

---

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

**Time:** 9:30am  
**Date:** Wednesday, 23 June 2021  
**Venue:** Ngake (16.09)  
Level 16, Tahiwī  
113 The Terrace  
Wellington

---

**MEMBERSHIP**

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

**NON-VOTING MEMBERS**

Te Rūnanga o Toa Rangatira Incorporated  
Port Nicholson Block Settlement Trust

**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](mailto: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**

1. The Infrastructure Committee has the following responsibilities:
  - a. Council Infrastructure and infrastructure strategy, including:
    - (i) Transport,
    - (ii) Waste,
    - (iii) Water (three waters)
    - (iv) Council property (buildings)
    - (v) Relationships with other non-council infrastructure
  - b. The Road Corridor
  - c. 30-year infrastructure strategy
  - d. Asset management plans
  - e. Capital Works Programme Delivery, including CCO's and Wellington Water Limited's capital works programmes
  - f. Three waters reform
2. The Committee has the responsibility to discuss and approve a forward agenda.

**Quorum:** 9 members

---

**TABLE OF CONTENTS**  
**23 JUNE 2021**

---

<b>Business</b>	<b>Page No.</b>
<b>1. Meeting Conduct</b>	<b>5</b>
<b>1.1 Karakia</b>	<b>5</b>
<b>1.2 Apologies</b>	<b>5</b>
<b>1.3 Conflict of Interest Declarations</b>	<b>5</b>
<b>1.4 Confirmation of Minutes</b>	<b>5</b>
<b>1.5 Items not on the Agenda</b>	<b>5</b>
<b>1.6 Public Participation</b>	<b>6</b>
<b>2. General Business</b>	<b>7</b>
<b>2.1 Te Ngakau General Update</b>	<b>7</b>
<b>2.2 Sludge Minimisation</b>	<b>15</b>
<b>2.3 Transfer of land (segregation strips) adjoining 60-72         Murphy Street from NZTA to Council.</b>	<b>109</b>
<b>2.4 Draft Submission - Infrastructure for a Better Future         Aotearoa New Zealand</b>	<b>115</b>
<b>2.5 Forward Programme</b>	<b>117</b>



---

## 1. Meeting Conduct

---

### 1.1 Karakia

The Chairperson will open the meeting with a karakia.

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

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

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

### 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

### 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](mailto: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. General Business**

---

---

### **TE NGAKAU GENERAL UPDATE**

---

#### **Purpose**

1. This report provides Pūroro Waihanga | Infrastructure Committee with an introduction to the range of workstreams across Te Ngakau and a general update with respect to the range of activities currently being undertaken within Te Ngakau Civic Precinct.

#### **Summary**

2. A range of work is underway across Te Ngakau Civic Precinct ranging from physical works, such as the Town Hall, to planning and design with respect to Te Matapihi and MOB/CAB.
3. The Town Hall works are progressing towards completion of the building works in Dec 2023. The project while on budget at this stage will be under pressure from a resourcing and cost escalation perspective as the construction market works through supply chain issues from covid-19 and a very strong Wellington construction market.
4. Recent decisions regarding Te Matapihi and the future of MOB/CAB have informed the work programmes and work on these key aspects of the precinct are being advanced.
5. The Te Ngakau Civic Precinct Framework is out for public consultation and once adopted will shape the strategic direction of the precinct.
6. With respect to Te Matapihi, an alternative structural solution is being assessed concurrently which considers the use of Viscous Dampers rather than Base Isolation. This alternative has been proposed to Council on the basis that it will deliver a similar resilience outcome at lower cost with a shorter construction programme. Work to develop and assess the alternative structural proposal is underway and will inform any decision to change the approach to strengthening the building.
7. Appropriate programme and project governance structures have been established and a programme reporting dashboard will be developed for future reporting to this Committee.

#### **Recommendation/s**

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.
2. Note the status of the main workstreams within Te Ngakau Civic Precinct.

- 
- Note that a reporting dashboard will be developed that encompasses the range of workstreams across Te Ngakau Civic Precinct covering the status of each workstream for future reporting to the Infrastructure Committee

## **Background**

- Te Ngakau Civic Precinct is Wellington's unique civic place connecting the city to the waterfront.
- The precinct is in a period of transition. The civic buildings and assets within the precinct are in various states of operation. Some are currently closed due to earthquake damage or as a precaution due to seismic risk.
- Council has a range of projects and initiatives that are underway that are part of the transition process.
- Together these projects and initiatives form the Te Ngakau programme. It is our intention to report the status of the programme to the Infrastructure Committee on a regular quarterly basis.
- There are four main streams of work that are underway are:-
  - The Town Hall strengthening project which will see the Town Hall strengthened, restored and become the home of the National Centre for Music.
  - Te Matapihi, strengthening the Central Library and upgrading the building to host an enhanced library service and other ancillary activities.
  - Development of a framework for Te Ngakau Civic Precinct.
  - Determining the future of the Municipal Office and Civic Administration Buildings (MOB and CAB).
- It is our intention to report to the Infrastructure Committee on a regular quarterly basis on the status of the programme of works and the individual projects within the programme. An appropriate reporting dashboard will be developed for this purpose.

## **Discussion**

- Officers have established a Te Ngakau Steering Group for the whole of the Te Ngakau Civic Precinct programme of works. This group will maintain a focus across all of the individual projects occurring across the precinct and this work will form the basis of future reporting to this Committee.
- A Programme Director, Danny McComb, has been appointed to oversee the programme of works across the Te Ngakau Civic Precinct.
- Each of the individual projects within the overall programme of works will have a fit-for-purpose project governance structure and these are in place for the Town Hall project and Te Matapihi.
- An overview of the status of the main workstreams is set out below:-

---

### **The Town Hall**

18. The strengthening works on the Town Hall are ongoing. This is an exceptionally large and complex project with a target completion date of December 2023.
19. The focus of the project continues to be on the structural works. Piling works are now largely completed in the areas outside of the auditorium. The Auditorium piling will commence in 2022.
20. Piling work on the MOB East Wall has now been completed. This work was necessary in the event that the MOB building could not be demolished. The area where the MOB piles are located could not be practically reached post the strengthening of the Town Hall. Completing this work on the MOB piles will now allow use to separate the Town Hall building from MOB. This means that MOB could be demolished without major disruption to the Town Hall or alternatively, if MOB cannot be demolished the pile structures to support strengthening MOB are in place.
21. The main risks to the Town Hall relate to the scale and complexity of the project. In addition and similar to other construction projects, we are seeing the impacts of Covid-19 feed through into the supply chain and in particular in areas of scaffolding and non-indented steel. The Wellington construction market is extremely stretched and this is being seen in the availability of consultants and subcontractors and is feeding through into escalation of material and labour costs.
22. While expenditure on the project is broadly in line with budget at this stage of the project, the nature of the risks to programme and cost escalation will be a challenge going forward. Our current forecasts, through to project completion in 2024, are for a potential overspend of between 2.1% and 8.7%, these outcomes are very dependent on delivering on programme and where cost escalation lands over the next three years.

### **Te Matapihi**

23. Following the decision of Council as part of the Long Term Plan to advance work on Te Matapihi immediately, the focus has been on procurement and contracting of the design team and resourcing the project team and structures to support delivery of the project.
24. A Project Director, Paul Perniskie, has been appointed to lead the project and he joined Council in May 2021. Paul has a strong background in large construction projects.
25. Council had previously resolved that Te Matapihi would be strengthened to a high resilience level through the use of a Base Isolation system. Base isolation is widely recognised as providing the most resilient building solutions and is the same approach that is being undertaken within the Town Hall and Takina.
26. Council has been approached by one of the structural engineering firms in Wellington with a strengthening scheme for Te Matapihi that they believe could deliver a similarly resilient building outcome, at a lower cost and with a shorter build programme. Their proposed alternative scheme is based on using what are termed Viscous Dampers within the structure as opposed to Base Isolators. Officers and their technical advisors had considered Viscous Dampers through the concept design phase, the view at the

---

time was that a Viscous Damping solution would not deliver benefits over and above Base Isolators.

27. However, given the potential benefits indicated, more work will be done on the alternative resilience scheme. To accommodate this work we have adopted a staged design process that will allow the opportunity to fully investigate the Viscous Damper solution to determine if it is able to deliver a comparable resilience outcome at a materially lower cost and with a reduced programme duration. Design and other work on the project will continue at the same time, this allows momentum on the project to be maintained while the Viscous Damper option is fully assessed.
28. The Viscous Damping solution will fully worked up through June and July and will then be subjected to a comprehensive independent peer review, six weeks has been allowed to undertake and complete this review work.
29. The review will among other things consider comparative resilience outcomes, programme duration and cost.
30. Depending on the outcome of this process a decision will be made to either continue with the Base Isolation scheme or to adopt the alternative Viscous Damper scheme.
31. As part of the reporting back to this Committee updates will be provided and if necessary any decisions required regarding any change to the structural approach will be brought to Council.

#### **Te Ngakau Civic Precinct Framework**

32. The Te Ngakau Civic Precinct Framework is now out for public consultation which runs from 19 May through to 16 June 2021. To date the level of submissions has been modest.
33. Once the consultation process has closed Officers will review the submissions and report back to the Committee in August. At this point Officers will be seeking approval to formally adopt the Framework, subject to the views expressed through the consultation process.
34. Once adopted the Framework will provide the strategic approach required to ensure decision making for all aspects of the precinct contribute to the vision for Te Ngakau.

#### **MOB and CAB**

35. The future of MOB and CAB was consulted on as part of the Council 2021-2031 Long Term Plan. The consultation identified the Council's preferred option as being to demolish the buildings and seek to replace them through the sale of a long term lease on the land to enable a suitable replacement building to be developed in their place.
36. The preferred option to demolish the MOB/CAB buildings will be subject to receiving the necessary resource consent for the demolition.
37. The Long Term Plan noted the need for a resource consent and an amount of \$750k was provided within the Long Term Plan to develop the resource consent application and progress this through the resource consent process.
38. There are a range of supporting documents that will be necessary to inform the resource consent process. The first of these is the Te Ngakau Framework and as noted above progress on adopting a Framework is well advanced. The other key documents

---

needed to support the consent process are a Conservation Plan for the precinct and a Design Brief for the site that would be created by the demolition of the buildings. Work on both of these key documents has commenced and we expect to complete these in October 2021.

### **Next Actions**

39. Officers will continue to advance these projects and will report the status and progress to the Infrastructure Committee on a regular basis.
40. All of the projects within Te Ngakau will be reported to the Committee under a single report covering the full Te Ngakau programme.
41. A fit for purpose reporting dashboard will be developed for the programme that will enable the Committee to monitor the status of the programme and individual projects within the programme.

### **Attachments**

Nil

Author	Danny McComb, Manager Economic & Commercial
Authoriser	Tom Williams, Chief Infrastructure Officer

---

## **SUPPORTING INFORMATION**

### **Engagement and Consultation**

Each of the individual projects have or are subject to appropriate engagement and consultation processes. Te Matapihi and MOB/CAB have most recently been consulted on as part of the Long Term Plan. The framework for Te Ngakau Civic Precinct is currently out for public consultation.

### **Treaty of Waitangi considerations**

Engagement with Mana Whenua is and has occurred across the projects including their engagement and input into the development of the framework for Te Ngakau. The framework envisages a future where Mana Whenua input and cultural perspectives are embodied within Te Ngakau.

### **Financial implications**

All of the projects are funded either through existing budgets as is the case with the Town Hall or through budgets as part of the 2021-2031 Long Term Plan. There is Financial risk going forward associated with the Town Hall project and this is covered within the report.

### **Policy and legislative implications**

This report is a status report and does not have any policy or legislative implications.

### **Risks / legal**

Risks are apparent within the individual projects. These are touched on within the body of the report. The future reporting dashboard to the Committee for the programme will address key risks across the programme and individual projects.

### **Climate Change impact and considerations**

There are no specific impacts or considerations in this area within the update report. There are significant climate change challenges that will need to be addressed across the precinct and the Te Ngakau Framework will provide a strong objective and policy based approach for future works across the precinct.

### **Communications Plan**

This report is an introductory update to the new Infrastructure Committee for information purposes. There are no decisions required within the report.

### **Health and Safety Impact considered**

There are no health and safety impacts within this report, the report is primarily a status report of the works across the Te Ngakau Civic Precinct. Each of the individual projects has a strong and clear focus on health and safety from a design perspective and in the case of the Town Hall from a construction site perspective. Safety across the precinct is a strong focus given the range of earthquake damaged buildings or construction works ongoing within the precinct.





---

## **SLUDGE MINIMISATION**

---

### **Purpose**

1. This report asks the Pūroro Waihanga | Infrastructure Committee to agree to the next steps of the sewage sludge minimisation project.

### **Summary**

2. The City cannot achieve carbon and waste objectives unless sewage sludge is removed from the Southern landfill. Wellington Water Limited has identified a preferred technical option to remove sludge, and officers are developing funding options, including working with Crown Infrastructure Partners to examine the potential for accessing funding through the Infrastructure Funding and Financing Act 2020.

### **Recommendation/s**

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.
2. Note that Wellington City cannot achieve carbon and waste minimisation objectives unless sewage sludge is decoupled from the Southern landfill.
3. Note WWL's business case outlining that lysis-digestion with thermal drying is the preferred technical option for Wellington City.
4. Note that officers are developing a commercial framework with Crown Infrastructure Partners using the provisions of the Infrastructure Funding and Financing Act 2020 to fund sludge minimisation.
5. Note that officers are developing a governance framework in conjunction with Crown Infrastructure Partners and Wellington Water Limited.
6. Note that officers are assessing integration of sludge minimisation with the Government's Three Waters Reform package.
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.

### **Background**

3. The Council has committed to two key environmental objectives. As outlined in the 2017 Wellington Region Waste Management and Minimisation Plan, the Council seeks to reduce the total quantity of waste sent to municipal landfills by one third. And in 2020 the Council released Te Atakura – the Council's plan to achieve net zero carbon emissions by 2050.
4. Solid waste and wastewater treatment account for 88.6% of the Council's gross emissions.

- 
5. Currently, most of Wellington City's sewage sludge is disposed at the Council's Southern landfill in Careys Gully, where it must be mixed with other waste. This method of disposal severely constrains waste minimisation and carbon reduction, effectively preventing the City from achieving its environmental objectives.
  6. If Wellington City is to achieve its environmental objectives, the interdependency between sewage sludge disposal and the Southern landfill must be broken.

## **Discussion**

7. Selection of Preferred Technical Solution. In 2020 Wellington Water Limited (WWL) was tasked with undertaking an analysis with the following investment objectives:
  - By 2026, significantly reduce the amount of sludge sent to Southern landfill so that resulting constraints on the landfill's operations and WCC's waste minimisation goals are removed.
  - Significantly enhance the (short and long term) resilience of sludge management in Wellington, including:
    - Removing the risks in operation of the current sludge management system from a lack of redundancy, aging equipment and exposure to hazards.
    - Reducing the exposure of sludge disposal to costs beyond WCC's control (such as levies on waste disposal).
    - Planning for growth, so that this part in the chain of the wastewater system does not become a constraint on population growth.
  - To significantly reduce the environmental impact and risks of sludge management in Wellington.
8. WWL's analysis considered sixteen options, with eight at Careys Gully and eight at Moa Point. WWL has identified a preferred option at Moa Point that would see sludge stabilised in large heated digestion tanks that capture methane, and then dried using heat to drive off moisture. This is known as lysis-digestion and thermal drying (LD + TD). The end product is stable granules that do not need to be disposed at the Southern landfill. The volume of waste is reduced by around 80%.
9. Other options were cheaper, but did not deliver the investment objectives as effectively.
10. WWL's completed analysis is published on the WWL website<sup>1</sup>. A business case and accompanying WWL board paper is attached.
11. Project Cost. The preliminary cost range for construction outlined in the LTP consultation document was \$147m to \$208m. This was an early estimate, it is expected this range will evolve as the details of the construction process are finalised. WWL advises that the tight contracting market and supply constraints related to Covid are likely to impact on the cost range.

---

<sup>1</sup> <https://www.wellingtonwater.co.nz/sludge-minimisation-facility/>

- 
12. Operating costs of the facility once constructed are estimated at \$3-5m annually. Officers propose to address this estimate in the 2024 LTP when further certainty will be available on asset ownership, whether vested to WCC or moved into an entity created through the water reform process.
  13. The LTP Consultation Document recommended investing in the sludge minimisation facility using non-Council funding. While overall there was strong support for sludge minimisation (around 80% of submissions were supportive), this support was divided evenly between those who wished to use IFF funding arrangement and those who wished for the Council itself to fund the initiative.
  14. Infrastructure Funding and Financing Act 2020. Officers are working with Crown Infrastructure Partners (CIP) to develop a commercial framework using the Infrastructure Funding and Financing Act 2020 (IFF) to facilitate funding that does not sit on the Council's balance sheet.
  15. The purpose of the IFF is to provide a funding and financing model for the provision of infrastructure for housing and urban development that
    - supports the functioning of urban land markets; and
    - reduces the impact of local authority financing and funding constraints; and
    - supports community needs; and
    - appropriately allocates the costs of infrastructure.
  16. Practically, this is achieved by funding the relevant project through a special purpose vehicle (SPV), and then collecting a levy from the beneficiaries of the project over a predetermined timeframe. The levy is required to be administered by the Council on behalf of the SPV, however, legally the finance and the levy do not form part of Council operations.
  17. CIP administers the IFF on behalf of the Government, including responsibility for sourcing financing for and administering SPVs. The Ministry of Housing and Urban Development has an oversight responsibility for IFF initiatives.
  18. Infrastructure assets created by the relevant project are ultimately vested to the Council, which takes on the responsibility for the operating costs of those vested assets.
  19. The beneficiaries of a project are citizens and entities that directly benefit from the existence of a project. This can be both residential and commercial beneficiaries, and consideration of the scale of benefit can be factored into the application of the levy. The preliminary estimate of the levy in the consultation document for typical Wellington residential premises was between \$70-\$100 p.a. The final levy will depend on final project costings which are still being developed.
  20. The benefit to the Council of using this funding mechanism is the asset is created without the Council having to finance it. This allows the Council to utilise its funding

---

capacity to invest in other important projects and minimises the Council resource necessary for project management.

21. The potential downside of using IFF is it may be more expensive than other Council funding options. This will be a key part of the negotiation between Council and the Crown.
22. In parallel to the work being progressed with CIP, officers are assessing alternative funding options to ensure the final funding mechanism is the best outcome for Wellingtonians.
23. Council Debt Funding. The normal mechanism the Council would use to fund a project of this scale would be to debt fund the capital component, and rates fund operational costs, depreciation, and interest costs.
24. The downside of this approach requires the management of the project costs within the constraints of the Council's debt funding capacity, which in turn requires the Council to prioritise the sludge minimisation facility in the context of all possible projects competing for Council funding.
25. Council Capital Raise. An alternative option for funding the cost of the Sludge Minimisation Facility is to realise capital from the Council's balance sheet through the strategic divestment of existing Council assets. This approach has the lowest net impact on the Council's balance sheet and will likely have the lowest net impact on ratepayers.
26. The considerations associated with this approach to funding investments are generally strategic in nature, with the benefits dependant on the financial characteristics of the asset divested and the amount of capital realised.
27. The Southern Landfill. It had been anticipated that the Southern landfill would be extended. While this is still likely to be required, if sludge is removed from the waste stream the profile of the extension is likely to be different from the status quo. The future of the landfill is on hold until October, when it is anticipated that community engagement around the future of the landfill will be reactivated, on the basis that there will be no sludge into the landfill after the sludge plant is constructed, clearing the way for further waste and carbon minimisation.

## **Options**

28. The Council is not yet under any contractual obligation to proceed down the IFF path, and has the option of withdrawing over the coming months. However, CIP is currently negotiating in good faith, and given the general support shown through the LTP consultation, officers do not consider that withdrawal is currently an option, and do not recommend withdrawal. The Council is unable to deliver a sludge plant within its current funding constraints.

## Next Actions

29. If approved, officers will continue to work with CIP and WWL to develop the commercial framework.

## Attachments

- Attachment 1. Wellington Water Major Projects Committee Meeting 14 June 2021 [↓](#)  Page 21

Author	Mike Mendonca, Head of Resilience
Authoriser	Sara Hay, Chief Financial Officer Tom Williams, Chief Infrastructure Officer

## SUPPORTING INFORMATION

### Engagement and Consultation

The initiative was consulted as part of the LTP. While there was strong support for sludge minimisation, this was divided evenly between those who favoured IFF and those who wished for the Council to fund the initiative.

### Treaty of Waitangi considerations

There are implications for Mana Whenua. WWL is engaged with Mana Whenua as part of planning.

### Financial implications

The cost of sludge minimisation is substantial; this was consulted as part of the 2021 LTP, and there are implications for the 2024 LTP.

### Policy and legislative implications

This is the first such initiative using the IFF legislation. There is an element of risk that comes with being first; the governance structures are being designed to manage this risk.

### Risks / legal

There are multiple legal risks with this initiative. The governance structures are being designed to manage this risk.

### Climate Change impact and considerations

The recommendations are aligned with Te Atakura.

### Communications Plan

A communications plan is under development by WWL.

### Health and Safety Impact considered

Health and safety implications will be managed through the appropriate PCBU.



Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## Major Project Committee Meeting

Meeting: 14 June 2021  
Agenda no: 3  
Prepared: Susan Cuthbert, Principal Advisor to the Chief Executive  
Approved: Susan Cuthbert, Principal Advisor to the Chief Executive  
Recommended: Colin Crampton, Chief Executive

## Sludge Minimisation Facility – Funding and Delivery

### Purpose

1. To discuss the Sludge Minimisation Facility that will be going to the Board and discuss advising the Board.

### Summary

2. The Board has asked that the Committee provide proactive oversight of all planning, co-ordination and delivery of the proposed Sludge Minimisation project.
3. A Board paper is attached that explores the proposal and how it could be progressed with both Wellington City Council and Crown Infrastructure Partners.
4. Representatives from Wellington City Council and Crown Infrastructure Partners will be present at your meeting.

Page 1 of 2

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

5. The Committee is asked to discuss the proposal and make a recommendation to the Board on how to proceed. The Board's next meeting is on 16 June 2021.

### Recommendation

6. It is recommended that the Committee:
- a) **Discuss** the Sludge Minimisation Facility proposal to date as outlined in the Board paper
  - b) **Discuss** its advice to the Board.

### Attachments

7. There is one attachment:
- [Attachment A: Sludge Minimisation Facility – Funding and Delivery](#)

Page 2 of 2

3

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## Board Meeting

Paper number: 055-05  
Board meeting: 16 June 2021  
Agenda no: 7.2  
Prepared: Tonia Haskell, GM Network Development and Delivery  
Approved: Colin Crampton, Chief Executive  
Recommended: Colin Crampton, Chief Executive

## Sludge Minimisation Facility – Funding and Delivery

### Purpose

1. To discuss the proposed way of delivering the Sludge Minimisation Facility.

### Summary

2. Wellington City Council (WCC) and Wellington Water have been working on a way to reduce the amount of sludge entering the Southern landfill because the current practice of disposing sludge is not sustainable for the ongoing operations of the landfill.
3. A detailed option selection process was undertaken and a preferred option identified, all of which was discussed during LTP considerations by WCC.

Page 1 of 13

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

4. Wellington Water has been working with WCC and Crown Infrastructure Partners (CIP) to progress the applicability of the Sludge Minimisation Facility (SMF) using the Infrastructure Funding and Financing Act. Good progress is being made.
5. The purpose of this paper is to explore the activity and how it is to be progressed with both WCC and CIP.
6. Wellington Water will need to assess the overall performance parameters for our involvement in this project so all parties can enter into an arrangement to progress the project while understanding all the risks.

### Recommendation

7. It is recommended that the Board:
  - a) **Notes** the ongoing development of the Sludge Minimisation Facility project;
  - b) **Notes** WCC has made good progress proposing this activity be advanced using the Infrastructure Funding and Financing Act;
  - c) **Agrees** Wellington Water should position itself as the developer and deliverer of the Sludge Minimisation Facility;
  - d) **Notes** the dialogue between WCC, CIP and the Major Projects Committee at its 14 June 2021 meeting;
  - e) **Approves** the release of the Business Case, 2020 Options Cost Estimate and indicative development and delivery programme; and
  - f) **Agrees** to receive further advice on the shape and form of agreements between WCC and CIP or both prior to the commercial framework being agreed.

Page 2 of 13

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Attachments

8. There are four attachments:

- [Attachment A: Sludge Minimisation Facility Business Case](#)
- [Attachment B: 2020 Options Cost Estimate](#)
- [Attachment C: Indicative development and delivery programme](#)
- [Attachment D: Wellington Water Governance Structure](#)

Page 3 of 13

6

## Context

9. Sludge is the result of the first stage of the treatment of wastewater. In the metropolitan area of Wellington, all wastewater treatment plants consist of biological treatment of wastewater followed by separation of solids from the liquid using clarifiers, followed by further water reduction using centrifuges or drying before disposal to landfill. If treated to standards that are safe to handle, then treated sludge is also referred to as “biosolids”.
10. Sludge from the Moa Point Plant is pumped to the Southern landfill where it is concentrated through centrifuges before being disposed of in the landfill. The final sludge product consists of about 25-30% solids and 15-20% water and as the population grows, the amount of sludge needing disposal also grows. Concurrently, general waste volumes being disposed of at the landfill are reducing; so much so they are now approaching the minimum ratio of four parts general waste to one part sludge, allowed under the resource consent for the landfill.
11. WCC are therefore focused on resolving how to manage sludge so the medium-term viability of the landfill is secured. In the long-term their aspiration is to close the landfill. Wellington Water has been helping by investigating the best way to reduce the volume of sludge produced at Moa Point. After an optioneering phase, the preferred option has been recommended to Wellington City Council (WCC). Wellington Water and WCC have discussed the preferred option but it has not been fully endorsed by WCC. Over the next 2-6 weeks, WCC will present the preferred option to council using the business case produced by Wellington Water for the Sludge Minimisation Facility (Attachment A).
12. The preferred solution is what experts technically call “thermal hydrolysis”, then anaerobic digestion followed by drying. In lay persons terms it means the sludge is cooked under heat and pressure so the molecular structure of the sludge is broken down so all the organic material can be digested via an anaerobic process. The last step is drying which uses gas generated from digestion. This overall process has been used overseas but is new to New Zealand.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

13. The business case contains cost estimate material. These estimates have been prepared for the purposes of option selection only, hence the term 'Options Cost Estimate'. The cost estimate is not a proper estimate of outturn costs for the preferred solution and has not been escalated to match a delivery schedule. The estimate has been updated from 2020 to 2021 terms (refer Attachment B).
14. It is proposed to build the plant on land adjacent to the Moa Point plant resulting in the decommissioning of the pipelines from the Moa Point to the landfill (and the reduction of risks we all know about). This will require land purchase from Wellington Airport and consents under the Resource Management Act 1991.

#### Traditional funding is not possible

15. WCC has just completed its Long-Term Planning for the 21/31 period. Wellington Water provided advice to WCC on levels of investment recommended for Three Waters including the Sludge Minimisation Facility.
16. At an infrastructure level, WCC have many demands on its funding and following Covid-19, its revenues aren't as secure as before. Even after investing close to its debt cap, WCC still has many deserving activities which would not be able to be funded so it must make careful rationing decisions.
17. As part of looking at what it can/cannot fund, WCC have investigated alternative funding and financing options to deliver the Sludge Minimisation Facility. This includes using the Infrastructure Funding and Financing Act (IFF) which was set up to accelerate infrastructure for green fields housing developments. The sludge facility is not a green field development, but meets the criteria of providing essential infrastructure to support a growing Wellington. If this proposal proceeds it would be a test case for the IFF.

Page 5 of 13

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

### How does the IFF Work

18. In simple terms, a Proposer (in this case WCC) approaches Crown Infrastructure Partners (CIP) to explore the idea of using the IFF to fund and finance the project. If the project meets the requirements, then the IFF funds and finances the project with the capital and interest costs repaid by a levy on the beneficiaries of the activity (in this case Wellington ratepayers). It is important to note the IFF only funds the development and delivery costs not the operational and capital renewal costs over the life of the project. The whole of life operational and capital renewal costs are funded by the Asset Owner which would be either WCC or any new water entity.
19. By using the IFF, the activity is considered off balance sheet for WCC and is achieved through a Special Purpose Vehicle (SPV) overseen by CIP.
20. The project appears to progress through three stages, as follows:
- a) Preliminaries: All parties act in good faith to explore the use of the IFF and decide if the project will proceed. Wellington Water is involved and all work we undertake is funded by existing WCC budget allocations for the Sludge Minimisation Facility (≈\$1M in 20/21);
  - b) Commercial framework: The framework lays out the work the Proposer and CIP need to do to realise the delivery of the facility. This sets out the performance parameters of the work, i.e. cost of the project; timelines; financing; levy etc. Wellington Water would be the Proposer's development and delivery entity. All work undertaken by Wellington Water would be funded by WCC revenues and then capitalised into the SPV (≈\$16M in 21/22 and 22/23); and
  - c) Financial Close: This agreement lays out the final funding and financial arrangements so the facility can be constructed, financing agreed, levy settled and all risks allocated. Wellington Water would deliver the facility under this agreement. Costs and timeframes to be agreed.
- CIP will be at our board meeting to allow a conversation about expectations and how each of these stages will work.

Page 6 of 13

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

21. On completion of the project the asset is transferred to the owner who would fund ongoing operational costs and capital renewals. The SPV would continue to exist until the debt is paid off.
22. Based on indicative timeframes provided by WCC, it appears the Commercial Agreement would be settled by the end of July 2022. CIP is keen to target financial close by 30 June 2022 although our planning suggests this phase should be more like 18 months or December 2022.

**How does Wellington Water fit in?**

23. Wellington Water is contracted to Wellington City Council as its three waters planning and delivery entity. WCC have asked us in good faith to continue to develop the work but this needs to be formalised because the way of working under the IFF is different from day to day work with WCC and our other councils. This is because the project is commercially ring fenced and all risks need to be allocated to the parties involved.
24. It is proposed the Board agree with WCC to deliver the SMF through two stages:
  - a) Continue to work on the preliminary stages under existing agreements between WCC and Wellington Water; and
  - b) Enter into a specific agreement with WCC, CIP or both for the development and delivery of the project to coincide with WCC/CIP signing the Commercial Agreement.
25. This should obviously be discussed with both WCC and CIP. Officers of the three entities will initiate discussions and I suggest the Board Chair and Major Projects Committee Chair consolidate these agreements at a Governance level with WCC and CIP.

Page 7 of 13

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

### The Project is now an urgent Project

26. Now that the project looks very likely to comply with all the requirements of the IFF, CIP and WCC are keen to fast track the project. Wellington Water is not currently set up to deliver on that basis.

27. Therefore, the Board is asked to consider how best should Wellington Water participate in this project. Our logic is as follows:

- a) Wellington Water is the service provider so should start from the position of assuming it should deliver the project;
- b) Sludge treatment activities are a core competency of a water services provider so we should deliver it. While the rationale for the project is WCC's, the facility is within the Wellington Water operating spectrum now and into the future;
- c) While we don't have specific \$200M-\$300M project development and delivery DNA within Wellington Water, members of the Board and Senior Management Team have direct experience delivering projects up to and over \$1 billion;
- d) It is not possible to deliver this project within the normal operating model of our capex system because we have a big programme to deliver over the next three years, and this system is already under-resourced. So we will need to deliver the work using a separate project team attached to the Wellington Water structure filled with purpose selected personnel. We will appoint a Project Director to lead the project team. We are confident our current management structures have the breadth to accommodate the additional work;
- e) We do have the intellectual property to undertake a project like this, to deliver the outcomes sought and to ensure value to the beneficiaries of the project is realised; and

Page 8 of 13

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

f) It is natural and logical to think carefully how our existing supplier, Veolia, will be involved in the project as we look to “whole of life” solutions and who will operate the plant and under what guarantees. This is not urgent and can be done once the Commercial Framework is agreed.

28. We suggest the Board discuss the project with WCC and CIP on the basis we are the organisation able to deliver this project, and beginning a conversation on the performance parameters of a successful project now is a good idea.

#### Anticipated Governance

29. The governance between WCC (Proposer); CIP (Funder) and Wellington Water (delivery agent) has yet to be resolved and will need to be before the commercial framework is decided.

30. Within Wellington Water we have established a Major Projects Committee which reports to the Board. The Committee will oversee the performance parameters of the SMF with all delegation currently retained at Board level.

31. Within Wellington Water we have established a Steering Group consisting of the CE, GM ND&D and an independent person (yet to be appointed). The Project Director, leading the project team, will report to the Steering Group. Line management of the Project Director will be to the GM ND&D.

Page 9 of 13

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

### Deliverables need approval

32. To date Wellington Water has released drafts of the business case and the 2020 Options Cost Estimate to WCC/CIP to enable the preliminaries to be progressed. You are asked to approve these, as well as the high level development and delivery timelines. These are contained within the attachments.
33. Over the next six weeks the project team will develop a suite of documents which will outline the performance parameters for the SMF to be outlined to the Board. We envisage this being agreed by the Committee prior to the commercial framework being agreed between WCC/CIP and any other formal agreements involving Wellington Water. We would expect to enter into a formal agreement with WCC and CIP or both to ensure the basis of our participation is clear and how the initial risks will be allocated.

### Emerging Risk Profile

34. The acceleration of the sludge minimisation project through the Infrastructure Funding and Financing Act has some risks associated with it which are worthy of noting. Those risks are:
  - a) That other owners of Wellington Water perceive less attention on our biggest 20/21 capex programme, due to being distracted by the Sludge Minimisation Facility project;
  - b) That early levy calculations based on estimate created to allow options to be compared change significantly when a proper outturn cost estimate for the preferred option is calculated for agreed delivery timeframes;

Page 10 of 13

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

- c) That even with a proper preferred option estimate in place there could still be significant changes due to the complexity of procuring a new technology from overseas;
- d) Our experts advise us that there has been a substantial uplift well ahead of inflation in the costs of materials and construction in the world market due to the impacts of Covid-19, and are expecting that uplift to continue;
- e) The risk of delays to the development and delivery of the project due to the difficulty setting up a project delivery structure to meet the ambitious deadlines in an already overheated infrastructure sector in New Zealand; and
- f) The risk to the project cost estimate if the delays in delivery are not understood and not factored into the final estimate.

## Conclusion

- 35. Reducing sludge is a critical project for WCC. It makes a significant contribution to the reduction of waste going to landfill and is part of the functioning of a modern city.
- 36. It's an exciting project to be involved with but has come at a time when the sector is under strain through reform, has plenty to do under prevailing LTP conditions, and is struggling to find the resources to do everything.
- 37. However, all things considered, it is right for Wellington Water to play its part in the development and delivery of this essential project for WCC.

Page 11 of 13

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

### Recommendation

38. It is recommended that the Board:

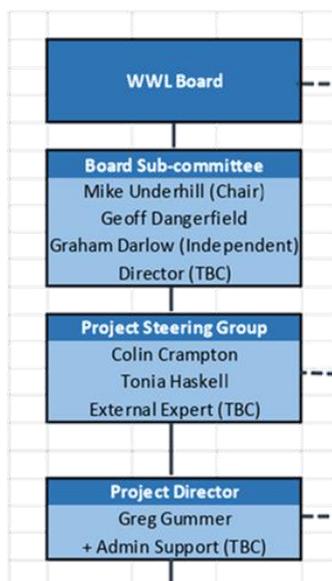
- a) **Notes** the ongoing development of the Sludge Minimisation Facility project;
- b) **Notes** WCC has made good progress proposing this activity be advanced using the Infrastructure Funding and Financing Act;
- c) **Agrees** Wellington Water should position itself as the developer and deliverer of the Sludge Minimisation Facility;
- d) **Notes** the dialogue between WCC, CIP and the Major Projects Committee at its 14 June 2021 meeting;
- e) **Approves** the release of the Business Case, 2020 Options Cost Estimate and indicative development and delivery programme; and
- f) **Agrees** to receive further advice on the shape and form of agreements between WCC and CIP or both prior to the commercial framework being agreed.

Page 12 of 13

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

**Attachment D**

**Wellington Water Governance Structure**



Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



# Wellington Sludge Minimisation Facility

Single Stage Business Case



Our water, our future.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

#### Document Information

	Position
<b>Document ID</b>	
<b>Document Owner</b>	Steve Hutchison, Chief Advisor Wastewater
<b>Issue Date</b>	14 June 2021
<b>File Name</b>	Wellington Sludge Minimisation Facility – Single Stage Business Case

#### Document History

Version	Issue Date	Changes
0.1	12/03/2021	Draft Strategic and Economic Case for review and discussion
0.2	26/03/2021	Draft Business Case for review and discussion
0.3	20/04/2021	Draft Incorporating Wellington Water comments
0.4	19/05/21	Revised draft incorporating Wellington City Council comments
0.5	10/06/21	Revised incorporating Wellington City Council comments

#### Document Review

Role	Name	Review Status
Project Manager	Chris French	12/03/2021 – Review for WWL issue
Project Manager	Chris French	26/03/2021 – Review for WWL issue
Project Manager	Chris French	20/04/2021 – Review for WWL issue
Project Manager	Chris French	20/05/2021 – Review for WWL issue
Project Management	Chris French	10/06/2021 – Review for WWL issue

#### Document Sign-off

Role	Name	Sign-off Date
Team Lead, Connect Water	Malcolm Franklin	12/03/2021 – Review for WWL issue
Team Lead, Connect Water	Malcolm Franklin	26/03/2021 – Review for WWL issue
Team Lead, Connect Water	Malcolm Franklin	20/04/2021 – Review for WWL issue
Manager, ND&D Wellington Water	Tonia Haskell	20/04/2021 – Review for WCC/CIP issue
Manager, ND&D Wellington Water	Tonia Haskell	11/06/2021 – Review for WWL Board endorsement and release to WCC

Single Stage Business Case – Wellington Sludge Minimisation Project | Page i

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Executive Summary

Wellington City sees itself as a sustainable, climate friendly eco capital. It aspires to be 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.

This aspiration is desired at a time when a sharp increase in growth is anticipated.

Wellington City Council (WCC) requires a fundamental change in the management of sewage sludge, to allow it to be 'de-coupled' from the existing disposal to the Southern Landfill. If this change does not occur, the City cannot be the eco capital it imagines itself to be.

Sewage sludge is produced as a by-product from Wellington City's two wastewater treatment plants (WWTPs) at Moa Point and Karori and is currently dewatered to remove some water content before disposal at the Southern Landfill.

### The Need for Change

As summarised in the following diagram, the current volume and composition of the sludge is a major inhibitor to enabling waste minimisation efforts in Wellington City. In its current form, sludge requires solid waste to be mixed at a ratio of 1:4. By reducing the amount and composition of wastewater by-product this, WCC can implement waste minimisation initiatives which reduce the amount of solid waste sent to Southern Landfill. This in turn will reduce carbon emissions from Southern Landfill, Wellington City Council's major carbon emission source.



### Investment Objectives

The current challenges with sludge management have, in turn, informed investment objectives for this business case. Three key investment objectives have been identified:

- **Objective 1:** By 2026, remove the constraints on the landfill's operations and Wellington City Council's waste minimisation goals, by significantly reducing the amount of sludge sent to Southern Landfill,
- **Objective 2:** Significantly enhance the (short and long term) resilience of sludge management in Wellington, and

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

- **Objective 3:** Significantly reduce the environmental impact and risks of sludge management in Wellington. The main risks are associated with odour emissions and carbon emissions from sludge disposal.

#### Identifying a Preferred Option

A detailed multi-criteria assessment (MCA) was undertaken in 2020 which enabled three options to be shortlisted and taken forward (together with the option of doing nothing) into this business case. These options, all located at Moa Point, are:

- **Option 1:** Lysis-Digestion and Thermal Drying,
- **Option 2:** Thermal Drying and Gasification, and
- **Option 3:** Mesophilic Anaerobic Digestion and Thermal Drying.

This business case has evaluated these options by assessing the degree to which each option achieves the three defined investment objectives. In addition, capital and operating cost models have been prepared and assessed, together with a sensitivity analysis to confirm the robustness of the analysis. The following table provides a summary of the assessment.

	Option 1: Lysis-Digestion and Thermal Drying	Option 2: Thermal Drying and Gasification	Option 3: Mesophilic Anaerobic Digestion and Thermal Drying	Option 4: Do Nothing
Objective 1 – Enable Waste Minimisation through Sludge Volume Reduction	★★★★	★★★★	★★★	⊘
Objective 2 – Significantly Enhance the Resilience of Sludge Management	★★★★	★★	★★★★	⊘
Objective 3 – Significantly Reduce Environmental Impact / Risk	★★★★	★★★★	★★★	⊘
Capital Cost (\$million)	\$160.2 - \$220.6M (\$186.2)	\$136.1 - \$210.7 M (\$173.4M)	\$222.1 - \$314.3 M (\$268.2)	\$0
Operating Cost to 2075 (\$million)	\$4.9 - \$7.1M (\$6.0M)	\$4.1 - \$5.9M (\$5.0M)	\$5.7 - \$8.3M (\$7.0M)	\$6.0 - \$8.6M (\$7.3M)
TOTEX (\$million)	\$354.0 - \$468.9M (\$411.5M)	\$277.8 - \$343.8M (\$310.8M)	\$441.4 - \$522.7M (\$482.1M)	\$271.2 - \$275.3M (\$273.3M)

#### Notes:

1. The number of stars reflect the degree to which the option meets the investment objective. Zero stars = does not meet objective at all, Four Stars = meets objective well.
2. Numbers shown in brackets indicate median costs.
3. All Costs (including operating costs to 2075) are 2020 costs and are provided for comparative purposes only.
4. The capital cost estimates, include high level estimates for the physical plant, buildings, other structures and civil works, to which percentages for contractor margins, professional services (design consenting and management) and contingencies have been applied. The capital cost estimates also include high level estimates for land acquisition.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

5. The operating cost estimates include high level estimates of energy use, chemical use, labour costs, slug transportation and disposal costs, and maintenance costs of the assets. These are based on high level modelling of each option.
6. The Total Expenditure (TOTEX) to year 2075 is based on a net present value model of the capital and operating costs applying standard discount and inflation factors

The analysis of whole-of life (TOTEX) cost over the design horizon of this project has identified that the lowest cost option is Option 4: Do Nothing, which is to continue to dewater the sludge and dispose to Southern Landfill. However, consent restrictions placed on the disposal of sludge at the landfill mean that this option is not tenable in the future, because insufficient solid waste is available to mix with the dewatered sludge. This would require additional solid waste to be imported to Southern Landfill or diversion of dewatered sludge to other landfills. Neither of these approaches is considered tenable.

The next lowest TOTEX option is thermal drying and gasification. As noted in the advantages and disadvantages for this option, the installation of a thermal drying and gasification process presents a significant risk, because there are no significant installations in Australasia. This would create a significant implementation and operational risk, which cannot be readily mitigated. On that basis, this option has not been considered further.

Of the two options of relatively well-established technology, the option with the lowest TOTEX is Lysis-Digestion and Thermal Drying. This option is also most aligned to the investment objectives.

On that basis, the **preferred option is Lysis-Digestion and Thermal Drying.**

#### Funding the project

Wellington City Council have indicated that their preferred option is to deliver the project using external funding sources and are currently working with Crown Infrastructure Partners to identify a potential funding and delivery model under the Infrastructure Funding and Financing Act (2020). This would mean that the project would not be funded by Council debt and would not exceed Council's debt-to-income cap. An additional charge would be applied to the project "beneficiaries" (i.e. the community served by the project) in the form of a levy to repay the borrowing required to fund the project. Operational costs would continue to be funded by Council.

#### Planning for Delivery

The following table provides a summary of key project planning considerations.

Key Consideration	Current Status
Risk Management	A workshop was facilitated at project establishment, where key stakeholders identified and evaluated the key risks. The risk register is periodically reviewed, and key risks identified, with mitigations presented to the current project management team.
Procurement Strategy (Service Delivery Model)	A number of key challenges / considerations for this project have been identified. These include the technical complexity of the project, the need to engage international technology providers, programme pressures, and opportunities for innovation. These lend to a collaborative service delivery model, with a collaborative culture underpinning the model to engage the designer(s), technology provider(s) and constructor(s) early to co-design and then construct the facility.
Land Acquisition	Specialist property consultants have been engaged to support the land acquisition process at the Moa Point site. The proposed method of acquisition will be recorded in a Land Acquisition Strategy as a key output of the project planning process. This strategy will support acquisition of the proposed site early in the project.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Key Consideration	Current Status
Project Organisation and Governance Structure	<p>Project structures and governance will be established for the initial stages of the project. A separate and dedicated WWL project team and internal governance will be in place by June 2021. Shared governance with CIP and WCC will need to be formed by July 2021.</p> <p>The organisational and governance structures for the delivery and construction phases of this project are highly dependent on the service delivery model that will be identified and endorsed through the development and approval of the procurement strategy. Upon completion of the procurement strategy, a detailed organisation and governance plan will be developed in conjunction with CIP and WCC and implemented.</p>
Stakeholder Engagement	<p>A Stakeholder and Community Engagement Plan has been developed for this project. It identifies the key stakeholders that require engagement, the objectives of engagement with each party, and who is responsible for that engagement.</p>
Consenting	<p>District Plan and Resource planning approvals will be required and a timeframe for these have been included in the project programme. At a District Plan level, the recommended approach is to alter the existing Moa Point Drainage and Sewage Treatment Plan Designation through a Notice of Requirement. At Resource Planning level, the three anticipated consents (discharge to air, discharge to stormwater and earthworks) are considered discretionary activities.</p>
Delivery Programme	<p>Key project milestones have been identified; they include:</p> <ul style="list-style-type: none"> <li>• Land acquisition and completing consenting</li> <li>• Developed design for cost estimation and funding purposes</li> <li>• Securing funding</li> <li>• Undertaking detailed design by December, and</li> <li>• Construction completion</li> </ul>

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Contents

Executive Summary .....	i
Contents .....	v
Introduction.....	6
Strategic Case: The Case for Change .....	7
Economic Case: Identifying the Option.....	11
Approach to Identifying Options .....	11
Multi-criteria Assessment of Options .....	12
Assessing the Options Against the Objectives .....	13
Financial Assessment of Recommended Options.....	17
Summary and Recommendation .....	19
Financial Case: Funding Requirements.....	20
Commercial and Management Case: Planning for Successful Delivery.....	21
Risk Management Planning .....	21
Procurement Strategy (Service Delivery Model) .....	21
Land Acquisition Strategy .....	21
Project Organisation and Governance.....	22
Stakeholder Engagement.....	22
Delivery Programme .....	23
Appendix A – Basis of Cost Estimates	
Appendix B – Project Risk Assessment	

Single Stage Business Case – Wellington Sludge Minimisation Project | Page v

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Introduction

Wellington City sees itself as a sustainable, climate friendly eco capital with a dynamic and sustainable economy<sup>1</sup>. It aspires to be 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.

This aspiration is desired at a time when a sharp increase in growth is anticipated. 50,000-80,000 more people are expected to live in Wellington City over the next 30 years. If the City is to grow in a way that is consistent with its low waste and low carbon aspirations, substantial infrastructure change is required.

Wellington City Council (WCC) requires a fundamental change in the management of sewage sludge, to allow it to be 'de-coupled' from the existing disposal to the Southern Landfill. If this change is not made, the City cannot deliver on its aspirations.

Sewage sludge is produced as a by-product from Wellington City's two wastewater treatment plants (WWTPs) at Moa Point and Karori (also known as the Western WWTP) and is currently dewatered to remove some water content before disposal at the Southern Landfill. The existing sludge treatment and disposal method creates critical operational and other constraints at the landfill, and as outlined in the Case for Change, is inhibiting WCC from pursuing solid waste minimisation initiatives and reducing carbon emissions associated with solid waste management.

## Purpose of this Document

The purpose of this Single Stage Business Case (SSBC) is to present the key attributes of the solutions being considered to allow WCC to manage sewage sludge in a more environmentally and socially responsible manner while achieving the major objectives of Waste Minimisation and Carbon Reduction.

This business case builds on earlier Multi-Criteria Analysis (MCA) to assess options against a range of criteria and provides further analysis on the most favourable options against the benefits defined in this business case.

This document has been prepared for the approval of Wellington City Council.

## Scope of this Business Case

This business case is focused on sludge treatment options for Wellington City. Sludge management for the wider region (including Wellington City Council share of Porirua WWTP) is out of scope.

While regional sludge management facilities have been considered in the past, the Project Brief – Wellington City Council Wastewater Sludge Minimisation is specific to Wellington City's sludge management needs, recognising that the challenges of sludge disposal for Wellington City are unique and require more urgent attention.

Furthermore, this business case does not consider disposal methods for treated sludge. While the selection of a preferred treatment option has considered the potential for beneficial or alternative disposal pathways for the treated sludge product (biosolids), the establishment of these alternative pathways is a longer-term activity outside the scope of this business case.

<sup>1</sup> Wellington City Community Outcomes Framework

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Strategic Case: The Case for Change

### The Case for Change – In a Nutshell

#### Why is this journey important?

Wellington City Council is committed to reducing carbon emissions and to greatly reducing the amount of waste sent to Southern Landfill. These commitments are detailed in the following:

- **Wellington Region Waste Management and Minimisation Plan (2017 – 2023) commits to greatly reducing waste to landfill.** The key target in this plan is to reduce solid waste sent to Class 1 landfills from 600kg per person per annum to 400kg per person by 2026. As noted above, sludge management currently inhibits solid waste minimisation efforts, and in itself makes up approximately 20% of the solid waste inputs into the Southern Landfill at present.
- **Te Atakura - First to Zero Strategy commits Wellington City to zero carbon by 2050.** Approximately 80% of Wellington City Council's carbon emissions are attributed to Southern Landfill. Therefore, reaching zero carbon requires a fundamental change in solid waste management, and therefore sludge management. Of note, this strategy already references sewage sludge as an existing project, by committed funding to a sewage sludge processing solution at the Southern Landfill in the 2018-28 long term plan. In exploring solutions, the plan commits to looking at the potential for digesters or co-processing of other waste streams than sludge to see if further maximised benefit can be achieved. This sludge minimisation project aligns to these actions.

These targets face further challenge from the significant economic and population growth being experienced in Wellington at present. As the population grows, sludge volumes are expected to grow proportionally, and further constraints are placed on capacity at Southern Landfill.

In the immediate term, it is projected that there will be insufficient solid waste to mix with sludge (at the required ratio) within 1 – 2 years. Reducing sludge, and then ultimately solid waste volumes, to landfill is an enabler for future population and economic growth.

#### Why do we need to change?

As summarised in the following diagram, the current volume and composition of the sludge is a major inhibitor to enabling waste minimisation efforts in Wellington City, because so much solid waste is needed to mix with the sludge in its current form. By changing this, waste minimisation initiatives can be implemented, which reduce the amount of solid waste sent to Southern Landfill. This in turn will reduce carbon emissions from Southern Landfill over the longer term.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



Figure 1: The Case for a Change in Sludge Management for Wellington City.

This Sludge Minimisation Project addresses Step 1 in this journey.

#### What happens to sewage sludge in Wellington?

The sludge by-product from Moa WWTP is currently pumped through pipelines across the southern parts of Wellington to the sludge dewatering plant (SDP) at the Southern Landfill, known as Carey's Gully SDP. Sludge from Wellington City's other WWTP in Karori, is dewatered at that plant and is also sent to Southern Landfill for disposal.

In terms of the range of sludge management processes available, the SDP is relatively simple, being designed to remove some water from the sludge. The product from this process is a wet soil-like material that enables the sludge to be mixed with solid waste at the Southern Landfill. However, it is an odorous material and has high degree of biological hazard, so requires careful disposal in the landfill. The mixing of sludge with solid waste is a requirement of the resource consent for the Southern Landfill and a necessary landfill operational requirement to manage landfill structural stability and odour.

Given the current processing methods of the sludge, and the significant volume of sludge, the only place it can be disposed of is at Southern Landfill.

#### Addressing Resilience

In terms of resilience, the current way in which sewage sludge is managed presents several risks. These include:

1. The sludge transfer pipelines (which transfer sludge between Moa Point WWTP and the Carey's Gully SDP at present) are a single point of failure for the sludge system. In 2020, a section of these pipelines failed within the Mt Albert tunnel, which highlighted their vulnerability. The economic, environmental, and reputational damage to Wellington City was substantial, and highlighted the community's repugnance for this kind of failure. The pipelines also traverse several fault lines.
2. The dewatering facility at Carey's Gully is an ageing facility and may fail in a significant seismic event, meaning the sludge couldn't be de-watered and therefore couldn't be disposed of at the Landfill.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

3. There is currently only one option for disposal of the sludge – the Southern Landfill. This isn't considered to be viable long-term. Changing the form of the sludge provides more options of where it is disposed.
4. Government policy is increasing the cost of sludge disposal to landfill and may make landfill disposal entirely unviable.

#### Bringing Mana Whenua Views

Recognising the importance of mana whenua values and principles in decision making, representatives of Ngāti Toa and Taranaki Whānui were a core part of the combined project team who defined the criteria and Multi-Criteria Assessment (MCA) process for selecting a preferred option at early project stages. Ongoing engagement with iwi is a critical component of the delivery of this project.

Early engagement with iwi identified a number of core values / principles that influence project decisions, including:

- A desire to implement processes that align to traditional Maori values and methods of human waste management, and the principles of rahui in disposing of human waste;
- A desire to harness and use the resources for the sludge to give them another life;
- Having a positive impact on the environment and our communities through the action we take (kaitiakitanga);
- Acknowledging the potential impacts of sludge management on areas of settlement (marae, papakainga), use (food gathering areas), wāhi tapu, statutory acknowledgements and sites of significance.

These core principles were applied as a criteria in the evaluation of options during the Multi-Criteria Assessment process.

#### Defining the Project Objectives

During the development of the strategic case, an investment logic mapping workshop was conducted which brought together key stakeholders to understand the problems facing the wider Wellington region regarding sludge management.

The problem statements are summarized in the table below, together with the benefits which link to these problem statements and come from addressing sludge management in Wellington.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Investment objectives combine the problem statements and the benefits in a way that confirms, through the life cycle of the project, that the benefits of undertaking the project have been realised. Three investment objectives have been distilled from combining the problem statements and benefits, as follows:

**Investment Objective One: Enable Waste Minimisation through Sludge Volume Reduction**

By 2024 remove the constraints on the landfill's operations and Wellington City Council's waste minimisation goals, by significantly reducing the amount of sludge sent to Southern Landfill.

This investment objective relates to the initial focus of sludge management needs in Wellington, which is to reduce the amount of sludge that needs to be sent to landfill through a new way of processing the sludge.

**Investment Objective Two: Significantly Enhance the (short and long term) resilience of Sludge Management in Wellington.**

In the short term, enhancing resilience means:

- Removing the risks in operation of the current sludge management system from a lack of redundancy, ageing equipment and exposure to hazards.
- Reducing the exposure of sludge disposal to costs beyond Wellington City Council's control (such as levies on waste disposal).
- Planning to grow Wellington City the way it wants too, in a sustainable and environmentally friendly manner.

In the longer term, enhancing resilience means placing less reliance on a single pathway for sludge disposal, by opening up alternative disposal / beneficial re-use options.

**Investment Objective Three: Significantly Reduce the Environmental Impact and Risks**

The key environmental impacts that need to be reduced are:

- Carbon emissions – the current system for sewage sludge management has estimated carbon emissions of around 4,000 tCO<sub>2</sub>-e per annum for year 2023. This project aims to reduce the amount of sludge, and producing a 'better' end product that is less susceptible to degradation at its disposal point (and therefore reducing greenhouse gases emissions). In real benefit terms, it is difficult to project the decline of carbon emissions as current sludge in the landfill ceases degradation together with the more stable sludge added to the landfill in future. However, it is expected that the sludge added to the landfill in the future (after implementation of this project) will have at least 50% less carbon emissions associated with it (to treat and dispose of the sludge) than at present.
- In the shorter term, the installation of treatment processes that include stabilisation could enable methane (and other greenhouse gas) production, controlled capture and utilisation from sludge treatment, which offsets the fugitive emission of these gases from the landfill.

In the longer term, if beneficial re-use could be established by application of biosolids to land which has the potential to offset carbon-intensive chemically generated fertilisers and provide significant amounts of carbon into the soil<sup>2</sup>.

- Odour emissions – by putting in place more advanced processes that enable improved capture of fugitive emissions during the breakdown of sludge in a controlled way, the risk of odour emissions can be reduced.

<sup>2</sup> <https://www.wasteminz.org.nz/wp-content/uploads/2019/10/WasteMINZ-2019-Potential-value-of-biosolids-in-NZ-%E2%80%93-an-industry-assessment.-Paper.pdf>

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Economic Case: Identifying the Option

### Approach to Identifying Options

The process to identify and evaluate options for the Sludge Minimisation Facility is described in the concept design report for the project and involved two parallel streams of work – to identify and select process options, and identify and select site options. The process is summarised in the diagram below. Further information on each of the two options workstreams is provided further below.

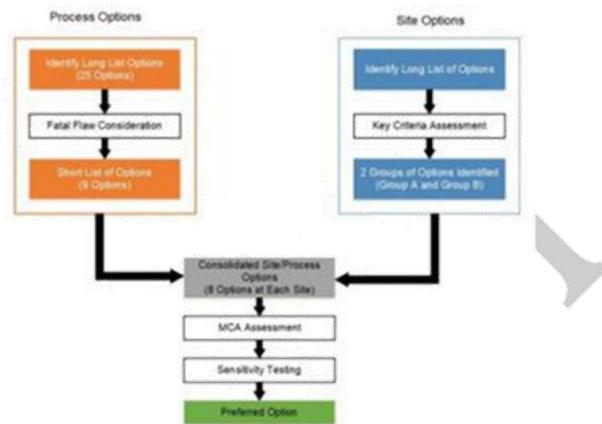


Figure 2: Option Process Overview

### Identifying Process Options

A three staged approach was used to identify and select preferred process options. This included:

1. An initial long list of options was developed based on a desktop study which considered a wide range of commonly available and emerging technologies across four sludge management technology categories:
  - Concentration Processes – Reducing sludge volume, generally by removing water from the sludge
  - Stabilisation Processes – Stopping or stabilising biological activity, which can reduce odour emissions from further handling / disposal,
  - Hydrolysis Processes – Treatment to support the enhanced recovery of energy or nutrients, or aid sludge reduction, and
  - Conversion Processes – Conversion of the sludge into other forms for beneficial re-use.
2. A fatal flaw (traffic light) analysis was undertaken to identify non-favourable long list options and identify a short list. This included both technical considerations (achieving significant sludge volume reduction, ability to accommodate the plant on available sites and maturity of technology) and consultation with iwi to understand cultural concerns with sludge management that might influence process selection.
3. Following development of initial concepts for the short-listed options (which were combined with the shortlisted site options as described below), a multi-criteria assessment of the short-listed options was undertaken to establish the top ranked options, which have been taken forward into the business case. The analysis included a sensitivity analysis to confirm the multi-criteria assessment outcome.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Refer to the Concept Design Report<sup>3</sup> for details on the options identified and evaluated at each stage of this process.

#### Identifying Site Options

The process to identify potential site options followed a three-stage process, as follows:

1. A desktop study was undertaken to identify an initial list of potential sites using a range of criteria, including site size and shape, access for heavy vehicles, likely noise and odour impacts on neighbours, ability to access utilities, topography and land use designation. This search focused on sites across the southern areas of Wellington. This identified groups of sites in two general areas – around the Moa Point WWTP site and at Carey's Gully,
2. Further technical analysis was then undertaken to understand site constraints to inform refined site selection. This was able to pinpoint specific locations in the two areas noted above, and
3. The site options were combined with shortlisted process options for multi-criteria assessment.

#### Multi-Criteria Assessment of Options

A Multi-Criteria Assessment (MCA) workshop was held in July 2020 with key stakeholders to identify a preferred option from the short-listed site and process options. The basis of the MCA (i.e. MCA criteria and interpretation) was collaboratively developed by technical specialists, Wellington Water and iwi stakeholders. The associated weightings of the criterion were determined based on a survey of MCA participants. The criteria included function, alignment to mana whenua values, system complexity, environmental outcomes and cost.

#### Identification of Preferred Options

As outlined in the Concept Design Report, further sensitivity analysis was used to confirm the impacts of changing the weighting of the criteria of the selection of the preferred option. The original and alternative weightings consistently identified a preferred option, which is to install a digestion-lysis-digestion (DLD) and thermal drying process at the proposed Moa Point site.

Following the MCA assessment, further investigation and development was undertaken on this option. It was identified that this option could be refined and optimised without significantly impacting the key outcomes achieved by this option, especially the nature and amount of sludge. The refined option is to install Lysis-Digestion and Thermal Drying, which removes the first digester stage in the process. This was identified because:

- The size of the plant required for Wellington is close to the crossover point at where digestion-lysis-digestion becomes financially viable, and therefore either process option would be feasible, and
- It alleviates some major site constraints, in particular, not requiring the additional digester stage avoids having to relocate a medical supply facility of national significance adjacent to the proposed site.

For the purposes of this business case, the top three options from the MCA have been taken forward (including the refined option noted above) together with the option of "doing nothing". The options taken forward for business case analysis are therefore:

- **Option 1:** Lysis-digestion and thermal drying, at the proposed Moa Point site,
- **Option 2:** Thermal drying and gasification, at the proposed Moa Point site, and
- **Option 3:** Mesophilic anaerobic digestion and thermal drying, at the proposed Moa Point site.
- **Option 4:** Do nothing (continue sludge dewatering at Carey's Gully).

<sup>3</sup> Wellington Sludge Minimisation Facility – Concept Design Report. Connect Water, September 2020, Version 1.0.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Assessing the Options Against the Objectives

For each of the do nothing and preferred options noted above, an assessment has been made as to how each option aligns to the defined investment objectives in this business case. This assessment used a 5-point scale with the following definitions.

Table 1: Benefit Assessment Criteria

Score	Definition
⊘	Does not meet the objective
★	Partially meets the objective
★★	Meets the objective with minimal deficiencies
★★★	Fully contributes to the objective
★★★★	Exceeds the objective

A brief overview of each of the options is provided below, together with their scoring against the objectives defined in this business case.

### Option 1: Lysis-Digestion and Thermal drying, at the Proposed Moa Point Site.

#### Process Overview

This option involves a process to treat the sludge involving three key stages, as follows:

1. Thermal hydrolysis. In this process, the sludge is placed in a pressure vessel and heated. This lysis process causes the destruction of the cellular material within the sludge, which makes the digestion process described below more effective, producing greater amounts of biogas and sludge stabilisation.
2. Mesophilic anaerobic digestion. This is a commonly used process globally for the stabilisation of sludge. The sludge is retained and kept warm within digester tanks, in which microbes break down the organic matter within the sludge. As they do so, methane (biogas) is released and captured within the lid of the digester. The biogas will be used in an energy centre to create heat for the sludge treatment process and electricity.
3. Thermal drying. Thermal dryers are available in a range of configurations, but all use heat to drive water off the sludge to produce a dry product (typically containing less than 10% moisture). This greatly reduces the volume of sludge output because so much water is removed. The water that is removed from the sludge is usually captured and discharged to the wastewater treatment plant for processing.

As noted above, the end product from this process is dry granules that have been stabilised, which reduces the amount of break down that the sludge goes through when disposed of in the landfill, the amount of odour and the biological hazard of the sludge. The end product is about 80% lower in volume than the existing sludge management process.

#### Evaluation Against Defined Objectives

The following table provides a summary evaluation of this option against each of the defined objectives.

Table 2: Evaluation of Option 1 Against Defined Objectives for Wellington Sludge Minimisation Project.

	Score
Objective 1 – Enable Waste Minimisation through Sludge Volume Reduction	★★★★

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Objective 2 – Significantly Enhance the Resilience of Sludge Management	★★★★
Objective 3 – Significantly Reduce Environmental Impact / Risk	★★★★

This option performs well against the objectives because it substantially reduces sludge volume to enable waste minimisation in Wellington City, and produces a sludge output which is highly stable, therefore less prone to environmental risk. The process is a mature technology, which together with locating it at Moa Point, will enhance the resilience of the sludge management system.

**Advantages and Disadvantages**

The following table provides a summary of the key advantages and disadvantages of the Lysis-Digestion and Thermal Drying Option.

Table 3: Summary of Key Advantages and Disadvantages for Option 1.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>All of the components of this process have been used widely globally, and only one component (thermal Hydrolysis) has not been used in New Zealand before, although there are installations in Australia.</li> <li>The thermal hydrolysis process significantly enhances the digestion process to produce greater amounts of biogas and stabilise the sludge further than can be achieved with digestion alone. This creates greater opportunities to recover energy for other uses.</li> <li>This option removes the risk of continuing to operate the pipelines between Moa Point WWTP and Carey’s Gully.</li> <li>The new plant can be readily built offline from the existing live plant and then brought online, creating a simpler plant commissioning and handover process.</li> <li>This process more closely aligns with Mana Whenua values, especially because it mimics a process of degradation of sludge (albeit at an accelerated rate) and enables beneficial recovery of energy.</li> <li>If funding were a challenge to complete the project, there is an opportunity to build the plant in stages (Stage 1 = Thermal Hydrolysis and Digestion; Stage 2 = Thermal Drying). The output of the first stage would be a stabilised and volume reduced sludge (but not dried), which goes towards achieving some of the objectives.</li> </ul>	<ul style="list-style-type: none"> <li>Thermal hydrolysis is not established in New Zealand. This will require specialist operator training and international expertise to support the delivery of the project.</li> <li>The available site area at Moa Point is constrained for the required infrastructure. This means that the main process equipment will need to be accommodated in multi-storey facilities (which adds cost).</li> <li>The two sludge streams from Moa Point (primary and secondary sludge) need to be kept separate for initial processing. This would require some re-configuration of the Moa Point sludge process (but not significant).</li> </ul>

**Option 2: Thermal Drying and Gasification, at the Proposed Moa Point Site.**

**Process Overview**

Gasification is a process of combustion in the absence of oxygen. The sludge is pre-treated by dewatering and thermally drying it as has been previously described. The gasification process also produces biogas which will be captured and used for process heat and/or electricity generation.

The product of gasification is biochar, which can potentially be used as a fuel source for other combustion processes such as industrial and commercial boilers

**Evaluation Against Defined Objectives**

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

The following table provides a summary evaluation of this option against each of the defined objectives.

Table 4: Evaluation of Option 2 Against Defined Objectives for Wellington Sludge Minimisation Project.

	Score
Objective 1 – Enable Waste Minimisation through Sludge Volume Reduction	★★★★
Objective 2 – Significantly Enhance the Resilience of Sludge Management	★★
Objective 3 – Significantly Reduce Environmental Impact / Risk	★★★★

This option would significantly reduce the volume of sludge to landfill and provide potential future pathways for the sludge, thereby meeting objective 1. The sludge is also stabilised by this process to meet objective 3. The key challenge with this option is that it is a less mature technology, which reduces its resilience score.

#### Advantages and Disadvantages

The following table provides a summary of the key advantages and disadvantages of the Thermal Drying and Gasification Option.

Table 5: Summary of Key Advantages and Disadvantages for Option 2.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>This option removes the risk of continuing to operate the pipelines between Moa Point WWTP and Carey's Gully.</li> <li>The new plant can be readily built offline from the existing live plant and then brought online, creating a simpler plant commissioning and handover process.</li> </ul>	<ul style="list-style-type: none"> <li>Gasification is not established in New Zealand and there is only one installation (under construction) in Australia. This limits access to regional expertise and will require specialist operator training and international expertise to support the delivery of the project.</li> <li>This option is less aligned to mana whenua aspirations / principles.</li> <li>While this option could be staged, the first stage (thermal drying) would not achieve a stabilised sludge (so would only partially meet objectives). This is only of concern if funding does not permit full development in one go.</li> </ul>

### Option 3: Mesophilic Anaerobic Digestion and Thermal Drying, at the Proposed Moa Point Site.

#### Process Overview

Under this option, the sludge is treated in a process involving two key stages, including:

- Mesophilic anaerobic digestion. As previously noted, the sludge is retained and kept warm within tanks (digesters), in which microbes break down the organic matter within the sludge. As they do so, methane (biogas) is released and captured within the lid of the digester. The biogas can be used in an energy centre to create heat (usually for the sludge treatment process) and/or electricity. Because this option does not include a cell lysis step first, a greater number of digesters will be needed than for Option 2.
- Thermal drying. As previously noted, this process uses heat to drive water off the sludge to produce a dry product (typically containing less than 10% moisture). This greatly reduces the volume of sludge output because so much water is removed.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

The end product from this process is dry granules that have been stabilized (albeit not as far as some other options), which reduces the amount of break down that the sludge goes through when disposed of in the landfill, the amount of odour and the biological hazard of the sludge.

**Evaluation Against Defined Objectives**

The following table provides a summary evaluation of this option against each of the defined objectives.

Table 6: Evaluation of Option 3 Against Defined Benefits for Wellington Sludge Minimisation Project.

	Score
Objective 1 – Enable Waste Minimisation through Sludge Volume Reduction	★★★
Objective 2 – Significantly Enhance the Resilience of Sludge Management	★★★★★
Objective 3 – Significantly Reduce Environmental Impact / Risk	★★★★★

**Advantages and Disadvantages**

The following table provides a summary of the key advantages and disadvantages of the Mesophilic Anaerobic Digestion and Thermal Drying Option.

Table 7: Summary of Key Advantages and Disadvantages for Option 3.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>This process is widely used at larger WWTPs around New Zealand, which provides access to local operational expertise.</li> <li>This option removes the risk of continuing to operate the pipelines between Moa Point WWTP and Carey’s Gully.</li> <li>The new plant can be readily built offline from the existing live plant and then brought online, creating a simpler plant commissioning and handover process.</li> <li>This process more closely aligns with Mana Whenua values, especially because it mimics a process of degradation of sludge (albeit at an accelerated rate) and enables beneficial recovery of energy.</li> <li>If funding were a challenge to complete the project, there is an opportunity to build the plant in stages (Stage 1 = Thermal Hydrolysis and Digestion; Stage 2 = Thermal Drying). The output of the first stage would be a stabilised and volume reduced sludge (but not dried), which goes towards achieving some of the objectives.</li> </ul>	<ul style="list-style-type: none"> <li>While digestion produces biogas, the amount produced will be less than other processes, so the opportunities for energy recovery are less.</li> <li>The available site area at Moa Point is constrained for the required infrastructure. This means that the main process equipment will need to be accommodated in multi-storey facilities (which adds cost).</li> </ul>

**Option 4: Status Quo (or Do Nothing)**

**Process Overview**

Under this option, the existing method of sludge processing would continue, which includes:

1. Pumping the sludge from Moa Point WWTP to Carey’s Gully,
2. Centrifuge dewatering. In this process, the centrifuge essentially spins off free water from the sludge. The solids are collected into a skip bin for disposal,
3. Dewatered sludge from the Western WWTP is sent to Southern Landfill, and
4. The solids will be disposed of at the Southern Landfill and mixed with general waste to meet the consent requirements. Any solids over and above the consented amount will need to be transported to the alternative landfills.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

#### Evaluation Against Defined Objectives

The status quo option does not score well against the investment objectives, because:

- This option will not enable waste minimisation for Wellington City Council because sludge volumes will not be reduced,
- The resilience / risk profile of the sludge management system will not change, and
- The environmental risks of the existing sludge management system will remain.

The status quo option will not require any additional capital funding, however there will be uncertain future operating costs with increasing waste levies and transportation costs if sludge has to be transported to another landfill. There is very limited capacity at other landfills in the Wellington region.

Table 8: Evaluation of Option 4 Against Defined Objectives for Wellington Sludge Minimisation Project.

Benefit Criteria	Score
Objective 1 – Enable Waste Minimisation through Sludge Volume Reduction	⊖
Objective 2 – Significantly Enhance the Resilience of Sludge Management	⊖
Objective 3 – Significantly Reduce Environmental Impact / Risk	⊖

#### Advantages and Disadvantages

The following table provides a summary of the key advantages and disadvantages of the Status Quo Option.

Table 9: Summary of Key Advantages and Disadvantages for Option 4.

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>• The current dewatering process is well understood so presents low operational risk</li> </ul>	<ul style="list-style-type: none"> <li>• This option requires the existing sludge transfer pipelines to continue to be used, which creates a resilience risk.</li> <li>• The sludge produced is unstabilised and of a large volume. This creates significant challenges for ongoing disposal at Southern Landfill.</li> <li>• The unstabilised nature of the sludge, and the lack of energy recovery from it, does not align to mana whenua values / aspirations.</li> </ul>

## Financial Assessment of Recommended Options

#### Whole of Life Cost Assessment

The whole of life cost (TOTEX) of the options were determined by undertaking a net present value (NPV) analysis. The NPV analysis is provided for the purpose of comparing the relative cost of the options, and have been developed on the following basis, and as further outlined in Appendix A:

- The 2020 Options Cost Estimates presented herein have been developed for the purpose of option comparison and Wellington City Council long-term planning. The Estimate for the preferred option is subject to further development in subsequent project phases and subject to escalation due to current market conditions, inflation adjustment and update of Risks and contingencies.
- The capital cost estimates are in accordance with Wellington Water's cost estimate manual. The estimates are based on early / concept design development.
- Capital costs for this project are subject to significant uncertainty, including but not limited to:

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

- Market (contractor / supplier) appetite for risk for a project of this complexity and scale,
- The procurement of materials from overseas, which are subject to foreign exchange volatility, disruptions due to the current global pandemic, and the like,
- Inflationary pressures on materials and labour in the construction sector, which are currently in exceedance of standard inflation indices, and
- Any accelerated time requirements associated with funding.

The following table provides a summary of the comparative cost estimates developed for the options under consideration in this business case. These include:

- Capital cost estimates, which include high level estimates for the physical plant, buildings, other structures and civil works, to which percentages for contractor margins, professional services (design consenting and management) and contingencies have been applied. The capital cost estimates also include high level estimates for land acquisition.
- Operating cost estimates, which include high level estimates of energy use, chemical use, labour costs, slug transportation and disposal costs, and maintenance costs of the assets. These are based on high level modelling of each option.
- Total Expenditure (TOTEX) to year 2075. This is based on a net present value model of the capital and operating costs applying standard discount and inflation factors.

Table 10: Summary of Estimated Capital and TOTEX Costs for Sludge Minimisation Options.

Option	Capital Cost (\$million)*	Operating Cost (\$million p.a.)*	TOTEX at year 2075 (\$million)*
Option 1: Lysis-Digestion and Thermal Drying (at Moa Point)	\$160.2 - \$220.6M (\$186.2)	\$4.9 - \$7.1M (\$6.0M)	\$354.0 - \$468.9M (\$411.5M)
Option 2: Thermal Drying and Gasification (at Moa Point)	\$136.1 - \$210.7 M (\$173.4M)	\$4.1 - \$5.9M (\$5.0M)	\$277.8 - \$343.8M (\$310.8M)
Option 3: Mesophilic Anaerobic Digestion and Thermal Drying (at Moa Point)	\$222.1 - \$314.3 M (\$268.2)	\$5.7 - \$8.3M (\$7.0M)	\$441.4 - \$522.7M (\$482.1M)
Option 4: Do Nothing	\$0	\$6.0 - \$8.6M (\$7.3 M)	\$271.2 - \$275.3M (\$273.3M)

\*Cost ranges are for comparative purposes only. Numbers shown in brackets indicate median costs.

In addition to the cost estimates provided above, we have identified potential benefits that from the implementation of this project, which are not yet quantifiable. These include:

- The potential to utilise surplus heat from the process for other purposes, by exporting heat to nearby commercial properties (such as the airport buildings). Upon further design development, the quantities of heat available to export will be quantified.
- The potential to generate electricity from the new sludge process and use this to offset electricity use in either the sludge treatment plant or the Moa Point WWTP, which is a large consumer of electricity. The amount of electricity available is dependent on the process adopted. A benefits analysis of different uses for surplus energy for heat, electricity or other purposes, will be undertaken as part of design development.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

### Sensitivity Testing

The robustness of the financial assessment has been tested by undertaking sensitivity analysis. This has adjusted the cost estimates by varying elements that make up the TOTEX cost, according to the following scenarios:

- Scenario 1: Assume inflation occurs at twice the rate proposed for power and maintenance costs, noting that these are key contributors to the operations and maintenance costs and exposed to inflation.
- Scenario 2: Assume inflation occurs at half the rate proposed for power and maintenance costs.
- Scenario 3: Assume growth occurs at 20% above the proposed population projection rate. This impacts the amount of sludge to be processed and has an effect on all operating costs (energy, fuel, sludge transport/disposal).
- Scenario 4: Assume growth occurs at 20% below the proposed population projection rate.
- Scenario 5: Polymer (plant chemical) costs increase by 20%.
- Scenario 6: Assume that inflation for transportation of sludge occurs at twice the rate proposed.

Additional sensitivity testing was undertaken to assess the financial impacts related to operational carbon emissions, with reference to the New Zealand Emissions Trading Scheme (NZ ETS). These scenarios include:

- Scenario 7a: assuming that the carbon price remains at the current fixed cap of \$25/NZU (current at time of Cost Estimation in October 2020)".
- Scenario 7b: assuming that the fixed cap for carbon increases to \$50/NZU.

The sensitivity analysis has indicated that the scenarios above have no impact on the outcomes of the comparative TOTEX costs of the options. Furthermore, the results of carbon price analysis indicate that Option 1 (Lysis-Digestion and Thermal Drying) is the most effective from a carbon cost reduction perspective. Of note, from a carbon cost perspective Option 4 (Do Nothing) obtains a cumulative cost of over four times greater than all other shortlisted options.

### Summary and Recommendation

In summary, the analysis underpinning this economic case has shown that:

- A detailed MCA has enabled three options to be shortlisted and taken forward, together with the option of doing nothing, into this business case. These options are Lysis-Digestion and Thermal Drying, Thermal Drying and Gasification, and Mesophilic Anaerobic Digestion and Thermal Drying.
- An analysis of TOTEX cost over the design horizon of this project has identified that the lowest cost option is the base case, which is to continue to dewater the sludge and dispose to Southern Landfill. However, consent restrictions placed on the disposal of sludge at the landfill mean that this option is not tenable in the future, because insufficient solid waste is available to mix with the dewatered sludge. This would require additional solid waste to be imported to Southern Landfill or diversion of dewatered sludge to other landfills. Either of these options is not considered tenable.
- The next lowest TOTEX option is thermal drying and gasification. As noted in the advantages and disadvantages for this option, the installation of a thermal drying and gasification process presents a significant risk, because there are no significant installations in Australasia. This would create a significant implementation and operational risk, which cannot be readily mitigated. On that basis, this option has not been considered further.
- Of the two options of relatively well-established technology, the option with the lowest TOTEX is Lysis-Digestion and Thermal Drying. This option is also most aligned to the investment objectives.

On that basis, the **preferred option is Option 2: Lysis-Digestion and Thermal Drying.**

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Financial Case: Funding Requirements

Wellington City Council are assessing a number of funding options and have assessed options for potential funding models for the Sludge Minimisation Project.

Funding of the project externally through use of the Infrastructure Funding and Financing Act (2020). An additional charge would be applied to the project "beneficiaries" (i.e. the community served by the project) in the form of a levy to repay the borrowing required to fund the project.

Wellington City Council have indicated that Option 1: Lysis-Digestion and Thermal Drying is preferred and are currently working with Crown Infrastructure Partners to identify a potential funding and delivery model under the Infrastructure Funding and Financing Act (2020).

DRAFT

Single Stage Business Case – Wellington Sludge Minimisation Project | Page 20

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Commercial and Management Case: Planning for Successful Delivery

### Risk Management Planning

A risk workshop was facilitated at project establishment, where key stakeholders identified and evaluated the key risks that might prevent, degrade, or delay the achievement of the investment objectives. The results of this assessment are provided in Appendix B.

### Procurement Strategy (Service Delivery Model)

This project features a number of key factors which influence the service delivery model, including:

- The application of specialist technology from international vendors. The scale and technical risk of the project lends itself to large, reputable international vendors who have the capability to manage multiple plant items under a single vendor supply package,
- The technology selection will have a significant impact on the overall process design and flows into the configuration of the physical plant on the site. This lends itself to collaborative, early engagement between the technology providers and the design team who will integrate the process into the proposed site,
- A high technical and structural complexity, on a constrained site. This lends itself to early contractor engagement in the design process with a strong collaborative culture, given the strong links between construction methodology and design,
- The current programme is highly pressured and reducing waste in the procurement process will be important, as well as understanding the critical programme risks, and
- Innovation from construction contractors and international vendors has the potential to enhance value to meet key project objectives, including minimizing whole of life cost. To maximise opportunities for value enhancement, early engagement of preferred international vendors and construction contractors will be required.

In summary, the criteria for selection of a service delivery model for this project strongly favours a collaborative model involving early contractor engagement to support the design process so that complexity, innovative approaches and particularly risk management can be proactively managed. Potential options that take this approach are being considered and will be documented in a procurement strategy, which will need to be approved as a key output of project planning.

### Land Acquisition Strategy

This project requires the acquisition of land from Wellington International Airport Limited (WIAL) at the location of the proposed Sludge Minimisation Facility.

The proposed new facility will be constructed across two land parcels – an existing one owned by Wellington City Council, and another currently owned by WIAL. The sites have mixed designations relating to both airport operations and wastewater operations activities. An extension of the wastewater designation will be required, and discussions between Wellington City Council and WIAL are underway to define new designation boundaries.

Specialist property consultants have been engaged to support the land acquisition process at the Moa Point site. The proposed method of acquisition will be recorded in a Land Acquisition Strategy

Single Stage Business Case – Wellington Sludge Minimisation Project | Page 21

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

as a key output of the project planning process. This strategy will support acquisition of the proposed site early in the project.

### Project Organisation and Governance

Project structures and governance will be established for the initial stages of the project. A separate and dedicated WWL project team and internal governance will be in place by June 2021. Shared governance with CIP and WCC for the initial phases of the project will need to be formed by July 2021.

The project organisational and governance structures for delivery and construction phases for this project are highly dependent on the service delivery model that will be identified and endorsed through the development and approval of the procurement strategy. Upon completion of the procurement strategy, a detailed organisation and governance plan will be developed as a key output of project planning.

The governance structure will need to recognise the interests of the key parties to the project, including:

- Wellington City Council, as ultimate owner of the facility,
- Wellington Water, as the delivery agency for the project, and
- Crown Infrastructure partners, as the funding agency for the project.

Further consultation with Ngati Toa and Taranaki Whānui will also be undertaken to confirm if they wish to have participation at a governance level in this project.

Depending on the preferred service delivery model, and in particular the way risk is shared and allocated, additional consideration may be needed to the participation of key contracted entities, such as the constructor(s), designer(s) and technology provider(s). The final Governance Structure for the future phases of the project will be determined together with WCC and CIP based on the SPV.

### Stakeholder Engagement

A Stakeholder and Community Engagement Plan has been developed for this project. It identifies the key stakeholders that require engagement, the objectives of engagement with each party, and who is responsible for that engagement. It is based on the following guiding principles:

- **Partnership management:** Wellington City Council and Wellington Water ensures that its partnership responsibilities are being appropriately recognised and provided for in all its activities.
- **Understanding and awareness:** we acknowledge, respect and provide for the diversity of needs of the groups we engage with.
- **Proactive engagement:** We look after our partners, stakeholders, customers and communities of interest by placing the quality and timeliness of engagement and communications practices.
- **Reputation management:** The maintenance and enhancement of Wellington City Council's and Wellington Water's reputation is actively recognised and provided for in the planning and delivery of its engagement and communications services.
- **Accessibility:** We acknowledge the differing information capabilities and requirements of the groups when we plan our engagement and communications activities.
- **Clarity:** The information we provide is appropriately tailored so that it can be readily understood and actively used by our partners, stakeholders, customers and communities of interest.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Consenting Requirements

A consenting strategy has been developed for the project which has identified that Resource management Act approvals will be required at both a district and regional level for the preferred option. These include:

- District Plan Approvals – the recommended approach is to alter the existing Moa Point Drainage and Sewage Treatment Plant Designation (Designation 58) through a Notice of Requirement. The Notice of Requirement would alter the existing designation boundaries as well as some of the existing conditions to provide for the SMF. It is noted that the approach to utilising and altering Designation 58 is subject, first, to agreement with WCC as the requiring authority. Agreement of WCC as the territorial authority will also be required.
- Resource planning Approvals – It is anticipated that resource consent will be required from GWRC for the following activities:
  - Discharge of contaminants to air from the operation of the sludge minimisation facility;
  - Discharge of stormwater from the site due to the increase of impervious area; and
  - Earthworks exceeding 3,000m<sup>2</sup> for the construction of the facility.
 The overall status of the consent is anticipated to be a discretionary activity. If dewatering was required during construction, this may be able to process under an existing 'global' resource consent held by Wellington Water for dewatering.

The requirements for District Plan and Resource Planning approvals have been incorporated into project programme.

## Delivery Programme

The following table summarises the key project milestones. A detailed programme is developed with each stage of the project to enable detailed task planning.

The table below shows two programmes, an accelerated programme with high risk (P50) and a lower risk programme (P95)

Table 11: High Level Project Schedule.

Project Phase (Wellington Water Standard)	Start Date	P50 Completion Date	P95 Completion Date
Investigations	September 2019	May 2020	May 2020
Optioneering and Concept Design	October 2019	December 2020	December 2020
Land acquisition	July 2021	June 2022	July 2022
Consenting	July 2021	June 2022	April 2023
Completion of developed design, including preparation of cost estimates for funding purposes	September 2021	June 2022	June 2022
Procurement for plant vendors and main contractors	July 2021	June 2022	February 2023
Funding secured	June 2022		
Finalisation of detailed design for construction purposes	June 2022	December 2022	July 2023

Single Stage Business Case – Wellington Sludge Minimisation Project | Page 23

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Construction – supply and installation	August 2022	August 2024	
--	-------------	-------------	--

*[High level Gantt Charts for both options to be added]*

DRAFT

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Appendix A – Basis of Capital Cost Estimates

- The capital cost estimates are in accordance with the Wellington Water Cost Estimation Manual (Rev. 0, 2019).
- The base estimate was developed, using:
  - Vendor price information, where available, for process plant and equipment of similar size to that required to achieve the Basis of Design for this project.
  - For auxiliary / side stream process units, where vendor information is not immediately available, such as tanks and utilities, unit prices from other recent projects of a similar scale and complexity were used.
  - Building sizes were estimated from concept layouts and no specific optimisation has been undertaken for each process option. Cost rates (\$/m<sup>2</sup>) for buildings from other projects of similar scale / complexity have been applied.
  - Moa Point land acquisition valuation developed by Align Ltd
- A project contingency of 40% and an overall risk contingency of 60% have been applied
- No allowance was made for current market conditions and cost escalations.
- No specific allowance was made for the impacts of the COVID global pandemic. The impacts of COVID will be highly dependent on a range of factors, including but not limited to:
  - The mix of offshore-sourced plant and equipment. Conditions at the place of manufacture and global logistical challenges may create time delays and cost increases. For this reason, conservative estimates for plant procurement have been used.
  - Construction delays caused by interruptions from COVID lock-downs. This entirely depends on the methodology and the timing of site works. No specific allowances have been included, however a detailed analysis of likely impacts of this will be undertaken as part of detailed procurement planning.
  - Increased costs due to resource constraints in post-COVID recovery. Escalation and inflationary factors will be assessed as part of procurement and cost reviews for the project.
- The estimated capital expenditure has been distributed across years 2020 to 2025 based on the currently anticipated project delivery programme, and a general inflation rate as per the Wellington City Council LTP 2018 – 2028 has been applied.
- All dollar figures are expressed in GST exclusive terms.

Single Stage Business Case – Wellington Sludge Minimisation Project

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Appendix B – Project Risk Assessment

DRAFT

Single Stage Business Case – Wellington Sludge Minimisation Project

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Risk Type	Risk Description	Consequence	Possible impact on Investment Objectives	Established Controls	Consequence	Likelihood
<b>Complex Multi-party Stakeholder Engagement</b>	There is poor or ineffective stakeholder management.	Inability to consent the SMF, resulting in project delays and increased costs	Effective stakeholder engagement and management is critical to achieving the investment objectives. If stakeholders are not satisfied with the preferred option, benefits may not be realised as anticipated or be delayed.	An external communications advisor has been appointed to develop and manage stakeholder and community engagement plan	Medium	Low
	Lack of iwi engagement leads to surprises for iwi, key stakeholders and community	Project delays or additional costs and/or re-work required to address stakeholder concerns		An external communications advisor has been appointed to develop and manage stakeholder and community engagement plan. The project team have undertaken early engagement with iwi to support the identification of options and design the options selection process.	Medium	Low
	Community liaison group do not support options or solution	Project delays or additional costs and/or re-work required to address stakeholder concerns		An external communications advisor has been appointed to develop and manage stakeholder and community engagement plan	High	Low
	Delays in the engagement process	Key project activities are delayed (e.g. development of cultural impact assessment)		Time delays may mean that the investment objectives take longer to be delivered	Maori capability advisor has been employed by Wellington Water to liaise with iwi representatives and assist in MCA process	Medium
<b>Limited Land Availability</b>	Limited land availability in desired areas for placement of the new Sludge Management Facility.	Increase in costs to manage facility within available land parcels (because plant has to be multi-storey or further away from source of sludge)	Potentially lower resilience depending on preferred site location	A detailed review of available land options was undertaken early in the project, to inform site selection.  Upon identification of a preferred site (Moa Point), detailed analysis was undertaken on how to fit the facility into the space available. The use of multi-storey buildings and taller structures has been adopted, and accounted for in cost estimates to date.	Low	High

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Risk Type	Risk Description	Consequence	Possible impact on Investment Objectives	Established Controls	Consequence	Likelihood
<b>Resourcing</b>	Lack of market attractiveness to tender	Inflated costs, potential to not engage vendor for preferred solution	May impact the ability for the project to deliver, or for the costs to significantly increase which could impact the overall attractiveness of the project	Wellington Water procurement advisor appointed for reviews and approvals of procurement strategy. Early engagement with key vendors and constructors is planned.	Medium	Low
<b>Landfill Capacity</b>	The capacity of the existing Southern Landfill is constrained.	The Southern Landfill may not be able to receive all of the currently produced sludge, and/or solid waste may need to be imported.		Wellington City Council are identifying alternative plans for sludge disposal while the new facility is constructed.	High	Medium
<b>COVID-19 Disruptions</b>	COVID Disruptions to global logistics	Delays or increased costs to source specialist plant in other countries.	Delays which impact current resilience of sludge management in Wellington.	Conservative programme estimates have been used to account for COVID impacts.	Medium	Medium
	Cost pressures due to buoyant post-COVID market	Increases in cost or protracted programme to deliver project.		Analysis is to be completed to confirm inflationary and escalation pressures in current market conditions.	Medium	High
<b>Land Acquisition</b>	Unable or difficult to procure land at Moa Point on a willing seller / willing buyer basis.	Increases in cost or programme delays caused by alternative process for land acquisition (Public Works Act)		Early engagement with Wellington International Airport (who own land parcel) to discuss project and create buy-in, while also discussing logistical matters. Project designs have been changed to accommodate some of these issues.	Medium	Medium
<b>Publicly notified consent process</b>	Delays in publicly notified consent process	Programme delays due to extension of consenting, which results in cost overruns for additional consenting/community engagement activities		Early engagement with key stakeholders and media release for the general public. Consenting strategy has been developed by Connect Water and reviewed by Wellington water and legal advisor	Medium	High

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Risk Type	Risk Description	Consequence	Possible impact on Investment Objectives	Established Controls	Consequence	Likelihood
<b>Neighbouring operations</b>	The neighbouring airport, WWTP and Cyclotek Facility all place constraints on construction and operation of the new sludge minimisation facility.	Constraints on construction which increase costs or delay programme.		Early engagement has been undertaken with neighbouring operations to discuss challenges and identify potential mitigations, which have been subsequently incorporated into concept design.	Medium	High
<b>Electricity Supply</b>	Limited electricity capacity in area where new sludge facility is to be constructed.	Increased costs to provide new electrical supply infrastructure.	May impact resilience of new plant.	We have consulted with the electrical network owner / manager about capacity to identify available capacity. We have included costs to supply new transformers and provide standby generation options, as well as considering electrical generation.	Medium	Low
<b>Capital cost and scope uncertainty</b>	Market conditions remain volatile and continuous development of project scope with contractors and vendor supplier, which causes significant cost overruns.	Costs after fully developed design are higher than current expected costs	Increasing capital costs may mean that the cost of the chosen option may outweigh the benefits achieved	Early engagement with vendors and constructors to understand scope and construction risks. Independent cost estimators engaged to ensure robust estimation of construction works and allocation of contingency is appropriate.  Assignment of contingencies to account for risk and uncertainty in accordance with Wellington Water's Cost Estimation Manual.	Medium	High

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## Options Cost Estimate Report

**Council:** Wellington City Council  
**Suburb(s):** Moa Point  
**Project name:** Sludge Minimisation Facility (SMF)  
**Estimate purpose:** 2020 Options Cost Estimate  
**Project code:** OPC 100126  
**Date:** June 2021

**Consultant organisation:** Connect Water  
**Consultant project code:** OPE 00000341

Our water, our future.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



### Document information

Activity	Role	Name	Signature	Date
Prepared by	Project Manager	Chris French		08/06/2021
Reviewed by	Project Director	Greg Gummer		
Approved by	Group Manager Network Development and Delivery	Tonia Haskell		

### Revision history

Date	Version number	Description of change
28/05/2021	1.0	Draft for Wellington Water Review
08/06/2021	2.0	Revised Draft for Wellington Water Review

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## Table of contents

1	Introduction.....	1
1.1	Background .....	1
1.2	Scope and Purpose of this Estimate .....	1
2	Scope and Structure of the Estimate.....	2
2.1	Scope of Works .....	2
2.2	Structure of the Estimate.....	2
3	Cost Estimate.....	4
4	Estimate Qualification, Risk and Contingency Allowances.....	5
4.1	Information Sources.....	5
4.2	Estimate Qualifications and Assumptions .....	5
4.3	Project Risk Allowances .....	9
4.4	Parallel / Independent Estimating Process.....	11

## List of appendices

Appendix A: Connect Water Cost Estimate for Preferred Option Selection

Appendix B: Wellington Water Cost Estimation Manuals

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 1 Introduction

### 1.1 Background

Wellington Water are proposing to develop a sludge minimisation facility (SMF) to receive and treat sludge from the Moa Point and Western (Karori) wastewater treatment plants.

To date, this project has been undertaken in two key stages. Stage 1 has involved the identification and evaluation of options for the sludge minimisation process, and where it is to be located, through a multi-criteria assessment process. Having selected a preferred site and process through a multi-criteria assessment process, a concept design has been developed for a preferred option, being Lysis-Digestion and Thermal Drying, at a site adjacent to the Moa Point wastewater treatment plant.

### 1.2 Scope and Purpose of this Estimate

The project has involved cost estimating in two stages (aligned to the project stages noted above):

1. Initial estimates were prepared in June 2020 based on high level concept information for the purposes of comparing the options through the multi-criteria assessment (MCA) process. These estimates were not prepared for budgeting purposes.
2. Having identified a preferred option (Lysis-Digestion and Thermal Drying), an estimate was prepared in October 2020 during the concept design process for this option. The estimate accuracy is commensurate with the level of design undertaken at that time.

**This Cost Estimate Report relates specifically to item 2 above, the cost estimate prepared in the options selection process ("2020 Options Cost Estimate").** It should not be relied upon for any other purpose. As the project design develops, and risks are further understood, the cost estimate will likely change and increase with accuracy.

This report provides an overview of the basis and structure of the estimate, the key assumptions made during estimate development, and presents the estimate itself.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 2 Scope and Structure of the Estimate

### 2.1 Scope of Works

This process involves a thermal hydrolysis process combined with anaerobic digestion, followed by a thermal drying process. The biogas that is generated from the anaerobic digestions can be beneficially used to generate electricity to power the processes, as well as to generate heat for energising the thermal hydrolysis and thermal drying processes.

The scope of project work included within the estimate is shown below:

1. Land acquisition
2. Site enabling works
3. New Thermal Hydrolysis Process system
4. New Digester Tanks and associated Digester Mixing System
5. New Thickening and Dewatering System
6. New Thermal Dryer System
7. New Thickening and Dewatering Building
8. Auxiliary systems, such as water, heat, power, and odour control systems
9. New Digester Plant Rooms
10. New Dryer integrated building
11. New Bio solids Building
12. New Raw sludge building

This project will be delivered as a "Major Project" by Wellington Water. It has been assumed that consenting, detailed design, procurement and MSQA services will be provided by the Wellington Water Consultancy Panel.

### 2.2 Structure of the Estimate

The Estimate has been broken down into the following components:

1. Main Process Vendor Plant & Equipment
2. Preparation Works
3. Structures and Buildings
4. Civil Works
5. Electrical, Instrumentation and Controls
6. Contractor's Overheads and Margin
7. Professional Services
8. Baseline Estimate
9. Project Contingency
10. Expected Estimate

PCMT-11.1 Cost Estimate Report

PRINTED COPY UNCONTROLLED

Version: 2.0

**2020 OPTIONS COST ESTIMATE**

2 | Page

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



11. Funding Contingency
12. Land Acquisition
13. 95th Percentile Estimate.

DRAFT

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



### 3 Cost Estimate

Applying the basis of estimate described above, Table 1 presents the summary 2020 Options Cost Estimate for the proposed Wellington SMF, constructed as a LD + TD facility under a single stage. Refer to Appendix A for a further breakdown of the cost estimate.

**Refer to Section 4 for an overview of the qualifications, assumptions, exclusions, and risks relating to this estimate.**

**Table 1: 2020 Options Cost Estimate for Proposed Wellington Sludge Minimisation Facility (Lysis-Digestion + Thermal Drying at Moa Point)**

Item No.	Description	Low Value	High Value	Mean Value
1.	Main Process Vendor Plant & Equipment	\$31,057,000	\$40,141,000	\$36,155,000
2.	Sub-total Preparation Works	\$619,000	\$894,000	\$734,000
3.	Sub-total Structures and Buildings	\$17,186,000	\$24,825,000	\$20,369,000
4.	Sub-total Civil Works	\$6,009,000	\$8,679,000	\$7,121,000
5.	Sub-total Electrical, Instrumentation and Controls	\$3,228,000	\$4,935,000	\$4,012,000
6.	Sub-total Contractor's Overheads and Margin	\$26,588,000	\$38,405,000	\$31,512,000
7.	Sub-total Professional Services	\$13,487,000	\$19,481,000	\$15,984,000
8.	<b>Baseline Estimate</b>	<b>\$98,174,000</b>	<b>\$137,360,000</b>	<b>\$115,887,000</b>
9.	Project Contingency (20%)	\$17,671,000	\$25,525,240.00	\$20,943,787
10.	<b>Expected Estimate</b>	<b>\$115,845,000</b>	<b>\$162,885,000</b>	<b>\$136,830,787</b>
11.	Funding Contingency (30%)	\$31,278,000	\$45,180,000	\$37,070,502
12.	Land acquisition	\$3,740,000	\$3,740,000	\$3,740,000
13.	Wellington Water Management Fee (5%)	\$7,543,000	\$10,590,000	\$8,882,000
13.	<b>95th Percentile Estimate</b>	<b>\$158,406,000</b>	<b>\$222,395,000</b>	<b>\$186,524,000</b>

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 4 Estimate Qualification, Risk and Contingency Allowances

### 4.1 Information Sources

The 2020 Options Cost Estimate was developed by Connect Water based on the Concept Design Report V2.0 and its Appendix E – Concept Design drawings for additional information. It was prepared in accordance with the WWL Cost Estimation Manual, a copy of which is attached in Appendix B.

### 4.2 Estimate Qualifications and Assumptions

#### 4.2.1 General Qualifications

The following general qualifications apply to this 2020 Options Cost Estimate:

1. The Cost estimates currently presented in this **draft** revision are pending an update prior to issue of the next formal revision, to include escalation of rates and prices (local construction and overseas equipment procurement) since last formal Cost Estimate in October 2020 to June 2021, future inflation to project completion in 2025/26, and to update project and finding risks and additional contingencies to account for market conditions and other updated risk factors.
2. All estimates are presented in New Zealand Dollars, exclusive of GST.
3. The “Base Date” of the estimate is October 2020 and no allowance has been made at this stage for escalation up to June 2021 and any potential future escalation and inflation up to the completion of the project.
4. No allowances made for Global exchange rate fluctuations. Allowances for this will be assessed as part of a risk review of the project. In addition, we have not allowed for foreign market escalation that could potentially affect the cost of major equipment from Vendors.
5. No allowance has been made for the impacts of extraordinary global events (such as the current COVID-19 outbreak) within the base estimate.

#### 4.2.2 Key Assumptions and Basis for Estimate

As previously noted, the 2020 Option Cost Estimate was prepared in accordance with WWL’s Cost Estimation Manual (Rev. 0, 2019) as provided in Appendix B. The following table provides a summary of how the estimate has been developed to align with the Manual, including the assumptions.

Table 2: Basis of Capital Cost Estimate Summary

Cost Estimate Manual Section		Considerations for Procurement Strategy
3.1	Estimation Approach	<ul style="list-style-type: none"> <li>The approach taken is the <b>General Approach</b>, unless otherwise stated below.</li> </ul>
3.2.1	Development of Base Estimate	The base estimate has been developed as follows: <ul style="list-style-type: none"> <li>Vendor pricing has been sought for all major plant and equipment wherever possible. Where this has not been possible (due to time</li> </ul>

PCMT-11.1 Cost Estimate Report

PRINTED COPY UNCONTROLLED

Version: 2.0

2020 OPTIONS COST ESTIMATE

5 | Page

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



Cost Estimate Manual Section		Considerations for Procurement Strategy
		<p>constraints), multiple quotations and contract prices have been used from previous projects, generally within the last five years.</p> <ul style="list-style-type: none"> <li>For installation of vendor supplied plant, percentage allowances of the vendor plant cost have been made. These are based on an analysis of installation costs in similar projects undertaken by us in the last 10 years.</li> <li>For piping and ancillary costs (not part of main plant supply), percentage allowances of the vendor plant cost have been made. These are based on an analysis of installation costs in similar projects undertaken by us in the last 10 years, taking a system-by-system approach.</li> <li>Costs for structures have been developed by applying detailed designs for projects completed in the last 10 years of a similar nature to this, with concept level updates to reflect the specific structural design standards that apply to this project. For tanks, bottom-up estimate of costs has been developed. For building structures, an assessment of the \$/m<sup>2</sup> rates from previous similar projects has been applied, adding additional allowances to reflect the proposed structural design approach for this project.</li> <li>A bottom-up estimate of geotechnical treatment and civil works costs has been undertaken.</li> <li>A bottom-up estimate of electrical, instrumentation and controls costs has been made, as follows: <ul style="list-style-type: none"> <li>Costs for significant components, such as main switchboards, earthing systems and power supply upgrade costs, have been obtained from recent similar projects.</li> <li>A count of the likely number of local control panels and VSDs, and low and high rates from recent similar projects has been made.</li> <li>A general allowance for instrumentation has been made based on experience from recent previous projects.</li> <li>A % cost for cabling and installation has been made from an analysis of recent projects.</li> </ul> </li> <li>Costs for contractor margins, overheads and risk allowances have been applied as described further below.</li> <li>Professional services costs have been applied as described further below.</li> </ul>
<b>3.2.2, 3.2.4, 6.2</b>	Expected Estimate and Project Contingency	<ul style="list-style-type: none"> <li>The simple approach has been used to arrive at the expected estimate, which is based on applying a percentage project contingency (described further below).</li> <li>At the completion of a project risk review, the advanced approach will be applied as an alternative subject to agreement with WWL.</li> </ul>
<b>3.2.3, 3.2.5, 6.2</b>	95 <sup>th</sup> Percentile Estimate and	<ul style="list-style-type: none"> <li>The simple approach has been used to arrive at the 95<sup>th</sup> percentile estimate presented below, which is based on applying a percentage funding risk contingency (described further below). At the completion</li> </ul>

PCMT-11.1 Cost Estimate Report

PRINTED COPY UNCONTROLLED

Version: 2.0

2020 OPTIONS COST ESTIMATE

6 | Page

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



Cost Estimate Manual Section		Considerations for Procurement Strategy
	Funding Risk Contingency	of a project risk review, the advanced approach will be applied as an alternative.
<b>4</b>	Estimate Type	<ul style="list-style-type: none"> <li>The estimate presented in this report is a Level Two estimate, in accordance with Section 4.3 of the Cost Estimation Manual.</li> </ul>
<b>6.3</b>	Simple Approach for Contingency	<ul style="list-style-type: none"> <li>As previously noted, the simple approach has been used at this stage for project and funding risk contingencies. At the completion of a project risk review, the advanced approach will be applied as an alternative.</li> <li>Based on Section 2.3 of the Cost Estimation Manual, for the Level Two Estimate, the project contingency applied is 20% (percentages applied to average of low, mean and high values), and the funding risk contingency applied is 30% (percentages applied to average of low, mean and high values)</li> </ul>
<b>7.1</b>	Use and Application of Historic Rates	<ul style="list-style-type: none"> <li>Refer above on development of Base Estimate</li> </ul>
<b>7.2</b>	Consultancy and Council Costs	<ul style="list-style-type: none"> <li>Based on assessment of the project scale and complexity, the following percentage allowances of physical works cost have been applied for professional services:                             <ul style="list-style-type: none"> <li>Development – 3.0%</li> <li>Consenting – 3.0%</li> <li>Detailed Design – 6.5%</li> <li>Procurement – 0.5%</li> <li>Construction – 5.0%</li> </ul> </li> <li>Comparisons have been made of these costs against other projects of similar scale and complexity, available industry guidelines and consultation with design discipline leads. The proposed percentages above are consistent with these comparisons.</li> </ul>
<b>7.3</b>	Physical Works Costs	<ul style="list-style-type: none"> <li>Physical works costs were applied in accordance with Section 7.3 of the Cost Estimation Manual, and incorporating consideration of the complexity and nature of the project, including:                             <ul style="list-style-type: none"> <li>On-site overheads of 15% - this project is considered to be of a complexity that warrants on-site overheads at the upper range of those stipulated in the Cost Estimation Manual.</li> <li>Off-site overheads of 12%</li> <li>Environmental Management of 3%</li> <li>Contractor's Risk of 5% - the work is considered to be complex and require management of international vendors by the main contractor.</li> <li>Traffic management of 6%</li> </ul> </li> </ul>
<b>7.4</b>	Other	<ul style="list-style-type: none"> <li>All estimates are presented in New Zealand Dollars, exclusive of GST.</li> </ul>

PCMT-11.1 Cost Estimate Report

PRINTED COPY UNCONTROLLED

Version: 2.0

2020 OPTIONS COST ESTIMATE

7 | Page

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



Cost Estimate Manual Section	Considerations for Procurement Strategy
	<ul style="list-style-type: none"> <li>The "Base Date" of the estimate as at the date of submission (October 2020) and no allowance has been made at this stage for escalation or inflation.</li> </ul>

In addition to those items described in the Cost Estimation Manual, the following assumptions and exclusions have been made:

- We have assumed the works will be delivered by an Alliance and our pricing reflects this delivery model.
- No allowance has been made for demolition and decommissioning of the existing sludge pipeline or the dewatering plant at Carey's Gully.
- Although not shown on the concept design drawings, we have made a general allowance for footpath and road reinstatement to the perimeter of the works.
- A general allowance for security fencing, landscaping and security lighting has been included.
- Although not shown on concept design drawings, we have made allowances to protect the existing main sewer and outfall pipes that run beneath the proposed site.
- Under-slab services and drainage connections have been included in foundation estimates for buildings and structures.
- All foundations to have 100mm concrete blinding for fixing shutters to.
- Digester roofs assumed to be formed of stainless-steel plate or similar.
- An allowance has been included in building superstructure estimates for plant access platforms.
- Building wall and roof cladding assumed to be formed of Kingspan panels (or similar) for noise insulation requirements.
- Building services have been allowed for in building structure estimates.
- We have included an allowance for leasing and running an offsite lay down yard in the vicinity of Wellington Airport along with plant and transport for materials management.
- We have made an allowance for a 50-80T crane on site for 20 months during construction.
- We assume all project development costs to date are now sunk costs and have not been included.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



### 4.3 Project Risk Allowances

In addition to the basis of estimate presented in Section 2.4, project risks were identified in September 2020 that could have an impact on the 2020 Options Cost Estimate. The following table summarises how these risks have been considered in the development of the 2020 Options Cost Estimate.

Table 3: Summary of Risks Considered in the 2020 Options Cost Estimate Preparation.

Risk Item	How this has been Considered in the 2020 Options Cost Estimate
Unknown ground conditions, high groundwater	Initial geotechnical studies were undertaken, building on existing information about the site, during the concept design stage. A specific scope was developed for geotechnical works (slope stabilization and foreseen ground conditions) within the base estimate, noting that the site is founded on an old quarry (where Geotech condition are favourable) and significant studies have been previously undertaken on the slope behind the site. On this basis, any further geotechnical costs for unknown ground conditions are considered to form part of the project contingency.
Need for additional processes (side stream treatment)	Some thermal hydrolysis processes can cause colouration to the wastewater from the sludge treatment process, which can have a knock-on effect for the Moa Point wastewater treatment process. To account for this, a general risk allowance of \$2 million has been included within the project contingency for the addition of an additional process to treat the colour or change process units (i.e. disinfection) at Moa Point WWRP.
Condition of existing assets	The propose project has very little interface with the existing plant. On that basis, no extraordinary risk allowances have been made for condition of existing assets having a bearing on the project.
Performance and sizing of digestion and lysis plant	Process design proposals were received from two leading international vendors and compared, to arrive at a concept design. These proposals were very similar. Accordingly, no extraordinary risk allowances are proposed.
Allowances for ancillaries (missed scope in ancillaries costs)	As part of the cost estimation process, detailed analysis of recently completed projects (actual outturn costs) was undertaken of projects with similar technical complexity. That enabled us to identify a relevant percentage range that could be applied to main plant costs to arrive at ancillaries and installation costs. This method was preferred over costing individual ancillary items, which increases risk that scope will be missed.
Plant installation costs (missed scope in installation)	As part of the cost estimation process, detailed analysis of recently completed projects (actual outturn costs) was undertaken of projects with similar technical complexity. That enabled us to identify a relevant

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



	percentage range that could be applied to main plant costs to arrive at installation costs. This method was preferred over costing individual ancillary items, which increases risk that scope will be missed.
Foreign Exchange Risk on Vendor Plant and Equipment	A detailed management plan for foreign exchange risk is to be developed. No specific risk allowance (beyond contingencies) has been made at this stage.
Digester / large tank construction method (which impacts cost)	Independent / parallel estimates for the project were received from two construction cost specialists (Bond CM and Alta). This included independent estimates of large tank structures based on their understanding of current construction techniques and referring to other similar projects. The costs for these items were similar to those estimated by Connect Water.
Plant building construction style (which impacts cost)	An analysis of other projects of a similar nature was undertaken to identify a range of \$/m <sup>2</sup> rates for buildings. A rate at the higher end of this range was then applied to this 2020 Options Cost Estimate.
Seismic design requirements	A concept structural design was undertaken to support the 2020 Options Cost Estimate process. As noted above, an analysis of other projects of a similar nature was undertaken to identify a range of \$/m <sup>2</sup> rates for buildings. A rate at the higher end of this range was then applied to this 2020 Options Cost Estimate.
Unexpected power supply upgrades	During the concept design process, Powerco (the electrical systems supplier) were consulted to confirm network capacity. An allowance for power supply upgrades was included within the 2020 Options estimate. Extraordinary power supply upgrades have not been accounted for.
Additional costs in consenting process (due to public notification / hearing requirements)	AN allowance has been included in the 2020 Options Cost Estimate for specialist legal inputs through the consenting process in the event that a public notification is required that leads to delays.
Lack of attractiveness to suppliers / contractors	The 2020 Options Cost Estimate includes costs for procurement management through a process that assumes early engagement with the contractor market to create market attractiveness. The estimate also assumes a two stage, collaborative procurement process that is likely to be more attractive to contractors relative to other significant projects in the market at the time.
Impacts of global pandemic	No risk allowance has been made for disruptions caused by COVID-19 in the estimates to date. These will be considered as part of a wider project risk review.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



#### 4.4 Parallel / Independent Estimating Process

Alta Consulting and Bond Construction Management were engaged by Wellington Water to provide parallel estimates for the Sludge Minimisation Facility, in addition to the estimate prepared by Connect Water. These estimates were found to be within 2 – 6% of Connect Water’s estimates.

The parallel estimation process has enabled a comparison of unit prices, contingency allocations, and general risk allowances.

DRAFT

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## **Appendix A: Connect Water Cost Estimate for Preferred Option Selection**

DRAFT

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Appendix B: Wellington Water Cost Estimation Manual

DRAFT

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Sensitivity: General

**Capital Cost Estimate**

Project: Wellington Sludge Minimisation Project  
 Job No.: 6511521/2020/100  
 Option: Lysis-Digestion + Thermal Drying  
 Prepared on: 8/06/2021  
 Revision: 1  
 Revision Name: Cost Estimate for Preferred Options Selection  
 Design Stage: Develop (Concept)

Item No.	Description	Unit	Qty	Rate	Mid Value	Low Value	High Value	Mean Value
<b>1.</b>	<b>Main Process Vendor Plant &amp; Equipment</b>							
1.1	Raw Sludge Pump, including installation, piping and ancillaries	LS	1	\$199,200	\$199,200	\$166,000	\$253,000	\$206,067
1.2	Gravity Belt Thickener, including installation, piping and ancillaries	LS	1	\$751,200	\$751,200	\$626,000	\$1,021,000	\$799,400
1.3	Polymer Prep Station, including installation, piping and ancillaries	LS	1	\$536,400	\$536,400	\$447,000	\$605,000	\$529,467
1.4	Polymer dosing pumps, including installation, piping and ancillaries	LS	1	\$88,800	\$88,800	\$74,000	\$108,000	\$90,267
1.5	Raw Sludge Conveyor, including installation, piping and ancillaries	LS	1	\$537,600	\$537,600	\$448,000	\$540,000	\$508,533
1.6	Raw Sludge Pumps	LS	1	\$54,000	\$54,000	\$45,000	\$68,000	\$55,667
1.7	Digester Feed Pump	LS	1	\$51,600	\$51,600	\$43,000	\$65,000	\$53,200
1.8	Digester 1 system	LS	1	\$2,595,600	\$2,595,600	\$2,163,000	\$3,145,000	\$2,634,533
1.9	Centrifuges	LS	1	\$772,800	\$772,800	\$644,000	\$863,000	\$759,933
1.10	THP feed pump	LS	1	\$140,400	\$140,400	\$117,000	\$180,000	\$145,800
1.11	THP	LS	1	\$6,632,400	\$6,632,400	\$5,527,000	\$7,789,000	\$6,649,467
1.12	Centrifuges 2	LS	1	\$427,200	\$427,200	\$356,000	\$459,000	\$414,067
1.13	Dewatered sludge pump	LS	1	\$140,400	\$140,400	\$117,000	\$180,000	\$145,800
1.14	Dewatered Sludge silo	LS	1	\$714,000	\$714,000	\$595,000	\$784,000	\$697,667
1.15	TD feed pump	LS	1	\$86,400	\$86,400	\$72,000	\$110,000	\$89,467
1.16	Thermal Dryer	LS	1	\$8,072,400	\$8,072,400	\$6,727,000	\$8,044,000	\$7,614,467
1.17	Dried Sludge Conveyor	LS	1	\$278,400	\$278,400	\$232,000	\$292,000	\$267,467
1.18	Dried Sludge Silo	LS	1	\$955,200	\$955,200	\$796,000	\$1,039,000	\$930,067
1.19	Biogas	LS	1	\$2,538,000	\$2,538,000	\$2,115,000	\$2,713,000	\$2,455,333
1.20	CHP	LS	1	\$5,871,600	\$5,871,600	\$4,893,000	\$5,753,000	\$5,505,867
1.21	Off-spec	LS	1	\$86,400	\$86,400	\$72,000	\$87,000	\$81,800
1.22	Hot water	LS	1	\$259,200	\$259,200	\$216,000	\$263,000	\$246,067
1.23	Tepid water	LS	1	\$217,200	\$217,200	\$181,000	\$208,000	\$202,067
1.24	Odour	LS	1	\$3,528,000	\$3,528,000	\$2,940,000	\$3,696,000	\$3,388,000
1.25	Foul Air ducting	LS	1	\$96,000	\$96,000	\$80,000	\$160,000	\$112,000
1.26	Digester internals including installation	LS	1	\$1,638,000	\$1,638,000	\$1,365,000	\$1,716,000	\$1,573,000
	<b>Sub-total Main Process Vendor Plant &amp; Equipment</b>					<b>\$31,057,000</b>	<b>\$40,141,000</b>	<b>\$36,155,000</b>
<b>2</b>	<b>Preparation Works</b>							
2.1	Demolish the existing AGS Building - steel cladding on steel framing, assume concrete floor slab	m <sup>2</sup>	530	\$200	\$106,000	\$95,400	\$137,800	\$113,067
2.2	Allowance to demolish existing hard stand and subbase	m <sup>2</sup>	3,880	\$150	\$582,000	\$523,800	\$756,600	\$620,800
	<b>Sub-total Preparation Works</b>					<b>\$619,000</b>	<b>\$894,000</b>	<b>\$734,000</b>

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Sensitivity: General

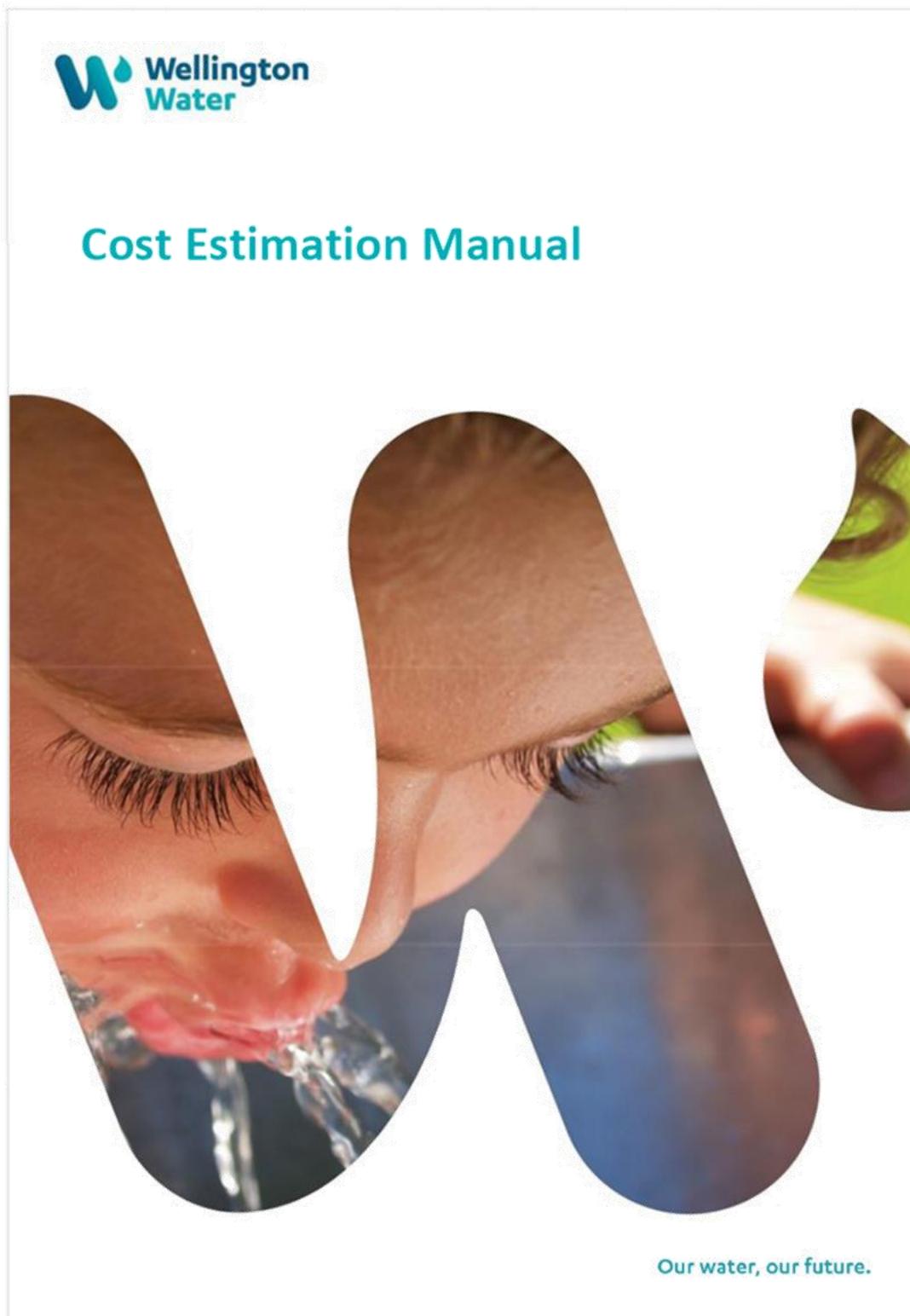
3 Structures and Buildings								
3.1	Digesters							
3.1.1	Construct new Concrete Digester foundation (Stage 1)	m <sup>2</sup>	629	\$2,000	\$1,257,143	\$1,131,430	\$1,634,290	\$1,340,954
3.1.2	Construct new 450mm Thick In situ post tensioned concrete Digester structure, including formwork, horizontal and vertical joints (Stage 1)	m <sup>2</sup>	1,810	\$4,500	\$8,146,286	\$7,331,660	\$10,590,170	\$8,689,372
3.2	Thickening and Dewatering Building							
3.2.1	Construct new Thickening and Dewatering integrated building, assume two storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab	m <sup>2</sup>	294	\$9,000	\$2,646,000	\$2,381,400	\$3,439,800	\$2,822,400
3.3	Digester Plant Room							
3.3.1	Construct new Digester Plant Room building, assume two storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab (Stage1)	m <sup>2</sup>	270	\$9,000	\$2,430,000	\$2,187,000	\$3,159,000	\$2,592,000
3.3.2	Construct new Digester Plant Room building, assume single storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab (Stage2)	m <sup>2</sup>	97	\$5,500	\$533,500	\$480,150	\$693,550	\$569,067
3.4	Digestate Tanks							
3.4.1	Construct new Concrete Digestate tanks foundation (Stage 1)	m <sup>2</sup>	57	\$2,000	\$113,143	\$101,830	\$147,090	\$120,688
3.5	Dryer Building							
3.5.1	Construct new Dryer integrated building, assume three storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab	m <sup>2</sup>	311	\$10,000	\$3,110,000	\$2,799,000	\$4,043,000	\$3,317,333
3.6	Miscellaneous Structures							
3.6.1	Construct new Raw sludge building, assume single storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab (Stage1)	m <sup>2</sup>	87	\$2,500	\$217,500	\$195,750	\$282,750	\$232,000
3.6.2	Construct new Bio Solids loading building, assume single storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab (Stage1)	m <sup>2</sup>	101	\$4,500	\$454,500	\$409,050	\$590,850	\$484,800
3.6.3	Construct new Transformer building, assume single storey steel portal frame with precast concrete panels, profiled steel roof on purlins, on reinforced concrete slab (Stage1)	m <sup>2</sup>	16	\$1,500	\$24,000	\$21,600	\$31,200	\$25,600
3.6.4	Bund for Polymer prep station	LS	5	\$30,000	\$150,000	\$135,000	\$195,000	\$160,000
3.6.5	Raft foundations for centrifuge feed pump	m <sup>2</sup>	5	\$550	\$2,750	\$2,480	\$3,580	\$2,937
3.6.6	Raft foundations for new Bio Gas holding blower	m <sup>2</sup>	20	\$550	\$11,000	\$9,900	\$14,300	\$11,733
<b>Sub-total Structures and Buildings</b>						<b>\$17,186,000</b>	<b>\$24,825,000</b>	<b>\$20,369,000</b>

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Sensitivity: General

<b>4</b>	<b>Civil Works</b>							
4.1	Allowance for extension of water supply to new facilities	Sum	1	\$20,000	\$20,000	\$18,000	\$26,000	\$21,333
4.2	Allow to connect proposed process wastewater drainage (i.e. sumps) to existing wastewater infrastructure	Sum	1	\$20,000	\$20,000	\$18,000	\$26,000	\$21,333
4.3	Allow to connect to existing stormwater systems	Sum	1	\$30,000	\$30,000	\$27,000	\$39,000	\$32,000
4.4	Allow to Connecting to Power, Sprinkler Water Potable Water	Sum	1	\$50,000	\$50,000	\$45,000	\$65,000	\$53,333
4.5	Allow for Process Waste water	Sum	1	\$190,000	\$190,000	\$171,000	\$247,000	\$202,667
4.6	Allow for Potable water	Sum	1	\$156,020	\$156,020	\$140,420	\$202,830	\$166,423
4.7	Allow for Stormwater drainage	Sum	1	\$382,650	\$382,650	\$344,390	\$497,450	\$408,163
4.8	Allow for relocation of existing services	Sum	1	\$200,000	\$200,000	\$180,000	\$260,000	\$213,333
<b>4.9</b>	<b>Pavement and Surfacing</b>							
4.9.1	Trim and Prepare subgrade	m <sup>2</sup>	2,405	\$1.60	\$3,848.00	\$3,460	\$5,000	\$4,103
4.9.2	Supply and Place AP65	m <sup>2</sup>	722	\$140.00	\$101,010.00	\$90,910	\$131,310	\$107,743
4.9.3	Supply and Place AP40	m <sup>2</sup>	722	\$180.00	\$129,870.00	\$116,880	\$168,830	\$138,527
4.9.4	40mm DG 10 AC	m <sup>2</sup>	2,405	\$50.00	\$120,250.00	\$108,230	\$156,330	\$128,270
<b>4.10</b>	<b>Slope Stabilisation</b>							
4.10.1	Bulk excavation of colluvium at East Slope	m <sup>3</sup>	5,850	\$50.00	\$292,500.00	\$263,250	\$380,250	\$312,000
4.10.2	Soil Nails at 2.5m x 2.5m centres, with 100mm shotcrete and mesh	m <sup>2</sup>	1,200	\$1,900.00	\$2,280,000.00	\$2,052,000	\$2,964,000	\$2,432,000
4.10.3	Rock Nailing & mesh	m <sup>2</sup>	3,600	\$700.00	\$2,520,000.00	\$2,268,000	\$3,276,000	\$2,688,000
4.10.4	Allowance for working platform	No	2	\$80,000.00	\$160,000.00	\$144,000	\$208,000	\$170,667
4.10.5	Allowance for Engineering Geologist	No	2	\$10,000.00	\$20,000.00	\$18,000	\$26,000	\$21,333
	<b>Sub-total Civil Works</b>					<b>\$6,009,000</b>	<b>\$8,679,000</b>	<b>\$7,121,000</b>
<b>5</b>	<b>Electrical, Instrumentation and Controls</b>							
5.1	Allowance for modification to existing power supply	Sum	1	\$60,000	\$60,000	\$50,000	\$100,000	\$70,000
5.2	Allowance for replacement MCC at Influent PS	Sum	1	\$600,000	\$600,000	\$500,000	\$750,000	\$616,667
5.3	Supply and install Main Switch Boards	Sum	1	\$796,800	\$796,800	\$664,000	\$958,000	\$780,267
5.4	Allowance for Supply and installation of VSDs, cabling and instrumentation	Sum	1	\$2,416,800	\$2,416,800	\$2,014,000	\$3,127,000	\$2,519,267
	<b>Sub-total Electrical, Instrumentation and Controls</b>					<b>\$3,228,000</b>	<b>\$4,935,000</b>	<b>\$4,012,000</b>
<b>6</b>	<b>Contractor's Overheads and Margin</b>							
6.1	Preliminary & General	Sum	64,379,000	15%	\$9,656,850	\$8,691,170	\$12,553,910	\$10,300,643
6.2	Environmental Management	Sum	64,379,000	3%	\$1,931,370	\$1,738,230	\$2,510,780	\$2,060,127
6.3	Traffic management	Sum	64,379,000	6%	\$3,862,740	\$3,476,470	\$5,021,560	\$4,120,257
6.4	Contractor's Offsite Overheads and Risk Margins	Sum	78,284,870	18%	\$14,091,277	\$12,682,150	\$18,318,660	\$15,030,696
	<b>Sub-total Contractor's Overheads and Margin</b>					<b>\$26,588,000</b>	<b>\$38,405,000</b>	<b>\$31,512,000</b>
<b>7</b>	<b>Professional Services</b>							
7.1	Professional Services - Consulting Phase	Sum	99,903,000	3.0%	\$2,997,090	\$2,697,380	\$3,896,220	\$3,196,897
7.2	Professional Services - Detailed Design	Sum	99,903,000	6.5%	\$6,493,695	\$5,844,330	\$8,441,800	\$6,926,608
7.3	Procurement	Sum	99,903,000	0.5%	\$499,515	\$449,560	\$649,370	\$532,815
7.4	Construction	Sum	99,903,000	5.0%	\$4,995,150	\$4,495,640	\$6,493,700	\$5,328,163
	<b>Sub-total Professional Services</b>					<b>\$13,487,000</b>	<b>\$19,481,000</b>	<b>\$15,984,000</b>
<b>8</b>	<b>Baseline Estimate</b>					<b>\$86,174,000</b>	<b>\$137,360,000</b>	<b>\$115,887,000</b>
9	Project Contingency	Sum	98,174,000	20.0%	\$19,634,800	\$17,671,000	\$25,525,000	\$20,944,000
<b>10</b>	<b>Expected Estimate</b>					<b>\$115,845,000</b>	<b>\$162,885,000</b>	<b>\$136,831,000</b>
11	Funding Contingency	Sum	115,845,000	30.0%	\$34,754,000	\$31,279,000	\$45,180,000	\$37,071,000
12	Land acquisition	Sum				\$3,740,000	\$3,740,000	\$3,740,000
14	WWL Management Fee	Sum		5.0%		\$7,543,000	\$10,580,000	\$8,882,000
	<b>95th Percentile Estimate</b>					<b>\$168,407,000</b>	<b>\$222,395,000</b>	<b>\$186,524,000</b>

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

**Document Status**

Revision	Author	Reviewer		
		Name	Name	Date
Draft A	P Crosby			
Draft B	P Crosby			
Draft C	P Crosby			28/7/2017
Draft D	S Wright	Gary Cullen	Gary Cullen	19/06/19
Revision 0	S Wright	Gary Cullen	Gary Cullen	22/06/19

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

## Contents

Document Status .....	ii
Contents .....	iii
1 Introduction.....	1
1.1 Foreword.....	1
1.2 Manual Objectives and Purpose.....	1
1.3 Intended Users .....	1
1.4 Document availability.....	1
2 Terminology and abbreviations .....	2
2.1 Terminology .....	2
2.2 Abbreviations.....	2
3 Estimation Definitions .....	3
3.1 Estimation Approaches.....	3
3.2 Estimate Cost Distribution.....	3
3.2.1 Base Estimate .....	4
3.2.2 Expected Estimate .....	4
3.2.3 95 <sup>th</sup> Percentile Estimate.....	4
3.2.4 Contingency.....	5
3.2.5 Funding Risk.....	5
4 Estimate Types.....	6
4.1 Level Zero Estimate .....	6
4.2 Level One Estimate .....	6
4.3 Level Two Estimate .....	6
4.4 Level Three Estimate .....	7
4.5 Level Four Estimate .....	7
4.6 Engineer’s Estimate .....	7
5 Roles, Responsibilities and Records .....	8
5.1 Levels of Authority.....	8
5.2 Cost Estimate Review .....	8
5.3 Independent Estimates.....	9
5.4 Estimate Records .....	9
5.5 Project Estimate Summary .....	9
6. Contingency and Funding Risk.....	10
6.1 General.....	10
6.2 Methodology .....	10
6.3 Simple Approach.....	11

iii

---

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

6.4 General Approach.....	11
6.5 Advanced Approach.....	12
7 Estimate Guidelines.....	13
7.1 Use and Application of Historic Rates.....	13
7.2 Consultancy Fees and Council Costs.....	13
7.3 Physical Works Costs.....	14
Appendix A – Estimating Flow Path.....	16
Appendix B– Project Estimate Template.....	17

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



# 1 Introduction

## 1.1 Foreword

One of Wellington Water Limited's (WWL) roles is to provide estimated costs for the development and delivery of water infrastructure projects and monitoring of a projects development and delivery against the budget value.

Often estimates are required several years in advance of the expected construction date to establish Long Term Plan budgets and sometimes with limited knowledge of the site-specific constraints and risks.

While the circumstances surrounding cost estimation may be challenging, it is nonetheless important that cost estimates reflect the likely cost of completing the project within known confidence limits. This underpins our credibility as a trusted advisor to our client councils.

Risk-based cost estimation is one of the tools to assist with developing accurate cost estimates under challenging circumstances. It will sit alongside other measures to improve accuracy – such as maintaining an adequate database of typical elemental rates, and regularly comparing cost estimates to final construction costs, along with any learnings for continuous improvement.

## 1.2 Manual Objectives and Purpose

The objectives of this manual is to provide instructions of how to provide and record cost estimates for use in planning work programmes and monitoring the development and delivery of a project against the budget value.

The manual includes the concept of risk-based cost estimating for use on all WWL projects. The objective is to improve the reliability and accuracy of cost estimates, and to establish common terminology that provides visibility over the maturity of cost estimates.

## 1.3 Intended Users

Anyone preparing estimates for WWL is to use this manual.

## 1.4 Document availability

This manual will be available as a pdf download at <https://wellingtonwater.co.nz>

Standard schedules for measuring projects are available from WWL for water supply, wastewater and stormwater.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 2 Terminology and abbreviations

The following tables summarize common terminology encountered within cost estimation activities.

Some of these terms are described in greater detail in following chapters.

### 2.1 Terminology

Term	Description
95 <sup>th</sup> Percentile Estimate	The expected estimate plus an allowance for funding risk. There is a 95% probability that the final out-turn cost will be less than the 95 <sup>th</sup> Percentile Estimate.
Base Date	The date to which the cost rates apply. This must be stated on each estimate sheet.
Base Estimate	The total sum of the elements that make up an estimate – including provisional sums. It excludes contingencies and escalation.
Contingency	A financial provision for risks, added to the Base Estimate to give the Expected Estimate (sometimes referred to as the risk contingency). It is an allowance to cover the statistical mean cost of threats and opportunities.
Expected Estimate	The base estimate plus an allowance for contingency. It is the statistical mean of the project's estimated cost after including threat and opportunity risk costs.
Funding Risk	An additional provision for known/unknown risk between the Expected and 95 <sup>th</sup> Percentile Estimates. This allowance is to cover the difference between the statistical mean and the statistical 95 <sup>th</sup> percentile of threats and opportunities.
Major Project	Major Projects are defined by the Terms of Reference for the Major Projects Governance Committee who are responsible for approving which projects are Major Projects.
Optimism Bias	A natural tendency to underestimate risks having a detrimental impact on the final out-turn cost.
Physical Works	The physical works include the contractor's onsite overheads, off site overheads and margins.
Risk	Risk is defined as the likelihood and consequence of an occurrence of a situation that will have a beneficial or detrimental outcome. A beneficial consequence is called an opportunity while a detrimental consequence is known as a threat.

### 2.2 Abbreviations

Term	Description
LTP	Long Term Plan (of Councils)
MSQA	Management, Surveillance and Quality Assurance
PMO	Project Management Office
SOQ	Schedule of Quantities
WWL	WWL Limited

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 3 Estimation Definitions

### 3.1 Estimation Approaches

This manual describes three approaches to cost estimation:

- **Simple Approach:** Applicable for smaller projects with little risk. Provides a single-point estimate that includes a simple contingency for risk.
- **General Approach:** Applicable for larger projects, or where there are several large risks. Provides a single-point estimate that includes a contingency for project risk, plus an assessment of the funding risk.
- **Advanced Approach:** Applicable to large projects with multiple risks. Uses Monte Carlo statistical modelling to provide a continuum of possible out-turn costs, from which the expected estimate and confidence levels can be determined.

This Cost Estimating Manual is based on WWL procuring the development and delivery of the project using the traditional methodology where the design is undertaken separately to the construction.

### 3.2 Estimate Cost Distribution

Figure 1 shows a theoretical cost distribution derived from an Advanced Approach simulation of a project cost estimate where risk events occur randomly and with different consequences.

The terms in Figure 1 are presented for estimates using the Advanced Approach, but for consistency can also be applied to estimates derived using the Simple Approach and General Approach.

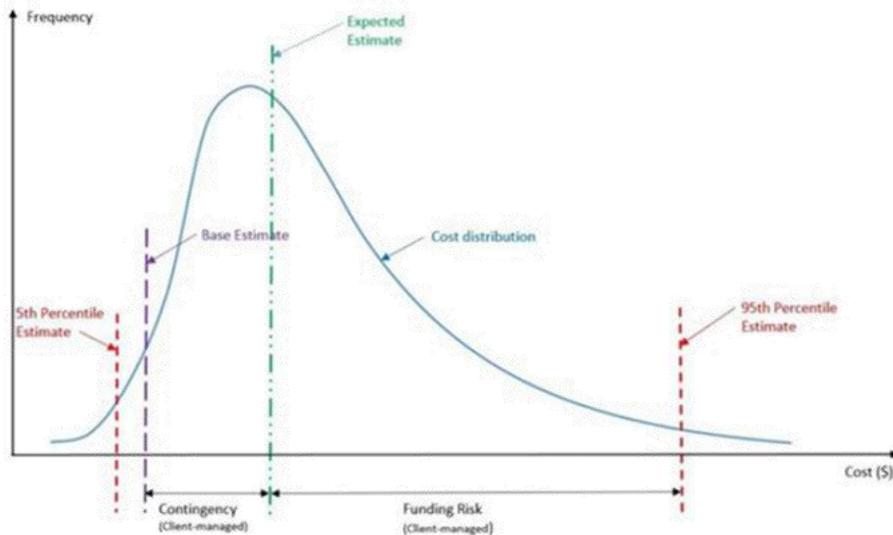


Figure 1 Risk-adjusted cost estimate terminology

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



### 3.2.1 Base Estimate

The Base Estimate is the total sum of the elements that make up an estimate – including provisional sums. It does not include any contingency or funding risk.

It does include the following items, although these are normally kept as separate subtotals for budgeting purposes:

- Development phase fees and Council costs,
- Consent phase fees and Council costs including property and land acquisition costs and fees and Council costs,
- Detailed Design phase fees and Council costs,
- Construction phase costs including:
  - Management, surveillance and quality assurance (MSQA) fees and Council cost,
  - Physical Works including:
    - The sum of the calculated quantities from a drawing multiplied by the current market rates for each work item,
    - Costs to cover the contractor's overheads and profit, temporary works, service protection or diversion, management of traffic, and the environment management,
    - Removal of contaminated land,
    - Public consultation cost,
    - Historic Places investigation requirements,
    - Consent Condition requirements.

The level of detail knowledge of the fees, land and consent requirements and physical works will vary during the development and delivery of the project. Determination of the level of knowledge is defined by the estimate type.

All cost estimates are to **exclude** WWL management fees to the Council and cost inflation.

### 3.2.2 Expected Estimate

**Advanced Approach:** Expected Estimate is the statistical mean of the project's estimated cost after including threat and opportunity risk costs.

**Simple and General Approach:** The Expected Estimate is the Base Estimate plus a contingency to account for the average cost of risk events.

### 3.2.3 95<sup>th</sup> Percentile Estimate

There is a 95% likelihood that the final out-turn cost will be below the 95<sup>th</sup> Percentile Estimate.

**Advanced Approach:** Calculated mathematically from the cost distribution resulting from the simulation modelling.

**General Approach:** Calculated (as an approximation) by adding the root-mean square of maximum risk costs to the Expected Estimate. Also known as the "Hong Kong" method.

**Simple Approach:** This is not normally calculated, but (unless better information is available) can be assumed to be the Expected Estimate plus 1.5 times the contingency.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



### 3.2.4 Contingency

This is the difference between the Expected Estimate and the Base Estimate – being a provision for the average cost of risk.

**Advanced Approach:** The mathematical difference between the Expected Estimate and the Base Estimate.

**General Approach:** An average risk cost is estimated for each elemental item, and summed to give the overall project contingency.

**Simple Approach:** A single value representing the average cost of risk to the project (typically empirically based without a formal assessment of risks).

When determining appropriate contingencies using the Simple or General Approaches, the estimator needs to recognise any inherent “optimism bias” already included in the Base Estimate.

Factors leading to optimism bias could include:

- Attempting to comply with a set budget,
- Downplaying the likelihood or consequence of risks,
- Assuming very competitive tender rates will apply.

### 3.2.5 Funding Risk

Funding organisations run the risk that one or more adverse events may affect a project with the result that the budget is exceeded. An upper confidence level provides a measure for the extent and likelihood of the cost increase.

The 95<sup>th</sup> Percentile Estimate is commonly chosen as the upper confidence limit (being a figure that 1 project in 20 may still exceed).

The Funding Risk is the difference between the Expected Estimate and the 95<sup>th</sup> Percentile Estimate.

**Advanced Approach:** The mathematical difference between the 95<sup>th</sup> Percentile Estimate and the Expected Estimate.

**General Approach:** A maximum risk cost is estimated for each elemental item, from which a Funding Risk value is calculated using a root-mean-square approach.

**Simple Approach:** A single value is chosen based on experience (sometimes linked to the size of the contingency).

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 4 Estimate Types

Estimates are classified into the following types dependent on their position in the project's life cycle.

Each estimate shall be segmented into principal expenditure groups by phase, including development, consenting, detailed design and construction.

All estimates are to be presented as 95th percentile estimates and include allowances for:

- Base Estimate,
- Contingencies,
- Funding Risks.

### 4.1 Level Zero Estimate

Sometimes estimates are requested prior to any investigation or feasibility work being carried out, and without any defined scope of works. These estimates fall outside any recommended procedures.

### 4.2 Level One Estimate

Under the WWL procedures, these estimates apply to the Definition Phase. These estimates are based on:

- Risk Register outputs,
- No site investigations,
- Estimate land requirements,
- Estimated consent conditions,
- Possibility of scope change,
- A range of options that may be developed and delivered.

### 4.3 Level Two Estimate

Under the WWL procedures, these estimates are prepared during the Development Phase. These estimates are based on:

- Risk Register outputs,
- Limited site investigations,
- Estimate land requirements,
- Estimated consent conditions,
- Possibility of scope change,
- Outline design drawings with schedule of quantities.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



#### 4.4 Level Three Estimate

Under the WWL procedures, these estimates are prepared during the Consenting Phase. These estimates are based on:

- Risk Register outputs,
- Site investigations,
- Known land requirements,
- Estimated consent conditions,
- Possibility of scope change,
- Preliminary design drawings with schedule of quantities,
- Outline construction methodology.

#### 4.5 Level Four Estimate

Under the WWL procedures, these estimates are prepared during the Detailed Design Phase. These estimates are based on:

- Risk Register outputs,
- Detailed site investigations,
- Known land requirements,
- Known consent conditions,
- Detailed design drawings, specifications and schedules of quantities,
- Preliminary construction methodology.

#### 4.6 Engineer's Estimate

Under the WWL procedures, these estimates are prepared during the Procurement Phase. Level 0 to 4 are estimates of the total outturn cost to WWL including all phases of the development and delivery. The Engineers Estimate is just the cost of paying the contractor to construct the works.

These estimates are to be based on the tender documents, but exclude:

- Property costs provided by the Council,
- Professional services costs for MSQA,
- Costs, fees, or levies to be paid directly by the Principal to third parties.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 5 Roles, Responsibilities and Records

### 5.1 Levels of Authority

The preparation of cost estimates may be undertaken by a member of staff or consultant/contractor engaged by WWL.

The following levels of authority are required to approve all cost estimates.

Estimate Type	PMO	Major Project
0	Design Manager	Design Manager
1	Programme Lead	Project Director
2	Programme Lead	Project Director
3	Programme Lead	Project Director
4	Programme Lead	Project Director
<b>Engineers Estimate</b>	Programme Lead	Project Director

### 5.2 Cost Estimate Review

The estimator managing the estimate is to obtain an internal peer review of all estimates >\$50k. The peer reviewer may be a person from within the estimator's own organisation or an independent person. Estimates of <\$50k do not need peer reviews.

The reviewer must be able to demonstrate independence from the estimator's project development team. The peer review is required to provide WWL assurance that good practice has been followed both in terms of this manual and any internal requirements the estimator may have in place

The reviewer is required to report any problems with the project estimate and, as a minimum:

- Gain a satisfactory understanding of the project to permit the peer review to proceed,
- Review the estimate scope for adequacy and completeness,
- Check that a bulk quantity check has been carried out by a suitably experienced person,
- Review the appropriateness of the rates and prices, lump sum and provisional sum items,
- Review all external price enquiries that may have been incorporated in the estimate to, confirm their scope, price and appropriateness for inclusion,
- Check that an arithmetic check has been undertaken,
- Review the scope definition statements and drawings to confirm that they are commensurate with the type of estimate and estimate deliverable,
- Review the appropriateness of the contingency and funding risk allowances.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



### 5.3 Independent Estimates

WWL Project Director will commission a parallel estimate for comparison for Level Two estimates of a project if the project is classified as a Major Project.

The parallel estimate does not remove responsibility or accountability from the consultant who prepared the project estimate.

A copy of the parallel estimate will be provided to the consultant. The consultant is then required to reconcile any differences they may have with the parallel estimator. If the parallel estimator and consultant cannot reach agreement, the consultant must report clearly the areas of disagreement to WWL's Project Director with a full explanation of why they disagree.

### 5.4 Estimate Records

The estimator is to prepare estimate report at each of the project hold points throughout the project life cycle. The update report must include:

- Scope of work the estimates are based upon,
- Source of data used to prepare the estimate,
- Summary and breakdown of current estimate,
- Assumptions made in preparing the estimate,
- Contingency and Funding Risk allowance derived by risk assessment or risk analysis,
- Changes between current and previous estimates including reason for change.

These reports are to form Appendices to the Project Brief, Concept Design Report, Preliminary Design Report and Detailed Design Report.

### 5.5 Project Estimate Summary

The Project Estimate is to be summarised using the template in Appendix B at each stage of the projects development.

Wherever possible Physical Works cost estimate elements are to be built up using WWL's standard measurement template.

For those stages which are complete, the actual values are to be used. A record of these values will be kept by WWL to influence the guidance of future cost estimates including contingency and funding risk values.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 6. Contingency and Funding Risk

### 6.1 General

AS/NZS ISO 31000 "Risk Management – Principles and guidelines" details the core principles of risk management.

Risks must be identified and assessed for every project. The level of detail varies depending on whether the project is graded for Simple, General, or Advanced procedures;

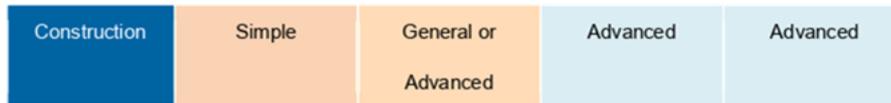
- **Simple:** Usually a simple determination as to whether the project has a significant risk that is likely to occur.
- **General:** Determine the likelihood and average consequence of the risks.
- **Advanced:** Determine the probability of the risk occurring, the possible range of cost consequences, and any correlation between risks.

### 6.2 Methodology

The following table details the methodology that shall be used to calculate Contingency and Funding Risk values at the various stages of the project life cycle:

Cost Estimate* and Risk Profile Bands				
Estimate Type	<\$50k and No high or extreme risks.	>\$50k - \$5M or 1 or more high or extreme risks	>\$5M - \$10M or 5 or more high or extreme or unusual risks	>\$10M
Level Zero, or Level One	Simple	Simple	Simple	Simple
Level Two	Simple	General	General or Advanced	General or Advanced
Level Three	Simple	General	General or Advanced	Advanced
Level Four	Simple	General or Advanced	Advanced	Advanced

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



Note: Cost bands are based on the Expected Estimate of the construction phase. Risk rates as defined by WWL risk management process.

Where General or Advanced is recommended as the applicable approach, the WWL Project Director or Programme Lead shall determine which of the two approaches is the more appropriate. This will generally be determined by the number and/or complexity of the project risks.

### 6.3 Simple Approach

The applied contingency represents an average allowance - estimated with an assumption of a 50% chance of being exceeded. In the absence of better information, the following table provides suggested contingency and funding risk rates:

Estimate Type	Project Contingency	Funding Risk
Level One	40%	60%
Level Two	20%	30%
Level Three	10%	15%
Level Four	5%	10%
Construction	3%	4.5%

The contingency is added each of the elemental costs to give the total project Expected Estimate. The funding risk is added to the Expected Estimate to give the 95<sup>th</sup> Percentile Estimate i.e. The Base Estimate plus Contingency equals the Expected Estimate. The Expected Estimate plus the Funding Risk equals the 95<sup>th</sup> Percentile Estimate.

### 6.4 General Approach

The General Approach is similar to the Simple Approach, except that contingency sums are applied to each work category. These are then summed to provide the overall project contingency.

The contingency is the average risk allowance - estimated with an assumption of a 50% chance of being exceeded.

The funding risk can be determined by considering high risk allowances for each risk. These cannot be added directly, as it is unlikely that all risks will eventuate at their worst consequence. Instead, a root-mean-squared calculation is used (often referred to as the 'Hong Kong' method) to determine an appropriate value for the Funding Risk.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 6.5 Advanced Approach

This approach is based on computer modelling of quantitative cost data associated with uncertainties in the estimating process and individual threats and opportunities with a cost and/or time cost impact. @RISK is the most widely used software, although other software such as Crystal Ball and Analytica also provide Monte Carlo modelling.

The output of a quantitative risk analysis is a probabilistic distribution of potential project cost scenarios. This distribution can be analysed to determine the mean (i.e. the Expected Estimate) and any desired percentile cost such as the 95<sup>th</sup> Percentile Estimate.

The Advanced Approach process entails the following:

- Determining the high/low costs for each scheduled elemental item – based on accuracy of measurement and variability in cost rates,
- Identifying other risks with potential to impact on the final out-turn cost, whether they:
  - significantly impact on scheduled quantities or cost rates, or
  - are not directly related to a scheduled item,
- For each risk:
  - determining whether the risk has a fixed or variable cost,
  - selecting a cost probability distribution and its defining values,
  - determining the likelihood of the risk,
- Establishing any correlations that exist between risks
- Running the required number of Monte Carlo simulations based on the number of risks and their likelihood or using a default value of 10,000 simulations,
- Extracting the required values from the resulting project cost distribution.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



## 7 Estimate Guidelines

### 7.1 Use and Application of Historic Rates

The following factors must be considered in deciding whether it is appropriate for an historical rate or price to be applied to a new estimate:

- Costs for the same work varies with the passage of time (inflation) and the older the data, the less reliable it will be. An appropriate allowance for inflation must be made whenever historical cost data is used. Reference can be made to NZTA cost escalation indices for the rates of construction inflation.
- Estimators need to be aware of any significant pricing changes in the historic records. For example, global fluctuations in the price of raw materials will mean that not all manufactured products followed the same inflationary path.
- When using historic cost data, the estimator must be aware of the site conditions that impacted on the make-up of rates at that time. For example, a trenching rate will differ if the work is undertaken in saturated soils (high groundwater level) compared to free-draining materials.
- When preparing an estimate, the estimator shall be mindful to capture any changes in technologies, methodologies, materials, plant and machinery that may affect the scope of the works, construction methodology, or selection of components that may influence the estimate. This is essential when there is a significant time gap between the project conception and construction.
- When using historic cost data, the estimator must be aware of the market conditions prevailing at the time of the tender. For example, competitive market conditions lead to a reduction in the allowances for offsite overheads and profit. The estimator must also consider the possibility that the allowances for overheads and profit have not been equally spread over all of the rates.
- Where items might have been sourced from overseas, then historic rates could have been significantly affected by the international exchange rate, and/or by the pricing strategy of the supplier. Similarly, the estimator needs to assess the risk that the supply price might change between preparation of the estimate and the date of supply for construction.

It is not always apparent from the title of a work item precisely what the rate includes. For example, if an item reads 'construct water main' the historic rate may or may not have included shoring, jointing, testing, surface reinstatement, etc. In tendering situations, the contractor may or may not have included some proportion of their indirect or offsite overheads and profit costs within the work items. In addition to the above, historical cost data may contain risk or contingency allowances specific to a particular project, or alternatively make no allowance for these.

### 7.2 Consultancy Fees and Council Costs

The cost estimate need to include all costs associated with the project excluding WWL's management fee to the Council. The value of the management fee varies annually and will be added to the cost estimate by WWL Programme Lead or Project Director.

Examples of Consultancy Fees and Council Costs include:

- Consultancy Fees for:
  - Development of Concept Design,
  - Preliminary Design,
  - Consenting applications,

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



- Detailed Design,
- Peer reviews,
- Procurement management,
- MSQA,
- Council Cost for:
  - Site Surveys,
  - Geotechnical Investigations,
  - Ecological Investigations,
  - Legal reviews and advice,
  - Consent Fees,
  - Consent monitoring,
  - Land and property purchase,
  - Principal arranged Insurances.

Wherever possible actual costs should be obtained for the Consultancy fees and Council costs. As such, it is sensible to consult with such a specialist when pricing those works. Where these are not known the following approximations should be used:

Project Phase	Consultancy Fee & Council Costs*
Development	3.0%
Consenting	3.0%
Detailed Design	6.5%
Procurement	0.5%
Construction	5.0%

Note \* percentage of Physical Works cost

### 7.3 Physical Works Costs

Unreliable estimates can result from overlooking buildability issues. Simply measuring the necessary quantities of a pipeline or a structure without recognising the difficulties and other costs associated with its construction may lead to an underestimate of project cost.

Factors that need to be considered are:

- On-site overhead (time related and fixed)
- Off-site overheads and profit
- Environmental Management
- Traffic Management
- Temporary Works
- Service protection or diversion
- Consent requirements
- Historic Places requirements
- Commissioning
- Contractors Risk

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



On-site overheads includes both the fixed costs associated with establishing the site (e.g. setting up site accommodation and facilities) and time-related costs associated with running the site during construction of the project (e.g. site management and supervision, and quality control). It also includes other associated project costs such as insurances and bonds.

Both direct and indirect costs will be subject to the addition of allowances for the tenderers offsite (head office) overheads and profit.

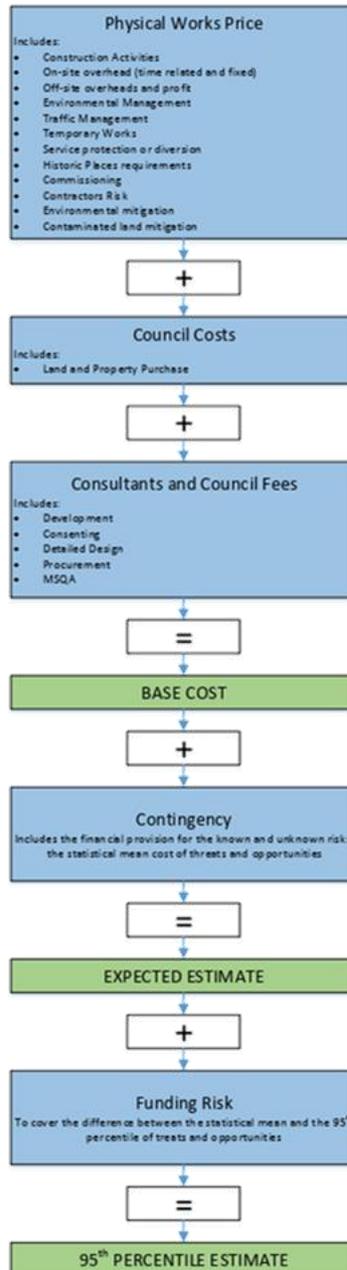
The following table provides guidance to estimators of the percentages to be allowed for various physical works elements when no actual values are available.

Physical Works Element	Percentage of Physical Works	Factors
<b>On-site Overheads</b>	9 – 15%	Scale, complexity, supervision requirements
<b>Off-site Overheads and Profit</b>	11 – 14%	Market conditions, risk, appetite for the work
<b>Environmental Management</b>	1 – 4%	Site conditions, proximity to waterways, geotechnical conditions
<b>Contractors Risk</b>	2 – 5%	Risk allocation, complexity, familiarisation with the work, contract terms
<b>Traffic Management</b>	0 – 10%	Site location, traffic volumes, working room, Level 1, 2 or 3

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery



**Appendix A – Estimating Flow Path**



Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

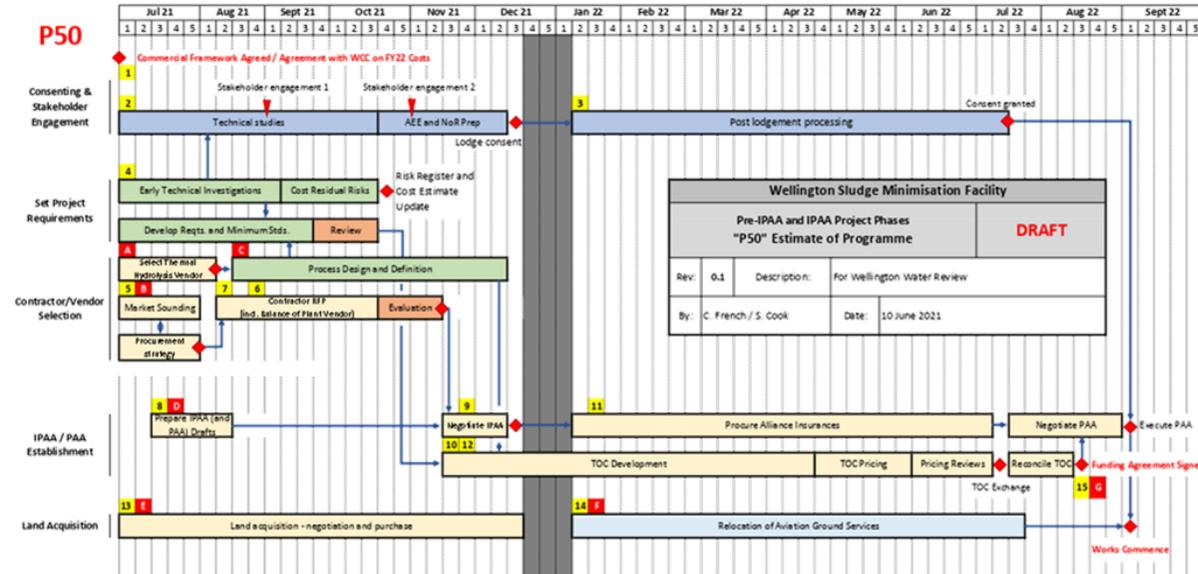


**Appendix B– Project Estimate Template**

PROJECT ESTIMATE				
Project Name:				
Current Phase:				
Base Date:				
Phase	Description	Base Estimate	Contingency	Total
<b>Development</b>				
	Consultancy Fees		\$	-
	Site Investigations		\$	-
	Other Costs (Legal, Land, etc.)		\$	-
	<b>Total Project Development</b>		\$ -	\$ -
<b>Consenting</b>				
	Consultancy Fees		\$	-
	Site Investigations		\$	-
	Consenting Fees, Community Engagement		\$	-
	Other Costs (Legal, Land, etc.)		\$	-
	<b>Total Consenting</b>	\$ -	\$ -	\$ -
<b>Detailed Design</b>				
	Consultancy Fees		\$	-
	Site Investigations		\$	-
	Other Costs (Legal, Land, etc.)		\$	-
	<b>Total Detailed Design</b>		\$ -	\$ -
<b>Procurement</b>				
	Consultancy Fees		\$	-
	Other Costs (Legal, Land, etc.)		\$	-
	<b>Total Procurement</b>		\$ -	\$ -
<b>Construction</b>				
	Consultancy Fees		\$	-
	Other Costs (Legal, Land, etc.)		\$	-
	Physical Works		\$	-
	Environmental Compliance		\$	-
	Earthworks		\$	-
	Ground Improvements		\$	-
	Water		\$	-
	Wastewater		\$	-
	Stormwater		\$	-
	Roads		\$	-
	Structures		\$	-
	Service Relocations		\$	-
	Landscaping		\$	-
	Traffic Management		\$	-
	Temporary Works		\$	-
	Other Construction Costs		\$	-
	Risk		\$	-
	SubTotal	\$ -	\$ -	\$ -
	On Site Overheads		\$	-
	Off Site O/H & Profit		\$	-
	Total Physical Works	\$ -	\$ -	\$ -
	<b>Total Construction</b>	\$ -	\$ -	\$ -
<b>Base Estimate</b>				
	Base Estimate	\$ -		
	Contingency		% \$ -	
	<b>Expected Estimate</b>			\$ -
<b>95th Percentile Estimate</b>				
	Funding Risk		%	
	<b>95th Percentile Estimate</b>			\$ -
Notes: This estimate is exclusive of escalation and GST.				
<b>Approvals</b>				
	Name	Signature	Date	
Prepared by:				
Reviewed by:				
Approved by:				

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Security: Green

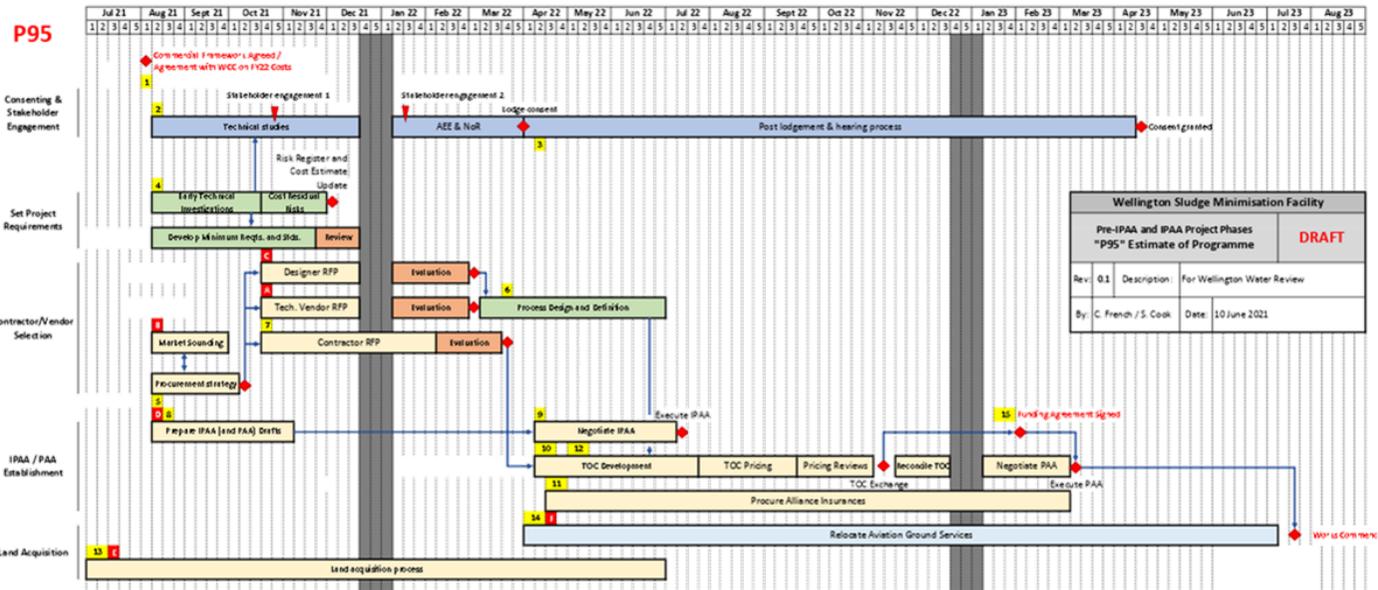


Notes & Key Assumptions:

1. The PSO programme assumes that approval to commence pre-IPAA work is obtained by 1 July 2021. As advised by WCC, approval may be provided for very early work while an agreement is reached for all work in the next financial year.
2. The PSO programme assumes that technical studies, Assessment of Environmental Effects and Notice of Requirement can be drafted within a 6 month period. This requires that there are no major issues raised in early stakeholder and public engagement, as has been indicated by stakeholder engagement to date.
3. The PSO programme assumes that, in accordance with the project consenting strategy, the activities requiring consent are discretionary.
4. Early technical investigations are required to bring further clarity to some key risks and itemise these risks with specific cost allowances within the project cost estimate (rather than as part of project contingencies).
5. The PSO programme assumes that the vendor for the thermal hydrolysis plant (which is central to the remaining process design) can be selected based on a market scan by international experts. This is based on:
  - > Early engagement with international experts, which has identified that there is only one prevalent global supplier of the thermal hydrolysis plant.
  - > That the relative value of the thermal hydrolysis plant is low (<5% of total cost), which may support a market scan and preferred supplier nomination (rather than formal EOI).
6. Early process design is needed to confirm critical parameters upon which the TOC will be based and that have a long lead time to determine (because of the need for sludge testing etc). This assumes that a designer is selected by nomination, so that they are able to work with the thermal hydrolysis vendor in an ECI environment.
7. The PSO programme assumes a single stage procurement process for contractor selection (i.e. no shortlisting first). Early market sounding suggests that this approach is appropriate.
8. The PSO programme assumes the use of industry-standard IPAA / PAA agreement templates which are readily acceptable to Wellington Water.
9. The PSO programme assumes that early market awareness of the project, and use of a standard IPAA agreement template, enables the IPAA negotiation to be 4 weeks.
10. The PSO programme assumes that TOC Development can commence in parallel to IPAA negotiation (as advised by Resolve Group).
11. The PSO programme assumes that Alliance insurances can be procured within 6 months.
12. The PSO programme assumes a TOC development period of 7 months (as advised by Resolve Group).
13. The PSO programme assumes that a sale and purchase agreement for the site can be established on a willing seller / willing buyer basis.
14. The PSO programme assumes that Wellington International Airport manage the re-location of Aviation Ground Services (and can do so within 6 months, as discussed previously with WIAL).
15. The PSO programme assumes that CIP will observe the TOC development process to obtain an appreciation of project risk and use this to inform the total funding amount.

Major Projects Committee Meeting 14 June 2021 - Sludge Minimisation Facility - Funding and Delivery

Summary Gantt



Notes & Key Assumptions:

- The P95 programme assumes that approval to commence pre-IPAA work is delayed until by 1 August 2021. As advised by WCC, approval may be provided for very early works while an agreement is reached for all work in the next financial year.
- The P95 programme assumes that technical studies, Assessment of Environmental Effects and Notice of Requirement are somewhat delayed by the need to address specific stakeholder concerns.
- The P95 programme assumes that the consent is publicly notified and subject to a hearing. Note: this risk has been identified in the project risk register and is being managed via early stakeholder engagement and specialist legal advice.
- Early technical investigations are required to bring further clarity to some key risks and itemise these risks with specific cost allowances within the project cost estimate (rather than as part of project contingencies).
- The P95 programme assumes that the accepted procurement strategy requires the thermal hydrolysis vendor, designer and contractor to be procured via RFP processes. The impact of this is that early / critical process design and definition can not commence which delays subsequent tasks / processes.
- Early process design is needed to confirm critical parameters upon which the TOC will be based and that have a long lead time to determine (because of the need for sludge testing, etc).
- The P95 programme assumes a single stage procurement process for contractor selection (i.e. no shortlisting first). Early market sounding suggests that this approach is appropriate.
- The P95 programme assumes that there is a longer process to approve the IPAA and PAA agreement templates.
- The P95 programme assumes that there is a longer process to negotiate the IPAA.
- The P95 programme assumes that TOC Development can commence in parallel to IPAA negotiation (as advised by Resolve Group).
- The P95 programme assumes a protracted period to procure Alliance insurances.
- The P95 programme assumes a TOC development period of 7 months (as advised by Resolve Group).
- The P95 programme assumes that a sale and purchase agreement cannot be readily established on a willing seller / willing buyer basis, so a Public Works Act process is needed. An opportunity has been identified to run both processes in parallel to partially mitigate this risk.
- The P95 programme assumes that Wellington Water is required to manage the re-location of Aviation Ground Services (OR that this activity becomes protracted).
- The P95 programme assumes that DP will observe the TOC development process to obtain an appreciation of project risk and use this to inform the total funding amount.

---

## **TRANSFER OF LAND (SEGREGATION STRIPS) ADJOINING 60-72 MURPHY STREET FROM NZTA TO COUNCIL.**

---

### **Purpose**

1. This report asks the Pūroro Waihanga | Infrastructure Committee to recommend to Council that it agrees to acquire approximately 21m<sup>2</sup> of land being sections 1 to 6 and 14 on SO 461178 on ROT 828494 (the Land), adjoining 60-72 Murphy Street Thorndon, from the Crown (Waka Kotahi - NZTA) for \$1 if demanded. (Please refer to the aerial plan in Attachment 1 that shows the Land outlined red).

### **Summary**

2. As part of their urban motorway review, Waka Kotahi (NZTA) were in the process of disposing of 60-72 Murphy Street and consulted Council on its roading requirements.
3. Along with legalisation with some parts of the Murphy Street off ramp and public footpath, segregation strips (the Land) have been created between the road and 60-72 Murphy Street for traffic safety purposes.
4. NZTA have agreed to transfer the Land to Council for \$1, if demanded, pursuant to Section 50 of the Public Works Act 1981. Officers recommend that Council approves this acquisition and transfer.

### **Recommendation/s**

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.
2. Recommend to Council that it:
  - (a) Agree to acquire approximately 21m<sup>2</sup> of land adjoining 60 -72 Murphy Street, Thorndon being sections 1 to 6 and section 14 SO 461178 on ROT 828494 (**the Land**) for \$1 (if demanded), pursuant to section 50 of the Public Works Act 1981.
  - (b) Delegate the Chief Executive Officer to carry out all steps necessary to conclude the acquisition of **the Land** from the Crown (Waka Kotahi – NZTA).
  - (c) Note that Council will pay reasonable costs of the Transfer of approximately \$3,000 funded from activity 2084.

### **Background**

5. In recent years NZTA have been reviewing their land holdings around the urban motorway and off ramps (constructed in the 1970's), and either disposing or legalising those parts that remain in fee simple title, along with any local road legalisation requirements.

6. In their process of disposing of 60-72 Murphy Street, NZTA consulted with Council about its surrounding road requirements. Along with legalising part of the formed public footpath and part of the road they agreed to provide segregation strips for traffic safety reasons.
7. NZTA arranged and paid for the survey (Survey Office plan (SO) 461178) of the Land and their balance property (60-72 Murphy Street) which was eventually sold to the adjoining owner (The American Embassy).
8. The Land (segregation strips) is required to ensure traffic safety by preventing direct access from 60-72 Murphy Street to the Murphy Street southbound motorway off ramp and where it merges with traffic from Tinakori (at relatively high speeds).
9. Note that 60-72 Murphy Street (now part of the larger American Embassy site) has alternate and safer access to Murphy Street via Halswell Street which it also has direct frontage to. The presence of these segregation strips will ensure the safer Halswell Street access is always used.

## **Discussion**

10. The proposed mechanism by which this acquisition would occur is pursuant to section 50 of the Public Works Act 1981 (PWA). This section allows the direct transfer of land from the Crown to a Local Authority (and vice versa) for a public work.
11. As the Land (segregation strips) is required for the functioning (indirectly) of a road and this is a wash-up of the urban motorway off ramp construction in the 1970's the consideration is \$1, if demanded.
12. Council's transport engineers requested that these segregation strips be created in order to ensure that traffic safety is preserved and not compromised by vehicle access directly from the 60-72 Murphy Street property onto Murphy Street.

## **Options**

13. If Council does not acquire the Land then NZTA could sell it to the adjoining owner be further developed with possible vehicle access directly onto Murphy Street creating traffic safety issues.

## **Next Actions**

14. Chief Executive to execute Section 50 Transfer agreement to acquire the Land.
15. NZTA to obtain LINZ approval to transfer the Land pursuant to section 50 PWA.
16. Settlement and Transfer of the Land.

## **Attachments**

Attachment 1. Aerial photo plan of the Land (segregation strips) to be acquired [↓](#) 

Page 113

---

Author	John Vriens, Senior Property Advisor
Authoriser	Brad Singh, Transport Assets Manager Tom Williams, Chief Infrastructure Officer

---

## **SUPPORTING INFORMATION**

### **Engagement and Consultation**

As NZTA is transferring the Land to Council for road related purposes and as a wash-up of the 1970's urban motorway project, there is no requirement to consult.

### **Treaty of Waitangi considerations**

The Land is RFR Land within the meaning of the Port Nicholson Block (Taranaki Whanui ki Te Upoko o Te Ika) Claims Settlement Act 2009 (Settlement Act) but the disposal of RFR land that is a public work in accordance with section 50 of the PWA is a permitted disposal pursuant to section 104(1) of the Settlement Act. In acquiring the Land Council acknowledges it will become RFR landowner and subject to the obligations of an RFR landowner once the Land has transferred. The Crown are required to notify iwi as part of this transfer.

### **Financial implications**

The Land is being transferred for a "peppercorn" amount (if demanded) and NZTA have already paid for all the survey required. Council is responsible for approximately \$3,000 of legal and transfer costs which will be paid for from Activity 2084.

### **Policy and legislative implications**

All land that is acquired requires Council approval.

### **Risks / legal**

The acquisition and transfer Agreement has been reviewed by Council's lawyers. The risk in Council not acquiring the land is that traffic safety to the Murphy Street motorway off ramp exit could be compromised.

### **Climate Change impact and considerations**

There are no climate change considerations associated with this decision.

### **Communications Plan**

None is required.

### **Health and Safety Impact considered**

If Council acquires the Land then traffic safety is benefitted by preventing vehicle access directly onto that part of Murphy Street that transitions from the motorway offramp to street and vehicles merging (at potentially higher speeds) with traffic travelling from Tinakori Road.



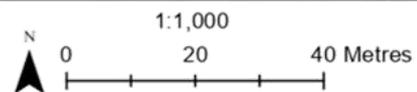
June 8, 2021

**Disclaimer:**  
 The use of any land or property information in OneMap is entirely at the user's own risk and discretion. Wellington City Council does not give any warranty that any information contained is accurate or complete. The Council does not accept any responsibility or liability for any action taken, or omission made, in reliance on information obtained from OneMap.

**Data Statement:**  
 Property boundaries, 20m Contours, road names, rail line, address & title points sourced from Land Information NZ. Assets, contours, water and drainage information shown is approximate and must not be used for detailed engineering design. Other data has been compiled from a variety of sources and its accuracy may vary, but is generally +/- 1m. Crown Copyright reserved.

**Property Boundaries Accuracy:**  
 +/-1m in urban areas  
 +/-30m in rural areas

**Data Source:**  
 Census data - Statistics NZ.  
 Postcodes - NZ Post.



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



---

## **DRAFT SUBMISSION - INFRASTRUCTURE FOR A BETTER FUTURE AOTEAROA NEW ZEALAND**

---

### **Purpose**

1. This report asks the Pūroro Waihanga | Infrastructure Committee to agree to submit on the Infrastructure Commission's consultation document setting out a long-term vision and strategy for meeting the infrastructure requirements for Aotearoa New Zealand.
2. Submissions are due by 2 July 2021. Officers seek the Committee's endorsement before submitting the response.

### **Summary**

3. The New Zealand Infrastructure Commission, Te Waihanga, is developing an Infrastructure Strategy for Aotearoa New Zealand. It has released a consultation document setting out a proposed direction for the Strategy for feedback, ideas and views. Following consultation, this information will be used to finalise the draft Infrastructure Strategy that will be provided to the Minister for Infrastructure in September 2021.
4. The document, and the questions it asks, is wide ranging and does not present a proposed strategy at this point. It is noted that Taituarā (formerly SOLGM) has drafted a more comprehensive submission on behalf of the sector and notes that more clarity is needed in the final strategy.
5. Officers have drafted a submission for the Committee to consider.

### **Recommendation/s**

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.
2. Agree to the draft submission (as attached).
3. Delegate to the Chief Executive and the Chair or Deputy Chair of the Pūroro Waihanga | Infrastructure Committee the authority to amend the submission to include any proposed amendments agreed by the Committee at this meeting, and any minor consequential edits, prior to it being sent.

### **Background**

1. As noted in the consultation document the national infrastructure has not kept pace of growth. There are issues emerging of climate change, unaffordable homes, congested cities and leaking pipes.

2. There are financial challenges in addressing these issues as infrastructure is expensive and it requires workforce skills that are already heavily in demand. There is a backlog of maintenance as well as a requirement to respond to population growth and issues such as climate change.
3. The Infrastructure Strategy aims to create an infrastructure system that gets the best results for all New Zealanders both now and well into the future. Te Waihangā has already engaged with a wide range of stakeholders and is now seeking further input before it reports back to Ministers.
4. The issues are wide-ranging and this is reflected in the wide range of questions asked in the consultation document. Many of these are contingent on wider issues under discussion such as financing for local government, the role of local government, three waters reform, urban development planning and resource management reform.
5. The submission focusses on funding mechanisms, climate change, and the need for a planned approach across the different government reforms to ensure that infrastructure outcomes can be delivered.

## Options

6. The Committee could decide to not make a submission or agree to the attached submission with any amendments that are agreed by the Committee to be incorporated.

## Next Actions

7. If the Committee decides to make a submission, any amendments will be incorporated. The document will be finalised and submitted by the deadline of by 2 July 2021.

## Attachments

Attachment 1. Infrastructure submission [↓](#) 

Page 118

Authors	Moana Mackey, Chief Advisor to Chief Planning Officer and Chief Infrastructure Officer Geoff Lawson, Team Leader Policy
Authoriser	Moana Mackey, Chief Advisor to Chief Planning Officer and Chief Infrastructure Officer Tom Williams, Chief Infrastructure Officer

---

## **SUPPORTING INFORMATION**

### **Engagement and Consultation**

This is in response to the New Zealand Infrastructure Commission, Te Waihanga consultation document setting out a proposed direction for a national infrastructure strategy.

### **Treaty of Waitangi considerations**

There are no Treaty implications from the submission itself. However how Māori are integrated within the strategy development and future direction is important and needs to be carefully considered.

### **Financial implications**

There are no financial implications from making the submission.

### **Policy and legislative implications**

None from making the submission. The Submission aims to be consistent with the Council's advice in wider submissions on issues such as climate change.

### **Risks / legal**

None from making the submission.

### **Climate Change impact and considerations**

None from making the submission. The national direction for infrastructure will have major implications for climate change including issues of adaption and transition.

### **Communications Plan**

Not required.

### **Health and Safety Impact considered**

There are no health and safety implications.

---

## **To be entered in the New Zealand Infrastructure Commission Te Waihanga online submission form**

2 July 2021

Tēnā koutou

### **Submission on Infrastructure for a Better Future Aotearoa New Zealand He Tūāpapa ki te Ora**

Wellington City Council (WCC) thanks the New Zealand Infrastructure Commission Te Waihanga for the opportunity to make a submission on this consultation document. The Commission has posed a wide range of questions which officers have responded to, noting that not all questions fall within the Council's areas of interest.

The overall vision that "infrastructure lays the foundation for the people, places and businesses of Aotearoa New Zealand to thrive for generations" is appropriate. It recognises the importance of infrastructure underpinning the wellbeing of the community.

The outcome of this consultation is important as there are many initiatives in the document that could be scaled to frame the work and priorities of the outcome of the Council's own strategic asset management review.

We note the gradual shift in local government from asset-based organisations to an expectation of well-being focused organisations, means the funding mechanisms for infrastructure needs to adapt.

We strongly support the focus on meeting the challenge of reducing emissions and responding to the impacts of climate change. WCC declared an ecological and climate emergency in June 2019 placing climate action front and centre of our decision-making. We believe that action needs to be taken now if we are to act on climate change. Future generations will live with the physical impacts of climate change and we strongly encourage the Commission to support policy and funding changes that accelerate decarbonisation within the next decade.

It is noted that the consultation document appears to be focused primarily with water, waste, transport, and energy infrastructure and does not deal with community, social and recreational infrastructure where many of the same issues exist.

The Council also acknowledges the Taituarā submission on behalf of the sector which is more detailed in its feedback. It notes that more clarity is required in the final strategy as there are areas of duplication and also some gaps in the information sought in this consultation document.

Responses to the questions posed in the consultation draft are provided in the attached.

Yours sincerely

Councillor Sean Rush

Chair

---

**Draft Submission**

**What are your views on the proposed 2050 infrastructure vision for New Zealand?**

*Vision - Infrastructure lays the foundation for the people, places and businesses of Aotearoa New Zealand to thrive for generations.*

The Council strongly supports this as an aspirational vision, particularly the incorporation of climate change and equity. The real issues will be in the planning, funding and delivery to achieve this.

**What are your views on the decision-making principles we've chosen? Are there others that should be included?**

*Outcomes: Efficient: Equitable: Affordable*

*Decision-making principles: Future-focused, Transparent, Focused on options, Integrated, Evidence-based*

The Council supports these decision-making principles. The Commission needs to ensure that the funding mechanisms are appropriate to support the principles. For local government, intergenerational equity is achieved by capital borrowings over the life of an asset. Ring fencing depreciation payments, within the asset class that generates it, provides transparency.

Equitable provision of an amenity/asset or level of service is very difficult to provide across territorial authority boundaries due to the independence of the various decision-making processes.

**Are there any other infrastructure issues, challenges or opportunities that we should consider?**

The issues of affordability and funding mechanisms needs to be considered. If there is an expectation that local government moves from asset-based organisations to well-being focused organisations, the funding mechanisms for infrastructure need to adapt. The current rates (property tax) based system was/is appropriate to provide the assets that service a property. Whether these mechanisms remain appropriate if the focus changes need to be considered.

The matter of equity in these funding mechanisms also needs to be considered. The Council would consider that people understand their tax dollars should be spent to provide equitable outcomes across New Zealand but may not agree that rates funding should be spent outside of their local Council boundaries. With any regionalisation of infrastructure spend this question of equity may need to be considered.

There are some specific challenges where positive environmental and amenity projects do not cover their costs. For instance, roading projects are largely self-funding (from targeted

---

taxation (FED and RUC)) However other projects such as cycleways have many positive social, amenity and environmental benefits, but do not have dedicated funding mechanisms. One option would be the development of a “total impact tool” that can help put dollar values onto the positive offsets and benefits.

In the challenges noted in the document (p29) the Council suggests amending “Avoiding unnecessary congestion in urban areas” to something like “moving people and freight more efficiently in urban areas” or “making it easier for people and freight to access urban areas”. Congestion (usually assumed to be car congestion) itself is not necessarily a problem. A city could move people and freight very efficiently, reliably and affordably by other modes but still have peak hour car congestion. By defining the problem as ‘congestion’ we risk pre-emptively defining the solution as ‘making it faster/easier to drive a car/truck through the city’.

Also, the Council suggests changing “Adapting to and mitigating the effects of climate change” (p29) to “transition to a net zero emission economy” and “adapting to the effects of climate change”. These are two related but quite different challenges so should be separated out. There is a risk that the current wording will only be interpreted as viewing adaptation as a challenge. Transitioning to Net Zero emissions is obviously important for our international competitiveness, long-term wellbeing and minimising long-run costs.

The issues of climate adaptation and how to address this consistently across the country is vital to be addressed in this strategy. Consideration should be given to making the MfE Guidance on Planning for Coastal Impacts mandatory. In many cases Local Authority assets provide protection to private property (a coastal road or park). When it is no longer viable to maintain those assets and Councils stop doing so, there is likely to be community concern and expectation of compensation or assistance.

**For the ‘Building a Better Future’ Action Area and the Needs:**

- **What do you agree with?**
- **What do you disagree with?**
- **Are there any gaps?**

The Council agrees with this action area.

We do recommend that the following action area P12 2:0 *Enabling Competitive Cities and Regions* should be amended to include the needs of businesses located in these areas alongside the needs of people.

On p12 3:1 the strategy raises the point of *Integrating infrastructure institutions* to create better service delivery. It must be clear that this is to better deliver on the outcomes and vision of the strategy. P13 sets out many of the options that are being considered already.

---

On P12 3.2 Ensure equitable funding and financing. The Council recommends that this needs to include sufficient funding to meet the identified priorities as there are significant infrastructure and funding gaps to close.

On P12 3:7 Reduce costs and improve consenting. The Council recommends that these are largely distinct and should therefore be separated, so that it is clear that improving consenting is not only about reducing costs. Local Authorities have a specific obligation to represent their communities views an “improvement” at a local level my not be seen the same way at a regional or national level.

**How could we better encourage low-carbon transport journeys, such as public transport, walking, cycling, and the use of electric vehicles including electric bikes and micro-mobility devices?**

On P34 Issues, Transport – The Council recommends adding a significant infrastructure gap around safe cycling/micro-mobility infrastructure in cities and towns.

**How else can we use infrastructure to reduce waste to landfill?**

We think that waste minimisation is as much about behaviour change and procurement as infrastructure.

While we would welcome investment in on-shore reprocessing of materials, funded by the waste minimisation fund, we think this needs to be complemented with a change in behaviour. That change needs to support better design to minimise waste at the top of the pipe, rather than post-consumer.

We think it is important that infrastructure isn't designed simply to enable us to behave in way we do now. Making it easy and convenient to dispose waste just hides the problem – we aspire to a low-waste future, not a high-waste-but-low-waste to landfill future.

We also need to complement infrastructure with a taxation regime that encourages the right behaviour.

**What infrastructure issues could be included in the scope of a national energy strategy?**

The Commission should consider the role of alternative transport fuels (e.g., biofuels and hydrogen) would be useful, given the limitations of battery electric technology for heavy vehicles.

Demand side issue in the built environment should also be considered. The Council supports the Climate Commission’s recommendation to introduce mandatory measures to improve the operational energy performance of commercial and public buildings.

In the short term we recommend the mandatory disclosure of energy performance of public and commercial buildings to create visibility of the buildings energy performance, enable

---

building owners to be supported to make improvements, and provide tenants with an understanding of the true cost of leasing a building.

Likewise, we support the Commission's proposal that a date should be set after which no new natural gas connections are permitted, and where feasible, all new or replacement heating systems installed are electric or bioenergy.

The Council recommends that this time frame should be relatively quickly and with possibly earlier timeframes for public buildings. This will impact for building owners and will need strong and clear guidance from central government. This should also consider support for building owners to transition away from natural gas prior to end-of-life replacement.

The National Policy Statement on Renewal Energy Generation also needs to be updated and strengthened to reflect the targets of the Climate Commission.

**Is there a role for renewable energy zones in achieving New Zealand's 2050 net-zero carbon emissions target?**

The concept is not explained in enough detail in the consultation document for us to comment.

**How can we achieve greater adoption of building information modelling (BIM) by the building industry?**

The real value in BIM is not at the design stage but the operation of the building/facility. At the design stage the cost gains are absorbed by the increased design cost.

Incorporating BIM into ongoing asset management provides significant long term "free benefits" provided the data is maintained and not allowed to erode as the cost of catch up can be significant.

**How should communities facing population decline change the way they provide and manage infrastructure services?**

The Council recommends that the funding principles on equity should address this issue. This might provide different priorities for different asset classes. Some asset provision might be considered as a "human right" e.g. water and wastewater and therefore funded in an equitable manner, others may not be considered to the same extent. WCC would observe that ratepayers do not support their rates being spent outside the collection boundary, there is a fundamental public policy consideration here ensuring that taxation has representation.

Large centralised systems are not always appropriate for small communities. A more effective and resilient outcome can be achieved by creating diversified infrastructure rather than centralised. In some cases, returning to rainwater and septic tank might be more affordable than continuing to provide a central service. Innovative ideas like trickle feed

---

water (not at mains pressure) or a central water service, but local septic for waste disposal needs to be considered.

Communities might then expect a different funding mechanism if they bear the costs more directly by owning individual or local solutions. Funding mechanisms to cover initial capital cost could be explored

**Does New Zealand need a Population Strategy that sets out a preferred population growth path, to reduce demand uncertainty and improve infrastructure planning?**

The concept of a Population “load” for an area might be considered in the same way that the government has set nitrogen and other limits for the agricultural sector. Development of a Total Environmental Impact tool would be helpful, to truly understand the costs and benefits of density vs sprawl, City vs Provincial etc. This might provide a pathway for structured infrastructure planning.

**What steps can be taken to improve collaboration with Māori through the process of planning, designing and delivering infrastructure?**

The Council recommends that the infrastructure framework sets clear expectations for engagement with Māori and early in the planning and design of infrastructure processes. New Zealand needs to embrace Māori holistic approaches that recognise the total impact over the long term, and work together to deliver new projects and restore past projects.

**What steps could be taken to unlock greater infrastructure investment by Māori?**

Māori investment can be long term and holistic, often with positive long term environmental or social benefits, but it must generate a return so that capital bases are not eroded.

**What actions should be taken to increase the participation and leadership of Māori across the infrastructure system?**

The Council recommends that the government invests in building the capacity of Māori to deliver quality advice and leadership in this system. Advice and expertise must be paid/compensated for (like other professional advisors).

The system must avoid third party run Māori engagement/consultation processes and expecting iwi volunteers to contribute advice for free.

**For the ‘Enabling Competitive Cities and Regions’ Action Area and the Needs:**

- **What do you agree with?**
- **What disagree with?**
- **Are there any gaps?**

---

In terms of 'C2. Coordinate delivery of housing and infrastructure', it would make sense to require more efficient use of street space (bus priority measures and connected walking and cycling networks) in areas/corridors targeted in the National Policy Statement Urban Development to enable housing development.

Without coordinated improvements in bus services and cycle networks alongside housing developments, there is a risk that the National Policy Statement Urban Development induces greater car traffic and on-street car storage. The NPS-UD's mandatory removal of minimum car parking standards will have impact on areas where growth/intensification occurs – coordinated investment in public transport and active modes is crucial alongside this.

**What cities or other areas might be appropriate for some form of congestion pricing and/or road tolling?**

Road pricing should be framed as a tool that can achieve objectives other than just "relieving congestion". For example, road pricing designed to improve the overall productivity of the transport system might be designed differently from one simply aiming to make driving more reliable/faster. Likewise, pricing aimed at reducing transport emissions, again might be different (e.g., including charges or restrictions on entering low/no emission zones).

Road pricing should be made available to be used in all urban centres to support mode shift, reduce emissions and improve the reliability of drive times. Meeting national emissions targets will require a reduction in private vehicle trips and significant mode shift to low carbon transport within a timeframe of years rather than decades. There is insufficient time to rely exclusively on electric vehicles incentives, or the construction of new infrastructure, to decarbonise transport. Road pricing has the potential to support a faster shift away from motor vehicle trips to low carbon transport modes where capacity can be expanded quickly, such as buses, cycling, micro-mobility and car share.

**What is the best way to address potential equity impacts arising from congestion pricing?**

The Council has recommended in the Congestion Question report that equity could be achieved by providing target discounts on charges or by having daily caps on charges. The Council also suggests consideration be given to utilising pricing revenue to discount alternative modes like public transport to mitigate any inequities.

The scale of impacts and the ability of the affected parties to pay or change behaviours need to be considered and whether transfer payments may be appropriate.

P83 – C3.1 states "Progress the implementation of a congestion pricing scheme for Wellington following the Let's Get Wellington Moving programme business case."

We support this initiative.

---

**Is a 10-year lapse period for infrastructure corridor designations long enough? Is there a case for extending it to 30 years consistent with spatial planning?**

The Council recommends that much longer-term designations are necessary to ensure future corridors are protected. The conversations about completing the Wellington urban motorway, establishing a cross valley link (in Lower Hutt) and more recently establishing better east west connections between SH1 and SH2 have been going on for many decades already, with no firm decisions currently on the radar.

If funding of property purchase is the major hurdle, then the 'multi-modal corridor protection fund', or the 'corridor reservation fund' (C4.3) could address this.

**Should a multi-modal corridor protection fund be established? If so, what should the fund cover?**

Clarity about the name and the purpose of the fund is needed. A fund could cover the following; Indicative design, evaluation and planning/protection work; advance property purchase for when current owners want to cash out; and management of the resultant property portfolio.

**Does New Zealand have the right institutional settings for the provision of infrastructure?**

As stated earlier in this submission, the reform of local government is seeing a shift from asset based (infrastructure provision) to a wellbeing focus. This may change the investment framework for infrastructure and institutional changes may be needed to better meet the outcomes sought in this strategy. In its spatial and land use planning function local government is required to represent the views of the constituents of their catchment, those views are not always efficient or appropriate at a larger scale, or across boundaries.

**How can local and central government better coordinate themselves to manage, plan and implement infrastructure?**

This should be a key factor to be considered in any conversation on local government review.

**What principles could be used to guide how infrastructure providers are structured, governed and regulated?**

From a local government perspective, the four wellbeing's would seem to be appropriate. This would provide a consistency in approach across the sector as a whole. However as noted above a property tax (rates) based revenue stream is not considered appropriate for a well being approach.

**What steps could local and central government take to make better use of existing funding and financing tools to enable the delivery of infrastructure?**

---

Local and Central government can borrow at attractive rates and a coordinated cross-government approach should be taken to ensure that funding is available to meet long term infrastructure plans. Current plans are limited by the debt ceilings of individual Councils or funding mechanisms which are specific to particular infrastructure types or agencies.

**Are existing infrastructure funding and financing arrangements suitable for responding to infrastructure provision challenges? If not, what options could be considered?**

The existing arrangements are not adequate for the size of the issue the country is facing. Relying on rates & borrowing is not optimal when Councils are addressing significant infrastructure deficits as well as provide capacity for future growth. Certainty is needed to enable take up of alternative funding measures by councils given the scale and risk profile of many of these projects.

P106 S2.3 states “Develop a pathway and transition plan for shifting all vehicles onto time, distance, and level-of-service-based pricing, improving transport pricing and the required governance arrangements needed to support this. Include a consideration of the merit of differential pricing for commercial and non-commercial traffic. This recommendation would need to be considered alongside recommendation C3.1, which relates to congestion pricing for urban areas.” While the Council supports this in principle it again needs to be considered within the financial constraints that Councils are operating within.

**Should local authorities be required to fund depreciation as part of maintaining balanced budgets on a forecast basis?**

Yes, and the depreciation should be ring fenced to the asset class it comes from. This needs to be in conjunction with an appropriate asset revaluation process to keep pace with inflation.

**What options are there to better manage and utilise existing infrastructure assets?**

Greater use of BIM and asset condition rather than age-based asset management. This can both extend and reduce asset life but does provide a focus on criticality, in some cases letting an asset fail then repair/replace is a valid strategy for low criticality assets.

**Are there benefits in centralising central government asset management functions? If so, which areas and organisations should this apply to?**

There may be benefits in setting common policies and macro accounting rules as an important first step. This could include setting depreciation policies, debt funding approaches, and agreed revaluation approaches.

**Do you see merit in having a central government agency procure and deliver infrastructure projects? If so, which types of projects should it cover?**

This approach is likely to be determined by the project with some more suited to this. The experience in some aspects of Waka Kotahi have been very positive, but examples of cost

---

blow overruns like Transmission Gully cannot be overlooked. However, historically where this has been done by infrastructure departments has been variable.

**What could be done to improve the productivity of the construction sector and reduce the cost of delivering infrastructure?**

There are benefits from a centralised design office so that as a country we do not continue investing in bespoke designs for many investments. There are also long-term gains from excellence in design standards.

**What components of the infrastructure system could have been improved to deliver effective stimulus spending during the Covid-19 pandemic**

There needed to be a joint approach to prioritisation that sequenced the projects as every agency wants to prioritise their project.

---

## **FORWARD PROGRAMME**

---

### Purpose

1. This report provides the Forward Programme for the Pūroro Waihanga | Infrastructure Committee for the next month.

### **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.

### **Recommendation/s**

That the Pūroro Waihanga | Infrastructure Committee:

1. Receive the information.

### **Discussion**

4. Thursday 12 August:
  - Swan Lane and Garrett Street upgrade
  - Update on the progress of the Three Waters Reform Initiative.

### **Attachments**

Nil

Author	Sean Johnson, Democracy Advisor
Authoriser	Jennifer Parker, Democracy Services Manager

## **SUPPORTING INFORMATION**

### **Engagement and Consultation**

N/A

### **Treaty of Waitangi considerations**

N/A

### **Financial implications**

N/A

### **Policy and legislative implications**

Timeframes and deliverables are reliant on organisational resourcing and priorities.

### **Risks / legal**

N/A

### **Climate Change impact and considerations**

N/A

### **Communications Plan**

N/A

### **Health and Safety Impact considered**

N/A