

Mangawhai Wastewater Scheme Stage 1 and 2

Approval – October 2023

Meeting: Kaipara District Council
Date of meeting: 25 October 2023
Reporting officer: Anin Nama, General Manager Infrastructure Services

Purpose | Ngā whāinga

To seek approval for the Mangawhai Wastewater Scheme stage 1 and 2.

Executive summary | Whakarāpopototanga

Concerns regarding the capacity constraints of the Mangawhai Wastewater Treatment Plant and the projected growth in Mangawhai resulted in the development of the Mangawhai Community Wastewater Scheme (MWWS) - Master Plan Strategy. The consultancy firm WSP was engaged to develop the strategy and produced a report titled “Basis of Design for Wastewater Treatment and Disposal”. The strategy was presented to Council in February 2022. Following this, the Mangawhai Advisory Group (MAG) was established to provide advice on further refinement of the strategy. The MAG met monthly, until its last meeting in September 2022. The main purpose of the MAG was to identify viable solutions for the overall scheme in response to the growth and management of wet weather flows experienced across Mangawhai.

The Master Plan Strategy was presented to the Elected Members at their December 2022 Council Briefing and identified an investment of circa \$90.5M is required.

At the December 2022 Council Briefing, Council was advised, given the significant investment, staff have commissioned an independent peer review to assess the Master Plan Strategy and conduct a value engineering assessment. The peer review has been conducted by a consortia of SCO Consulting and Beca Hunterh2o, both leading experts in wastewater treatment and effluent reuse from New Zealand and Australia. Both consultants have completed similar treatment system upgrades like the one proposed for Mangawhai and were successfully commissioned. The consortia were tasked with developing solutions with the lowest cost pathway for transitioning the MWWS to meet capacity for growth and enhancement of effluent quality for recycled water use at the Mangawhai Golf Course (Course) and the Lincoln Downs Brown Road Farm.

The peer review identified alternative upgrades that allow for near-term capacity upgrades and developed the Mangawhai CWWTP options report peer review report.

A summary of the peer review was presented to Elected Members at the April and September 2023 Council Briefings.

Recommendation | Ngā tūhunga

That the Kaipara District Council:

- a) Approves stages 1 and 2 for the Mangawhai Wastewater Scheme Project, including the suppliers and individual estimated contract values as listed in Attachment J (provided in full in the public excluded agenda), for a total sum of up to \$1.705m (Excluding GST).
- b) Notes that the funding for this project has been set aside in the 2021/31 Long Term Plan and 2023/24 Annual Plan.
- c) Delegates to the Chief Executive the authority to approve the procurement plan, the professional services agreement with the consortia, and the purchase agreement with World Water Works Inc for the inDENSE system and the installation of the inDENSE by Bellcon Ltd.

Context | Horopaki

The Mangawhai Wastewater Treatment Plant will reach capacity by 2024 and the existing Lincoln Downs Brown Road Farm by 2026, this led to the development of the Mangawhai Community Wastewater Scheme (MWWS) - Master Plan Strategy. The consultancy firm WSP was engaged to develop the strategy and produced a report titled “Basis of Design for Wastewater Treatment and Disposal” (refer to Attachment A). The strategy was presented to Council in February 2022. Following this, Mangawhai Advisory Group (MAG) was established to provide advice on further refinement of the strategy. The MAG met monthly, until its last meeting in September 2022. The main purpose of the MAG was to identify viable solutions for the overall scheme in response to the growth and management of wet weather flows experienced across Mangawhai.

The Master Plan Strategy was presented to the Elected Members at their December 2022 Council Briefing and identified an investment of circa \$90.5M is required (refer to attachments A and B).

At the December 2022 Council Briefing, Council was advised, given the significant investment, staff commissioned an independent peer review to assess the Master Plan Strategy and conduct a value engineering assessment. The peer review has been conducted by a consortia of SCO Consulting and Beca Hunterh2o, both leading experts in wastewater treatment and effluent reuse from New Zealand and Australia. Both consultants have completed similar treatment system upgrades like the one proposed for Mangawhai and were successfully commissioned. The consortia were tasked with developing solutions with the lowest cost pathway for transitioning the MWWS to meet capacity for growth and enhancement of class A effluent quality for recycled water use at the Mangawhai Golf Course (Course) and the Lincoln Downs Brown Road Farm.

The peer review identified alternative upgrades that allow for near-term capacity upgrades and developed the Mangawhai CWWTP options report peer review report (refer to Attachment D).

A cost estimate of the revised solution is circa \$72M (refer to tables 1 and 2).

A summary of the peer review was presented to Elected Members at the April 2023 Council Briefing (refer to Attachments E and F) and the September 2023 Council Briefing (refer to Attachments G and H).

To minimise the risk to Council, the project has been divided into stages. The stages are:

Stages	Activities carried out by Kaipara District Council
1	<ul style="list-style-type: none"> Optimise the treatment plant. Design the inDENSE system Commission the inDENSE system Implement the inDENSE system
2	<ul style="list-style-type: none"> Concept design and consent plan development of the golf course and Lincoln Downs Brown Rd Farm irrigation systems
Activities Wai Tāmaki ki Te Hiku (Entity A)	
3	<ul style="list-style-type: none"> Design and construction of upgrades of the inlet screen, convert the balance tank to a third cyclic activated sludge system (CASS) biological reactor unit and the installation of a second inDENSE system Design and install the ultra-filtration system with UV disinfection system
4	<ul style="list-style-type: none"> Detailed design and construction of the subsurface irrigation at the Mangawhai Golf Course Detailed design and construction of the Lincoln Downs Brown Rd Farm irrigation systems Resource Consent application for the subsurface irrigation at the Mangawhai Golf Course Resource Consent application for Lincoln Downs Brown Rd Farm irrigation systems

Discussion | Ngā kōrerorero

The following items provide an update on the progress from the previous Council Briefings, including investigations, ongoing work to optimise the treatment plant, and ensuring capacity for growth.

Growth projections and available capacity

The existing Mangawhai Wastewater Treatment Plant (WWTP) has a design capacity for 3,000 connections (residential equivalent). To date, approximately 2,764 connections are served by the WWTP, with the plant reaching capacity by mid to late 2024.

Proposed staged upgrades

Stage 1

Works have commenced with the technical team identifying operational issues impacting the performance of the plant (refer to Attachment I). Over the last month, the technical team has managed to resolve these issues by optimising the plant's performance and removing the stress points.

Stage 1 works also involve designing and implementing the inDENSE system, increasing the plant's capacity to 3,550 connections. The system allows the plant to tolerate higher flows and loads without compromising the plant's performance. The same technology is being used successfully by Watercare at their Māngere and Warkworth treatment plants. The design is planned to commence in October 2023, with construction planned for early 2024. Technical staff from Watercare are providing advice on the inDENSE system.

Stage 2

The existing Lincoln Downs Brown Road Farm will reach capacity by 2026. In addition, there have been several operational issues with the pond with residents complaining of hydrogen sulphide odour and alleged health problems due to the presence of the odour. Given this, the matter has been referred to the Public Health Medicine Specialist/ Medical Officer of Health from Ngā Tai Ora - Public Health Northland. We will update Council and continue to update residents as more information becomes available.

In the future, the Lincoln Downs Brown Road Farm irrigation system will be reduced, and the current spraying operation will be replaced with either a wetland system or subsurface irrigation. The long-term treated effluent disposal options will include both the Lincoln Downs Brown Road Farm and specific areas of the Mangawhai Golf Course.

Therefore, it is proposed to commence with the concept design of the future treated wastewater disposal and irrigation systems at the Lincoln Downs Brown Road Farm and specific areas of the Mangawhai Golf Course.

Stage 3

Stage 3 works involve upgrading the inlet works, converting the balance tank to a third CASS biological reactor unit, and installing the second inDENSE systems, including an ultra-filtration system with UV disinfection system to produce class A effluent. This stage will be delivered by Wai Tāmaki ki Te Hiku (Entity A). The upgrade will bring the capacity to 5,470 connections estimated to be sufficient to cater for growth through to 2047.

Stage 4

Stage 4 works involve designing, obtaining Resource Consent, and constructing the subsurface Irrigation system at the Lincoln Downs Brown Road Farm and specific areas of the Mangawhai Golf Course. This stage will be delivered by Wai Tāmaki ki Te Hiku (Entity A), to ensure the works are constructed prior to 2026 when the capacity of the Lincoln Downs Brown Road Farm will be reached.

Stage 5

The works involve various new pipelines, pump stations, or upgrades to cater for growth over the next 10 - 30 years.

Community Engagement

To ensure the community is informed of the project and the various stages, it is proposed to publicly release information on the project, through a media release, and a fact sheet on the Councils website.

Overview of the Consortia Team

Clint Cantrell, Director of SCO Consulting, has over 30 years of national and international experience in wastewater programmes including treatment plants and network systems. He has provided technical direction and oversight of wastewater programmes in the United States, United Kingdom, Australia, and New Zealand. In New Zealand, Clint led the concept design and consenting of Watercare's \$1.5B Central Interceptor and led the master plan for upgrading the Māngere Wastewater Treatment Plant. He has also led similar programmes in cities around the world including London (Thames Water), San Francisco, Seattle, New Orleans, Detroit, Sydney, Melbourne, Brisbane, Wellington, and Auckland.

Beca Hunterh2o is the leading specialist in Asia Pacific for wastewater treatment systems. They specialise in the design, commissioning, and operations of small to medium size treatment plants, including ones that discharge into highly sensitive environments such as the Great Barrier Reef. Their work includes plants very similar to the Mangawhai Plant and to date, they have delivered beneficial improvements to Council by enhancing how the plant performs and by identifying alternative upgrade pathways that have reduced cost and delivery risks.

Peter Gearing a specialist in treated wastewater irrigation will assist the consortia in the subsurface irrigation options at the Mangawhai Golf Course and the Lincoln Downs Brown Road Farm.

Procurement

It is proposed that the stage 1 optimisation, design, and commissioning of the inDENSE system be undertaken by the consortia, including the stage 2 concept design and consent plan for the Mangawhai Golf Course and the Lincoln Downs Brown Road Farm. The consortia following the peer review have developed the staged implementation and have experience in wastewater treatment plant optimisation and technology upgrades, therefore, there is a benefit in continuing with the consortia for the design phase. The inDENSE system will be purchased from World Water Works and shipped to Mangawhai. The installation of the inDENSE will be undertaken by Bellcon Ltd, the subcontractor that constructed the recent balance tank. To assist the General Manager, Babbage will undertake the project management activities.

The Council's procurement manual recommends where the procurement is outside the Council's Procurement Policy that the variation will need to be approved by the Chief Executive if under \$500,000 or the variation will need to be approved by Council if the amount is over \$500,000.

This approval is consistent with the procurement manual, which allows a direct appointment where:

- the required goods or services are available from only one source or only one supplier has the capability and capacity to deliver in the time required.
- continuity of advice is required.

There is limited capacity within the engineering service consultancies. Our panel of consultants are fully allocated with work, in addition, as the consortia undertook the review and identified a stage solution, and reduced the overall works by \$20M, it is proposed that a continuation of their services be provided.

Project Estimate

The high-level estimated cost for the Mangawhai Wastewater Scheme is shown in Tables 1 and 2.

Activities carried out by Kaipara District Council		
Stage 1 - Mangawhai WWTP near term capacity upgrades		
Element	Provider	Estimated Cost
Plant optimisation	Hunterh2oBeca	
Design and Commissioning	Hunterh2oBeca	
Technical review and Commissioning	SCO	
Project Management	Babbage Consultants	
inDENSE		
Purchase and shipping	World Water Works	
Installation	Bellcon Ltd	
Sub Total		\$1,095,000
Stage 2 - Concept design of the Mangawhai Golf Course and Lincoln Downs Brown Rd Farm irrigation systems		
Element	Provider	Estimated Cost
Concept design and consent plan development of the Mangawhai Golf Course and Lincoln Downs Brown Rd Farm irrigation systems	Beca, SCO and NexGen Water Ltd	
Sub Total		
Contingency (stage 1 & 2)		
Sub Total		\$610,000
Total		\$1,705,000

Table 1. Activities carried out by Kaipara District Council

Activities Wai Tāmaki ki Te Hiku (Entity A)		
Stage 3 - Mangawhai WWTP Long-term capacity upgrades plus Class A enhancement		
Element	Description	Estimated Cost
Design & implementation of Stage 2 upgrades	Design of balance tank conversion to 3rd CASS unit with inDENSE and ultrafiltration	\$21,725,000
	Construction and commissioning of Stage 2 upgrades	
Sub Total		\$21,725,000
Stage 4 - Design and construction of the Mangawhai Golf Course and Lincoln Downs Brown Rd Farm irrigation systems		
Element	Description	Estimated Cost
Consent application and consultation	Consultation, consenting and design of the Mangawhai Golf Course and Lincoln Downs Brown Rd Farm irrigation systems	
Detailed design	Detailed design of the Mangawhai Golf Course and Lincoln Downs Brown Rd Farm irrigation systems	
Implementation	Construction and commissioning of the Mangawhai Golf Course and Lincoln Downs Brown Rd Farm irrigation systems	
Sub Total		\$23,580,000
Stage 5 - Network Upgrades		
Element	Description	Estimated Cost
Various Network Upgrades	The works involve various new pipelines, pump stations or upgrades to cater for growth over the next 10 - 30 years.	
Sub Total		\$25,000,000
Total		\$ 70,305,000

Table 2. Activities Wai Tāmaki ki Te Hiku (Entity A)

Options

Option 1

Approves stages 1 and 2 proceeding with the designing and commissioning of the stage 1 works and the concept design of the stage 2 works. Approves the purchase and delivery of the inDENSE system and delegates to the Chief Executive the authority to approve the procurement plan, the professional services agreement with the consortia, and the purchase agreement with World Water Works Inc for the inDENSE system.

This is the recommended option.

Advantage: This option allows the stage 1 works to be completed by June 2024 and ensures the Plant has additional capacity to cater for the projected growth. It also allows for the concept design for stage 2. This work is important as it allows discussion to continue with the Management of the Golf Club regarding future disposal options.

Disadvantage: There is no disadvantage.

Option 2

Tender the works as a design and build of the stage 1 works and seek 3 proposals for the remaining concept design for the stage 2 works. Not the preferred option.

Advantage: There is no advantage.

Disadvantage: This option will delay the stage 1 works as tenders are sought and evaluated. Further, there would be a 6 - 8 month delay with the delivery of the inDENSE system.

Option 3

Undertake further options for analysis of the Mangawhai Wastewater Treatment Plant upgrade and the future treated wastewater disposal system.

Advantage: There is no advantage.

Disadvantage: This option will delay stage 1 by 6 - 8 months with the delivery of the inDENSE system and require Council to approve \$300,000 - \$500,000 unbudgeted Opex expenditure.

Financial implications

A sum of \$1.8m was provided in the 2021-2031 Long Term Plan and this sum was increased to \$2.3m in the 2022/23 Annual Plan. The unspent balance of \$1.96m has been carried through into the 2023/24 capital budget, approved by Council.

Risks and mitigations

There is a risk that the stage 1 works will not be completed by June 2024 if approval is not provided. Further, there is a risk with not proceeding with the stage 2 works, if the Management of the Golf Club loses interest in providing Council with the option to dispose of the treated wastewater in specific areas of the Mangawhai Golf Course. If this is the case, then Council will have limited alternative disposal options.

Significance and engagement | Hirahira me ngā whakapāpā

The decisions or matters of this report are considered to have a low degree of significance in accordance with Council's Significance and Engagement Policy. There is no benefit in undertaking public consultation on the options, as the alternative is estimated to cost an additional \$20m.

However, to ensure the community is informed of the project, it is proposed to publicly release information on the project, through a media release and a fact sheet on the Council's website. The public will also be regularly updated on progress with this work.

Therefore, no feedback is required for this decision, and the public will be informed of Council's decision via the agenda and minutes publication of this meeting, on the website, and through other channels as described above.

Next steps | E whaiake nei

Develop a procurement plan that outlines the approach discussed in this report and execute the activities following approval of the Chief Executive.

Attachments | Ngā tapiritanga

	Title
A	WSP Mangawhai Wastewater Scheme
B	Mangawhai Wastewater Scheme Report December 2022 Council Briefing
C	Mangawhai Wastewater Scheme Presentation December 2022 Council Briefing
D	Beca HunterH2o Mangawhai Peer Review and Options Report
E	Mangawhai Wastewater Scheme Report April 2023 Council Briefing
F	Mangawhai Wastewater Scheme Presentation April 2023 Council Briefing
G	Mangawhai Wastewater Scheme Report September 2023 Council Briefing
H	Mangawhai Wastewater Scheme Presentation September 2023 Council Briefing
I	Beca HunterH2o Summary Report
J	List of suppliers and the value for stages 1 and 2 provided in full in the PEX agenda