August 2021	2.2 Three Waters Reform Update	1. Receive the information.	No action required	
Thursday, 12 August 2021	2.2 Three Waters Reform Update	2. Note that major change is required for three waters management, even if reform does not proceed.	No action required	
Thursday, 12 August 2021	2.2 Three Waters Reform Update	3. Note that Water Reform oversight is included in the Terms of Reference of the Infrastructure Committee.	No action required	
Thursday, 12 August 2021	2.2 Three Waters Reform Update	4. Note that further advice will be presented to the Committee in September 2021.	Complete	This was reported to the Te Kaunihera o Pōneke | Council meeting of 30 September 2021.
Thursday, 12 August 2021	2.2 Three Waters Reform Update	6. Note that there is increasing public awareness around the government's proposed three waters reform along with a call for a public referendum on the sale and or transfer of Council's strategic water infrastructure assets and that this reform takes place in a context of a wider reform of local government and resource management which has the potential to fundamentally change the nature of local democracy.	No action required	
Thursday, 12 August 2021	2.2 Three Waters Reform Update	7. Note that the 14 December 2020, Cabinet Paper: Progressing the three waters service delivery reforms (paragraphs 81 to 95) recognises that the scale of the reforms would ordinarily involve the right of communities to participate in a special consultative process, described as 'not fit for purpose' and 'unlikely to achieve a desirable outcome' and the Minister's preference for their replacement with new legislation and a new process that is to apply to the reforms but would be time limited.	No action required	
Thursday, 12 August 2021	2.2 Three Waters Reform Update	8. Request officers to report back, at the next three water reform update to committee, on the steps required for a public referendum on the matter.	Complete	This was reported to the Te Kaunihera o Pōneke | Council meeting of 30 September 2021.
Thursday, 12 August 2021	2.3 Forward Programme	1. Receive the information.	No action required	
Thursday, 12 August 2021	2.4 Action Tracking	1. Receive the information.	No action required	

4. Public Excluded

Recommendation

That the Pūroro Waihanga | Infrastructure Committee:

1. Pursuant to the provisions of the Local Government Official Information and Meetings Act 1987, exclude the public from the following part of the proceedings of this meeting namely:

General subject of the matter to be considered	Reasons for passing this resolution in relation to each matter	Ground(s) under section 48(1) for the passing of this resolution
4.1 Proposed Land Acquisition	7(2)(i) The withholding of the information is necessary to enable the local authority to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations).	s48(1)(a) That the public conduct of this item would be likely to result in the disclosure of information for which good reason for withholding would exist under Section 7.