From:	Sarah Irwin
To:	Hai Nguyen; Nicki Wakefield; Selwyn and Mira Norris; Rudi Hoetjes; Erica Wade; northern.branch@forestandbird.org.nz; Stuart Savill; Johanna.Dones@northlanddhb.org.nz
Cc:	Ian Ho; Sarah Sunich; Simon Charles
Subject:	Whangarei WWTP technical working party
Date:	Tuesday, 29 September 2020 12:22:10 pm
Attachments:	image003.png image002.png

Kia ora,

Thank you everybody for coming and agreeing to being involved in the WWTP consenting process. We have also had confirmation that Shane Herare will be representing Forest and Bird – Shane do you have a direct email I could use?

Firstly my apologies - I forgot to get everyone to introduce themselves at the start of the meeting, which was a total oversite on my part.

We also have a date of the initial workshop which is tentative pending delivery of the draft long list options report from GHD later this month.

Can you please let me know your availability for the 22th or 23rd rd of October and a morning or afternoon session of approx. 3 hours?

Thurs 22nd	10am – 1 pm
Thrs 22nd	1- 4 pm
Fri 23rd	10am – 1 pm
Fri 23rd	1-4 pm

Kind regards

Sarah Irwin

Team leader – Infrastructure Planning | Infrastructure
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From:	Sarah Irwin
To:	Johanna.Dones@northlanddhb.org.nz; Rudi Hoetjes; Simon Charles; Mira Norris; Nicki Wakefield; Stuart Savill; Hai Nguyen; shanehenare@yahoo.co.nz; Erica Wade; Dave West
Cc:	Sarah Sunich; Ian Ho
Subject:	Minutes from the 1st meeting of the Whangarei Wastewater Treatment Plant technical group
Date:	Tuesday, 17 November 2020 12:35:54 PM
Attachments:	image003.png image002.png 1252891-MIN_Whangarei WWTP Long List Stakeholder Workshop 221020.pdf 12528591-MEM-Whangarei Long List Memo v3(combined).pdf

Kia ora,

Please find attached the minutes of the technical group meeting held on the 22 October 2020. Thank you for coming and participating – we found it to be extremely useful and it has helped to clarify where we need to go next.
It became clear that we need to step back somewhat and focus on the objectives and vision for what the plant can effectively achieve and then see how that can be achieved within future options.

We are also exploring whether the adaptive approach would be a way forward based on certain triggers around growth, contaminant levels and future targets as well as the cultural triggers.

We are proposing another meeting on Thursday 26 November 10-12pm or 1-3 pm for 2 hours to work through the objective and vision.
I apologise for this short notice but we are needing to keep moving on the project and the xmas break is fast approaching.

I have also attached the completed evaluation matrix so you can review the options as assessed based on our wide ranging discussion on the 22nd October. If we move towards an adaptive approach this assessment may not be as important but we still would like any feedback on our ratings.

Thank you again for your involvement we understand that everyone is busy and we appreciate that you are able to contribute to this discussion.

Sarah Irwin

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Whangarei District Council

Minutes

29 October 2020

Project	Whangarei WWTP	From	Sarah Sunich
Subject	Long List Stakeholder Workshop	Tel	
Venue/Date/Time	Whangarei WWTP / 22 October 2020 / 10am	Job No	12528591//
Copies to	All		
Attendees	Dave West and Aurelia Robertson (DOC) Nikki Wakefield (Rewarewa Block D representative) Mira Norris (Te Parawhau –Resource Management Advisor) Jo (Johanna) Dones (NDHB) Rudi Hoetjes (F&G Regional Manager) Simon Charles, Andy Keith, Sarah Irwin & Hai Nguyen (WDC) Sarah Sunich & Ian Ho (GHD)	Apologies	Erica Wade (DOC) NRC Forest & Bird

1 General

1.1	Is WDC doing any monitoring on the offload sites at the time of discharge to illustrate the level of treatment being achieved? – suggestion made to implement a programme of monitoring.	WDC regularly tests 3 discharge points from the wetlands as well as the point of discharge to the wetlands. This data will be reviewed as part of the analysis for the Wastewater Network Consent.
1.2	Rewarewa D block – Papakianga development indicated on a map by Nikki to the SW of the WWTP. Adjacent to the forestry block to the west of the WWTP site.	
1.3	Group would like to see Information on the different levels of treatment quality achieved through the plant – supported by quality data.	WDC to provide for next meeting
1.4	Request by the group for better understanding of what areas might contribute to the potential satellite schemes. At this stage of the project this is very high level evaluation and is more about the idea of taking a portion of flow from the current plant to ensure existing contaminant loads at the main plant to be maintained (or enhanced). More detailed engagement with other mana whenua groups would be required if this option were to be taken further.	To be provided if these options are to be taken forward.

Minutes		Action
1.5	Giving effect to cultural values – this is to be addressed through the development of a Cultural Values Assessment – further discussion is needed on who/how this would be prepared. Noted that the Limeburner Creek areas and the wider Whangarei Harbour has historically been a major food basket and tangata whenua have never been compensated for this lost. Civic Center CIA – Sarah Irwin to see how that is working. Have a wider hui to enable wider engagement to then find out who might be keen to be involved in the CIA.	WDC – Date of a Hui to be determined with WDC Maori Relationship advisors. Consultation plan has an initial hui after the next working party meeting.
1.6	WDC to provide a list of the water quality attributes that are being focused on for the effect's assessment – namely the Proposed Regional Plan Water Quality Standards –(see Table 22, Hatea River water quality standards in appealed version of the plan found at: https://www.nrc.govt.nz/media/4i2jloyu/proposed-regional-plan-appeals-version-august-2020.pdf .	
1.7	Emerging contaminants raised as a concern. NRC have carried out some harbour studies (David Lindsey), also consider the national emerging contaminants group (i.e. Grant Northcote) for more information.	WDC to address as part of AEE
1.8	Carter Holt Harvey site for sale - Lot 2 DP 208563 (54 ha) adjacent and north of the site, as well as the fertilizer site Part Lot 1 DP 50814 (10 ha) located adjacent to the Carter Holt Harvey Site.	
1.9	Biowaste composting – other options for disposal.	
1.10	Nikki would like to work with Sarah Irwin to prepare some words around the options work done today to go to the other hapu that may have interest, particularly around those options that could have an effect on those other hapu (e.g. satellite plant scenarios).	SI/NW
2	**Scoring options**	
2.1	35-year consent – Mira indicated she felt this was too long. Consideration of cultural triggers, engagement triggers, and review clauses in the consent – taking a more adaptive management approach could this been a solution?	

Minutes		Action
2.2	Costings for options requested from F&G to assist in making decisions. Ian Ho presented some very high-level ball park figures for each of the options, more detailed costings to be provided for the shorter-list options.	
2.3	Water scarcity – was an issue last year –strong support for further consideration of reuse / recycling.	
2.4	Mixed model options consideration.	
2.5	Source control initiatives needing greater consideration - suggested by Dave.	
2.6	Lower harbour discharges a no go.	
2.7	Deep bore injection a no go due to cost and uncertainties and level of treatment needed perhaps unnecessary.	
2.8	Soils at Whangarei Heads perhaps more conducive to higher rate irrigation (sandy soils).	
2.9	Group considers the plant is not located in a good part of the harbour for mixing in the harbour.	
2.10	WDC have looked at climate change/sea level rise at a high level and effects on plant – the wetlands are unlikely to be compromised at their current bund height within the 100 years of predicted coastal inundation. 	

Minutes		Action
2.11	General concerns that the water quality standards aren't being improved enough, although not wanting to speak on behalf of all, Nikki less concerned about where the discharge goes but more about the quality being proposed.	Noted. The standards to be met will be considered in the AEE.
2.12	Aspire that the waterways are swimmable (Rody).	
2.13	Mira, Nikki and Jo on the water harbour catchment group – where aspirational values are being promoted and they would like to see similar here. Take a longer view – 50 years for the plant rather than limiting to 35 years, prepare aspirational values for wastewater.	Noted.
2.14	Need more information on the performance standards for the different options.	
3	**Next steps**	
3.1	Due to time constraints with the workshop – WDC / GHD to prepare some scoring of the options to circulate for consideration by the wider group.	
3.2	Circulate to all parties for their input, may be a need for a further meeting/workshop to go through the results – could be online or another workshop.	

Sarah Sunich

Memorandum

10th November 2020

To	Whangarei District Council (Hai Nguyen, Sarah Irwin and Simon Charles)		
Copy to			
From	Ian Ho & Danielle Maynard	Tel	
Reviewed	Sarah Sunich and Anthony Kirk		
Subject	Long List Options - Summary Report	Job no.	12528591

Issue	Date	Description
1	25/09/2020	*Draft memo – High level summary only, pre-WDC Long List Discussion*
2	19/10/2020	*Draft memo – High level summary only, post-WDC initial Long List Discussion*
3	10/11/2020	*Final Draft Memo – Post Long List Workshop 29th Oct, including draft evaluation summary*

1 Summary

This memo summarises the long list options considered for the Whangarei WWTP best practicable option (BPO) assessment. For details refer to Table 1 overleaf and powerpoint prepared by GHD to inform the Long List Stakeholder Workshop (refer to Appendix 1).

The long list options evaluation considers the following criteria:

- **Investment objectives:**
  - Consentability - WDC desires to obtain a consent term of 25 to 35 years to provide greater certainty of investment
  - Enhanced environmental and public health outcomes – maintain environmental and health values of Limeburners Creek and the upper harbour.
  - Community affordability – willingness to pay via rates, plus the intention to lift investment levels through the water reform programme.
  - Operation robustness, reliability and efficiency – Annual operating costs, minimising failures, potential for remote operation, standardised design etc.
- **Environmental, Social and Cultural Factors:**
  - Impact on Limeburners Creek and upper harbour water quality.
  - Impact on groundwater (applicable to land-based discharge options).
  - Impact on adjacent land use options – e.g. potential spray drift (applicable to land-based discharge options), potential for odour impacts, potential for amenity impacts.
  - Cultural and community acceptability.

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- **Critical Success Factors:**
  - Consenting Pathway – issues or impacts that would make consenting difficult or likely to result in conflicts with iwi or the community.
  - Constructability – ability to implement.
  - Long term flexibility – adaptation to changes in growth assumptions or regional facility, ability to stage.
  - Risk Factors – to be identified, could include things like ownership of land used for land-based discharges, climate change etc.

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Memorandum

Table 1 Whangarei Long List Options High Level Option Technical Attributes

	Option 1 Existing Discharge – Plant Expansion	Option 2 Existing Discharge – Process Intensification	Option 3 Existing Site and a Satellite Plant at Nth Whangarei	Option 4 Existing Site and a Satellite Plant at Whangarei Heads	Option 5 Ocean Discharge and relocate Whangarei WWTP	Option 6 Ocean Discharge and Whangarei WWTP pump to ocean	Option 7 Land-based discharge (dry weather) with Existing WWTP site	Option 8 Supplemented with Reuse	Option 9 Deep Bore Injection / Existing WWTP Site	Option 10 Lower Harbour Discharge from Existing WWTP Site
Wastewater Treatment	Additional capacity of Peak Flow treatment, Primary clarifiers and second AS basin, filter/UV system Possible additional digester	Additional PFT, Primary clarifers, filter/UV system Possible additional digester Convert AS Basin via MBR or MABR retrofit	New NW WWTP (e.g SBR system), built over the next 10 years Upgrade current Whangarei WWTP like Option 1, with smaller flow increase Centralised biosolids management	New WH WWTP (e.g SBR system) Upgrade current Whangarei WWTP like Option 1, with smaller flow increase. Centralised biosolids management	**Relocate WWTP** to Whangarei Head**,** comprising new primary, secondary and tertiary treatment with new biosolids facilities.	Upgrade current Whangarei WWTP like Option 1, except tertiary filtration may not be required.	Upgrade current Whangarei WWTP like Option 1	Upgrade current Whangarei WWTP as Option 1 or 2 Additional treatment step to suit reuse requirements.	Capacity upgrade at Whangarei WWTP, followed by Advanced WTP (e.g. MF/RO)	Upgrade current Whangarei WWTP like Option 1
Effluent Discharge	To Limeburners Creek via existing wetlands	To Limeburners creek via existing wetlands	NW WWTP treated effluent to land-based discharge (~222ha) with a large storage pond. Whangarei WWTP continue to Limeburners Creek via wetlands.	WH treated effluent to low harbour outfall (2.1 ML/d in 2056) Whangarei WWTP continue to Limeburners Creek via wetlands.	New ocean outfall (100% flow)	New rising main 33km for 100% flow to WH New ocean outfall	New land based discharge (100% ADF), 760ha Wet weather flow discharged to Limeburner Creek via existing wetlands	Continue with wetlands and Limeburners Creek Investigate reuse opportunities including landscape/recreation space reuse, forest or land-based discharge and industrial reuse.	Deep bore injection (100% treated effluent)	New rising main 30km for 100% flow to WH New lower harbour outfall
Key features	Extend reticulation network Plant upgrades/additions – centralised treatment at Whangarei WWTP (ADF: 27ML/d)	Extend reticulation network Plant upgrades/additions – centralised treatment at Whangarei Can be designed to achieve higher N&P removal	New North Whangarei satellite plant (ADF: 8ML/d) Plant upgrades/additions to Whangarei WWTP Changes to reticulation around northern suburbs	New Whangarei Heads satellite plant (ADF: 2.1ML/d) Plant upgrades/additions to Whangarei WWTP Changes to reticulation around Whangarei head	Relocation of entire WWTP to Whangarei Heads Major reticulation network changes All effluent discharges to ocean	Extend reticulation network Less stringent N and P removal than wetland/land discharge Long rising main to WH and ocean outfall	Extend reticulation network Plant upgrades/additions, more stringent limits All effluent discharge to land (ADF only), only wet weather flow to Limeburner Creek	Extend reticulation network Plant upgrades/additions The percentage of effluent reuse may increase with time as appropriate opportunities are being identified.	Extend reticulation network Plant upgrades/additions Additional treatment potentially include indirect potable reuse standards from overseas	Extend reticulation network Less stringent N and P removal than wetland/land discharge
Effect on Limeburner Creek	Possible, requires investigation	Possible, requires investigation	Slightly lower than Option 1 due to less future discharge volume	Possible, requires investigation	No risk – no discharge to creek	No risk – no discharge to creek	Lower risk – discharge to creek only in wet weather	Possible, requires investigation	No risk – no discharge to creek	No risk – no discharge to creek
Impact on groundwater	Negligible (wetland discharge)	Negligible (wetland discharge)	Possible, requires investigation	Negligible (lower harbour discharge)	Negligible (ocean discharge)	Negligible (ocean discharge)	Possible, requires investigation, for 700+ha	Possible, requires investigation	Probable, requires significant investigation	Negligible (lower harbour discharge)
NRC Planning Rule/Risks	Discretionary activity (PNRP), existing activity recently went through a rigorous consent variation.	Discretionary activity (PNRP), existing activity recently went through a rigorous consent variation.	Discretionary activity and likely designation process. Meets intent of plan promoting land discharge.	Discretionary activity and likely designation process. Complexities around water discharge	Discretionary activity and likely designation process. Complexities around relocation of water discharge.	Discretionary activity. Complexities around relocation of water discharge.	Discretionary activity and likely designation process. Meets intent of plan promoting land discharge.	Discretionary activity and likely designation process. Meets intent of plan promoting land discharge.	Discretionary activity. Complexities associated with unknowns with this option.	Discretionary activity. Complexities in relation to water discharge and loss of mixing zone classification.
Relative CapEx	High	High to Very High	Very High	Very High	Extremely High	Extremely High	Very High	High	Extremely high	Extremely high
Stageability	Some stage-ability	Better stage-ability	Some stage-ability	Little stage-ability	Poor	Poor	Little stage-ability	Yes stage-ability	Poor	Poor
Risks/ Unknowns	Available space on site Wetland treatment efficacy (continual monitoring)	Available space on site Wetland treatment efficacy (continual monitoring)	Location of satellite WWTP and irrigation site	Location of satellite WWTP Only small flow reduction to Whangarei	Major changes to reticulation network, likely odour and septicity issues.	Construction and high cost of rising main and ocean outfall	Cost, location and availability of land for discharge Adjacent land use	Cost, location and availability of effluent reuse opportunities	No NZ standards for groundwater recharge applications, nor any existing references. Significant risks	Construction of rising main of treated effluent and acceptability of lower harbour discharge

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	Option 1 Existing Discharge – Plant Expansion	Option 2 Existing Discharge – Process Intensification	Option 3 Existing Site and a Satellite Plant at Nth Whangarei	Option 4 Existing Site and a Satellite Plant at Whangarei Heads	Option 5 Ocean Discharge and relocate Whangarei WWTP	Option 6 Ocean Discharge and Whangarei WWTP pump to ocean	Option 7 Land-based discharge (dry weather) with Existing WWTP site	Option 8 Supplemented with Reuse	Option 9 Deep Bore Injection / Existing WWTP Site	Option 10 Lower Harbour Discharge from Existing WWTP Site
	Potential future NES may stipulate further upgrades and pushes into Option 2		Network reticulation changes, odour and septicity issue	WWTP, increase operation complexity	New location for WWTP, and sludge trucks between WH and landfill		Increase operation complexity	Additional operation complexity	Significant increase in operation complexity	

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2 Long List Options

This section presents a high level description of the long list options and common assumptions made during this assessment. Further information for each option is also provided in the supporting Stakeholder Long-List Options workshop powerpoint presentation (refer to Appendix 1).

2.1 Common Assumptions

2.1.1 Population Growth

The current WDC population connected to the Whangarei WWTP is 65,000. The WDC population forecast predicts from 2018 up to 2051, however, to allow for a 35 year consent, we have linearly extrapolated the population forecast to 2056. This provides an estimated population of 95,000 EP in 2056 for the current Whangarei WWTP catchment (~46% growth predicted).

We have considered two satellite plant options in the long list, North Whangarei and Whangeri Heads.

The potential satellite plant for North Whangarei (including the entirety of: Hikurangi-Springs Flat, Kamo East, Three Mile Bush, Tikipunga North) is then predicted to have a population of 27,900 EP in 2056, thus catering for a large percentage of the growth predicted.

The potential satellite plant for Whangarei Heads (including the entirety of: Parua Bay, Patua – Whareroa – Bream Head) is then predicted to have a population of 7,600 EP in 2056, thus catering for a small percentage of the growth predicted.

2.1.2 Inflow and Infiltration (I&I) Reduction

For the purposes of the long list and short list options comparison, future flows are based on linear extrapolation of existing flows with population growth, as network modelling is still underway with a draft report detailing the outcome of the network modelling expected at the end of November 2020.

Flow estimates will be revised to incorporate the latest network modelling results and I&I data, for use in the shortlisted options evaluation or concept design. This is likely to affect the peak flow treatment requirements.

2.1.3 Current and Future Wastewater Flows

From the population growth and I&I reduction assumptions described above, Tables 2, 3, and 4 below present the estimated current and future wastewater flows for Whangarei WWTP and the two possible satellite plants. Whangarei WWTP flows also include trucked waste, carrying across the current percentage of 0.8% increase in plant inflow.

For the satellite plants mentioned below, the following areas were included in the population estimations as advised by WDC (email, 17/09/2020):

- North Whangarei: Hikurangi – Springs Flat, Kamo East, Three Mile Bush, Tikipunga North
- Whangarei Heads: Parua Bay, Patua – Whareroa – Bream Head

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Table 2 Current and Future Wastewater Flows – Whangarei WWTP

	2020/Current	2051	2056
Population	65,000	91,000	95,000
Average Daily Flow (m^3/day)	18,491	25,908	27,025
Maximum Daily Flow (m^3/day)	99,703*	139,584	145,720
% Average Daily Wastewater Flow Increase	N/A	40%	46%

** We have not included the recent 1 in 500 year storm event, resulting in excess of 140ML/d. This was significantly higher than the next higher flow event of 100 ML/d.*

Table 3 Current and Future Wastewater Flows – North Whangarei (Satellite Plant) and Whangarei WWTP Split

	2020/Current	2051	2056
Population connected to **North Whangarei WWTP**	16,327	26,211	27,889
Average Daily Flow (m^3/day)	4,645	7,456	7,934
Maximum Daily Flow (m^3/day)	25,044	40,205	42,779
% WW flow Increase	N/A	61%	71%
Population connected to **Whangarei WWTP**	48,673	64,789	67,111
Average Daily Flow (m^3/day)	13,846	18,452	19,091
Maximum Daily Flow (m^3/day)	74,659	99,379	102,941
% Average Daily WW flow Increase	N/A	33%	38%

Table 4 Current and Future Wastewater Flows – Whangarei Heads (Satellite Plant) and Whangarei WWTP Split

	2020/Current	2051	2056
Population connected to **Whangarei Heads WWTP**	5,531	7,328	7,606
Average Daily Flow (m^3/day)	1,573	2,085	2,164
Maximum Daily Flow (m^3/day)	8,484	11,240	11,667

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	2020/Current	2051	2056
% Average Daily WW flow Increase	N/A	33%	38%
Population connected to **Whangarei WWTP**	59,469	83,672	87,394
Average Daily Flow (m^3/day)	16,918	23,823	24,861
Maximum Daily Flow (m^3/day)	91,219	128,344	134,053
% Average Daily WW flow Increase	N/A	41%	47%

2.1.4 Estimation of Future Discharge Quality for Limeburner Creek

For the purpose of this long list options comparison, the current nitrogen (TN) and phosphorus (TP) mass loads in the plant effluent have been estimated using the limited number of TN and TP samples taken from the wetland influent sampling point, and correlating flows measured through the normal flow UV system. The mass loads were then used to estimate future discharge quality based on the assumption of maintaining the mass loads at the plant outlet.

It is recommended these treated effluent nitrogen and phosphorus concentrations and loading are reviewed following implementation of the updated sampling programme (commenced mid-October) to provide a more comprehensive and up-to-date benchmark of current plant effluent loads. A review of these plant loads will be undertaken as part of the concept design/master plan, around January 2021.

WDC to note that the nitrogen and phosphorus mass loads are critical assumptions for establishing the future discharge quality requirements. Therefore, figures are to be reviewed after more sampling data is collected.

Current Nitrogen Loads at WWTP Outlet

The data ranges from January 2018 (first available UV flow measurements) to October 2019 (last available TN measurements), with 12 data points in total.

- Current treated effluent (pre-wetland) TN concentration – 28.3 mg/L.
- Current TN load (based on ADF of 18,098 m^3/day through normal flow UV during TN sampling periods) – 573.8 kg/day

Current Phosphorus Loads at WWTP Outlet

The data ranges from January 2018 (first available UV flow measurements) to July 2018 (last available TP measurements), with 4 data points in total.

- Current treated effluent (pre-wetland) TP concentration – 3.3 mg/L
- Current TP load (based on ADF of 17,452 m^3/day through normal flow UV during TP sampling periods) – 51.3 kg/day

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Anticipated Treated Effluent Quality for Discharge to Limeburners Creek

For estimating the treated effluent quality required for discharge to Limeburners Creek, it is assumed that the current mass loads for TN and TP are maintained.

Table 5 Anticipated Treated Effluent Quality for Discharge to Limeburners Creek

	2020/Current	2051	2056
Average Daily Flow (m^3/day)	18,491	25,908	27,025
Average TN Concentration (mg/L)	31.0	22.1	21.2
Average TN Mass Load (kg/day)	574	574	574
Average TP Concentration (mg/L)	2.8	2.0	1.9
Average TP Mass Load (kg/day)	51	51	51

The long-listed plant upgrade options are intended to achieve the median TN and TP of 20 and 2 mg/L respectively.

WDC to note that future National Environmental Standards may stipulate a higher quality of plant discharge requirement, for example, the median nitrogen and phosphorus concentration limits could be 5 mgN/L and 1 mgP/L respectively based on indications given in recent reporting by the Department of Internal Affairs. This will be accounted for in the master planning stage for future treatment system expansion, for example Option 2 can be designed to achieve more stringent nitrogen limits than Option 1.

2.1.5 Irrigation Area Required for Land Based Discharge Options

For estimating the land area and the treated effluent nitrogen concentrations required for application to land, a weekly loading of 25 mm/week and a nitrogen loading rate of 150 kgN/ha/year were assumed initially. The estimated ADF for 2056 was also used, for Option 7.

For Option 3, North Whangarei Satellite Plant, there is also the assumption that wet weather flow will be stored on site.

Example land based discharge calculations for the current (2020) ADF, with full discharge to land, all year round:

$$ADF\ (2020) = 18{,}491\ \frac{m^3}{day} = 18{,}491{,}000\ \frac{L}{day}$$

$$Areal\ loading\ rate\ = 25\ \frac{mm}{week}\ = 0.0036 \frac{m}{day}$$

$$Land\ required\ = \frac{18491}{0.0036}\ = 5177480\ m^2\ = 517.7\ ha$$

$$N\ loading\ rate\ = 150\ \frac{kgN}{ha\ \times year}$$

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$$N\ loading\ rate\ =\ 150\ \frac{kgN}{ha\ \times year} \times 517.7\ ha\ = 77662.2\ \frac{kgN}{year} = 212.77\ \frac{kgN}{day}$$

$$Required\ N\ concentration\ in\ effluent\ =\ \frac{212.77}{18491000} \times 1000000\ \frac{mg}{kg} = 11.51\ \frac{mgN}{L}$$

As seen from this calculation, the plant upgrade for the land-based discharge options will have to achieve a median TN of 11.5 mg/L.

The acceptable phosphorus loading on land will be specific to the type of soil of the irrigation site, hence we recommend a detailed desktop review will be carried out if any of the land-based discharge options are carried forward.

Table 6 Anticipated Treated Effluent Quality for Option 7 Land Based Irrigation – All Year Round

	2020/Current	2051	2056
Average Daily Flow (m^3/day)	18,491	25,908	27,025
Area (ha)	518	725	757
Average TN Concentration (mg/L)	11.5	11.5	11.5
Average TN Mass Load (kg/ha/year)	150	150	150
Average TP Concentration (mg/L)	TBC	TBC	TBC
Average TP Mass Load (kg/ha/year)	*Require soil characteristic data*		

Potentially High Hydraulic Application Rate for Summer-only Irrigation

The hydraulic application rate can potentially be noticeably higher if aiming for a summer-only irrigation scenario. For instance, the example calculation is based on 50 mm/week potentially for future reuse, e.g. Option 8. Nevertheless, this higher hydraulic application rate will need to be verified to avoid exceeding the soil hydraulic and nutrient capacity if carried into the shortlisted option phase.

Example land based summer discharge calculations for a nominal 100 ha irrigation area in 2056:

$$ADF\ (2026) = 27{,}025\ \frac{m^3}{day} = 27{,}025{,}000\ \frac{L}{day}$$

$$Areal\ loading\ rate\ = 50\ \frac{mm}{week}\ = 0.07 \frac{m}{day}$$

$$50ha\ of\ land\ Land\ can\ treat\ =\ 1{,}000{,}000\ m^2 \times 0.07\ \frac{m}{day}\ = 7{,}000\ m3/day$$

$$Flow\ \%\ to\ land = \frac{7{,}000}{27{,}025}\ = 26\%$$

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During the winter months, the hydraulic application rate would drop to a similar level as described in the all-year-round irrigation scenario (Option 7).

2.2 Long List Options Description

Refer to Workshop PowerPoint presentation for Long List Options Description, in Appendix 1.

3 Long List Options Workshop (22nd October)

A Long List Stakeholder Workshop was held on 22nd October 2020 at the Whangarei WWTP, with the intention of explaining the background of the existing plant (including population growth, flow increase, receiving environment), leading into a discussion of the long list options and an Multi-Criteria Assessment (MCA) scoring applying weighted criteria discussed in Section 1 above.

Attendees included representatives from the Department of Conservation (DOC), Northland District Health Board (NDHB), local Iwi, Northland Fish and Game (F&G), WDC, and GHD, with apologies from Northland Regional Council (NRC) and Forest and Bird.

During the workshop, Option 8 was modified to include more reuse opportunities, including parks/gardens, industrial, and plantation applications in addition to wetland discharge (as opposed to the original suggestion of 100 ha land-treatment).

The participants agreed to streamline the shortlisting process with a critical flaw analysis based on feedback from the stakeholders. The unsuitable options were then removed, and have been summarised in Table 7.

Key points raised in the workshop by stakeholders include:

- General concerns over water quality standards not being improved enough – less concern over discharge location, more concern around water quality
- Need to see more longer view e.g. 50 years of the treatment plant rather than limited to the consent length of 35 years, and consider aspiration values for wastewater.
- Carter Holt Harvey site adjacent and north of the site may be available for sale.
- Monitoring of the effectiveness of the offload sites
- a Cultural Values Assessment
- Consideration given to what other iwi groups may need consulting within the event one of the satellite schemes and/or alternative discharge locations are pursued.
- Mixed Model options consideration
- .Aspirational goal for enhanced water quality in receiving environment and greater clarity sought on how each option can address this goal. A longer term view to be taken (100 years) with regard to options on the table, although concern raised over 35-year consent term and stakeholder involvement through a more adaptive management approach.
- Strong support for reuse and recycling, especially in light of water scarcity/drought last year.

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- Greater focus given to source control (water use efficiencies) and network I/I reduction to reduce flows to the plant.

Following the workshop, a discussion amongst the project team highlighted the following matters that require further work:

- Clarification on what each option can deliver in terms of discharge quality and thus load reduction to achieve/maintain the Proposed Northland Regional Plan (PNRP) water quality standards in the Hatea River and/or achieve a net improvement (enhancement).
- Clarification of the difference in costs between upgrading the plant (option 1) versus a complete change in process (option 2) to address the potentially more stringent NES limits (yet to be defined).
- Further exploration of solids waste/biosolids management required as the wastewater treatment plants are gradually being viewed as a resource recovery facility (e.g. producing reclaimed water from the treatment process, energy from biosolids and organic food waste and soil conditioner from digested biosolids).
- Confirmation on whether further odour sampling is necessary to support the consent application (it is noted Green Fingers Garden Waste company has raised a recent odour complaint).

Both the Workshop PowerPoint presentation and the minutes are included as Appendix 1.

4 Option Evaluation

The below table shows the long list options, with their scoring and reasoning as to why several options were ultimately excluded from being scored. For more detail, refer to the MCA evaluation sheet in Appendix 2.

Table 7 MCA scoring and option evaluation

No.	Option title	MCA scoring	Carry forward?
1	Existing Discharge - Plant Expansion	2	Yes
2	Existing Discharge - Process Intensification	1	Yes
3	Existing Discharge plus a Satellite Plant (Nth Whangarei)	-	No, considered difficulty to complete the necessary investigations within the pre-consent timeframe. Could be investigated as part of future consent review and may not be limited to North Whangarei.
4	Existing Discharge plus a Satellite Plant (Whangarei Head)	-	No, fatal flaw – caters for small flow only and increased complexity.

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No.	Option title	MCA scoring	Carry forward?
5	Ocean Discharge - Relocate Whangarei WWTP	-	No, significant hurdles associated with consent and construction of pipeline and outfall.
6	Ocean Discharge - Existing WWTP and pump to ocean	-	No, significant hurdles associated with consent and construction of pipeline and outfall although could be investigated as part of future consent review in line with Ruakaka WWTP upgrades.
7	Land-based Discharge (dry weather) - Existing WWTP site	-	No - fatal flaw around land availability and land costs but could be investigated as part of future consent review.
8	Existing Discharge supplemented with reuse and/or partial summer land-based discharge regime.	3	Yes
9	Deep Bore Injection - Existing WWTP site	-	No - fatal flaw around aquifer impact, aquifer recharge necessity, cost, and consent uncertainty.
10	Lower harbour discharge - Existing WWTP	-	No - fatal flaw around no/lack of support from Tangata whenua.

5 Next Steps

As agreed with WDC at a teleconference held on 3rd November 2020, GHD will continue the BPO assessment via an Adaptive Pathways Planning approach ("Adaptive Pathways"). An Adaptive Pathways approach will enable WDC to frequently review upgrade options for the Whangarei WWTP through consideration of a number of key drivers such as:

- Plant asset capacity limitations.
- Plant asset age and condition.
- Legislative changes such as new NES standards.
- Community aspirations and/or climate change necessity fornon-potable reuse opportunities.
- Other climate change factors (sea level rise / flooding).
- Flexibility to continue exploration of satellite scheme/ocean outfall/land application options.
- Regional solids waste and biosolids management strategy

An Adaptive Pathways approach provides greater flexibility and long-term view to optioneering infrastructure solutions in a rapidly changing environment and minimises Councils risk to locking into options that could become redundant in years to come. The first step of this approach would involve

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a follow-up stakeholder workshop in November, to identify and agree the key drivers for the WWTP master plan consideration. This will be followed with an options assessment and determination of trigger points for various plant improvements.

Appendices

Appendix 1 – Long List Options Powerpoint for Workshop

Appendix 2 – Long List Options MCA Evaluation Sheet

6 Limitations

This report: has been prepared by GHD for Whangarei District Council and may only be used and relied on by Whangarei District Council for the purpose agreed between GHD and the Whangarei District Council as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Whangarei District Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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Whāngarei WWTP – Long List Options Workshop

22nd October 2020, 10:00am – 1:00pm
Whāngarei WWTP

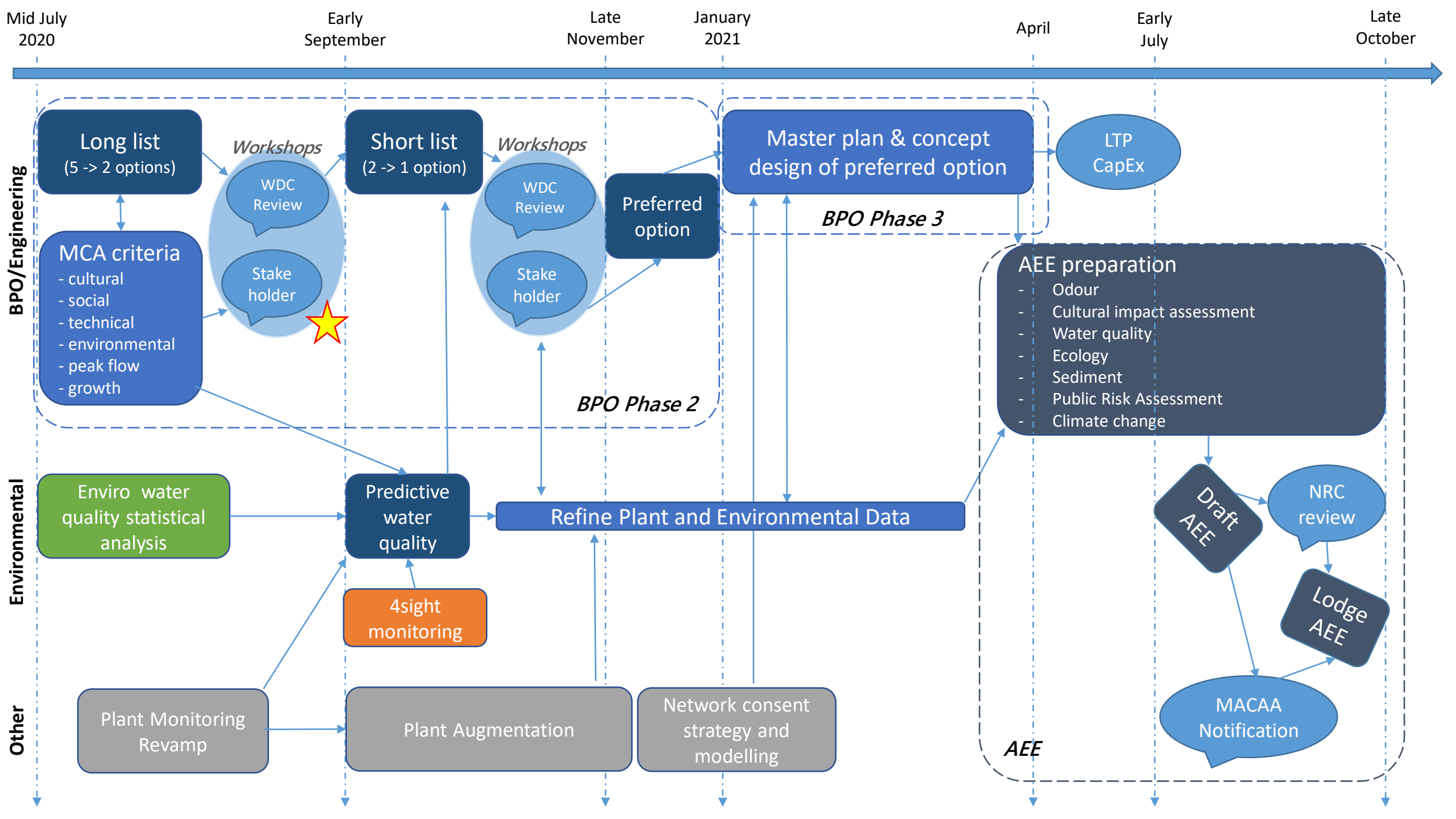
Agenda

10.00 am	Welcome and introductions
10.10 am	Programme
10.20 am	Background – existing plant, population growth, flow increase
10.45 am	Long list options
11.15 pm	Break
11.30 pm	Discussion of assessment of long list options
12.45 pm	Next steps
1.00 pm	Close

Welcome and Introductions

Purpose and Desired Outcome of workshop

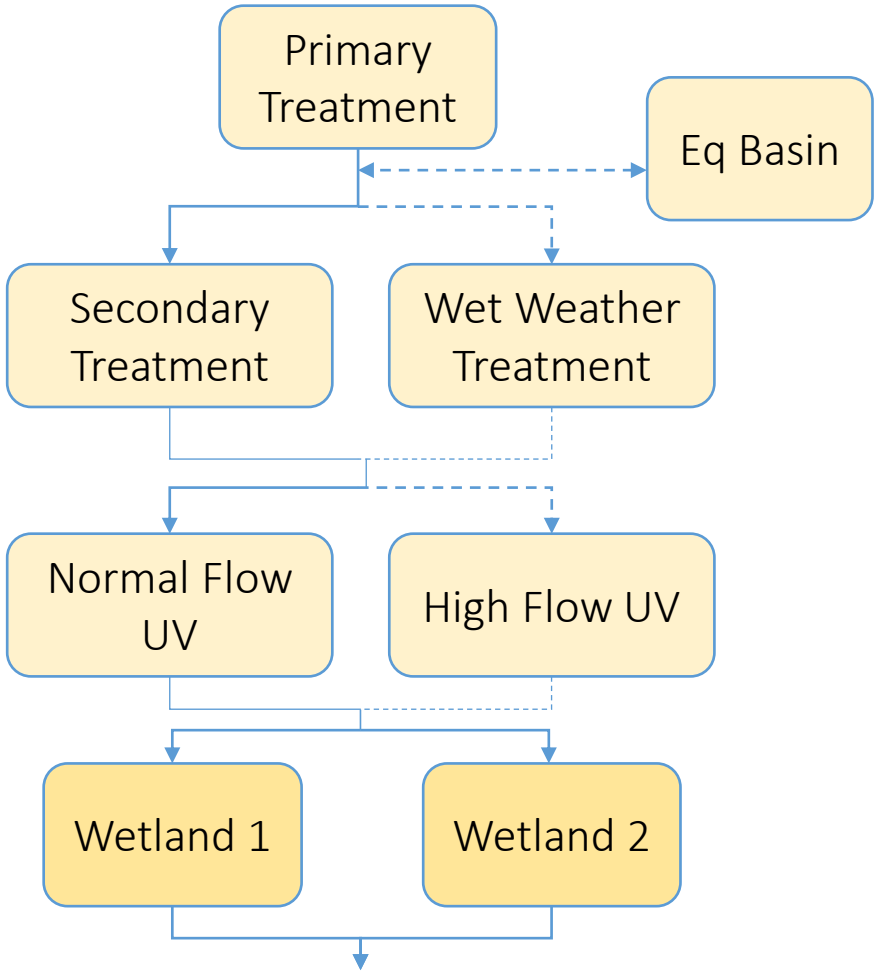
Programme to Consent Lodgement (July 2020)


Mid July 2020
Early September
Late November
January 2021
April
Early July
Late October
BPO/Engineering
Environmental
Other
Long list
(5 -> 2 options)
MCA criteria
- cultural
- social
- technical
- environmental
- peak flow
- growth
Workshops
WDC Review
Stake holder
Short list
(2 -> 1 option)
Workshops
WDC Review
Stake holder
Preferred option
BPO Phase 2
Master plan & concept design of preferred option
BPO Phase 3
LTP CapEx
AEE preparation
- Odour
- Cultural impact assessment
- Water quality
- Ecology
- Sediment
- Public Risk Assessment
- Climate change
Draft AEE
NRC review
Lodge AEE
MACAA Notification
AEE
Enviro water quality statistical analysis
Predictive water quality
4sight monitoring
Refine Plant and Environmental Data
Plant Monitoring Revamp
Plant Augmentation
Network consent strategy and modelling

Existing Treatment Plant, Growth Forecast and Receiving Environment


Whangarei i-SITE Visitor Information Centre
Anzac Rd
Morningside Rd
Anzac Park
High St
PORT WHANGAREI
PlaceMakers Whangarei
Habitat for Humanity (Northland)
Kioreroa Rd
The PBT Group - Whangarei
Renovation Warehouse
SPCA Whangarei Centre
Alter-Natives Nursery & Landscaping
South End Ave
Wrack Auto Electrical
Re:Sort
Gundigger Pl
Rewa Rewa Rd
Toll New Zealand
Keith Andrews Trucks Whangarei
New Zealand Couriers
Bidfood
Northland Parts Warehouse

Existing plant

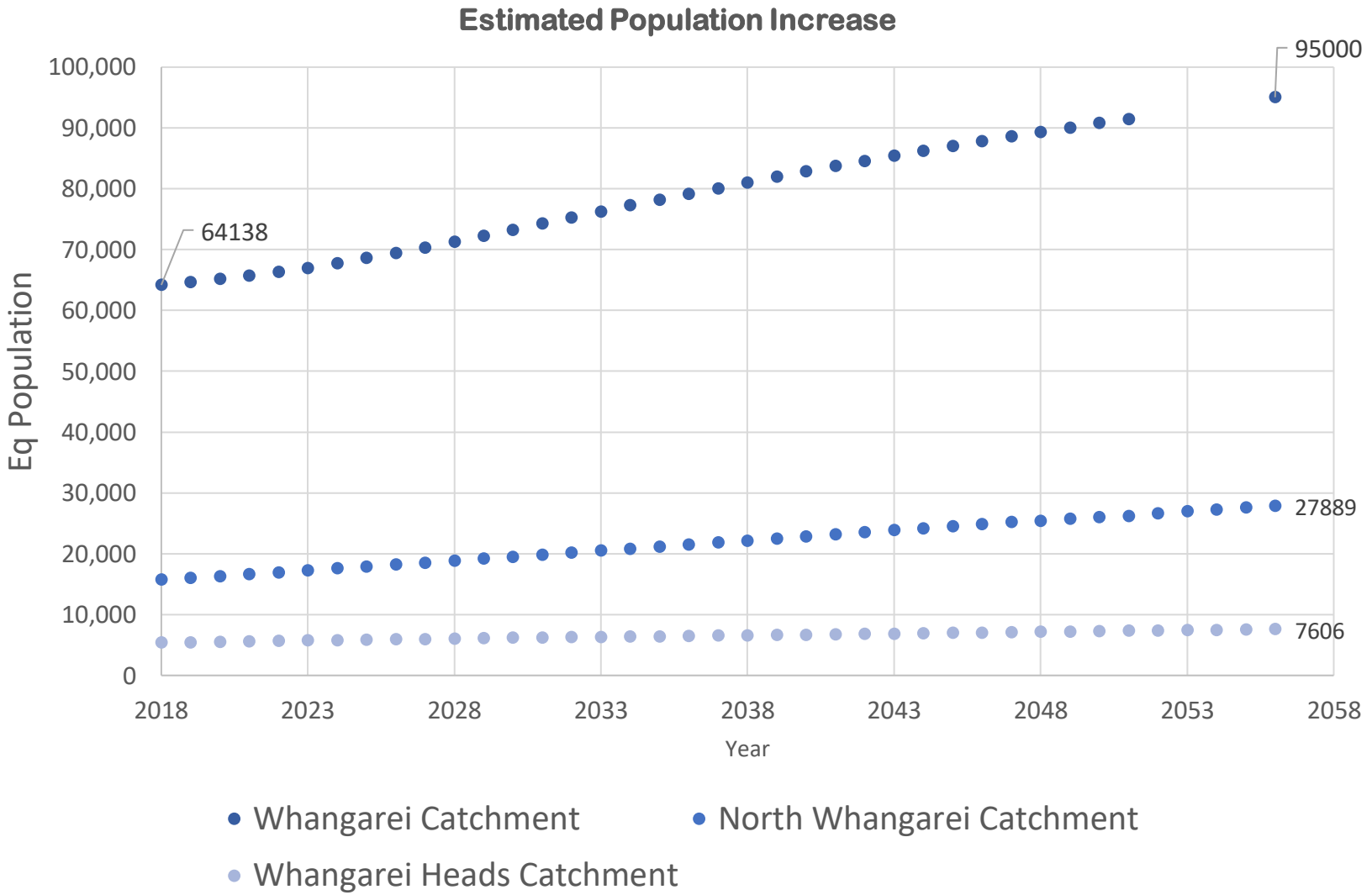


Predicted population growth

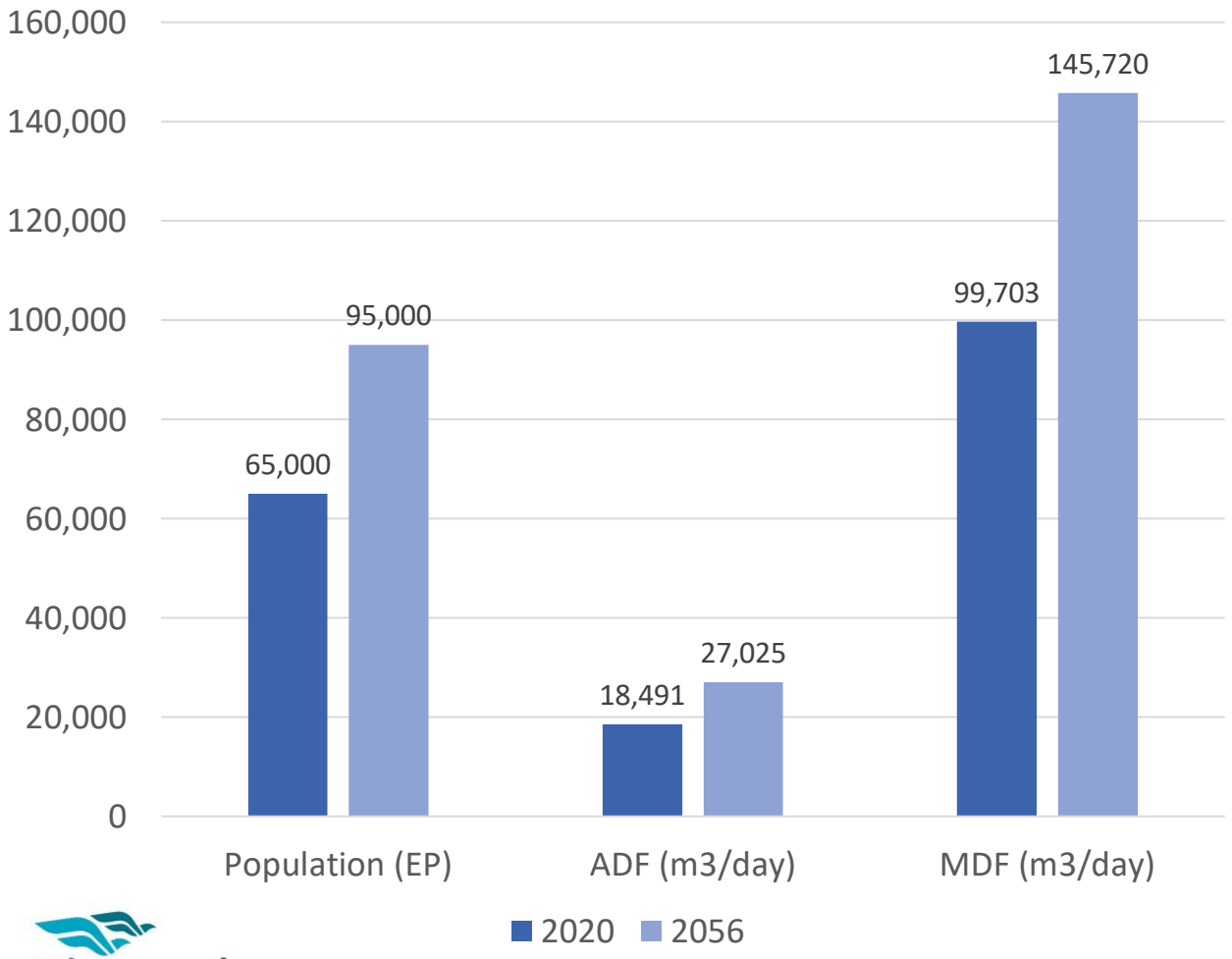
WDC seeks 35 years resource consent, extrapolating population forecast between 2018 and 2051, to 2056

Potential satellite schemes:

- North Whangarei
- Whangarei Heads



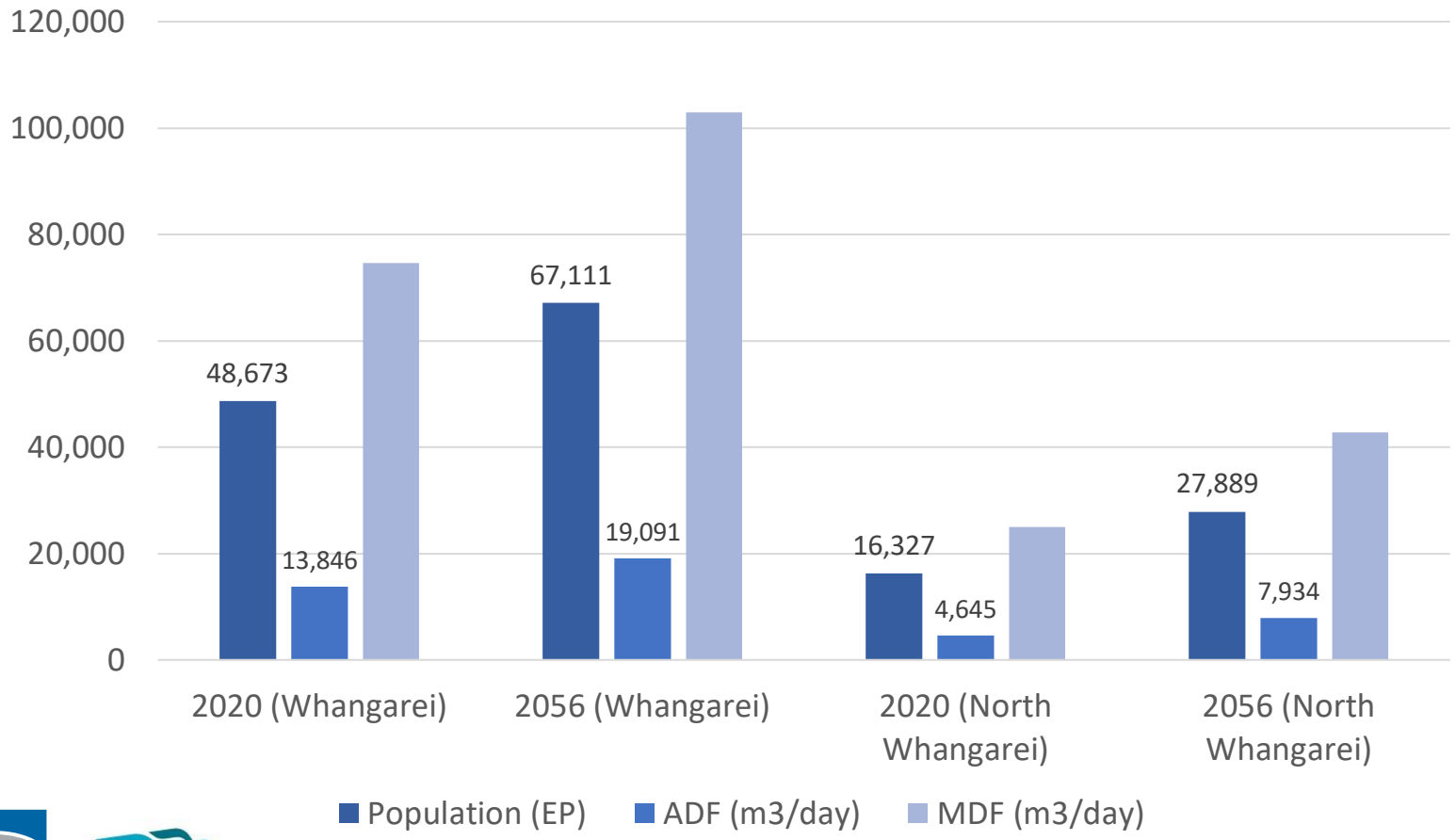
Plant flows – Whāngarei WWTP



Whāngarei catchment

46% increase in flow from 2020 to 2056

Plant flows – North Whāngarei (Satellite) and Whāngarei WWTPs



Whāngarei WWTP - 38% increase in flow from 2020 to 2056

North Whāngarei Satellite WWTP - 71% increase in flow from 2020 to 2056

Diverted 30% of flow to North Whangarei scheme

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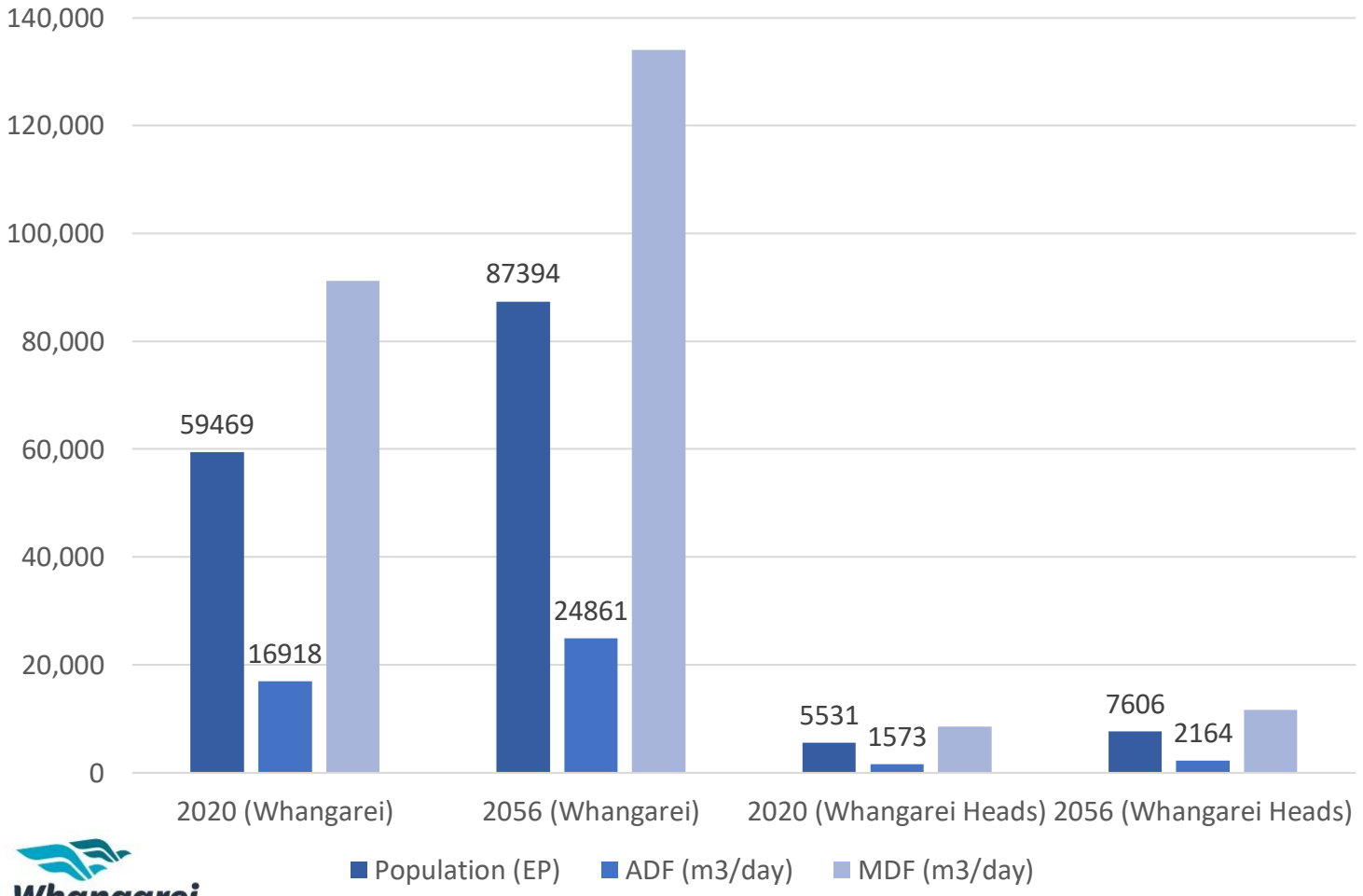
Plant flows – Whāngarei Heads (Satellite) and Whāngarei WWTPs



Whāngarei WWTP, 47% increase in flow from 2020 to 2056

Whāngarei Heads Satellite WWTP, 38% increase in flow from 2020 to 2056

Diverted 8% of flow to Whangarei Heads scheme

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Existing plant – capacity summary

Light loading
Possible future capacity issue
No/little extra capacity

Wastewater Treatment	Current capacity
Inlet works	
Primary clarifiers	
Trickling filters	
Anoxic selector	
Activated sludge basin	
Secondary clarifiers	
Normal flow UV	
Trickling filters	
Storm clarifiers	
High flow UV	

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Receiving environment

- Two wetlands, numerous cascades into the Limeburners Creek, then to Hatea River.
- The creek is influenced by urban activities, hence generally not known for swimming and shellfish gathering.
- Higher contribution of nutrients into the Hatea River during summer.

Long List Options

Long List Options Summary

1. Upgrade Existing Plant, Same Discharge
2. Process Intensification, Same Discharge

One Treatment Plant, Same Receiving Environment

3. Satellite Scheme for Northwest area
4. Satellite Scheme for Whangarei Head area

Satellite Scheme Alternatives

5. Relocate Whangarei WWTP, discharge to lower harbour
6. Upgrade Existing Plant, pump to ocean outfall
10. Upgrade Existing Plant, pump to lower harbour for discharge

7. Dry Weather land-based discharge
8. Partial dry weather land-based discharge

9. Deep Bore Injection

Alternative receiving environment

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1) Plant expansion, existing discharge

Option Description and Treatment Process:	Additional capacity of Peak Flow treatment, Primary clarifiers and second AS basin, filter/UV system Additional Biosolids capacity
Discharge Method and Location:	Existing wetlands (100%) then to the Limeburners Creek

2) Process intensification, existing discharge

Option Description and Treatment Process:	Additional Peak Flow Treatment, Primary clarifers, filter/UV system, Secondary Treatment may involve conversion of AS Basin into Membrane Bioreactor (MBR) or Membrane Aerated Biofilm Reactor (MABR) Additional Biosolids capacity
Likely Discharge Method and Location:	Existing wetlands (100%, excluding wet weather flow to Limeburners)

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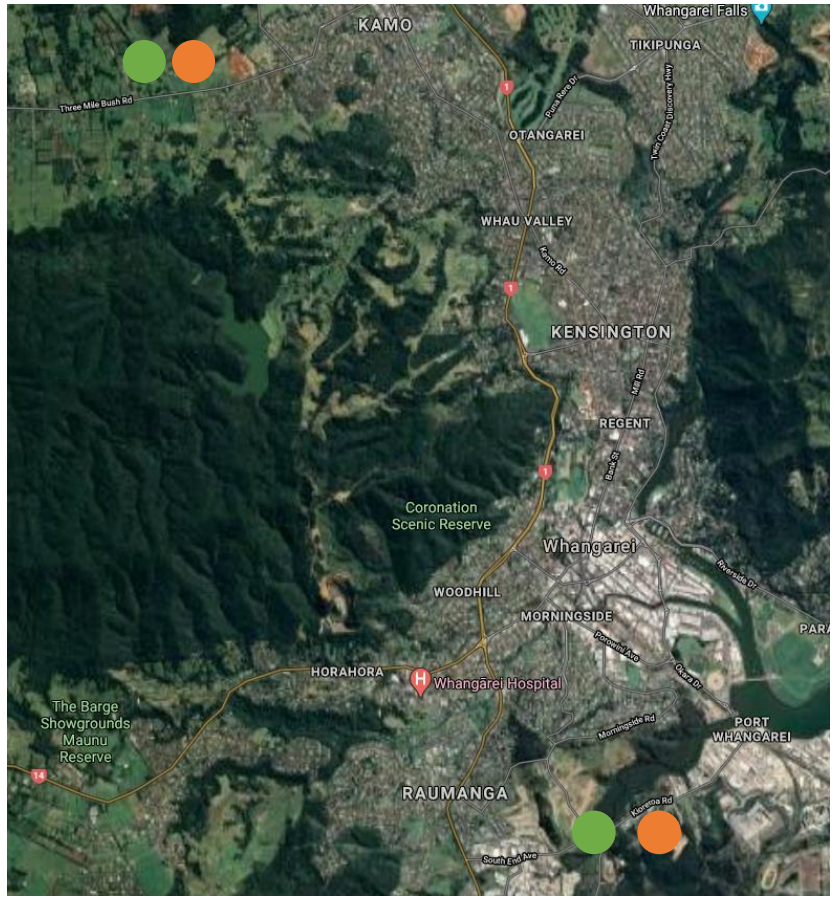
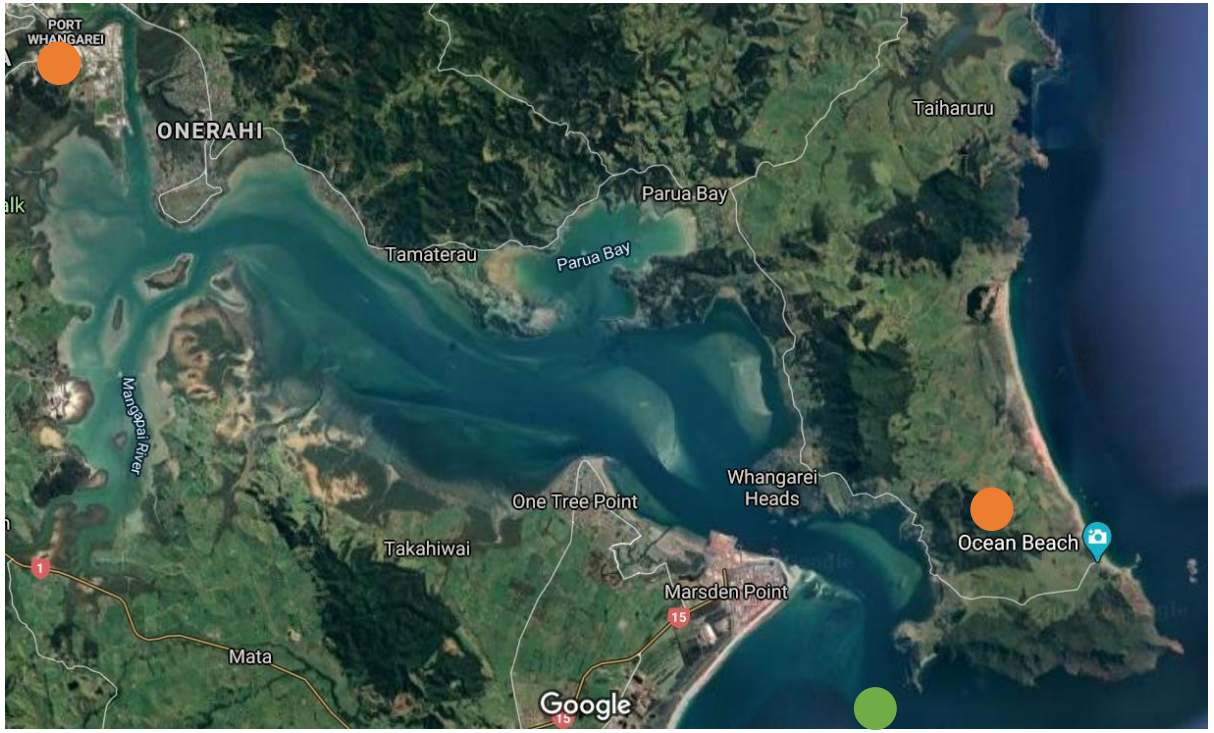
3) Existing site, North Whāngarei satellite plant



Option Description and Treatment Process:	New satellite scheme for Northwest catchment, built over the next 10 years Upgrade current Whangarei WWTP like Option 1, with smaller flow increase Centralised biosolids management
Likely Discharge Method and Location:	Northwest WWTP treated effluent to land-based discharge (~200ha) with a storage pond Existing Whangarei WWTP – continue with wetlands and into the Limeburners Creek

4) Existing site, Whāngarei Heads satellite plant



Option Description and Treatment Process:	New scheme for Whangarei Head Upgrade current Whangarei WWTP like Option 1, with smaller flow increase Centralised biosolids management
Likely Discharge Method and Location:	Main WWTP continues to discharge into wetlands then into the Limeburners Creek Whangarei head WWTP treated effluent to lower harbour outfall (2.1 ML/d in 2056)

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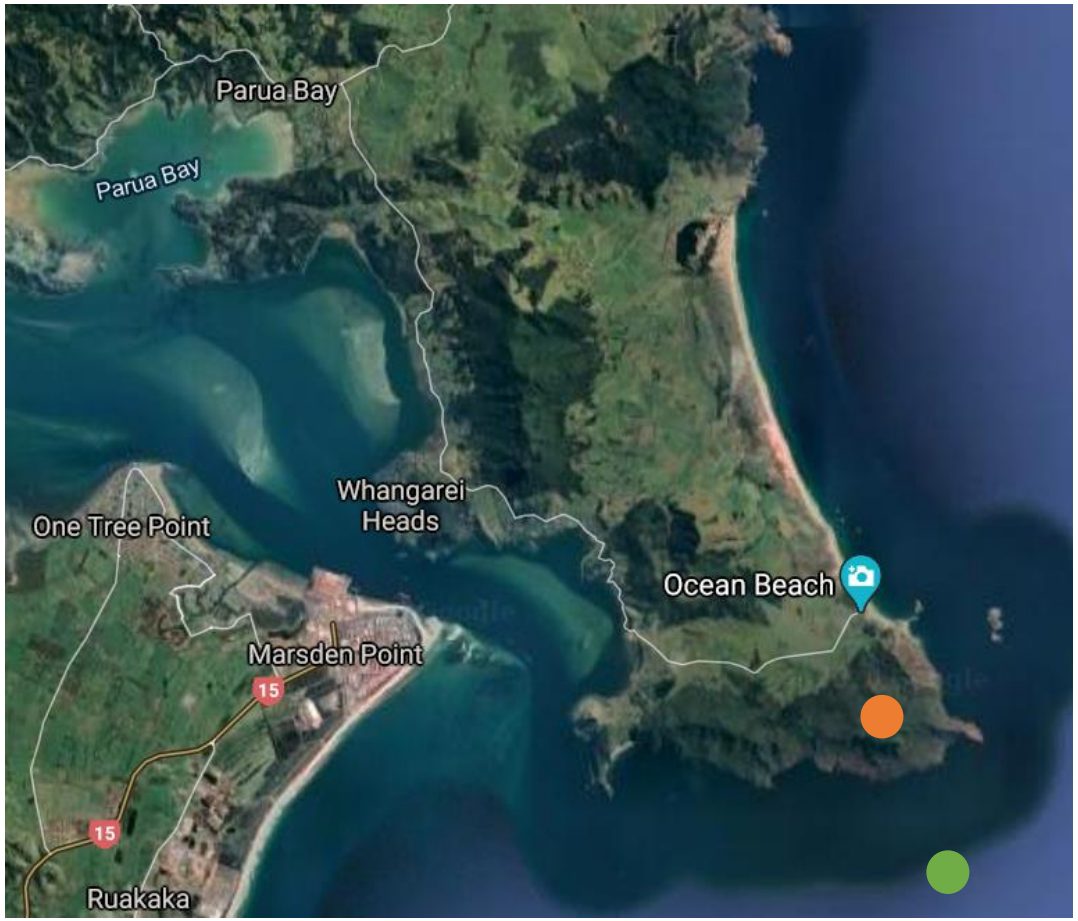
5) Relocate plant, ocean discharge



Option Description and Treatment Process:	Relocate WWTP to Whangarei Head, comprising new primary, secondary and tertiary treatment with new biosolids facilities.
Likely Discharge Method and Location:	New ocean outfall (100% flow)

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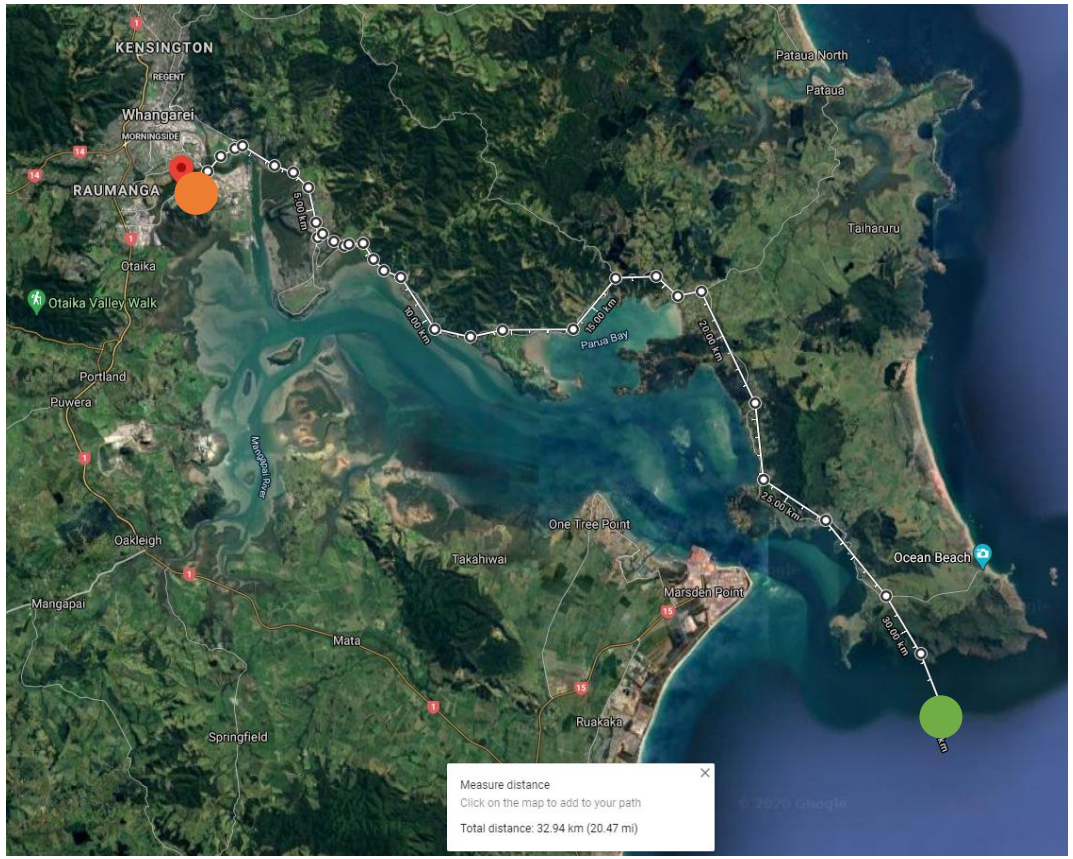
6) Plant expansion, ocean discharge



Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1, except tertiary filtration may not be required.
Likely Discharge Method and Location:	New rising main 33km for 100% flow to Whangarei Head New ocean outfall

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7) Plant expansion, land based discharge

Land based discharge site TBD

Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1
Likely Discharge Method and Location:	New land based discharge (100% ADF), 760ha Wet weather flow discharged to wetland then to Limeburners Creek

8) Plant expansion, partial land based discharge

Land based discharge site TBD

Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1
Likely Discharge Method and Location:	New land based discharge (nominal 100ha, ~13% ADF, higher in summer) Remaining to existing wetlands and Limeburner Creek

9) Plant expansion, deep bore injection

Deep bore injection site TBD

Option Description and Treatment Process:	Capacity upgrade at Whangarei WWTP, followed by Advanced WTP (e.g. MF/RO) as required
Likely Discharge Method and Location:	Deep bore injection (100% treated effluent)

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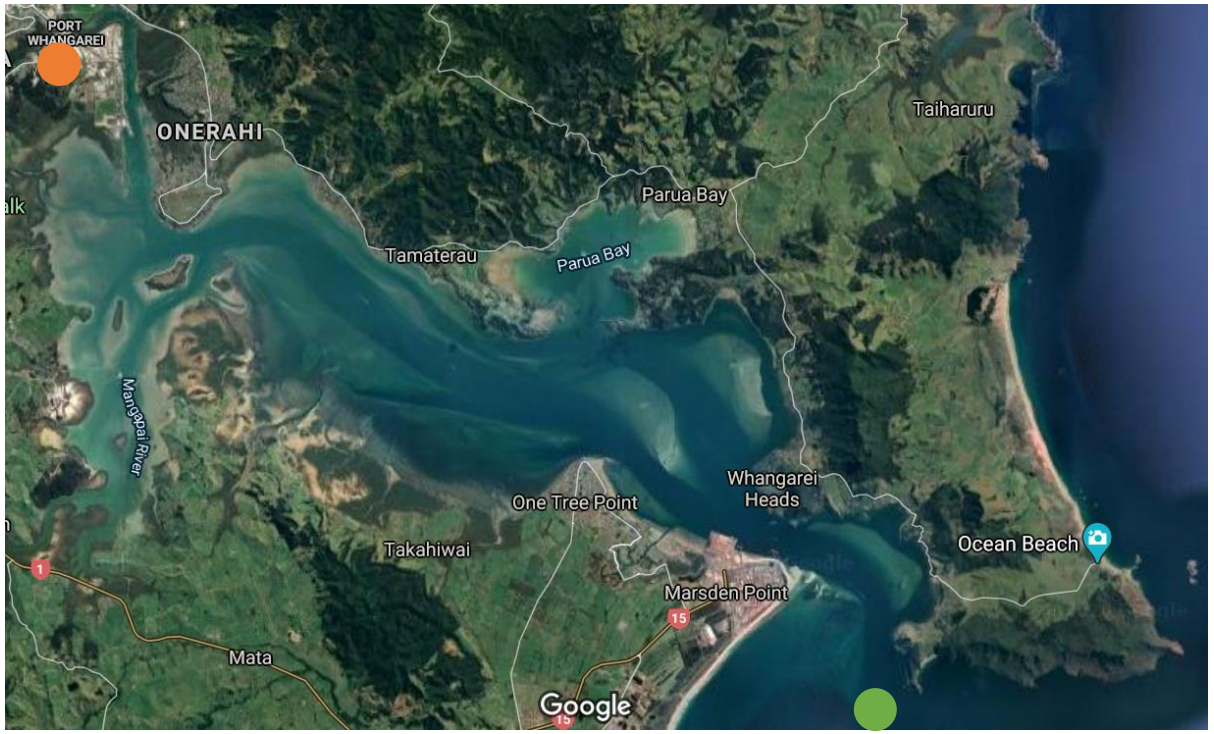
10) Plant expansion, lower harbour discharge



Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1
Likely Discharge Method and Location:	New rising main 30km for 100% flow to Whangarei head area New lower harbour outfall

Scoring Long List Options

MCA assessment criteria

Investment objectives

- Consentability (long term consent)
- Enhanced health and environmental outcomes
- Community affordability
- Operation robustness, efficiency and reliability

Environmental/ cultural/ social factors

- Impact on Limeburner creek and upper harbour quality
- Impact on groundwater quality
- Impact on adjacent land use options
- Cultural acceptability
- Community acceptability

Critical success factors

- Consenting pathway
- Constructability
- Long term flexibility
- Risk factors

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Long list scoring

5	*Strongly meets the criteria in all respects*
4	*Meets the criteria in most respects*
3	*Only partly meets the criteria*
2	*Does not meet the criteria*
1	*Fails to meet and is contrary to the criteria*
0	*Fatal Flaw*

All options will be scored against this same set of criteria, for an objective evaluation of benefits, risks and challenges.

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Next steps

1. Refine the Shortlisted Options
2. Determine further investigations for shortlisted options evaluation
3. Shortlisted Options evaluation
   - Further details for constraints identification
   - Planning / consent assessment
   - Layout / Schematics
   - Cost estimates

WHANGAREI LONG LIST MCA

Scoring
- 5 Strongly meets the criteria in all respects
- 4 Meets the criteria in most respects
- 3 Only partly meets the criteria
- 2 Does not meet the criteria
- 1 Fails to meet and is contrary to the criteria
- 0 Fatal Flaw

Option title			Option 1 - Existing Discharge - Plant Expansion		Option 2 - Existing Discharge - Process Intensification		Option 3 - Existing Discharge plus a Satellite Plant (Nth Whangarei)		Option 4 - Existing Discharge plus a Satellite Plant (Whangarei Head)		Option 5 - Ocean Discharge - Relocate Whangarei WWTP		Option 6 - Ocean Discharge - Existing WWTP and pump to ocean		Option 7 - Land-based Discharge (dry weather) - Existing WWTP site		Option 8 - Existing Discharge supplemented with reuse		Option 9 - Deep Bore Injection - Existing WWTP site		Option 10 - Lower harbour discharge - Existing WWTP
Option description			Keep the existing discharge at Limeburners Creek, with installing additional treatment tanks		Keep the existing discharge at Limeburners Creek, with intensifying existing process through MBR or MABR		Keep the existing discharge at Limeburners Creek, and construct a satellite plant in North Whangarei with land disposal		Keep the existing discharge at Limeburners Creek, and construct a satellite plant in Whangarei Head with ocean outfall		Move the Whangarei WWTP to a site in Whangarei Head, and discharge to ocean, east of Whangeri Head		Keep the Whangarei WWTP at the existing site, and pump to a ocean outfall, east of Whangarei Head		Stop discharging effluent into the Limeburners Creek in dry weather, and pump to irrigation site suitable for full flow. Wet weather discharged to Limeburner's Creek via wetlands		Similar to Option 1 or 2, with higher discharge quality enable current and future reuse opportunities (e.g. parks/gardens, or industrial, or plantation)		Significantly improve WWTP quality for deep bore injection, design for Indirect Potable Reuse quality		Keep the Whangarei WWTP at the existing site, and pump to Lower Harbour, close to Whangarei Head
Number of WWTPs			1		1		2		2		1		1		1		1		1		1
Receiving environment - main WWTP			Limeburners Creek (100%) via wetlands		Limeburners Creek (100%) via wetlands		Limeburners Creek (100%) via wetlands		Limeburners Creek (100%) via wetlands		Ocean (100%), east of Whangarei Head		Ocean (100%), east of Whangarei Head		100% ADF to land Excess to wetlands and Limeburner Creek		Reduce ADF to land Excess to wetlands and Limeburners Creek		Recharge to Groundwater Aquifier		Lower Harbour near Whangarei Head
Receiving environment - satellite WWTP			N/A		N/A		Land (100%) with storage		Harbour		N/A		N/A		N/A		N/A		N/A		N/A
CapEx Range/Order			High		High		Very High		Very High		Extremely High		Extremely High		Very High		High		Extremely High		Extremely High
Investment objectives	**Weight**	**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**	
Consentability - long term consent	20%	5	Baseline	5	Same as Option 1	3	More complex related to two facilities and two discharge permits. Satelite plant location needs detailed investigation, carries more uncertainty.	0	Not acceptable to Tangata Whenua, very likely sensitive users of the harbour, for food gathering etc. **Fatal Flaw - no further scoring of this option.**	1	Very difficult consent process related to rising main, treatment plant and ocean outfall.	1	Very difficult consent process anticipated, especially there are some pump station overflows out currently, construction of effluent rising main will be difficult for the community to support	0	Need lots of land (>700ha). Expect easier to consent than outfall options (Option 4 to 6)	3	Reuse opportunities including land irrigation are yet to be defined. However, identifying future reuse opportunities is in line with NRC and iwi aspiration	0	Extremely difficult to consent (no other case in NZ carries significant uncertainty and risks). **Fatal Flaw - not further scoring of this option**	0	Not acceptable to Tangata Whenua, very likely sensitive users of the harbour, for food gathering etc. **Fatal Flaw - no further scoring of this option.**
Enhanced health and environmental outcomes	30%	3	Baseline - Tangata Whenua keen to see higher discharge standards	4	Same discharge environment as 1. More effective removal of E coli and TSS than 1. Likely equivalent phosphorus removal as 1.	4	This satellite plant reduces 30% of ADF and loads to Limburners Creek than Option 1. However, there is some degree of uncertainty about land application around the satellite plant, which will be a state of the art facility.		This satellite plant reduces 8% of ADF and loads to Limburners Creek than Option 1. Ocean outfall around satellite plant will unlikely to cause local environmental impact.	3	This option removes discharge into the Limeburners Creek. New uncertainty about the environmental impact near the new discharge point	3	This option removes discharge into the Limeburners Creek. New uncertainty about the environmental impact near the new discharge point			5	Land-based discharge or reuse options will result in reduction in nutrient loads to the Limeburners Creek and harbour	0	Extremely difficult to consent (no other case in NZ carries significant uncertainty and risks). **Fatal Flaw - not further scoring of this option**		
Community affordability	25%	4	Baseline	3	Likely more expensive for MABR/MBR retrofit, requires reprogramming scada, retrofitting clarifiers, etc. There are some hidden costs like . more time for operator to get used to new configuration. 1 and 2 will be cheaper than all other costs, so to keep score not drop score too low.	1	Likely to be significantly more expensive than Option 1			1	Likely to be prohibitive expensive in terms of community affordability, as none of the existing plant assets can be reused.	1	Likely to be significantly more expensive than Option 1			2	Additional capital expenditure than Option 1, with additional treatment processes, effluent conveyance and irrigation equipment/land purchase				
Operation robustness, efficiency and reliability	25%	3	Possible issues with space, if putting additional treatment options - will be tight. If pop grows too much, may not be able to have the space on site	3	More space for expansion, new state of the art technology	2	Additional management of second plant. Although replacing Hikurangi (so replacing or enhancing a plant). New system requires integration with scada etc.			2	New state of the art treatment plant. however will be offset by septicity and odour issue related to long/difficult rising main	2	Rising main maintenance and operation	0	Land availabilty feasibility for 760ha or more is very difficult **Fatal Flaw - no further scoring of this option**	3	More complex than existing. Depends on how far pipeline goes				

WHANGAREI LONG LIST MCA

Scoring		
	5	Strongly meets the criteria in all respects
	4	Meets the criteria in most respects
	3	Only partly meets the criteria
	2	Does not meet the criteria
	1	Fails to meet and is contrary to the criteria
	0	Fatal Flaw

Option title			Option 1 - Existing Discharge - Plant Expansion		Option 2 - Existing Discharge - Process Intensification		Option 3 - Existing Discharge plus a Satellite Plant (Nth Whangarei)		Option 4 - Existing Discharge plus a Satellite Plant (Whangarei Head)		Option 5 - Ocean Discharge - Relocate Whangarei WWTP		Option 6 - Ocean Discharge - Existing WWTP and pump to ocean		Option 7 - Land-based Discharge (dry weather) - Existing WWTP site		Option 8 - Existing Discharge supplemented with reuse		Option 9 - Deep Bore Injection - Existing WWTP site		Option 10 - Lower harbour discharge - Existing WWTP
Investment objectives - score out of 100	100%	73		74		51		0		37		37		0		67		0		0	
Environmental/cultural/social factors	**Weight**	**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**	
Impact on Limeburner creek and upper harbour quality	25%	4	Baseline	4	Same as baseline	5	Less flow to creek			5	Remove discharge into Limeburners Creek	5	Remove discharge into Limeburners Creek			5	Removing more flows and nutrients into the Limeburners creek, and more during summer (critical)				
Impact on groundwater quality	10%	5	No impact - no discharge to land	5	No impact - no discharge to land	4	Satellite plant land-based discharge			5	No impact - no discharge to land	5	No impact - no discharge to land			3	Potential impact				
Impact on adjacent land use options	10%	4	Expand clarifiers, may struggle for space. Need another digester. But no immediate neighbour. Odour mitigation provided	4	Can be slightly more compact plant	3	Associated with new plant. Issues around buying land, neighbours of new plant			3	Quite rural, may not have neighbours close	4				3					
Cultural acceptability	30%	4		4		4	Irrigation component			1	Tangata Whenua indicated they have significant concerns in discharging into ocean because of volume	1	Tangata Whenua indicated they have significant concerns in discharging into ocean because of volume			4					
Community acceptability	25%	3		4	Can offer higher nutrient removal efficiency hence less in the discharge	3				2		2				4	Desired by stakeholders				
Environmental/cultural/social factors - score out of 100	100%	77		82		78		0		57		59		0		81		0		0	
Critical Success Factors	**Weight**	**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**		**Score**	
Consenting pathway	25%	4	Baseline	4	Same as baseline	3	More complex related to satellite plant			1	Very difficult consent process anticipated	1	Very difficult consent process anticipated			3	Similar to Option 7				
Constructability	25%	4	Generally acceptable, there maybe space constraint at the site	2	Additional complexity related to integration into the existing systems etc	2	Land availability and wastewater network reconfiguration			1	Considerable challenges in construction of new infrastructure (conveyance, WWTP and ocean outfall)	1	Construction of effluent rising main and outfall			2	Additional complexity related to integration into the existing systems etc				
Long term flexibility	25%	3	Some upgrade items can be staged	4	Conversion into MBR/MABR can potentially be staged, to suit the timeframe of future NES triggers	3	Little stageability, require at least 60% capacity of satelltite plant. However, potential solution for catering growth beyond 2056			2	Most infrastructure required to be built initially, little staging or future flexibility	2	Most infrastructure required to be built initially, little staging or future flexibility			4	Provide more flexiblity of staging. More flexibility of staging for future reuse and land based discharge opportunities				

WHANGAREI LONG LIST MCA

Scoring		
	5	Strongly meets the criteria in all respects
	4	Meets the criteria in most respects
	3	Only partly meets the criteria
	2	Does not meet the criteria
	1	Fails to meet and is contrary to the criteria
	0	Fatal Flaw

Option title		Option 1 - Existing Discharge - Plant Expansion		Option 2 - Existing Discharge - Process Intensification		Option 3 - Existing Discharge plus a Satellite Plant (Nth Whangarei)		Option 4 - Existing Discharge plus a Satellite Plant (Whangarei Head)		Option 5 - Ocean Discharge - Relocate Whangarei WWTP		Option 6 - Ocean Discharge - Existing WWTP and pump to ocean		Option 7 - Land-based Discharge (dry weather) - Existing WWTP site		Option 8 - Existing Discharge supplemented with reuse		Option 9 - Deep Bore Injection - Existing WWTP site		Option 10 - Lower harbour discharge - Existing WWTP
Risk factors	25%	4	Baseline	4	Same as baseline	3	Higher risk associated with establishing the satellite scheme			2	Construction challenges, community and cultural acceptance potentially difficult	2	Construction challenges, community and cultural acceptance potentially difficult			3	Higher risk associated with establishing the irrigation area			
Critical Success Factors - score out of 100	100%	75		70		55	0			30		30	0			60	0		0	
Overall total out of 100		**75**		**75**		61	0			41		42	0			**69**	0		0	
Rank		**2**		**1**		4	7			6		5	7			**3**	7		7	
Carry forward for further analysis		**YES**		**YES**		No, considered difficulty to complete the necessary investigatons within the pre-consent timeframe. Can be investigated as part of future consent review		No, fatal flaw - small flow (8%) and increase complexity		No, significant hurdles associated with consent and construction of pipeline and outfall		No, significant hurdles associated with consent and construction of pipeline and outfall		No - fatal flaw around land availability		**YES**		No - fatal flaw around aquifier impact, cost and consent uncertainty		No - fatal flaw around no/lack of support from Tangata whenua

From:	Sarah Irwin
To:	Mira Norris; Nicki Wakefield; Dave West; Erica Wade; Johanna.Dones@northlanddhb.org.nz; shanehenare@yahoo.co.nz; Rudi Hoetjes; Laura Wakelin; northern.branch@forestandbird.org.nz
Cc:	Sarah Sunich; Anthony Kirk; Ian Ho
Subject:	Update on Whangarei Waste Water Treatment Plant
Date:	Monday, 29 March 2021 4:54:49 pm
Attachments:	image003.png image002.png 12528591-PPT_Whangarei WWTP - Technical Group Meeting (DAP Workshop) 261120.pptx 12528591-MIN_Whangarei WWTP Technical Group Workshop 261120.docx

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Kia ora,

Hard to believe it is already the end of March.

Attached is the PPT and the workshop minutes from our meeting in late November. It is now time to look at the adaptive pathways proposed since that time and ensure all is on the right track.

Can you please let me know if you are available on the 8 April – either a 10am-1pm slot or 1-4pm, we may not need to schedule that long but would be great to get some indication of availability.

Kind regards

Sarah Irwin

Team leader – Infrastructure Planning | Infrastructure

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P 09 430 4200 | **DDI 09 945 4370** | **M 021 240 7973** | **E** sarah.irwin@wdc.govt.nz

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WDC - Final email sig

Link to the 'Love it Local' Facebook group. Opens in a new window.

Minutes

18 March 2021

Project	Whangarei WWTP Consenting	From	Sarah Sunich
Subject	Technical Working Group -Workshop #2	Tel	021446925
Venue/Date/Time	Whangarei District Council, 26th November 2020, 1-4pm	Job No	12/528591/
Copies to	All attendees and Name (Company)		
Attendees	Sarah Irwin (WDC) Simon Charles (partial meeting) (WDC) Hai Nguyen (WDC) Ian Ho (GHD) Sarah Sunich (GHD) Anthony Kirk (GHD) Danielle Maynard (GHD) Erica Wade (DoC) Laura Wakelin (DoC) Johanna Dones (NDHB) Rudi Hoetjes (Fish and Game)	Apologies	Mira Norris (Iwi) Nicki Wakefield (Iwi) Shane Henare (Forest and Bird) Stuart Savill (NRC) Dave West (DoC)

Minutes	Action
Welcome and recap of previous workshop • Sarah Irwin – circulated previous workshop minutes/MCA scoring/MCA memo. • Purpose of workshop to introduce and confirm Adaptive Pathways Approach to managing options for the Whangarei WWTP going forward (as an alternative to traditional MCA approach) and discuss and agree on key drivers and triggers to be considered in the adaptive pathway assessment. • Regional council decided a conflict if they were in technical group	
Summary of Long list MCA • Ian Ho revisited long-list options summary and reasons for carry forward/leave of options. • Options are not mutually exclusive and thus lead to the consideration of taking a more Adaptive Pathways Approach to optioneering over the long-term.	

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Minutes	Action
• Adaptive pathway approach does not exclude other 'options' and could be supported through flexible consent conditions (regular reviews of options in light of changing drivers) to allow for consideration of these options (or parts of) at different times over the term of the consent and longer.	
Assessment of Water Quality • Anthony Kirk presented initial findings from assessments on Enterococci, Faecal Coliform counts, and nutrients in Limeburners and Upper Harbour. Also presented nutrient projections taking consideration to population growth. • Guidelines for intertidal creeks does not capture Limeburners Creek (classified as a mixing zone). • DoC request update on ecological health and sediment quality status of receiving environment – 4sight have completed a baseline assessment focusing on Limeburners Creek and the confluence with the Hatea River. • Anthony Kirk gave a broad summary of 4sight report with key issue being Sediment. - Lots of mud accumulation and conditions adapted to this environment (particularly Hatea River acting as sediment trap). - Not many larger fish species. - Nutrients not a particular issue.	Sarah Irwin - to circulate 4sight baseline monitoring report
Project Programme and Adaptive Pathway Approach • Project programme – Ian Ho presented – WWTP options assessment to commence following Workshop 2. Workshop #3 to comment and finalise Adaptive Pathway for Whangarei WWTP early Feb 2021 followed by Council Approval Feb 2021. • Intent for high level costing to be included to inform Adaptive Pathway, but may be issues with costings from suppliers over the Christmas period.	
Drivers (see white board notes) • Cultural Aspirations. – Need to consider cultural factors, importance to treaty partners. – Harbour wanted to recreation (swimmability) and food gathering. – Discharge via wetlands important and accepted. – Cultural impact assessment to be produced. Necessary to have guidance from hapu iwi to ensure inclusion of those who need to be. • Regulatory – New standards implemented through Regional Plan (longer term)	

Minutes	Action

  - NES for wastewater discharges expected to be a disruptor (shorter term).
- Climate Change
  - Periods of intense rainfall expected to have increased volume. Generally, Whangarei expected to have a lower level of rainfall in general. Plant needs to be able to cope with these intense flows.
- Reuse - What does 'reuse' look like to the group?
  - Industrial reuse (e.g. potentially nursery watering) may have different requirements (not just pathogens). Need flexibility around consent – if majority of consent is around reuse in industry, rapid issues caused around how to address disposal if industry no longer needs it. Need to consider transport of water to industry use
  - No NZ standard for reuse water – consider Aus standards.
  - Improvement of pathogen treatment opens up different options (i.e. park/land application, toilet flushing).
  - Cultural sensitivities around reuse of water need to be checked.
  - Water reuse to power? Maybe not economic for this scale. Already some biogas co-generators on site. Power generation only 2.6MJ last year.
- Sustainability.
  - Reuse, climate change (carbon), water scarcity/water resource, carbon energy.
- Freshwater source management
  - Initiatives to incentivise population to decrease water use, reducing overall flow to plant (i.e. shorter showers, greywater reuse), education around what people are 'tipping down the sink' affecting the loads to the plant
- Residential development and changing community.
- Wider environmental drivers.
  - Improvement of quality of overall harbour catchment environment (Harbour Catchment Group and strategy already incorporated into proposed regional plan. Could release new guidelines).
  - Aspirational Whangarei Harbour Catchment Strategy (WDC/NRC's websites, guideline for NRC planning).
  - Catchment restoration or farm management practice improvement -> overall water quality improvements -> negative perception of WWTP as major contributor.
  - Changing use within the catchment.
  - Changing use of upper and lower Hatea.
  - Marina discharge into Limeburners Creek
- Other matters raised
  - New contaminants identified.

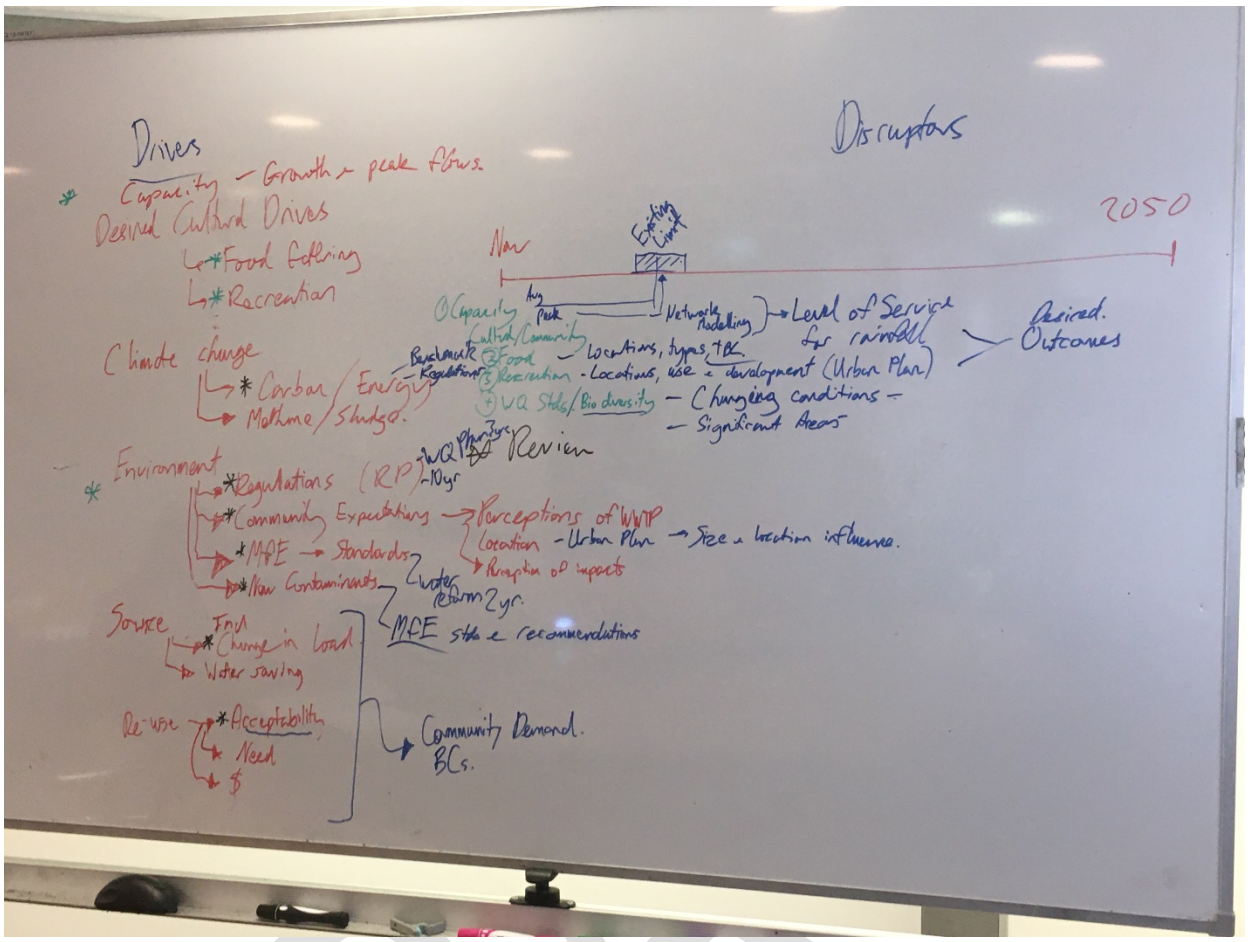
Minutes	Action
– Cost difference between addressing drivers/disruptors sooner rather than later. – Aspirational goals for next 10-20 years, how do we rank them?	
Primary drivers needing immediate consideration • Capacity limitations at plant. • Environment – PNRP. • Climate change – heavy rainfall/drought conditions. • Cultural factors (shellfish gathering/swimmability/etc.) – there is a desire to improve the catchment area even if the WWTP is not the main contributor to the issues being experienced in the upper harbour.	
Aims for treatment plant • Improve swimmability – how do we define this? • Hold nutrient mass load and/or improve. • Make best use of biosolids (energy source and good soil conditioner). • Improvement to UV disinfection will reduce risks to downstream activities (marina, etc.) and open up opportunities with reuse initiatives. • Understand climate change effects on plant performance. • Continued use of wetlands and possible expansion. Possible increase of wetland harvest (explore impact of nitrogen polishing on the environment and how it is measured). • Support no net loss of biodiversity.	
Triggers • Capacity – Stagger upgrades or plan now for 50-year population? Currently focused on next 35 years. – Levels of service for dealing with rainfall (output of network modelling and network master planning). – Size of plant and community expectations around this – how large to allow plant to expand before needing to move operations? – What is capacity limit of plant? • Food gathering – Identify what this means from a cultural point of view, in terms of types of food and important locations. • Recreation: – Development of town basin (urban plan), changes to marina and waterfront may increase desire for swimmability.	

Minutes	Action
– Improved water quality may lead to increased biodiversity (fish species, shellfish) which may in turn increase fishing/recreation. – Waka Ama complaints about burning sensations on skin. • Water quality: – Degradation of biodiversity in the area. – Impact on protected species. – NRC are mapping significant ecological areas, inner harbour likely to have some protected species. • Regulations: – PNRP and MfE water quality standards changing. – Regulations (RP) WQ Plan change for freshwater limits in the next 3 years (10-year cycle following that). – MfE standards water reforms likely to be in the next 2-3 years. – Emerging contaminants could come through in the NES (hormones, pharmaceuticals, microplastics, toxoplasmosis, etc). • Climate change: – Cloudy info and legislation around GHG emissions from treatment plant – Zero carbon act. – Blue carbon and use of marine ecosystems to store and sequester carbon. • Source control and reuse: – Loss or change in industrial use. – Water saving initiatives resulting in lower flows. – Composition of waste changing.	

Attachments Enclosed

Attachment 1 - Power point presentation:

Attachment 2 - Whiteboard notes:



Attachment 3 – 4Sight Baseline Ecological and Sediment Quality Report

Whāngarei WWTP – Dynamic Adaptive Pathways Workshop

26th November 2020, 1:00pm – 3:00pm
Whāngarei District Council

Agenda

1.00 pm	Welcome and recap of previous workshop
1.10 pm	Summary of Long List MCA findings and recommendations
1.20 pm	Status of current environmental data
1.40 pm	Introduction of Adaptive Pathways
1.45 pm	Discussion of drivers and key factors on the scheme
2.45 pm	Skeleton pathway map
3.00 pm	Close

Purpose and Desired Outcome of Workshop

Align on Drivers for Wastewater Treatment Plant improvements and Triggers for Action

Summary of Long List MCA

Option title	MCA score	Reason to not carry forward
1 – Existing Discharge - Plant Expansion	2	-
2 – Existing Discharge - Process Intensification	1	-
3 – Existing Discharge plus a Satellite Plant (Nth Whangarei)	-	Issues with fitting investigations into pre-consent timeframe. *(Could be investigated as part of future consent review and may not be limited to North Whangarei)*
4 – Existing Discharge plus a Satellite Plant (Whangarei Head)	-	Small flow only and increased complexity.
5 – Ocean Discharge - Relocate Whangarei WWTP	-	Significant hurdles with consent and construction of pipeline and outfall.
6 – Ocean Discharge - Existing WWTP and pump to ocean	-	Significant hurdles with consent and construction of pipeline and outfall. (Could be investigated as part of future consent review in line with Ruakaka WWTP upgrades)
7 – Land-based Discharge (dry weather) - Existing WWTP site	-	Land availability and land costs. *(Could be investigated as part of future consent review)*
8 – Existing Discharge supplemented with reuse and/or partial summer land-based discharge regime.	3	-
9 – Deep Bore Injection - Existing WWTP site	-	Fatal flaws around aquifer impact, aquifer recharge necessity, cost, and consent uncertainty.
10 – Lower harbour discharge - Existing WWTP	-	Fatal flaw around no/lack of support from Tangata whenua.

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Human Health Assessment

Monitoring and Climate Data Locations

Proposed Regional Plan – Coastal Water Standards

- Introduces Regional specific water quality standards for the Hatea River
- Limeburners Creek is a designated mixing zone
- Influence of WWTP discharges measured at the NRC Limeburners monitoring location
- Generally based on review of existing water quality

Properties	Parameters
Physical properties	DO, pH, temperature, clarity, turbidity
Nutrients	Nitrogen, phosphorous
Metals	Copper, lead, zinc
Pathogens	Enterococci
Biomass and trophic condition	Chlorophyll-a

Grade C

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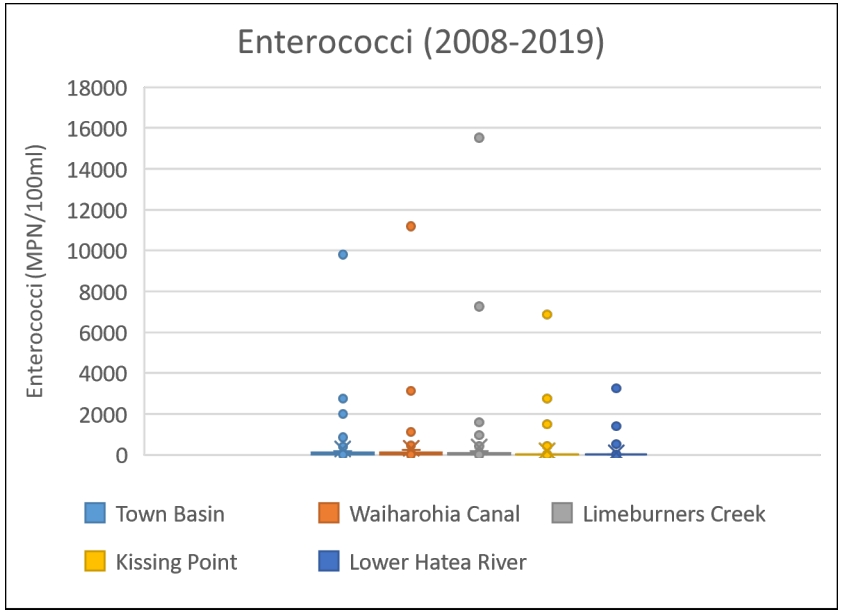
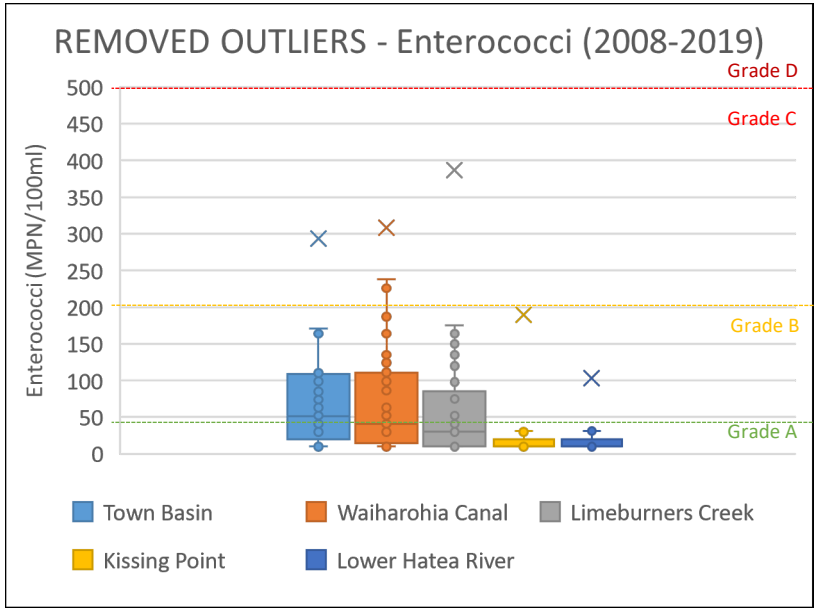
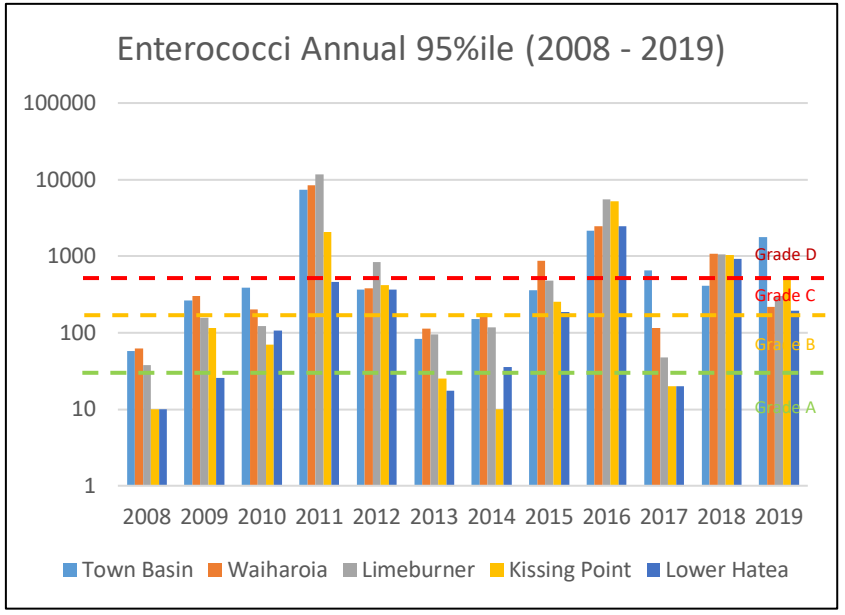
Recreational - Enterococci

Table D2: Suitability for recreation grade for marine sites

Susceptibility to faecal influence	Microbiological Assessment Category Indicator counts (as percentiles – see Table D1)			
	A ≤ 40 enterococci/ 100 mL	**B** 41–200 enterococci/ 100 mL	**C** 201–500 enterococci/ 100 mL	**D** > 500 enterococci/ 100 mL







- Enterococci used as indicator of viruses that cause illness associated with contact and submergence in marine setting
- Outliers in the dataset show significant events with high enterococci events.
- Upstream locations indicate Grade C and D, whereas downstream locations are typically Grade A and B.

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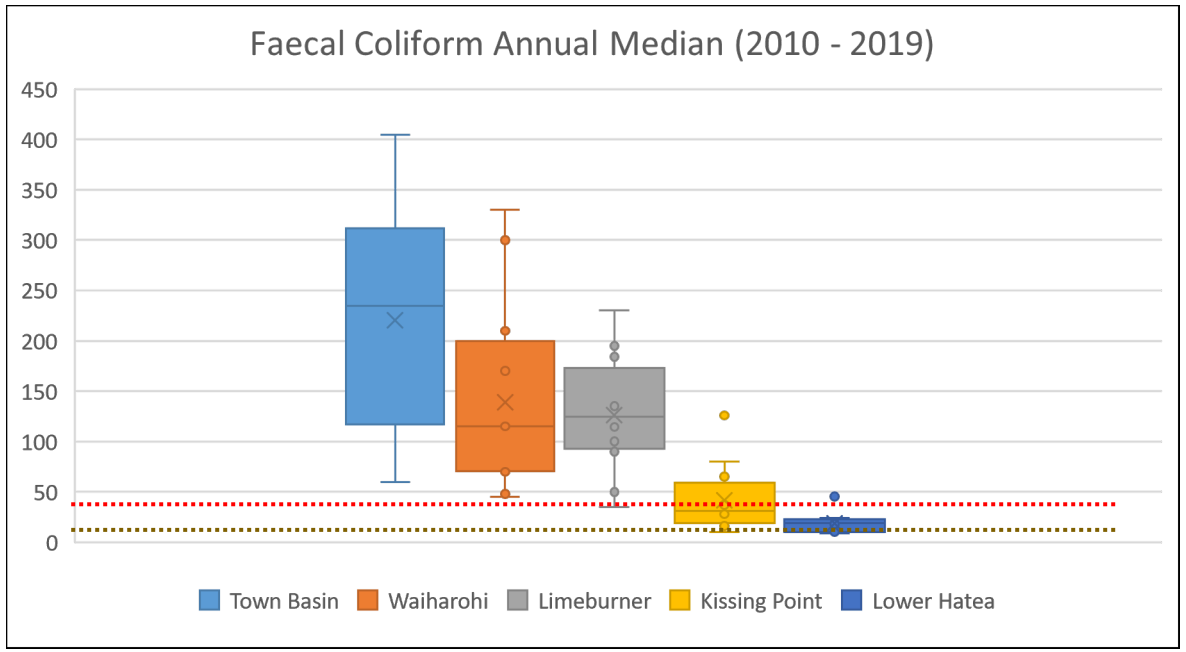
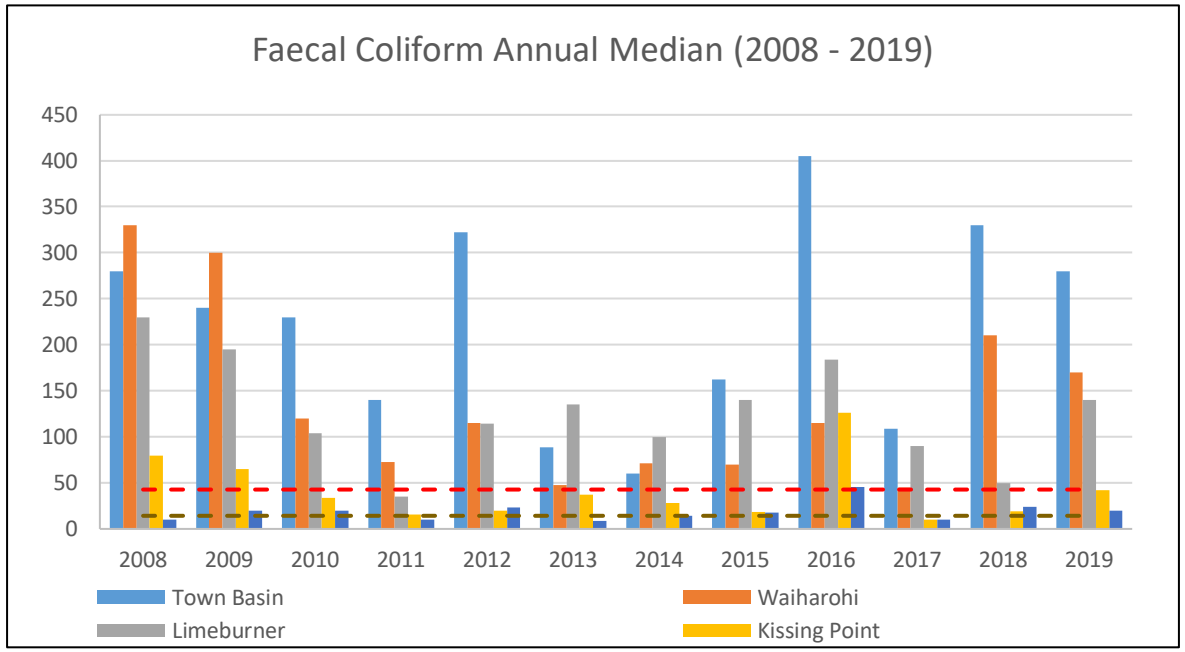
Food Gathering - Faecal Coliforms





- Faecal Coliforms used as indicator for pathogens that cause illness from food ingestion
- All locations are above shellfish-gathering guideline values (median 14 MPN/100ml)
- Significant decrease in Upper Harbour influence moving downstream

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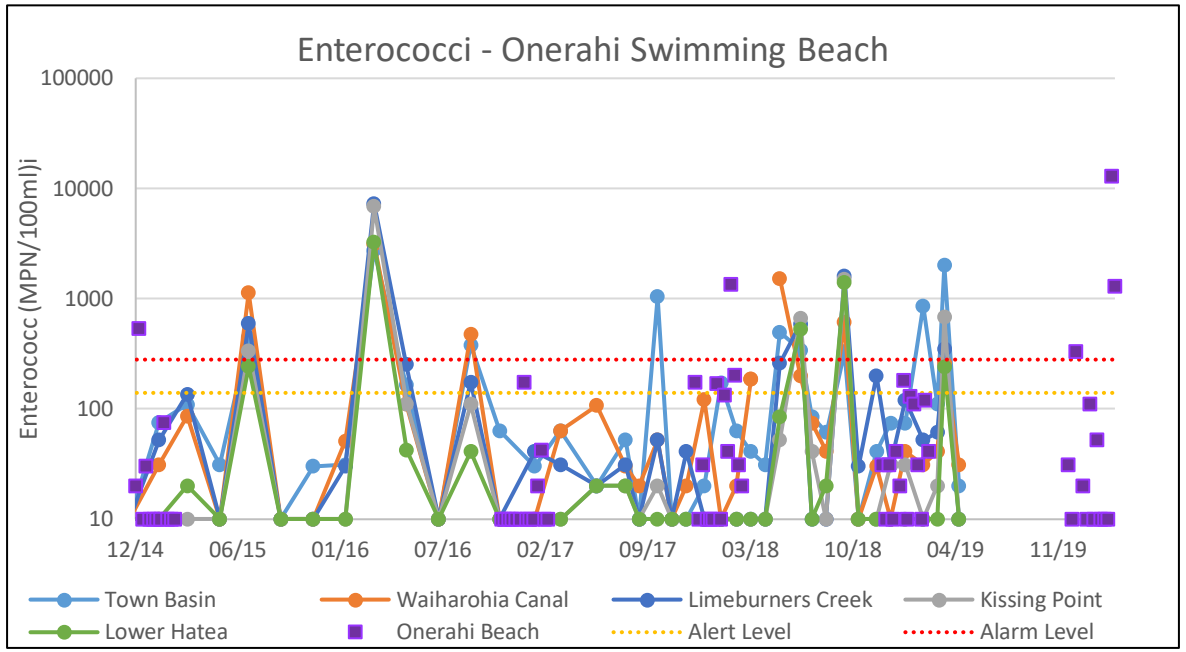
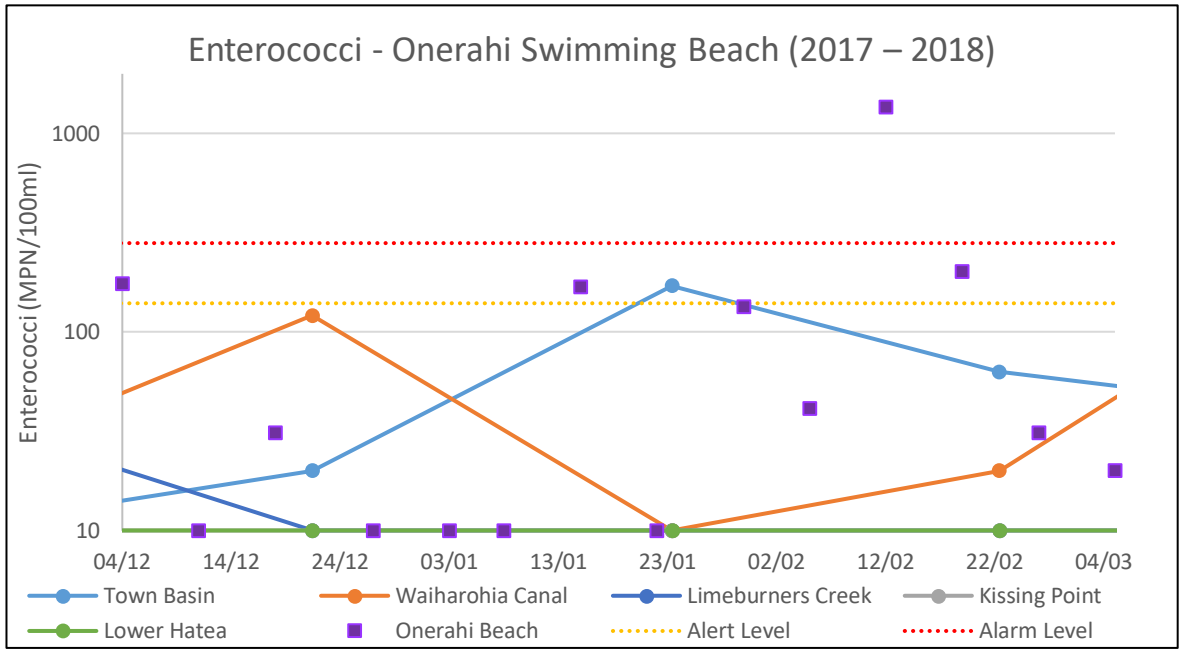
Swimming Area – Onerahi Beach





- 2017 – 2018 shows upstream locations increase in concentrations, however the downstream locations do not increase.
- Peaks at Onerahi beach can occur when downstream Hatea locations do not increase; thus indicating that the peaks at Onerahi Beach are due to localised rainfall-runoff (not the upper catchment area).

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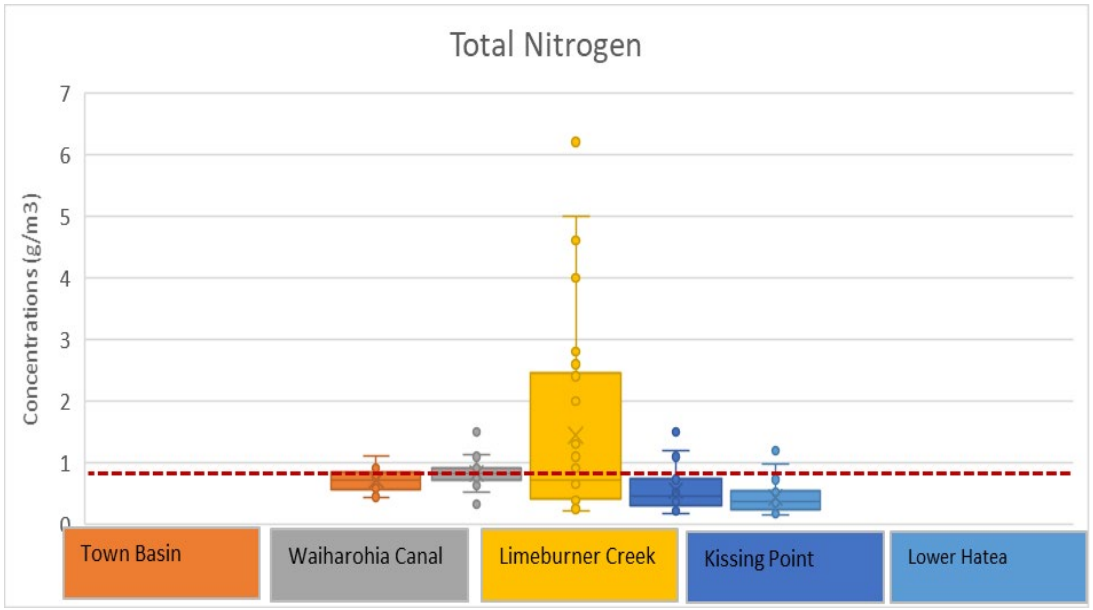
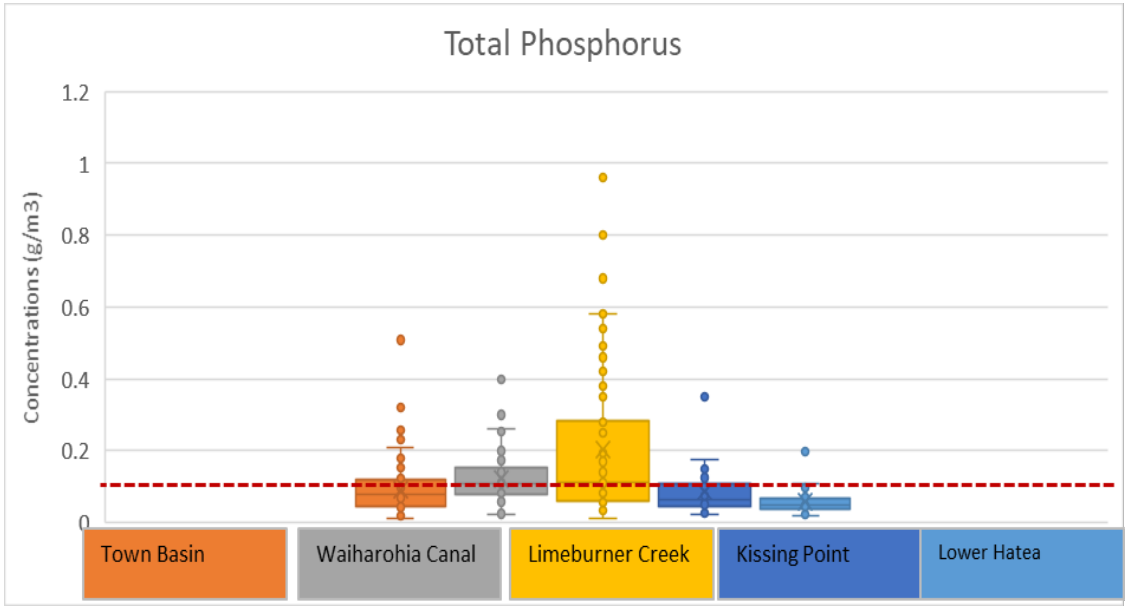
Water Quality – Nutrients

Parameter	% of Limeburner Creek on Downstream Load	
	Summer	Winter
Nitrogen	13% - 30%	7% -17%
Phosphorus	16% - 40%	8% - 23%





- Nutrients contribute to algal blooms and influence ecosystem health.
- WwTP is a notable source of nutrients in the upper harbour.
- Water quality in general meets the proposed water quality criteria in the Hatea River.

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Water Quality – Nutrients Projections

Parameter	Predicted Median Nutrient Concentrations at Limeburners Creek (g/m^3)				
	Guideline Value	Base Discharge Summer Flow	10% Additional Discharge Summer Flow	25% Additional Discharge Summer Flow	50% Additional Discharge Summer Flow
Total – N	0.86	0.79	0.82	**0.86**	**0.92**
Total – P	0.119	0.093	0.097	0.10	0.11
NH_4 – N	0.099	0.074	0.077	0.081	0.086

- Increased population loading increases the influence on the Upper Harbour.
- Nitrogen is likely to exceed proposed Northland Regional Plan water quality criteria.
- Future improvement in nutrient removal is likely to be needed.

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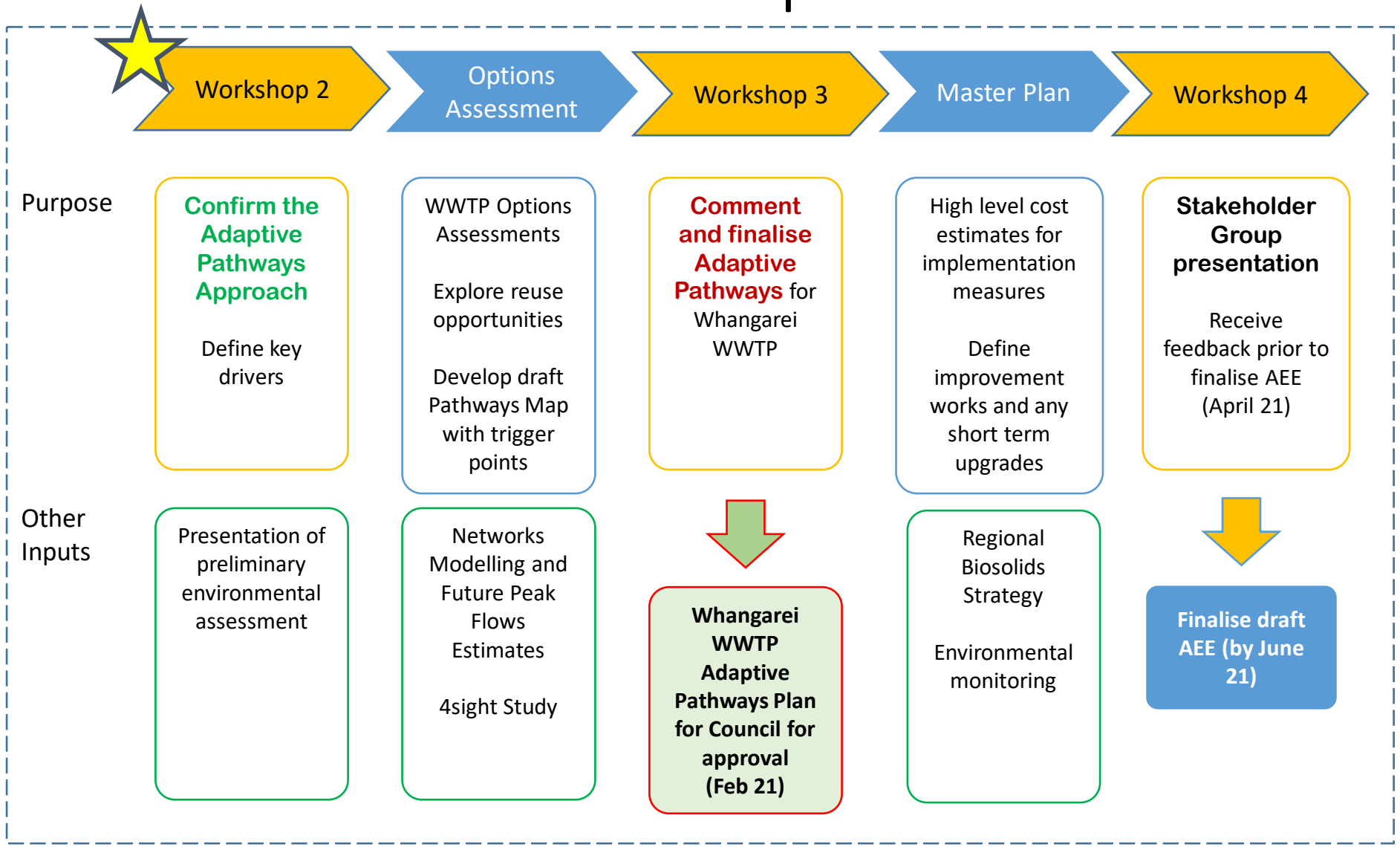
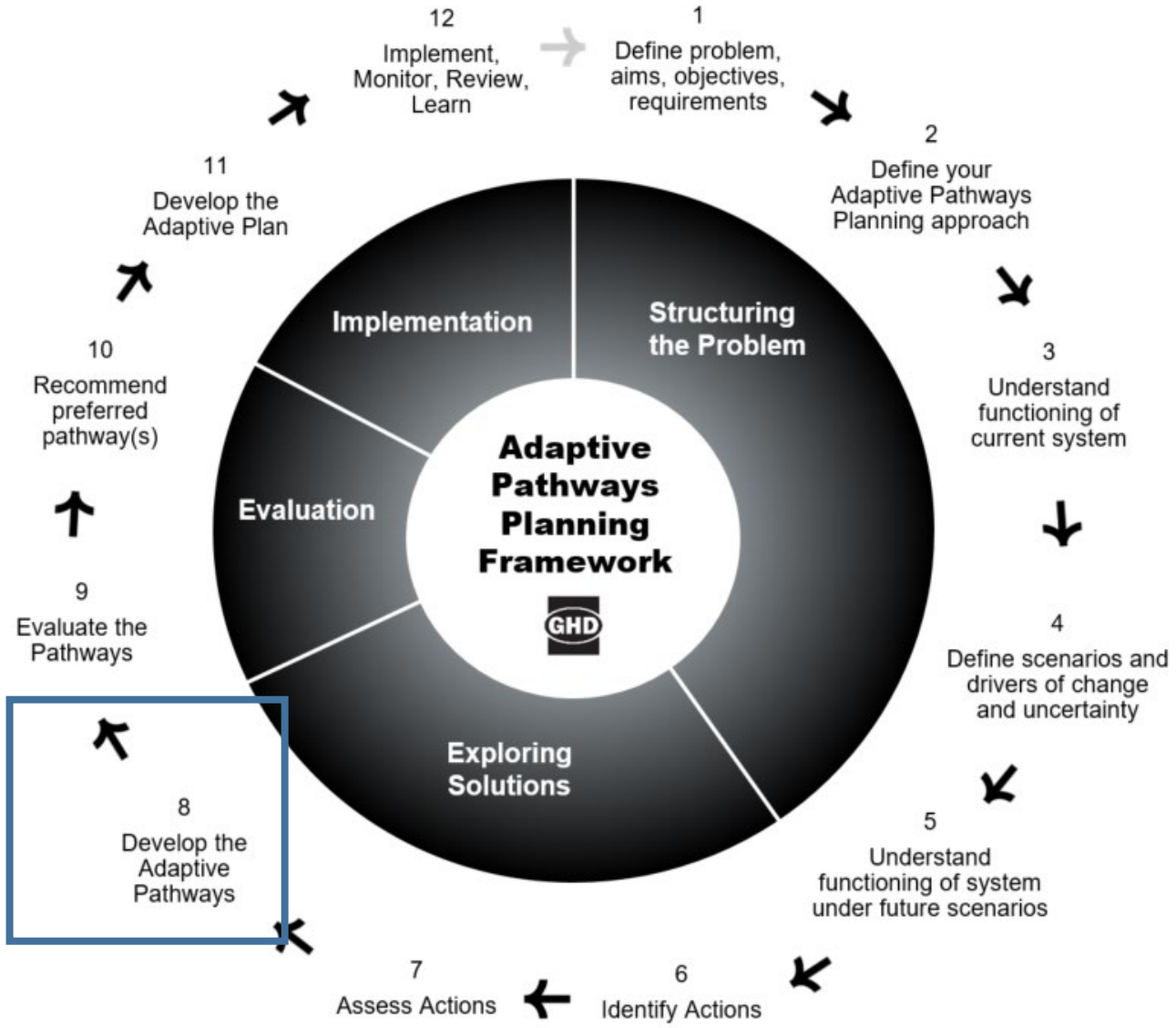
Programme – BPO and masterplan



Adaptive pathways

- Develop a plan that is **flexible** to change as the future unfolds
- Guides decision making – keep pathways open



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Adaptive pathways terminology

- **Implementation point:** The year that the works are to be operational

- **Trigger point:** The point that the decision needs to be made to undertake the works

- **Disruptors:** Events or uncertainties that will require a change in timing, or adopting an alternative pathway

Adaptive pathways terminology

- **Strategic pathways:** "options"
- **Preferred pathway:** Preferred high-level strategy based on MCA/NPV assessment
- **Alternative pathway:** High-scoring pathway, kept open and can be switched to if future disruptors make it more viable
- **Non-preferred pathway:** Undesirable pathway (low-scoring), would only be switched to if disruptors force it

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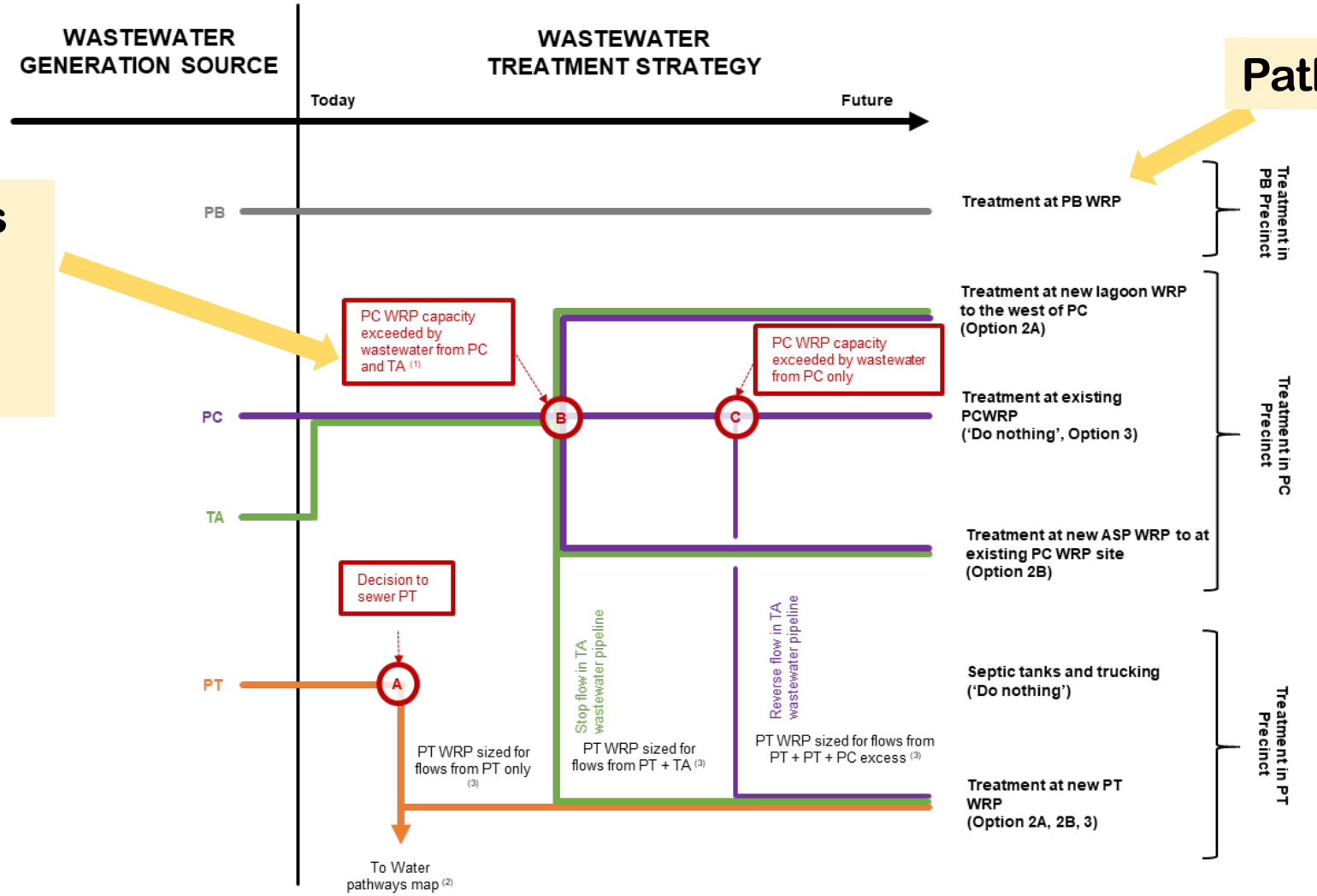
Example adaptive pathways

Trigger Points (to switch to different pathways)



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Drivers and key factors (whiteboard session)

Regulatory	Growth	Assets	Resilience	Technological
• PNRP Water Quality Standards and subsequent updates • New consent conditions • Future Wastewater NES	• Long term growth • Establishment of major growth nodes at Whāngarei outskirts • New industries	• Plant capacity bottleneck • Wastewater network capacity bottleneck • Site constraints • End of asset life of existing tanks	• Drought or water scarcity pressure • Rainfall and flooding • Sea level rise	• Emerging low or neutral carbon technology • Reuse opportunities for plant effluent and biosolids

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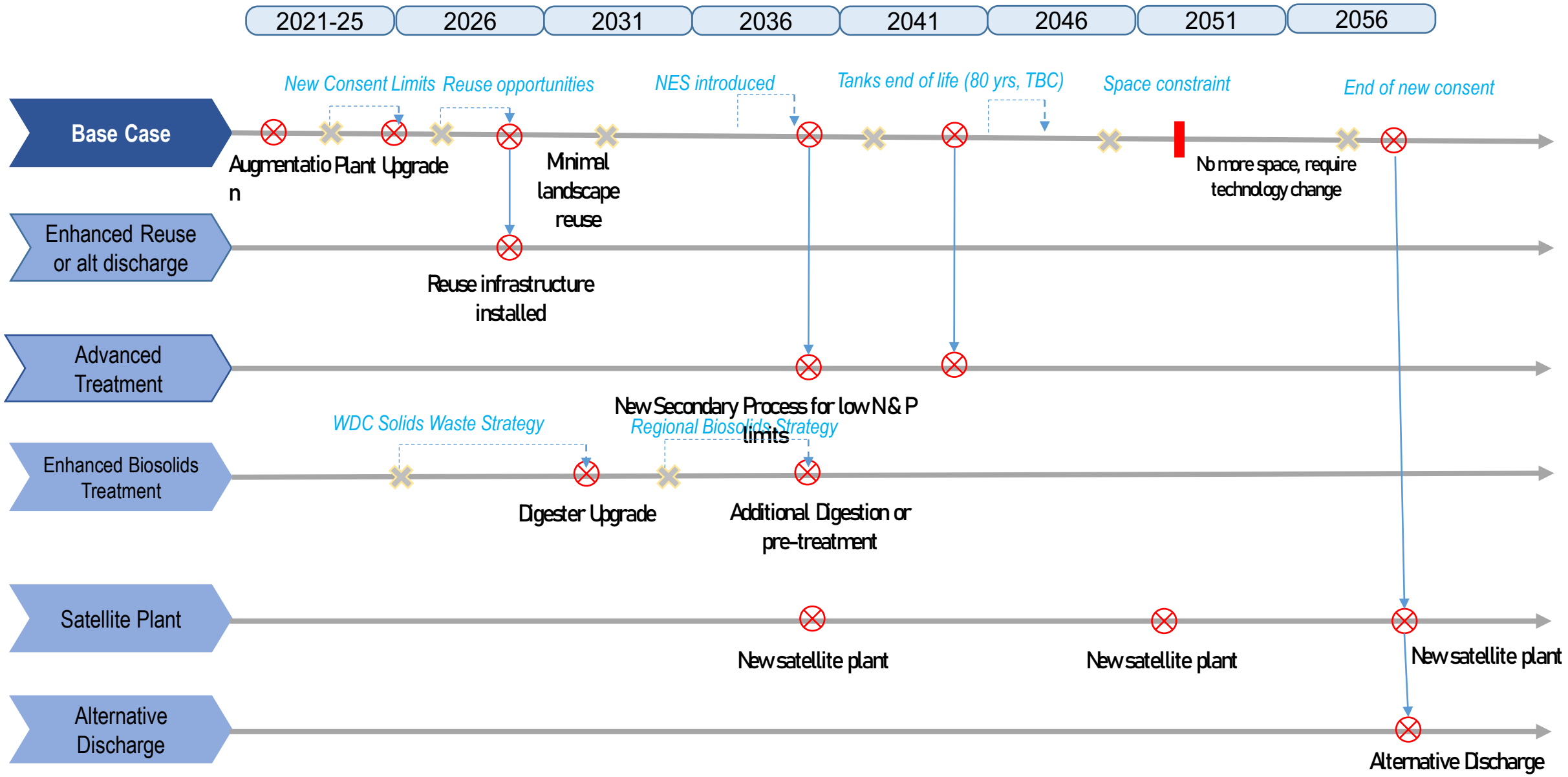
Skeleton Whāngarei pathway map – Preliminary draft only


2021-25
2026
2031
2036
2041
2046
2051
2056
New Consent Limits
Reuse opportunities
NES introduced
Tanks end of life (80 yrs, TBC)
Space constraint
End of new consent
Base Case
Augmentatio n
Plant Upgrade
Minimal landscape reuse
No more space, require technology change
Enhanced Reuse or alt discharge
Reuse infrastructure installed
Advanced Treatment
New Secondary Process for low N& P limits
WDC Solids Waste Strategy
Regional Biosolids Strategy
Enhanced Biosolids Treatment
Digester Upgrade
Additional Digestion or pre-treatment
Satellite Plant
New satellite plant
New satellite plant
New satellite plant
Alternative Discharge
Alternative Discharge

Base case

– indicative layout (further work in Dec to Feb 21)

Advanced treatment for Higher Quality Effluent

- indicative layout (further work in Dec to Feb 21

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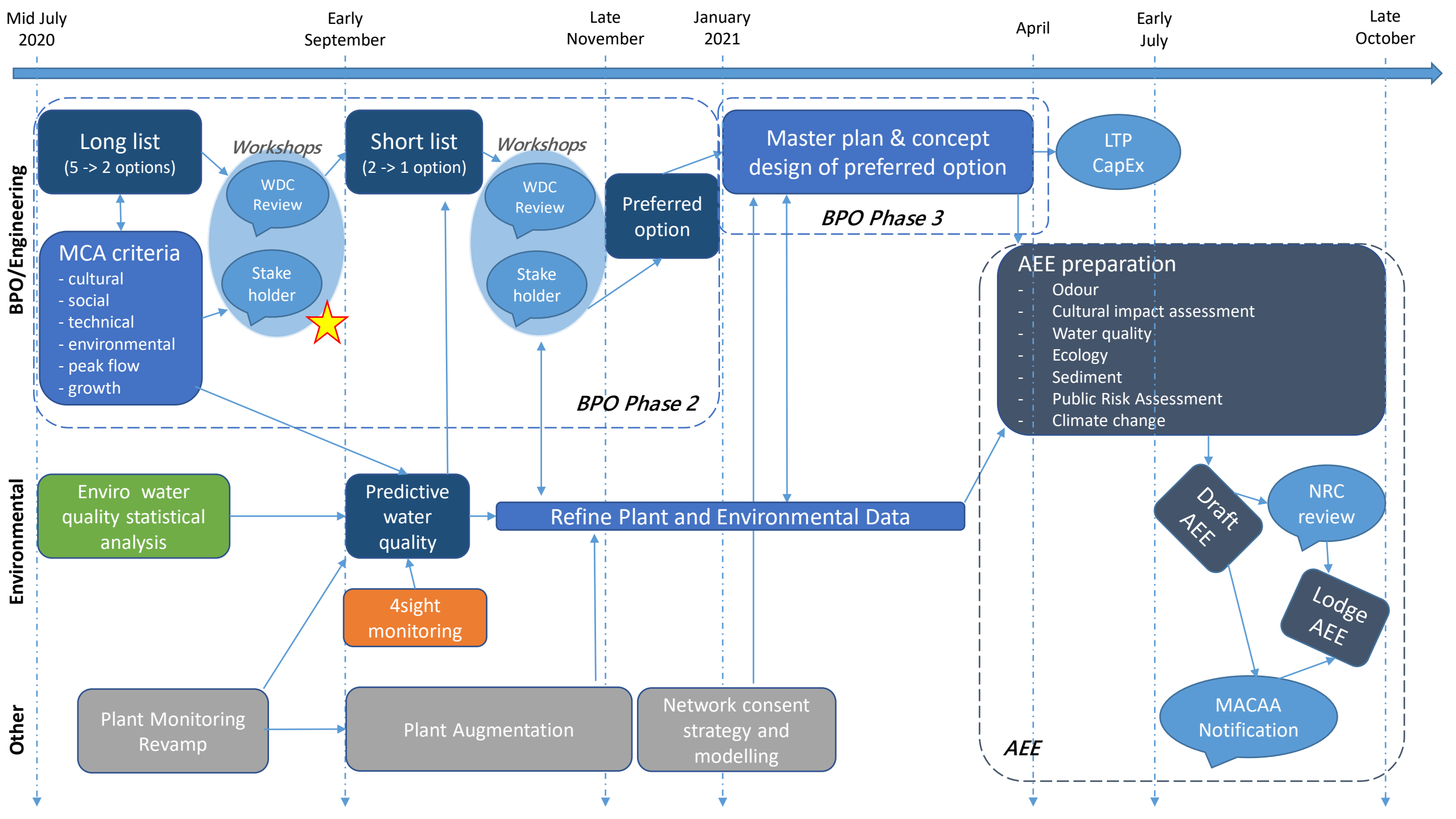
Questions?

Additional information

Link to slide

- Programme to consent lodgement
- Existing treatment plant
- Growth forecast (including flows)
- Receiving environment
- Original Long list options
- MCA assessment criteria

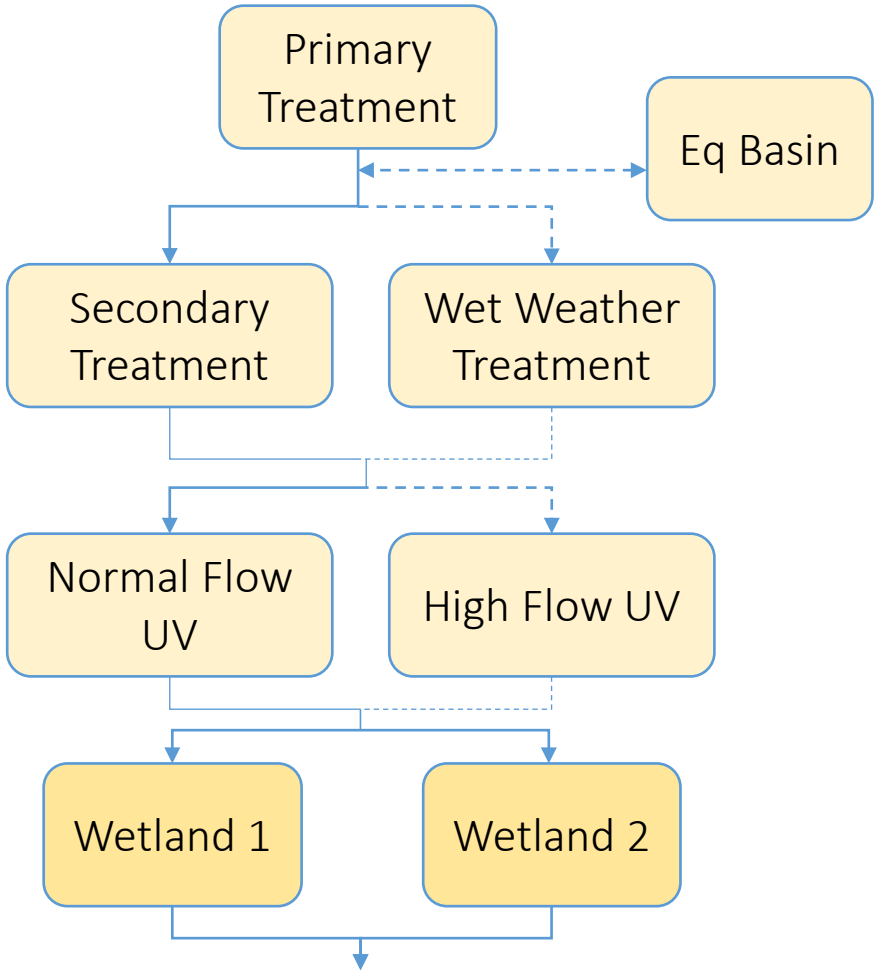
Programme to Consent Lodgement (July 2020)

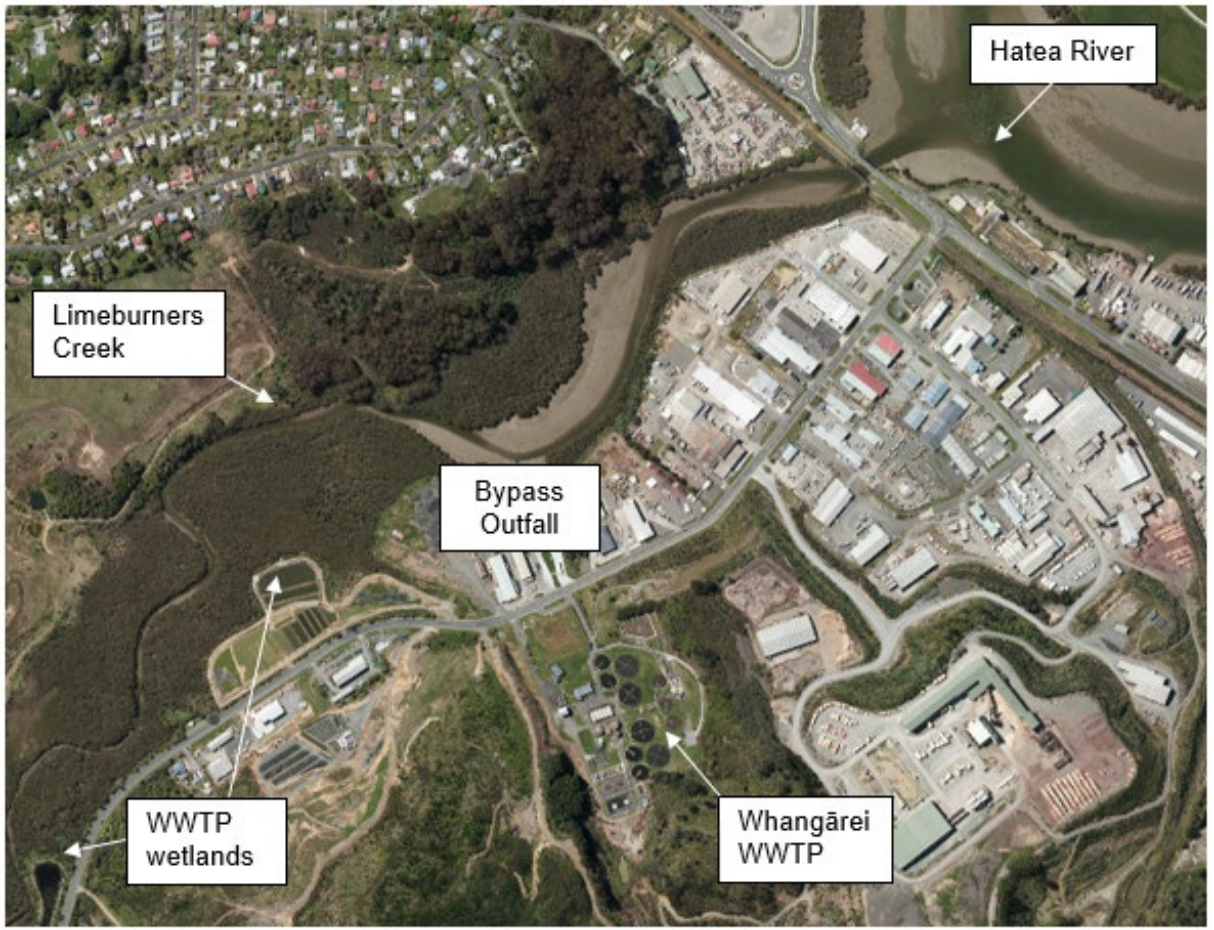

Mid July 2020
Early September
Late November
January 2021
April
Early July
Late October
BPO/Engineering
Environmental
Other
Long list
(5 -> 2 options)
MCA criteria
- cultural
- social
- technical
- environmental
- peak flow
- growth
Workshops
WDC Review
Stake holder
Short list
(2 -> 1 option)
Workshops
WDC Review
Stake holder
Preferred option
BPO Phase 2
Master plan & concept design of preferred option
BPO Phase 3
LTP CapEx
AEE preparation
- Odour
- Cultural impact assessment
- Water quality
- Ecology
- Sediment
- Public Risk Assessment
- Climate change
Draft AEE
NRC review
Lodge AEE
MACAA Notification
AEE
Enviro water quality statistical analysis
Predictive water quality
4sight monitoring
Refine Plant and Environmental Data
Plant Monitoring Revamp
Plant Augmentation
Network consent strategy and modelling

Existing Treatment Plant, Growth Forecast and Receiving Environment

Home – additional information

Existing plant





Existing plant – capacity summary

Light loading
Possible future capacity issue
No/little extra capacity

Wastewater Treatment	Current capacity
Inlet works	
Primary clarifiers	
Trickling filters	
Anoxic selector	
Activated sludge basin	
Secondary clarifiers	
Normal flow UV	
Trickling filters	
Storm clarifiers	
High flow UV	

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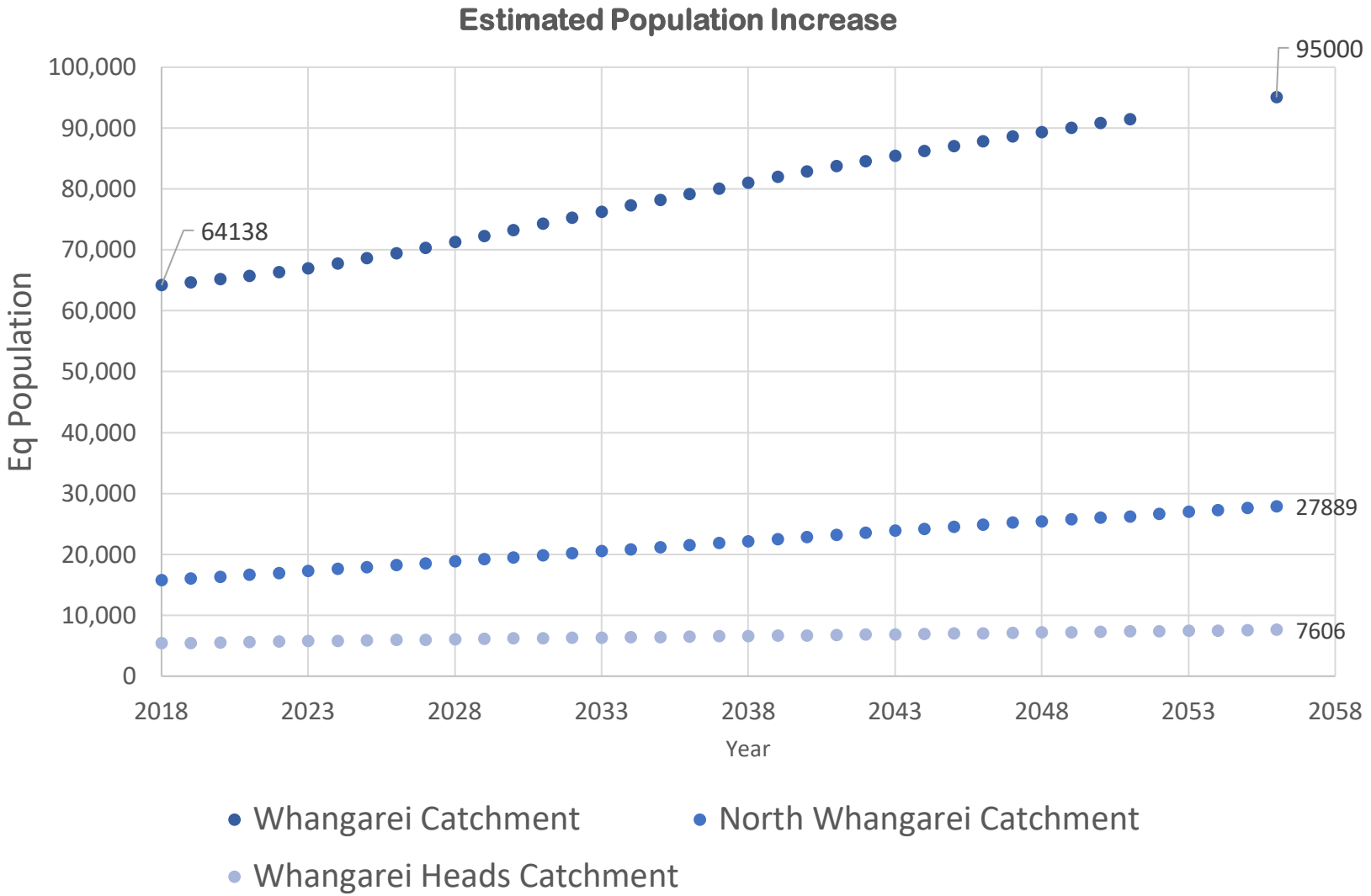
Predicted population growth

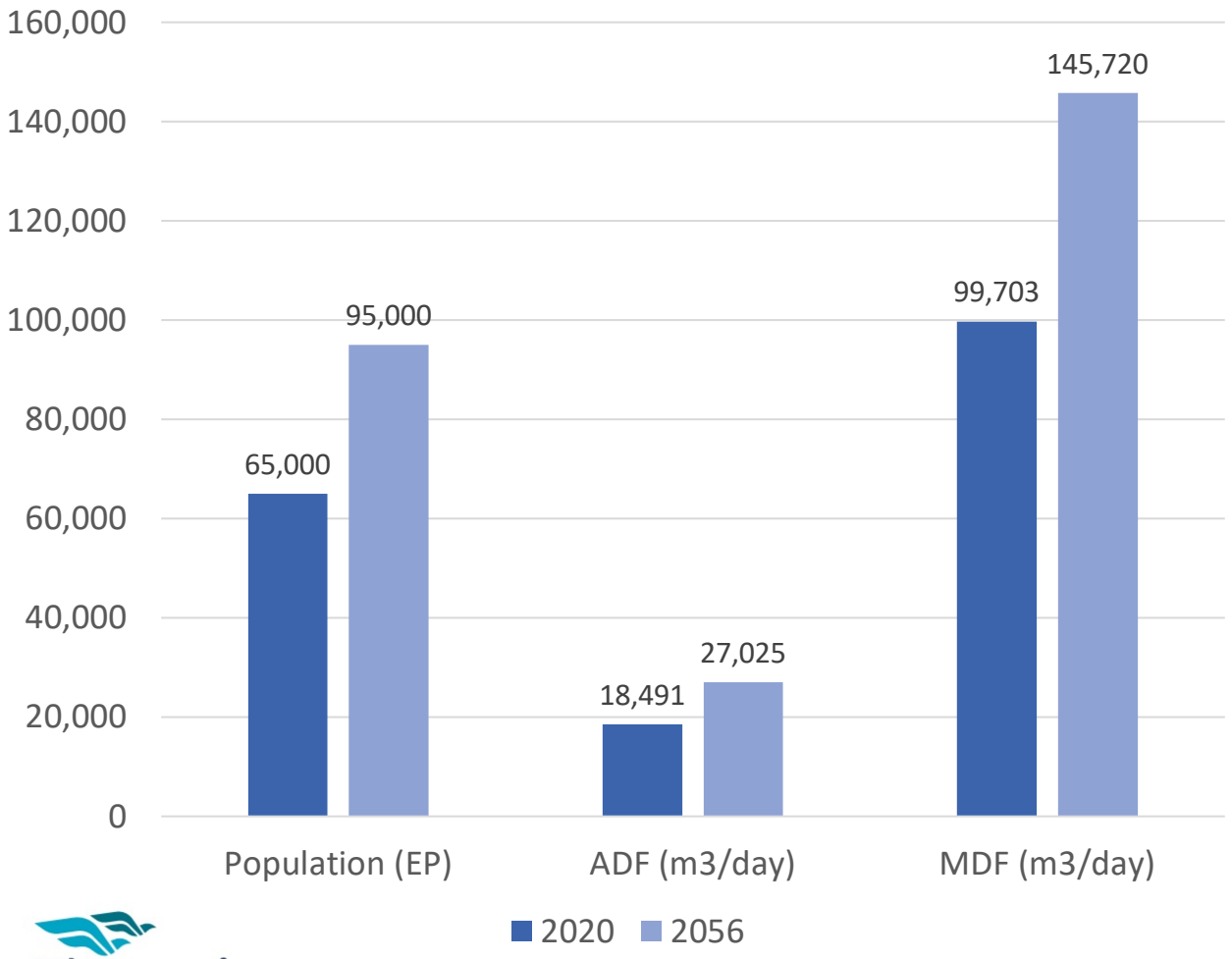
WDC seeks 35 years resource consent, extrapolating population forecast between 2018 and 2051, to 2056

Potential satellite schemes:

- North Whangarei
- Whangarei Heads



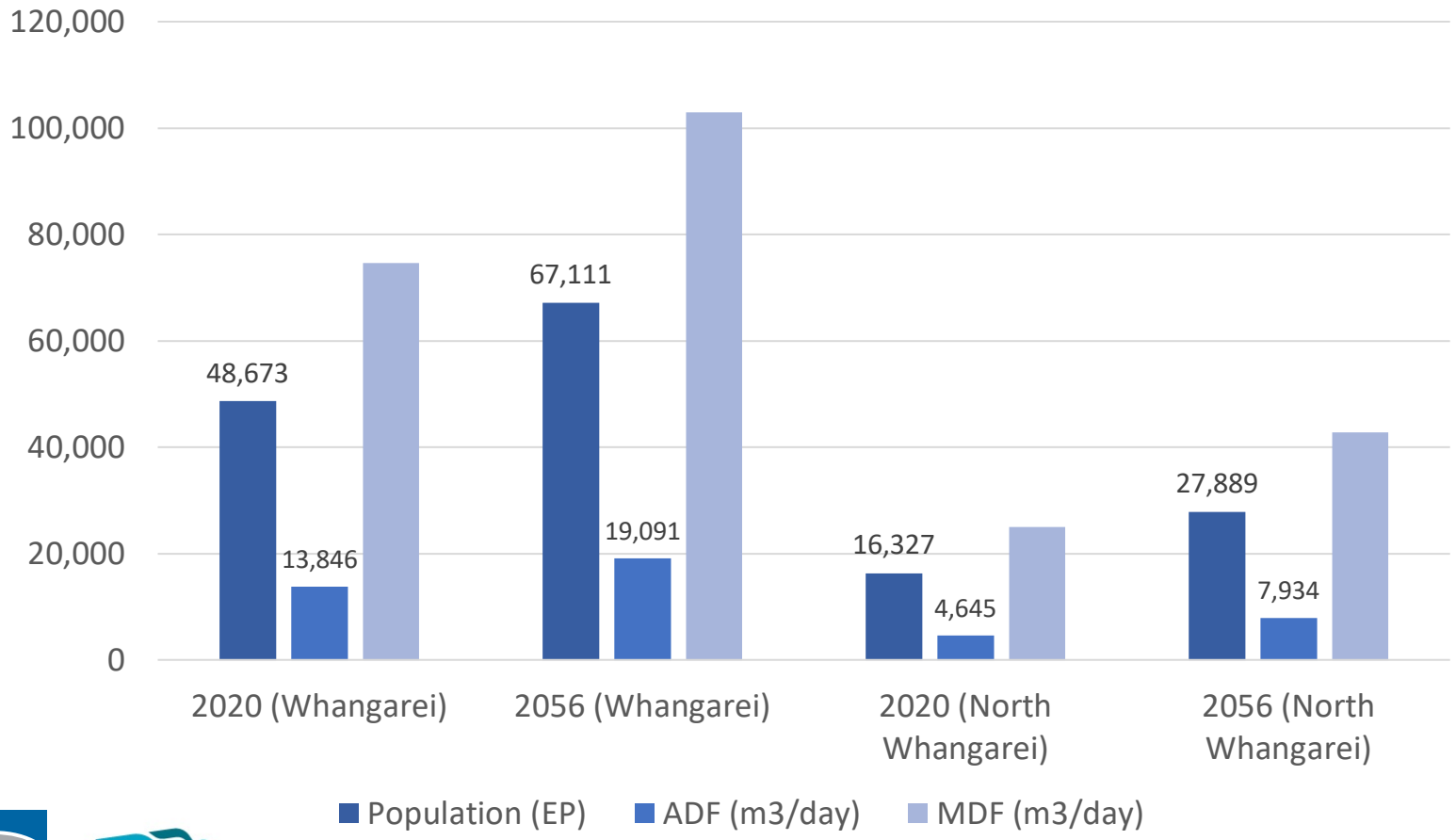
Plant flows – Whāngarei WWTP



Whāngarei catchment

46% increase in flow from 2020 to 2056

Plant flows – North Whāngarei (Satellite) and Whāngarei WWTPs

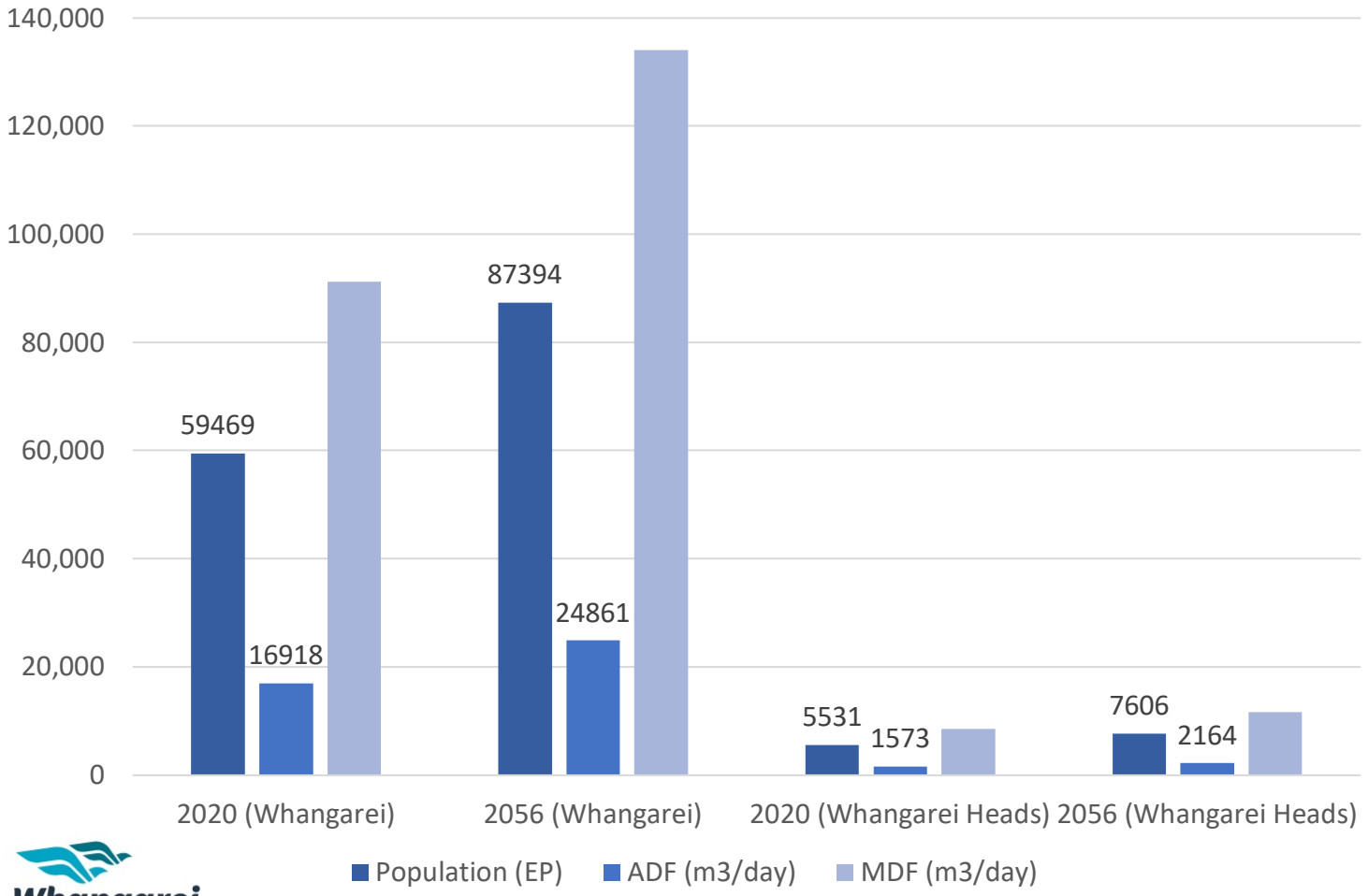


Whāngarei WWTP - 38% increase in flow from 2020 to 2056

North Whāngarei Satellite WWTP - 71% increase in flow from 2020 to 2056

Diverted 30% of flow to North Whangarei scheme

Plant flows – Whāngarei Heads (Satellite) and Whāngarei WWTPs



Whāngarei WWTP, 47% increase in flow from 2020 to 2056

Whāngarei Heads Satellite WWTP, 38% increase in flow from 2020 to 2056

Diverted 8% of flow to Whangarei Heads scheme

Receiving environment

- Two wetlands, numerous cascades into the Limeburners Creek, then to Hatea River.
- The creek is influenced by urban activities, hence generally not known for swimming and shellfish gathering currently.
- Higher contribution of nutrients into the Hatea River during summer.

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Long List Options

Long List Options Summary

1. Upgrade Existing Plant, Same Discharge
2. Process Intensification, Same Discharge

One Treatment Plant, Same Receiving Environment

3. Satellite Scheme for Northwest area
4. Satellite Scheme for Whangarei Head area

Satellite Scheme Alternatives

5. Relocate Whangarei WWTP, discharge to lower harbour
6. Upgrade Existing Plant, pump to ocean outfall
10. Upgrade Existing Plant, pump to lower harbour for discharge

7. Dry Weather land-based discharge
8. Partial dry weather land-based discharge

9. Deep Bore Injection

Alternative receiving environment

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1) Plant expansion, existing discharge

Option Description and Treatment Process:	Additional capacity of Peak Flow treatment, Primary clarifiers and second AS basin, filter/UV system Additional Biosolids capacity
Discharge Method and Location:	Existing wetlands (100%) then to the Limeburners Creek

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2) Process intensification, existing discharge

Option Description and Treatment Process:	Additional Peak Flow Treatment, Primary clarifers, filter/UV system, Secondary Treatment may involve conversion of AS Basin into Membrane Bioreactor (MBR) or Membrane Aerated Biofilm Reactor (MABR) Additional Biosolids capacity
Likely Discharge Method and Location:	Existing wetlands (100%, excluding wet weather flow to Limeburners)

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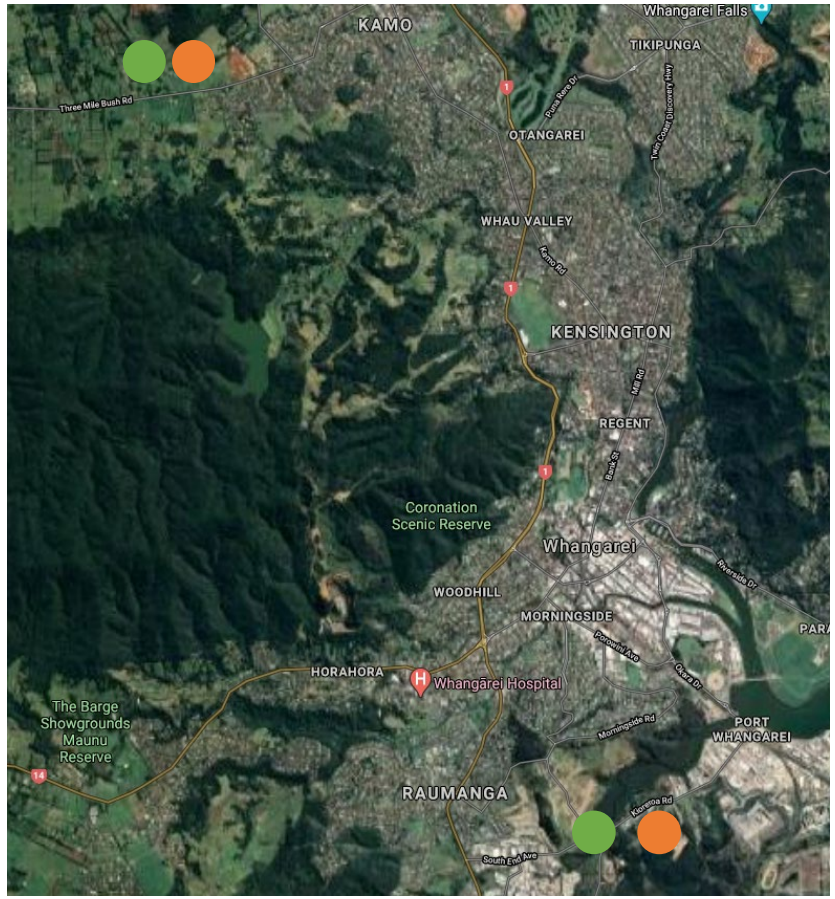
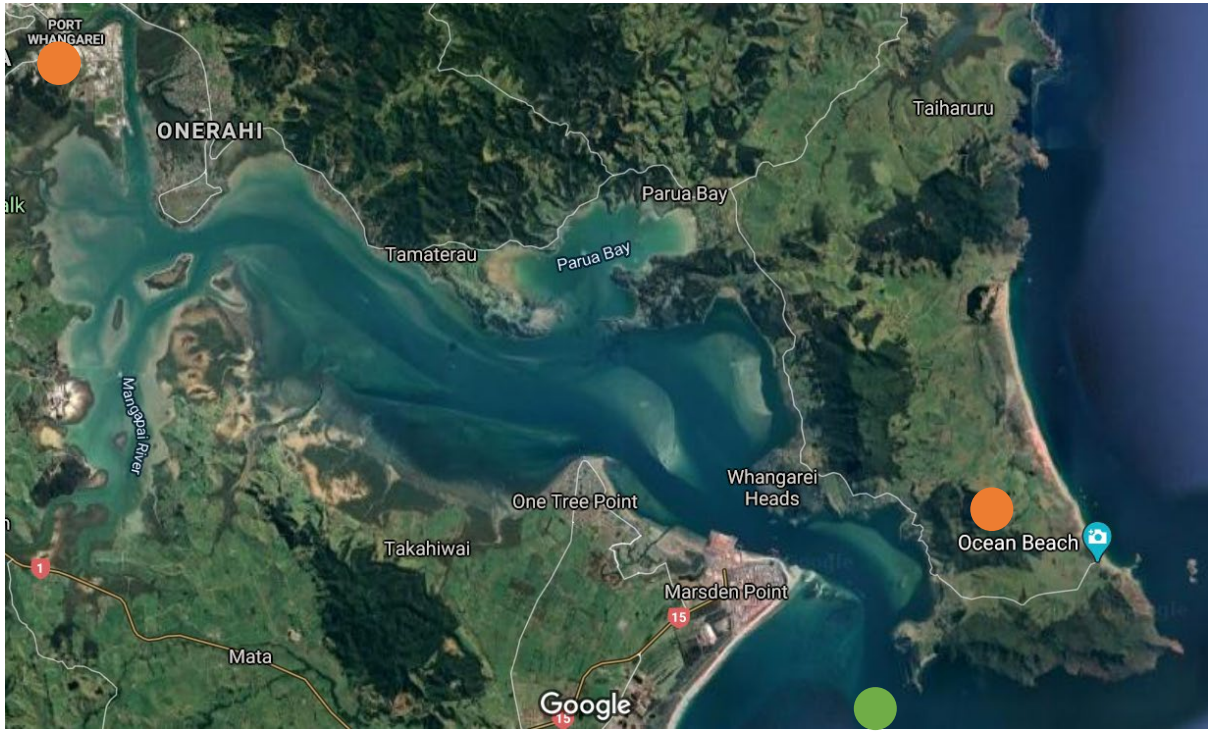
3) Existing site, North Whāngarei satellite plant



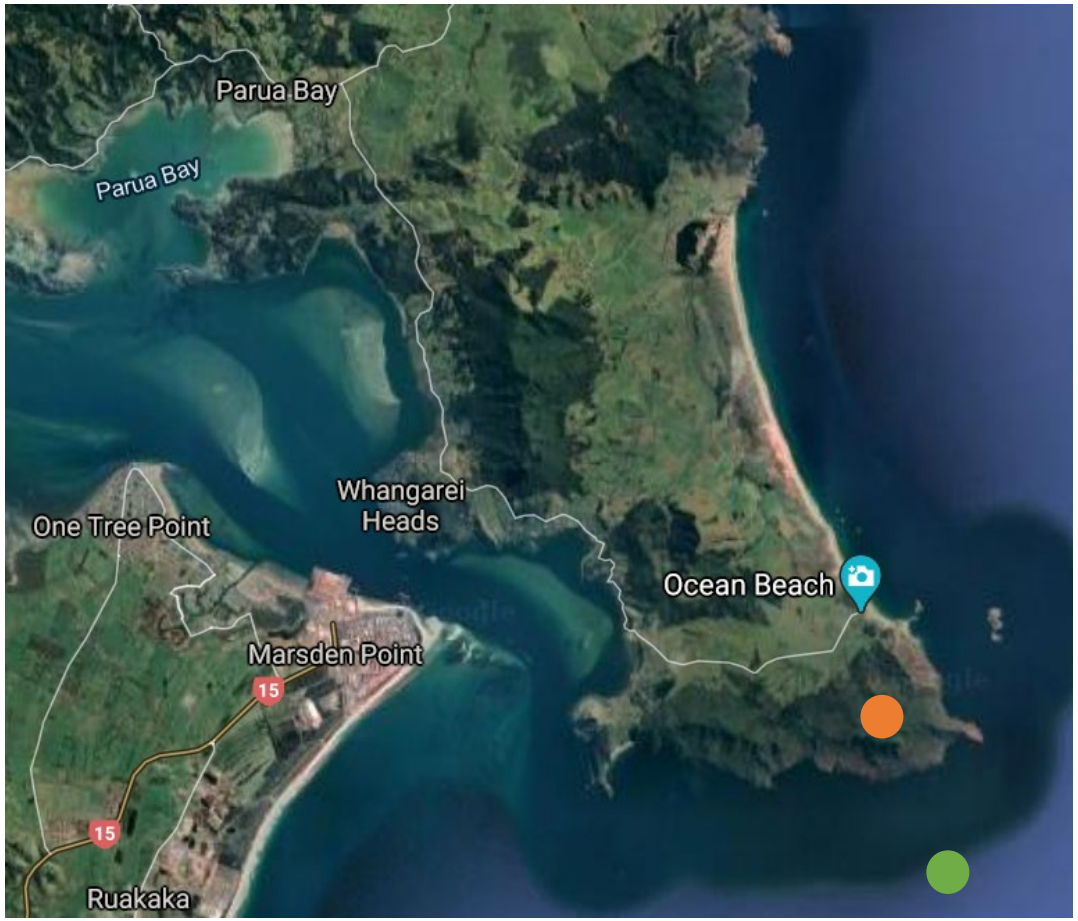
Option Description and Treatment Process:	New satellite scheme for Northwest catchment, built over the next 10 years Upgrade current Whangarei WWTP like Option 1, with smaller flow increase Centralised biosolids management
Likely Discharge Method and Location:	Northwest WWTP treated effluent to land-based discharge (~200ha) with a storage pond Existing Whangarei WWTP – continue with wetlands and into the Limeburners Creek

4) Existing site, Whāngarei Heads satellite plant



Option Description and Treatment Process:	New scheme for Whangarei Head Upgrade current Whangarei WWTP like Option 1, with smaller flow increase Centralised biosolids management
Likely Discharge Method and Location:	Main WWTP continues to discharge into wetlands then into the Limeburners Creek Whangarei head WWTP treated effluent to lower harbour outfall (2.1 ML/d in 2056)

5) Relocate plant, ocean discharge



Option Description and Treatment Process:	Relocate WWTP to Whangarei Head, comprising new primary, secondary and tertiary treatment with new biosolids facilities.
Likely Discharge Method and Location:	New ocean outfall (100% flow)

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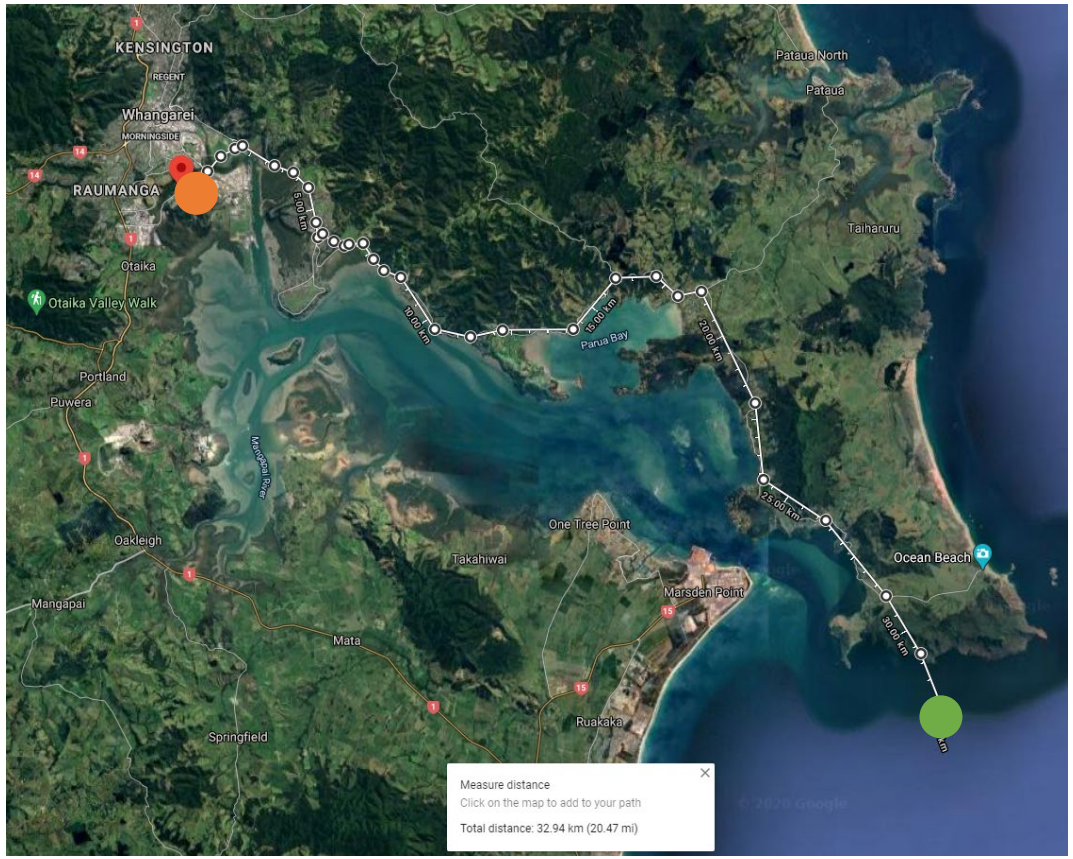
6) Plant expansion, ocean discharge



Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1, except tertiary filtration may not be required.
Likely Discharge Method and Location:	New rising main 33km for 100% flow to Whangarei Head New ocean outfall

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7) Plant expansion, land based discharge

Land based discharge site TBD

Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1
Likely Discharge Method and Location:	New land based discharge (100% ADF), 760ha Wet weather flow discharged to wetland then to Limeburners Creek

8) Plant expansion, partial land based discharge

Land based discharge site TBD

Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1
Likely Discharge Method and Location:	New land based discharge (nominal 100ha, ~13% ADF, higher in summer) Remaining to existing wetlands and Limeburner Creek

9) Plant expansion, deep bore injection

Deep bore injection site TBD

Option Description and Treatment Process:	Capacity upgrade at Whangarei WWTP, followed by Advanced WTP (e.g. MF/RO) as required
Likely Discharge Method and Location:	Deep bore injection (100% treated effluent)

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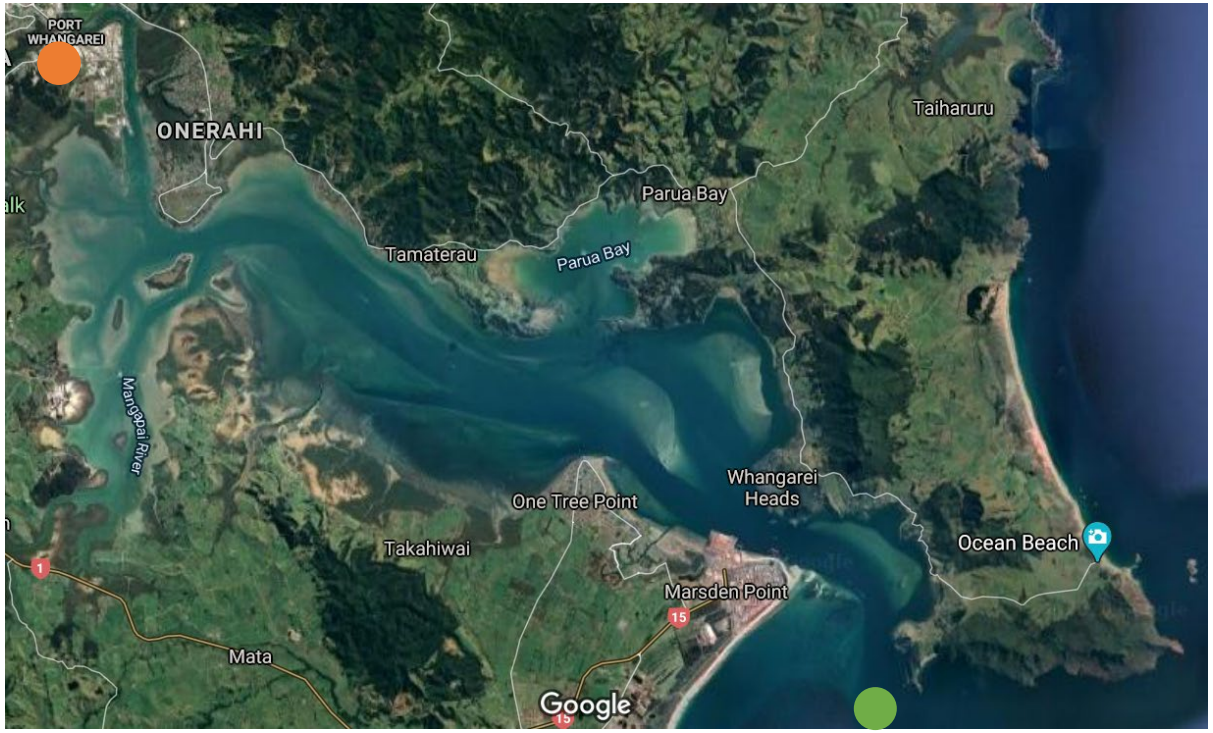
10) Plant expansion, lower harbour discharge



Option Description and Treatment Process:	Upgrade current Whangarei WWTP like Option 1
Likely Discharge Method and Location:	New rising main 30km for 100% flow to Whangarei head area New lower harbour outfall

Scoring Long List Options

MCA assessment criteria

Investment objectives

- Consentability (long term consent)
- Enhanced health and environmental outcomes
- Community affordability
- Operation robustness, efficiency and reliability

Environmental/ cultural/ social factors

- Impact on Limeburner creek and upper harbour quality
- Impact on groundwater quality
- Impact on adjacent land use options
- Cultural acceptability
- Community acceptability

Critical success factors

- Consenting pathway
- Constructability
- Long term flexibility
- Risk factors

Long list scoring

5	*Strongly meets the criteria in all respects*
4	*Meets the criteria in most respects*
3	*Only partly meets the criteria*
2	*Does not meet the criteria*
1	*Fails to meet and is contrary to the criteria*
0	*Fatal Flaw*

All options will be scored against this same set of criteria, for an objective evaluation of benefits, risks and challenges.

GHD

Whangarei District Council

From:	Sarah Irwin
To:	Simon Charles; Hai Nguyen; Johanna.Dones@northlanddhb.org.nz; Mira Norris; Nicki Wakefield; Dave West; Erica Wade; shanehenare@yahoo.co.nz; Rudi Hoetjes; Laura Wakelin; northern.branch@forestandbird.org.nz
Cc:	Sarah Sunich
Subject:	WWTP technical group meeting
Date:	Tuesday, 11 May 2021 9:56:41 am
Attachments:	image003.png image002.png AA2782_WDC_WWTP Water Quality Monitoring Report_FINAL.pdf 12528591-REP-Whangarei WWTP Options Report v2 (April 21).pdf

Kia ora,

Please find attached the final draft options report for the WWTP and the 4sight sediment and water quality assessment report (this is being incorporated into a larger WQ and public health report for the AEE).

We would like to discuss the options report with the technical group and come up with a preferred initial pathway for us to take forward for the AEE and ensure all is on the right track. The sediment AND WATER QUALITY IS FOR YOUR INFOMRATION.

Potential dates for the meeting are below - if you can please click in the doodle link and select the options that you are able to attend.

https://doodle.com/poll/bzbe27r2d9nukpvq?utm_source=poll&utm_medium=link

- Tuesday 25th May
- Thursday 27th May
- Monday 31st May
- Tuesday 1st June
- Thursday 3rd June.

Kind regards

Sarah Irwin

Team leader – Infrastructure Planning | Infrastructure
Whangarei District Council | Walton Plaza | Private Bag 9023, Whangarei 0148 | www.wdc.govt.nz
P 09 430 4200 | **DDI 09 945 4370** | **M 021 240 7973** | **E** sarah.irwin@wdc.govt.nz
Like us on Facebook

Whangarei District Council

From:	Sarah Irwin
To:	Johanna.Dones@northlanddhb.org.nz; Sarah Sunich; Anthony Kirk; Ian Ho; Simon Charles; Hai Nguyen; Dave West; Forest & Bird, Northern Branch; Rudi Hoetjes; Mira Norris; nicki@matakohe.org.nz; Georgina Olsen; Shane Henare; Erica Wade
Subject:	Minutes from WWTP technical working party
Date:	Monday, 21 June 2021 9:37:06 am
Attachments:	image003.png image004.png 12528591-PPT-Whangarei DAPP Report Update Workshop-20210601.pdf 1252859-MIN_Whangarei WWTP Technical Group Workshop 010621.docx

Kia ora,

Please find attached the minutes and presentation from the last technical working party meeting.

I will follow up with those who weren't able to make the meeting later this week once you have had a chance to review.

Also attached is a link to a poll to set a time for the next workshop – this is likely to be the last before we have a draft AEE so would really appreciate your attendance.

https://doodle.com/poll/9t7d4w9szygb4rw9?utm_source=poll&utm_medium=link

Thank you for your involvement to date.

Kind regards

Sarah Irwin

Team leader – Infrastructure Planning | Infrastructure

Whangarei District Council | Walton Plaza | Private Bag 9023, Whangarei 0148 | www.wdc.govt.nz

P 09 430 4200 | **DDI 09 945 4370** | **M 021 240 7973** | **E** sarah.irwin@wdc.govt.nz

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Minutes

03 June 2021

Project name	Whangarei WWTP Consenting	**From**	Sarah Sunich
Subject	Technical Working Group – Workshop #3	**Tel**	=6421446925
Date / Time	1st June 2021, 10 – 1:30pm	**Project no.**	12528591
Attendees	Mira Norris (Te Parawhau – Resource Management Advisor) Georgina Olsen (CIA consultant) Johanna Dones (NDHB) Simon Charles (WDC) Sarah Irwin (WDC) Hai Nguyen (WDC) Ian Ho (GHD) Anthony Kirk (GHD) Sarah Sunich (GHD)	**Apologies**	Andy Keith (WDC) Shane Henare (Forest and Bird) Laura Wakelin (DOC) Rudi Hoetjes (Fish & Game Regional Manager)
Objective	Update group on environmental investigations and baseline monitoring results Seek endorsement for pursuing Dynamic Adaptive Pathway #1.		

Minutes	Notes	Action
Welcome	– Sarah Irwin gave a recap of the project, introduced the workshop purpose and agenda.	–
Adaptive Pathway	– Ian Ho revisited the DAPP approach and why WDC is pursuing with this approach. – Ian presented the DAPP diagram including a description of the different pathways (pathway 1a – 1d, 2 (which relate to liquid stream treatment) and 3 (which relates to alternative disposal) + comment on additional pathways for odour control ('4') and solids management ('5'). – MN noted iwi's abhorrence to the ocean outfall proposed for Ruakaka, and the offensive discharge there. – Ian discussed the next steps in terms of master planning – costing out augmentation works and endorsed pathway.	– Clarification/update on DAPP diagram: • Population – within Whangarei "city" • Add arrow of Trigger 1 to link to Pathway 2
Receiving Waters investigation	– Anthony Kirk provided a summary of Baseline Water & Sediment Quality Monitoring Data, 4Sight baseline ecological surveys, Baseline pathogen data and public health risk conditions in the Harbour – key issues for the harbour are sediment (not related to the WWTP) and pathogens (augmentation work to	–

Minutes	Notes	Action
	address improvements to pathogens from WWTP). – Anthony further presented next steps based on DAPP approach which is to confirm the appropriate triggers for implementing upgrades/reviews, how these triggers are to be monitored and reported. – SI noted that the water quality section of the PNRP is potentially going to be reviewed again in 2022. – Community in the upper catchment of the Awaroa Creek is on septic tanks, also a number of septic tanks still in use in Onerahi. – Oysters were prevalent in the Upper harbour. – Onerahi was a white sandy beach now prevalent in mangroves. – 3 permanent signs at the outlet of the Upper Harbour, one at the boat ramp at Onerahi Beach (north of the picture given on pg 17 of the presentation).	
Air Quality Monitoring Update	– Sarah S presented the FIDOL methodology being used to assess odour and the results of the two odour surveys completed. – Mira noted that in the evening, particularly in times of mist, the odour from the WWTP is notable (held low perhaps), particularly at the port rd bridge, across the bridge to Onerahi and as far as Kissing Point (following the valley and river). Mira considers the odours were particularly bad in the 90's and have worsened. – JD also noted historical odours from the old CHH site but this site has been closed now for a year. – The next steps are to finalise the assessment and identify triggers for upgrades/monitoring requirements in line with development of a specific odour control pathway in the DAPP.	–
Consent Application Preparation	– Sarah Sunich presented the timeline for the consent application process. – Technical investigations completed end of July. – Workshop #4 to be arranged for first week of August. – AEE preparation to occur over August/September. – Working group feedback on AEE will be requested in late September/early October. – Lodgement end of October.	–
Revisit to Pathways	– Those present generally endorsed the DAPP approach being taken. – In order for the group to make a more informed endorsement over the 'liquid stream' pathways, Ian has prepared the	–

Minutes	Notes	Action
	advantages and disadvantages to each of the pathways (refer to Attachment 1). – Agreement made to cost pathways 1b and 1d as part of master planning because: • 1b will require 1 major expansion within the consent period (unless NES trigger occurs). • Larger bioreactor in 1b is less sensitive to uncertainty of population growth. • Costing for 1b can be easily adapted for 1a. • 1d provides an alternative pathway to 1a/1b.	
Next Steps	– Endorsement for above approach sought through feedback from the Technical working group. – Workshop #4 to discuss finalised technical documentation. – Sarah Irwin/Georgina to discuss programme for CIA development.	–

ATTACHMENT 1: ADVANTAGES AND DISADVANTAGES TO EACH PATHWAY

Pathway	Advantage	Disadvantage
Pathway 1a – Improved Quality through staged expansion	Staged improvement of treated effluent quality to manage population growth Familiar treatment process to the operation team Staged expansion of new bioreactors thus no need to work around existing process.	Relying on old trickling filters and secondary clarifier tanks (>30 years old) to perform for the next 30 years New secondary clarifiers #3 and 4 could become redundant if future technology changes.
Pathway 1b – Improved Quality through a large bioreactor instead of two tanks	Familiar treatment process Larger bioreactor than Pathway 1a thus manage greater growth up-front	Same as 1a Higher initial Capex than 1a Complexity associated with significantly larger structure.
Pathway 1c – Converting into MBR during the consent period	Similar technology to Pathway 2, thus more efficient in nutrient removal. Staged approach to change in technology – more manageable lead in time for replacement of existing infrastructure than Pathway 2. Introduction to more compact technology thus of benefit on this compact site and capable of	Significantly higher Capex Higher operating cost associated with process aeration and membrane cleaning.

	catering for a larger population than pathways 1a, 1b and 1d.	
Pathway 1d – Side-stream MBR	Better final effluent quality than Pathway 1a and 1b in terms of TSS, BOD_5 and pathogens Staged expansion of MBR (by removing trickling filters) Able to cater for a larger population within the existing site footprint	Additional operational complexity associated with MBR (two types of technology being operated) Higher operating cost associated with process aeration and membrane cleaning
Pathway 2 – Converting into MBR at the start of the consent period ("Enhanced Quality"	Compared to Pathway 1, significant improvement in discharge quality immediately by a new treatment process (e.g. MBR) Able to cater for a larger population within the existing site footprint	Very high capital cost as existing plant assets will be replaced by a new treatment process High operating costs associated with process aeration and membrane cleaning. May require another extensive upgrade if the future NES is significantly more stringent than the assumptions being made.

Whangarei WWTP

→ Technical Group Meeting
(June 2021 Update)

Workshop Agenda and Purpose

– **Purpose**
  - Provide an outline of recent environmental monitoring (air quality and water quality)
  - Seek endorsement for pursuing Dynamic Adaptive Pathway #1

– **Agenda Items**
  - Project Recap
  - WWTP Dynamic Adaptive Planning Pathway
  - Receiving Water Investigations update
  - Break
  - Air Quality Monitoring update
  - Consent Application programme and update
  - Next Steps – workshop in Sept 21(TBA)

Recap from last Meetings

Previous workshops:

- Long List Options (Oct 2020)
- Shortlisted Options / Introduction to Dynamic Adaptive Planning (Nov 2020)

Actions since the last workshop:

- Whangarei WWTP Consenting – Options Report (4th April 21)
- Whangarei WWTP Water Quality Assessment – Working draft (Apr/May)
- Two round of Air Quality survey (March and May)

Adaptive Pathway Planning

Project Drivers

From the consultation with key stakeholders, a range of drivers have been identified. Significant drivers that impact future planning include:

1. Population growth from 65,000 to 90,000
2. Receiving environment protection
3. Ongoing changes in regulations
4. Climate resilience e.g. recycled water, frequency and intensity of rainfall events

Adaptive pathways planning is a practical planning approach that has been developed in recent years in response to the need to plan for long term and potentially uncertain futures.

This approach helps embed adaptive responses into the short-medium actions that need to be taken, and leaves options open for the future if needed.

This approach leads to an adaptive and flexible plan to change as the future unfolds, and avoid redundant infrastructure being built.

Pathways planned

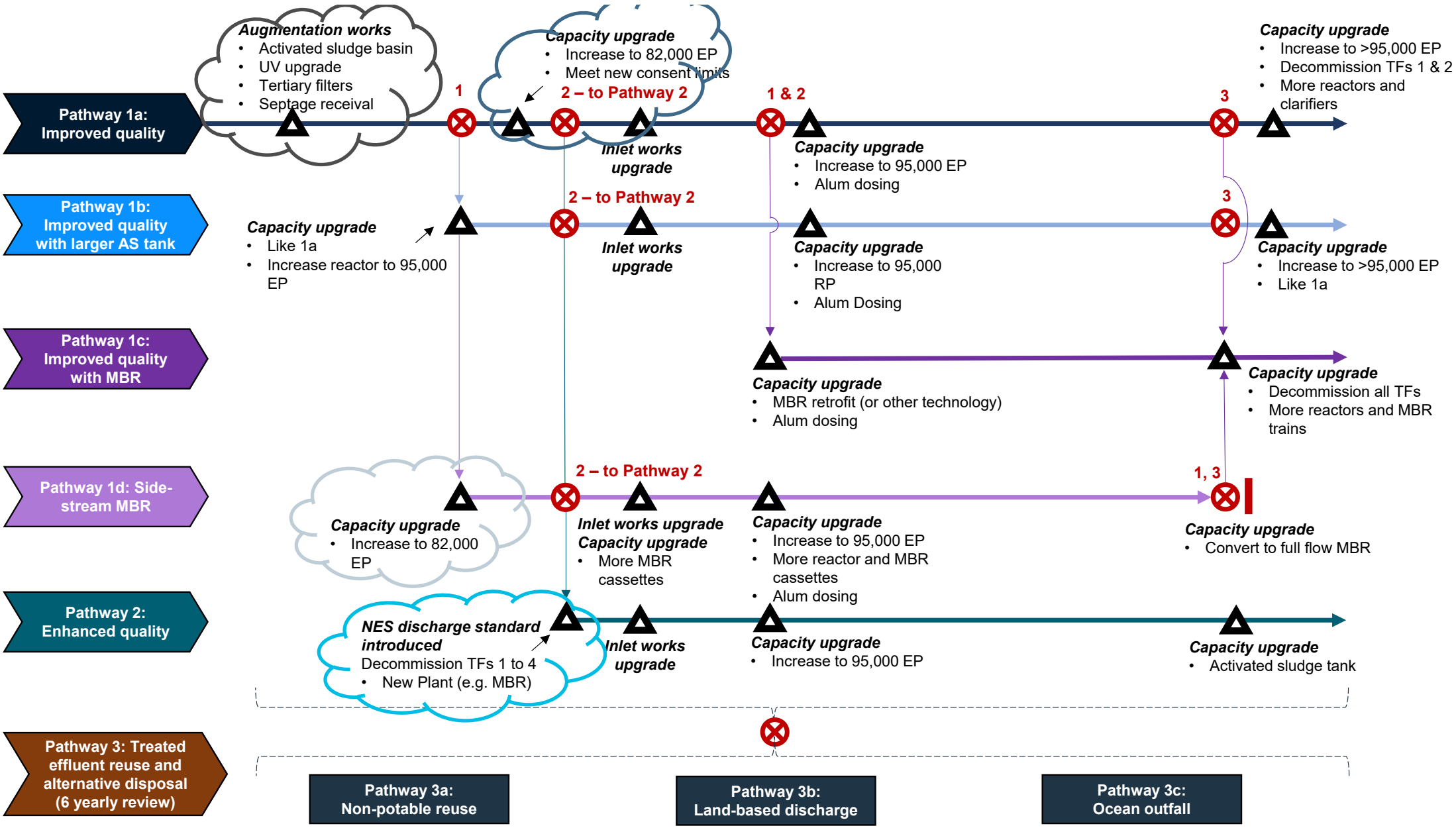
- **WWTP Augmentation** – this achieves improvement in ammonia, suspended solids and disinfection performance.
- **Pathway 1 Improve quality** – this assumes general improvement in discharge quality while nitrogen and phosphorus mass loads be maintained over the next 35 years. This splits into 4 sub-pathways.
- **Pathway 2 Enhanced quality** – this responds to a potential future scenario tighter coastal discharge standards may come into effect.
- **Pathway 3 Reuse and Alternative Disposal** – this considers the use of recycled effluent in public space irrigation for the interim, and ongoing exploring/review of alternative effluent disposal routes.

DAPP Pathway Key

Pathway ends

Infrastructure upgrade

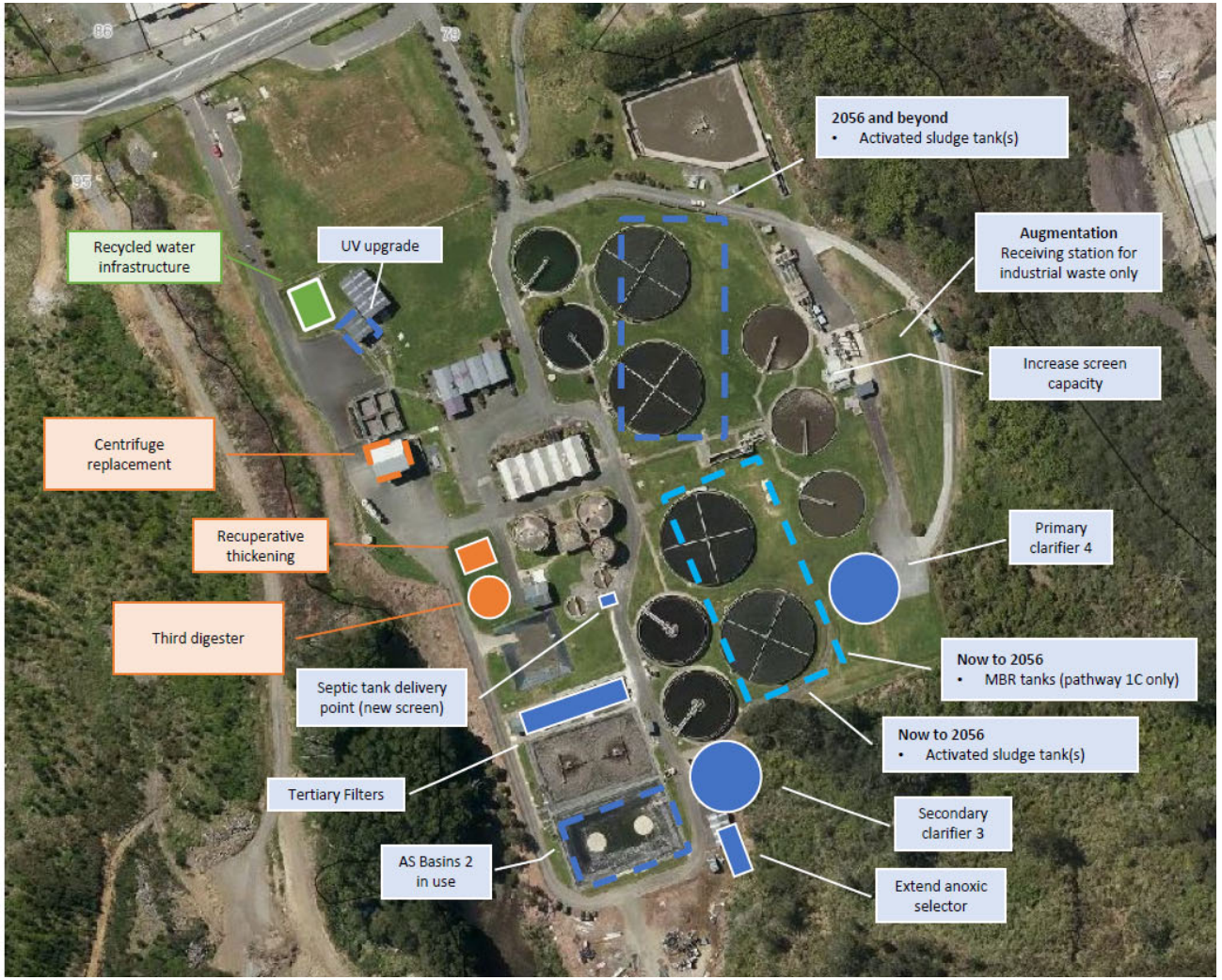
Key decision point
Example drivers:
1. Growth
2. Discharge standards
3. Resource consent expiry
4. GHG target


Pathway 1a: Improved quality
Pathway 1b: Improved quality with larger AS tank
Pathway 1c: Improved quality with MBR
Pathway 1d: Side-stream MBR
Pathway 2: Enhanced quality
Pathway 3: Treated effluent reuse and alternative disposal (6 yearly review)
Augmentation works
• Activated sludge basin
• UV upgrade
• Tertiary filters
• Septage receival
1
Capacity upgrade
• Increase to 82,000 EP
• Meet new consent limits
2 – to Pathway 2
Inlet works upgrade
1 & 2
Capacity upgrade
• Increase to 95,000 EP
• Alum dosing
3
Capacity upgrade
• Increase to >95,000 EP
• Decommission TFs 1 & 2
• More reactors and clarifiers
Capacity upgrade
• Like 1a
• Increase reactor to 95,000 EP
2 – to Pathway 2
Inlet works upgrade
Capacity upgrade
• Increase to 95,000 RP
• Alum Dosing
3
Capacity upgrade
• Increase to >95,000 EP
• Like 1a
Capacity upgrade
• MBR retrofit (or other technology)
• Alum dosing
Capacity upgrade
• Decommission all TFs
• More reactors and MBR trains
Capacity upgrade
• Increase to 82,000 EP
2 – to Pathway 2
Inlet works upgrade
Capacity upgrade
• More MBR cassettes
Capacity upgrade
• Increase to 95,000 EP
• More reactor and MBR cassettes
• Alum dosing
1, 3
Capacity upgrade
• Convert to full flow MBR
NES discharge standard introduced
Decommission TFs 1 to 4
• New Plant (e.g. MBR)
Inlet works upgrade
Capacity upgrade
• Increase to 95,000 EP
Capacity upgrade
• Activated sludge tank
Pathway 3a: Non-potable reuse
Pathway 3b: Land-based discharge
Pathway 3c: Ocean outfall

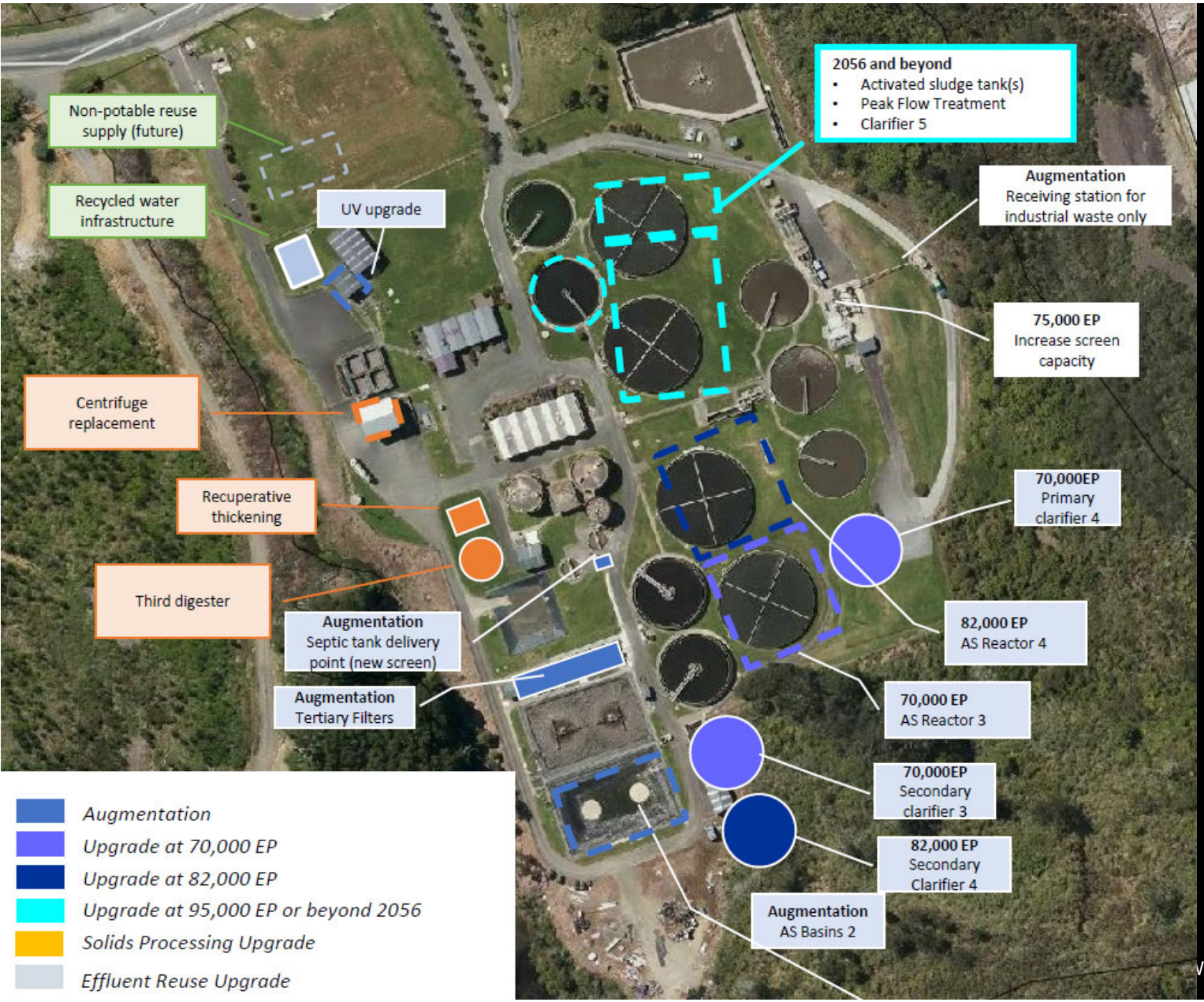
Future Changes to the Whangarei WWTP

Pathway 1

- Effluent TN ~ 20 mg/L
- General schematic showing pathways 1a, 1b, 1c, 1d



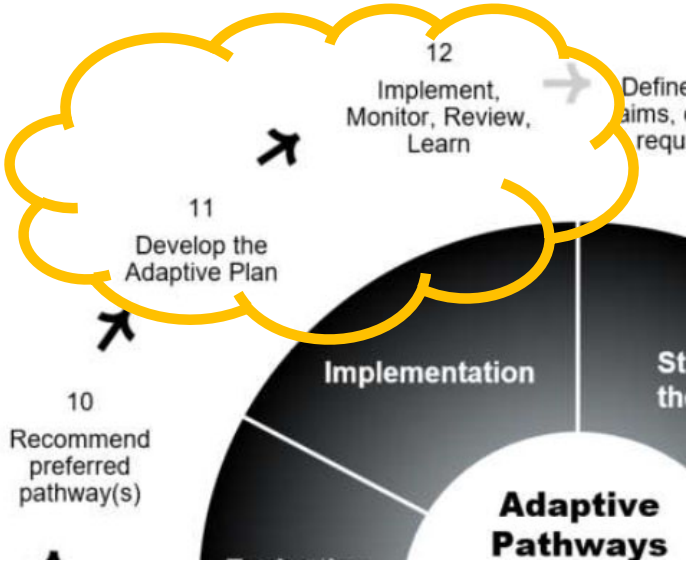
Example - Pathway 1a



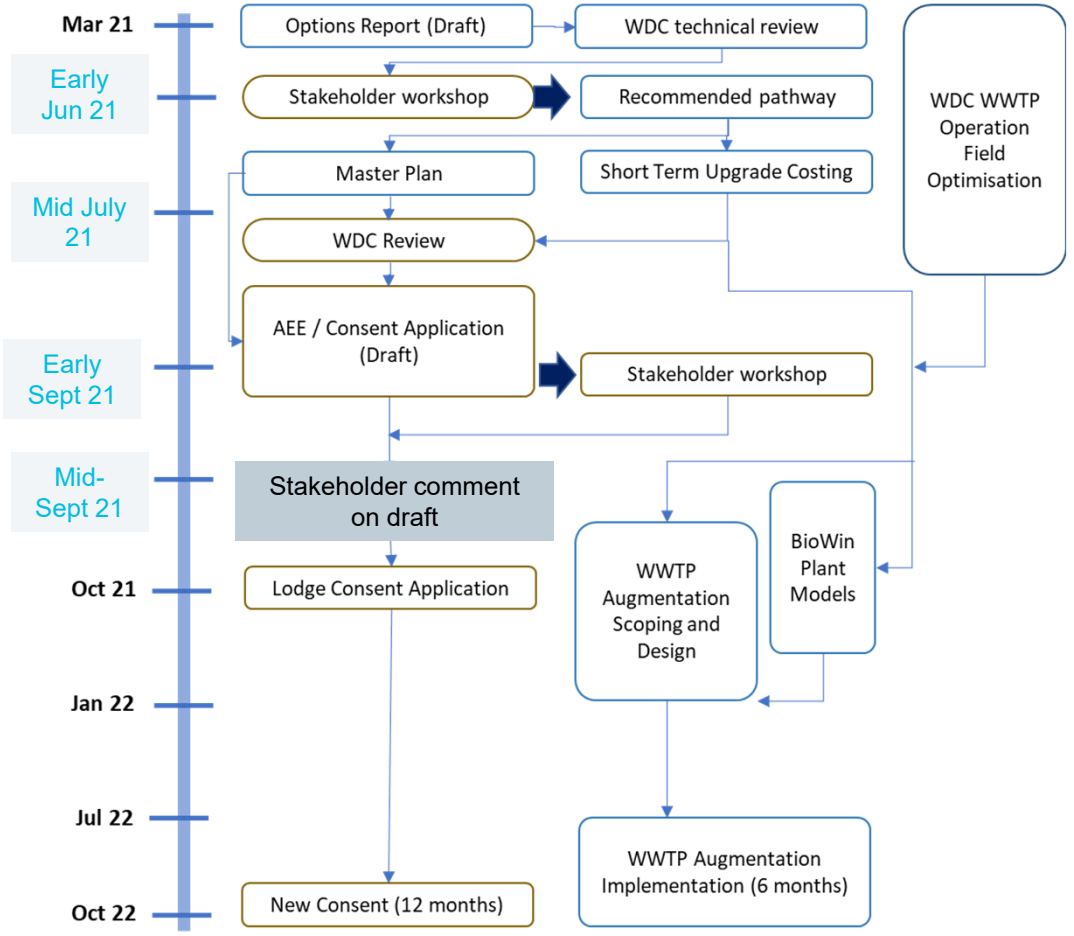
- Strong similarities to the existing plant set-up
- Keep nitrogen and phosphorus loads to receiving environment
- Staged Upgrade to match growth
- Flexible to switch to different sub-pathways

What's next?

- Making DAPP a living document
  a. *Ongoing Monitoring and Enabling Studies*
  b. *Periodic review of drivers and triggers*
  c. *Consent Application*
- Master Plan Document (with cost estimates)
- Plant Augmentation implementation



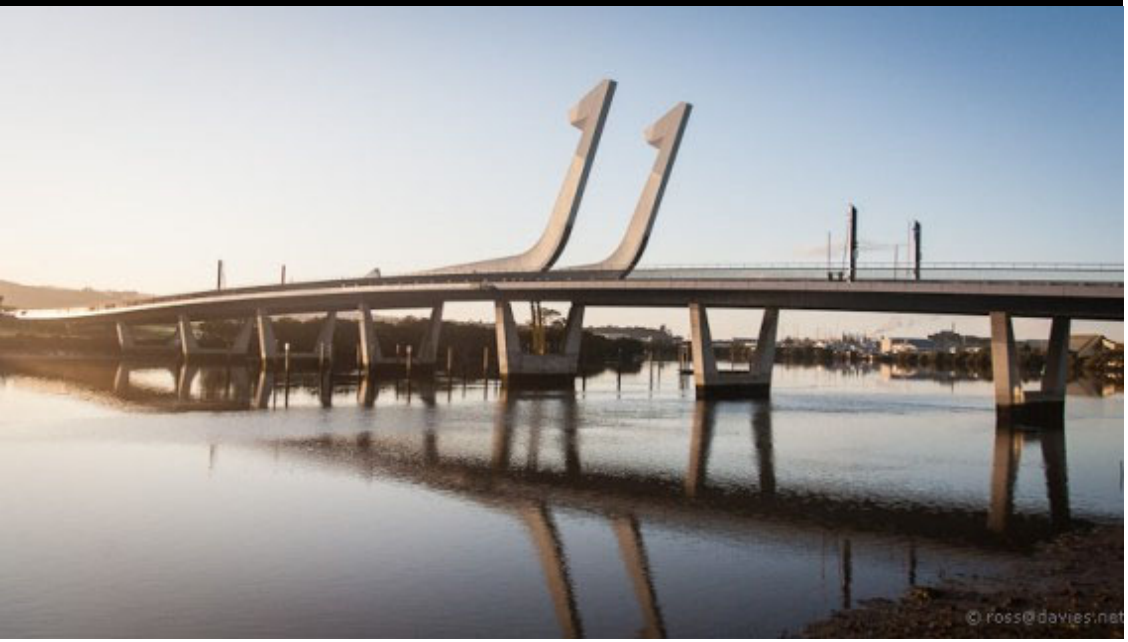
Original Programme in Options Adaptive Pathway Report



Water Quality Assessment

Aspects Considered:

- Hydrodynamics
- Water quality
- Public health risk
- Sediment
- Ecology



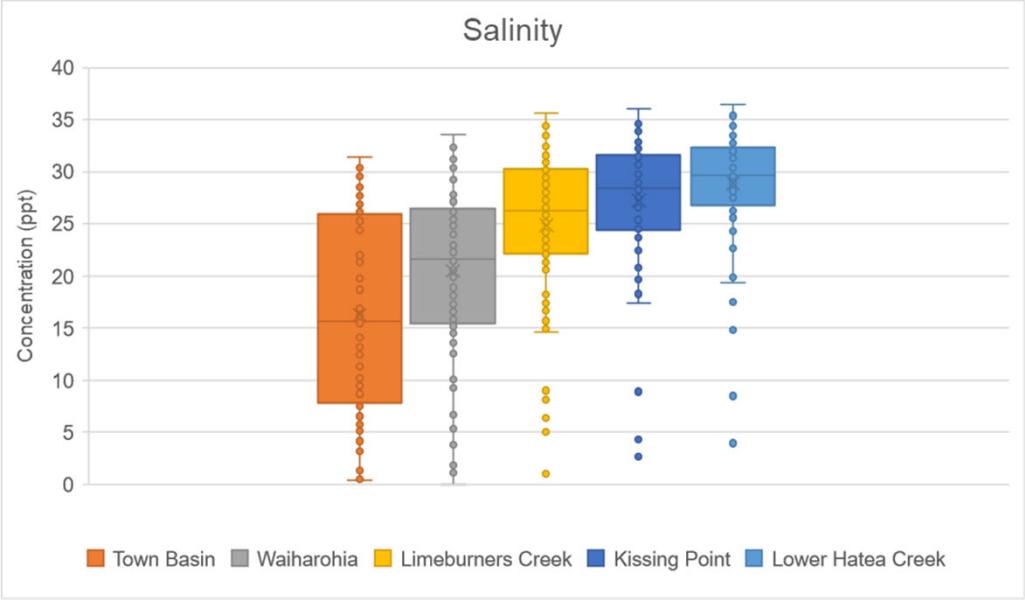
Water quality benchmark is provided by the PNRP water criteria. This sets out to achieve **no further degradation** of the Hatea River.

The approach to assessment:

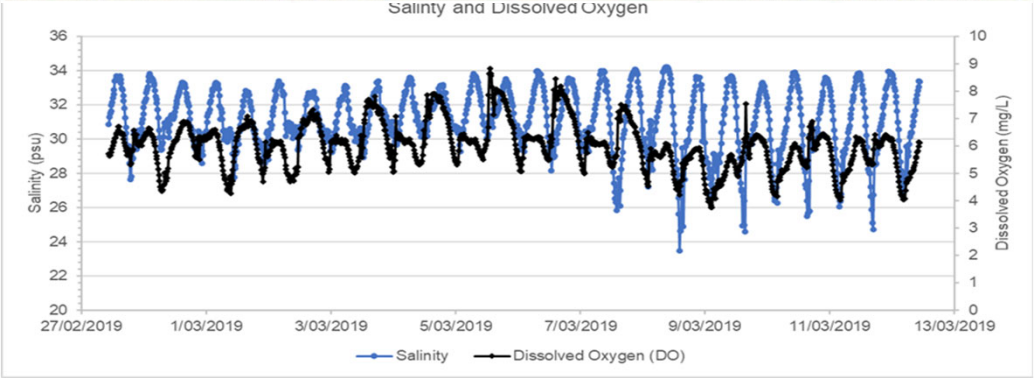
1) Understand the current influence of discharges
2) Identify any current key issues that need immediate improvement
3) Develop a framework for determining when changes to the WWTP are needed (adaptive approach)

Hydrodynamics

- Tidal flushing of Hatea River greatest from Limeburners Creek
- Greatest salinity and mixing at high tide
- Greatest freshwater influence at low tide
- Reversing flow in Limeburners Creek

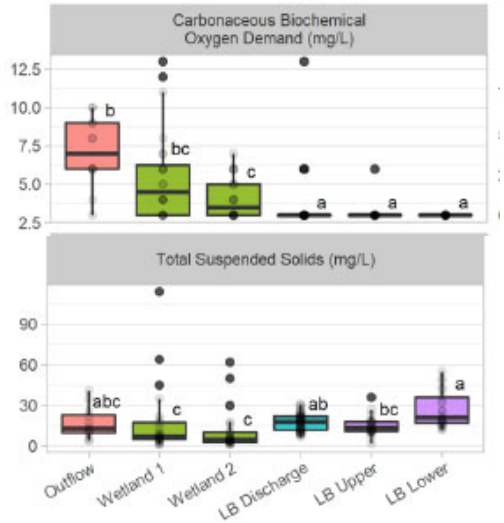


NRC Monitoring Locations

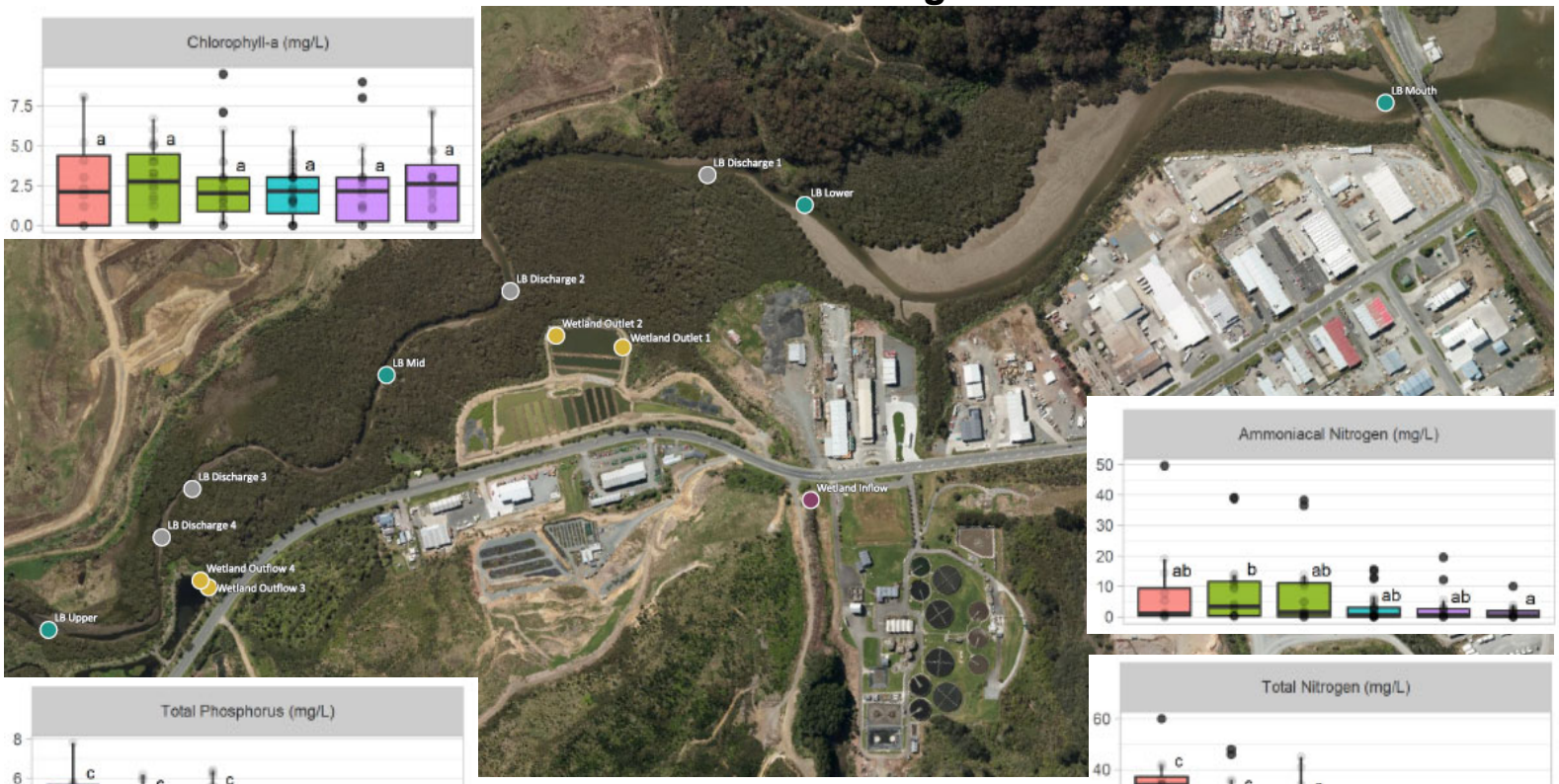


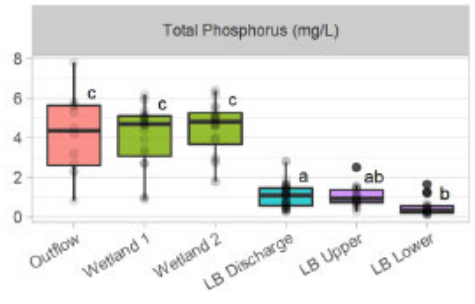
Water Quality – Limeburners Creek

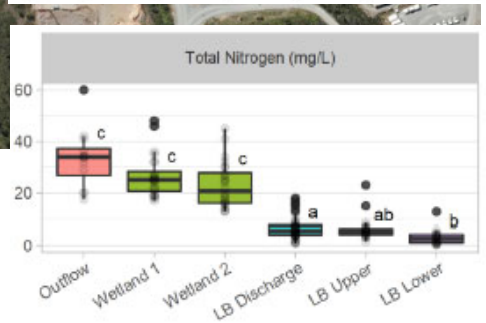
- Tidal dynamics
- Designated mixing zone
- Elevated nutrients (N and P)
- Turbidity and DO consistent with Awaroa



Limeburners Monitoring Locations

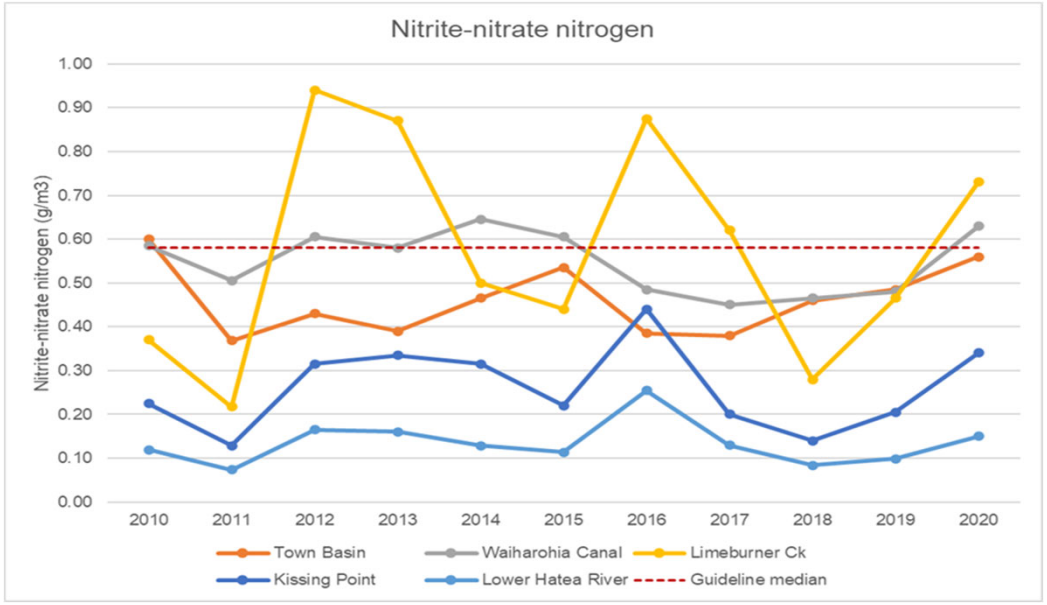


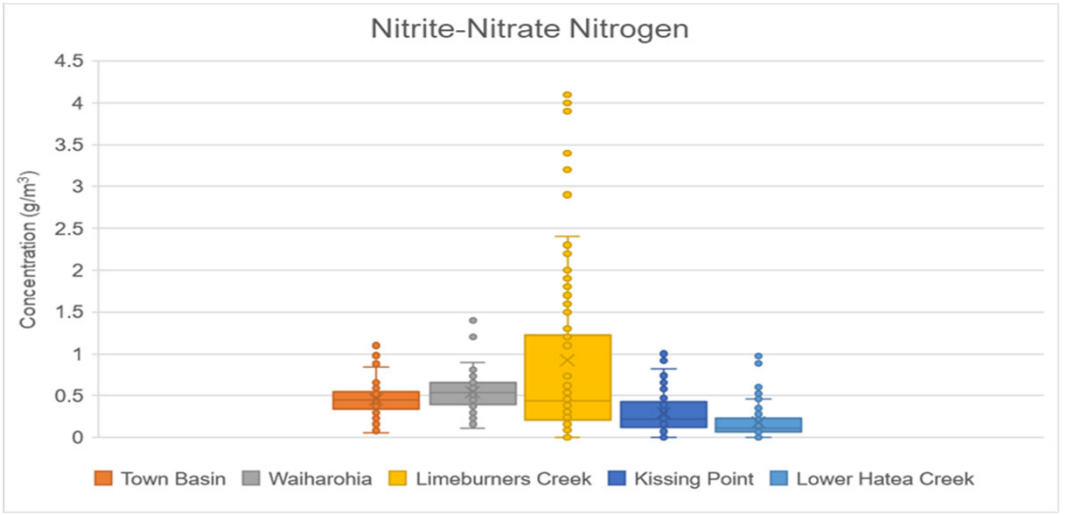


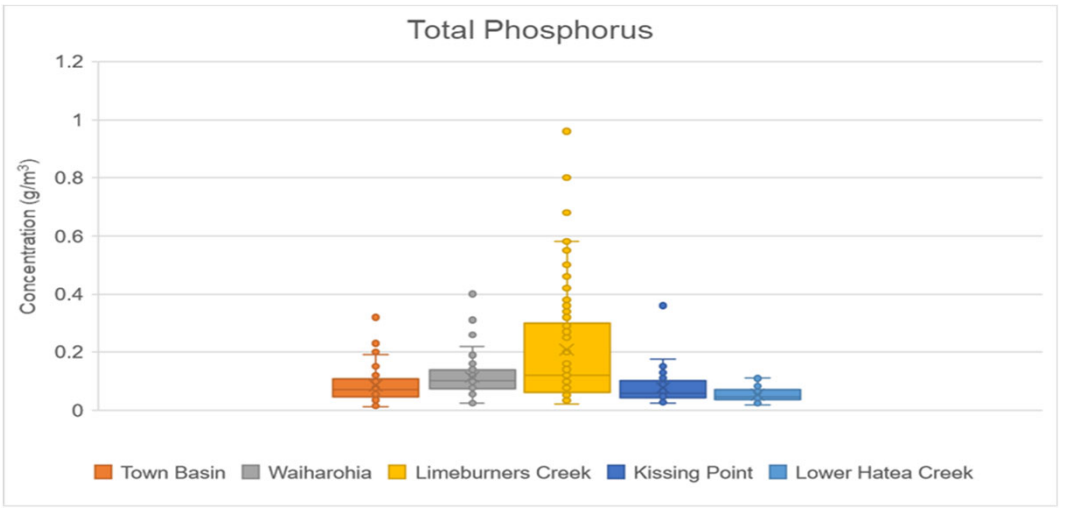


Water Quality - Nutrients

- Typically consistent with upstream urban waters (catchment sources)
- Less frequent periods of greater WWTP influence (higher flow times)
- NRC monthly sampling frequency creates generates irregular annual results

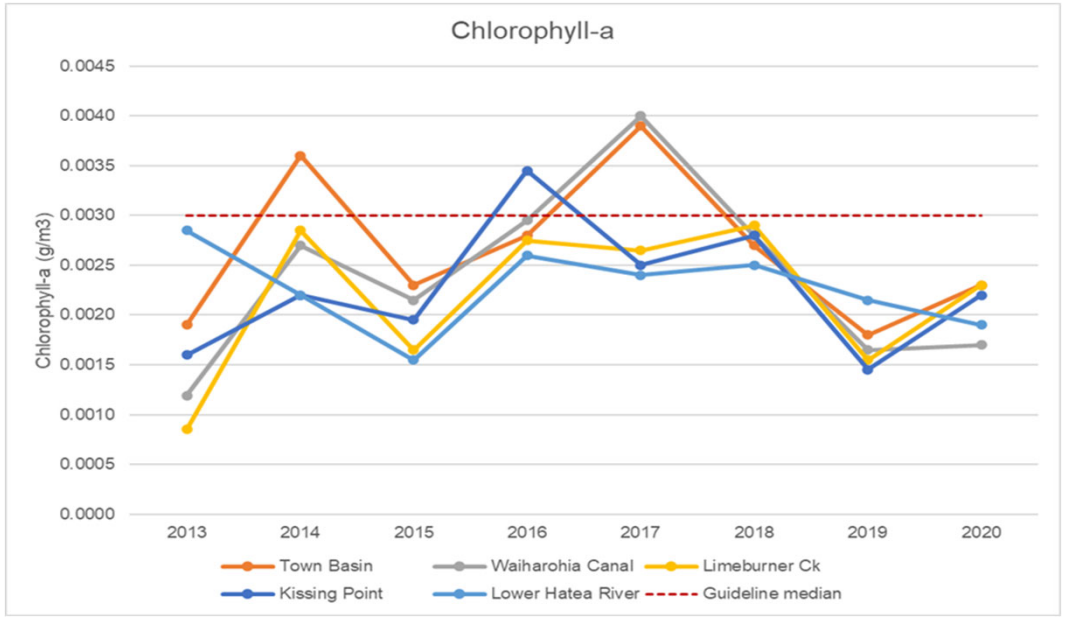


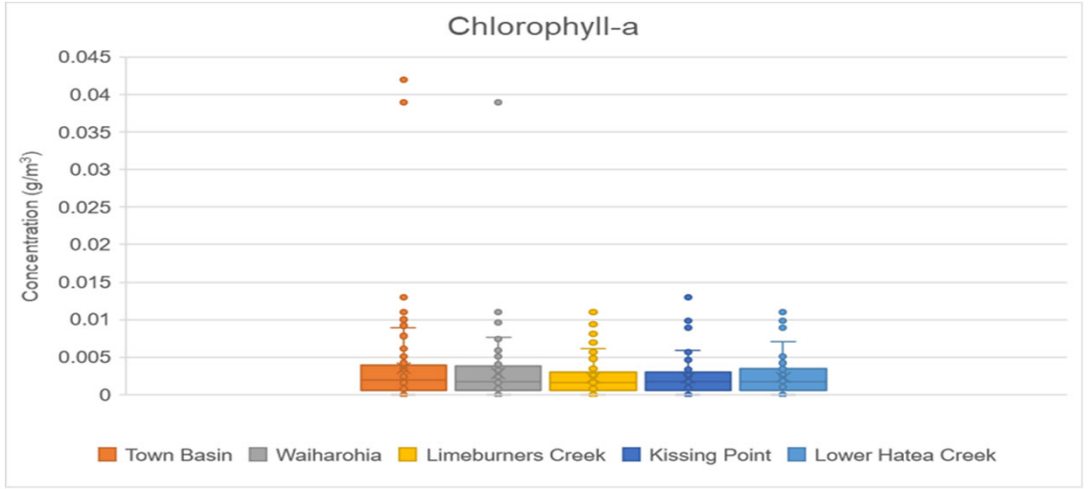


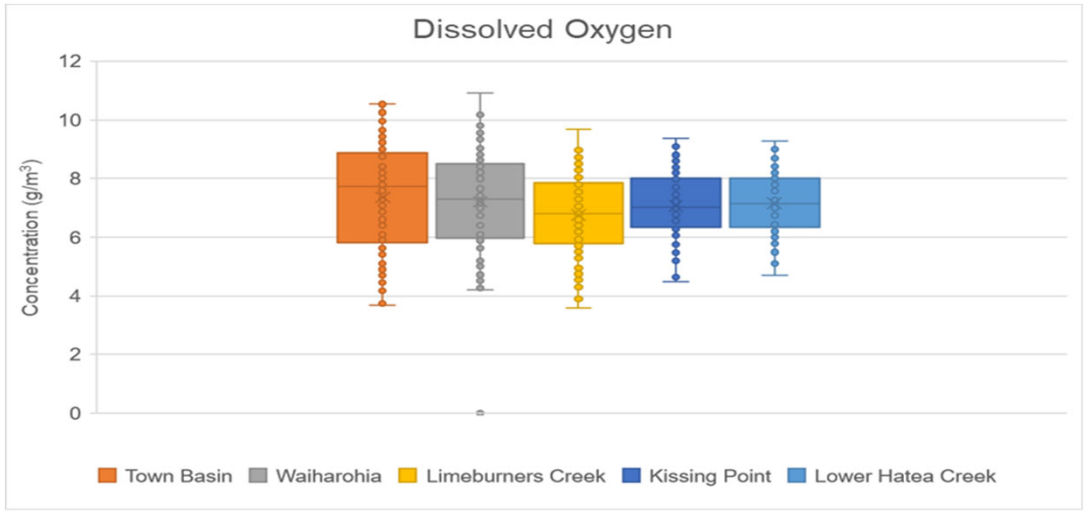


Water Quality - Eutrophication

- Elevated nutrient (N and P) concentrations and poor clarity suggest moderately eutrophic
- Growth of algae is limited by flushing times
- Greatest impact of nutrients evidenced in upstream areas – greater residence time

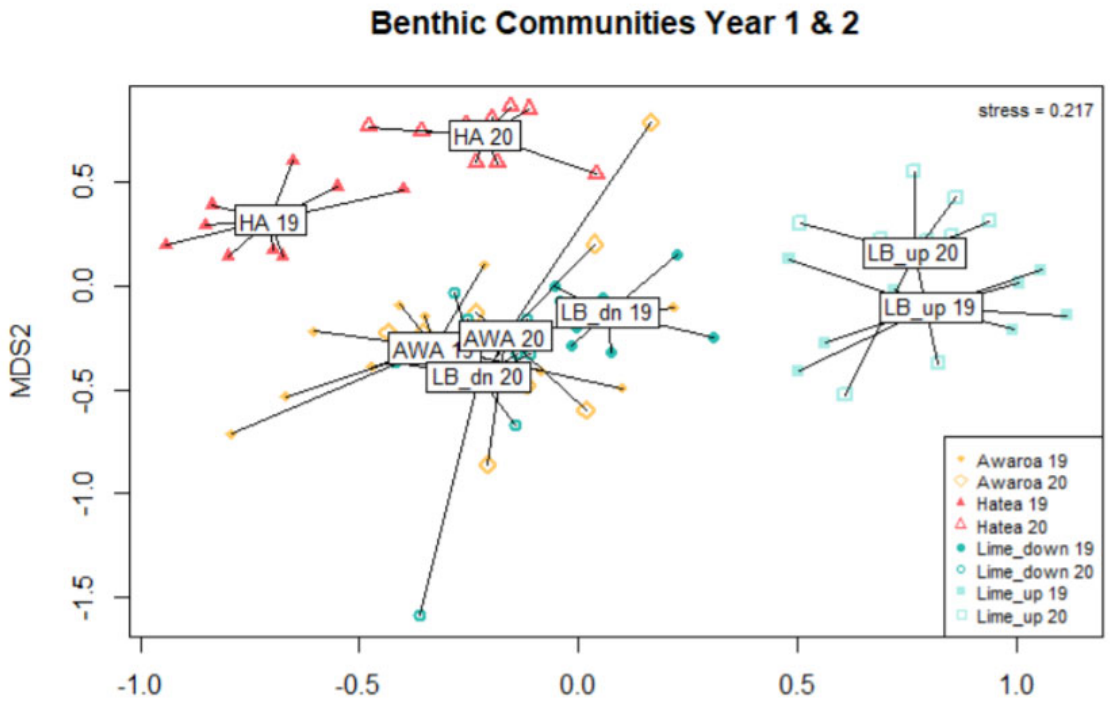






Water Quality – Sediment and Ecology

- Sediment of Hātea River and tidal creeks has high mud content and organic carbon
- Sediment metal concentrations below PNRP
- Benthic ecology (shellfish, crustaceans, worms, etc.) across Hātea River and tidal creeks reflect muddiness – limited number of species, lack of shellfish
- Ecology of Limeburners and Awaroa Creeks are very similar
- NRC and WDC monitoring of ecology suggest no adverse influence of WWTP
- Turbidity of Limeburners lower than Awaroa Creek

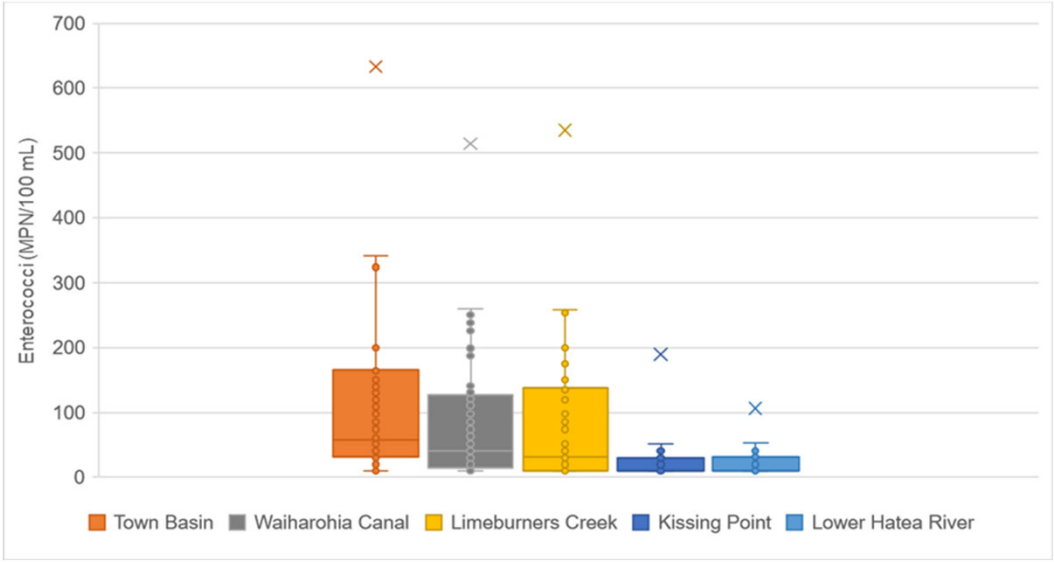


2020				
	Awaroa	Hātea	Lime_down	Lime_up
Average Abundance/core	122	74.3	164.3	72.4
Average Richness/core	10.5	10.9	10.6	7.6
Shannon Weiner Diversity Index	1.48	1.8	1.43	1.31

Water Quality – Public Health Recreation

- NRC consider the Hatea River to be an impacted environment.
- Suitable for wading secondary contact (wading, kayaking, etc.)

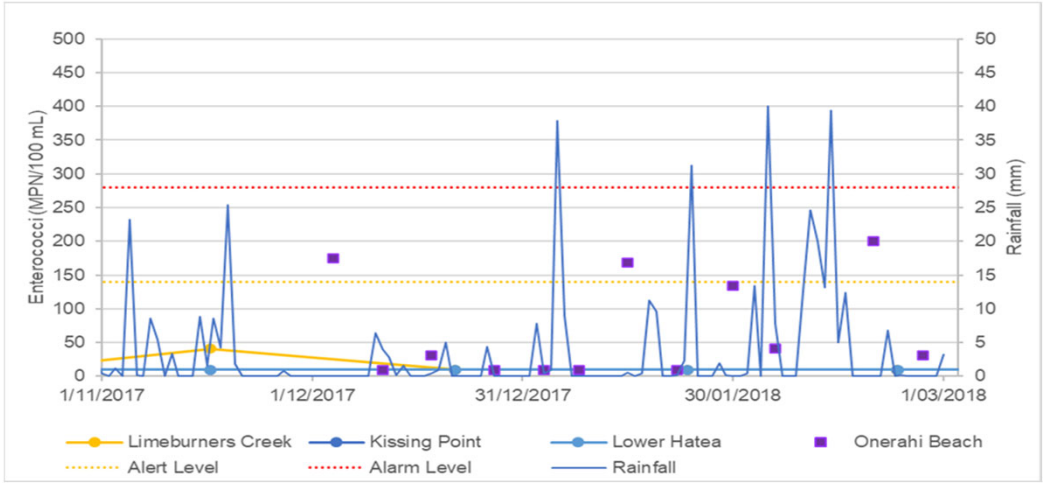
Enterococci annual 95%ile (2010-2020)

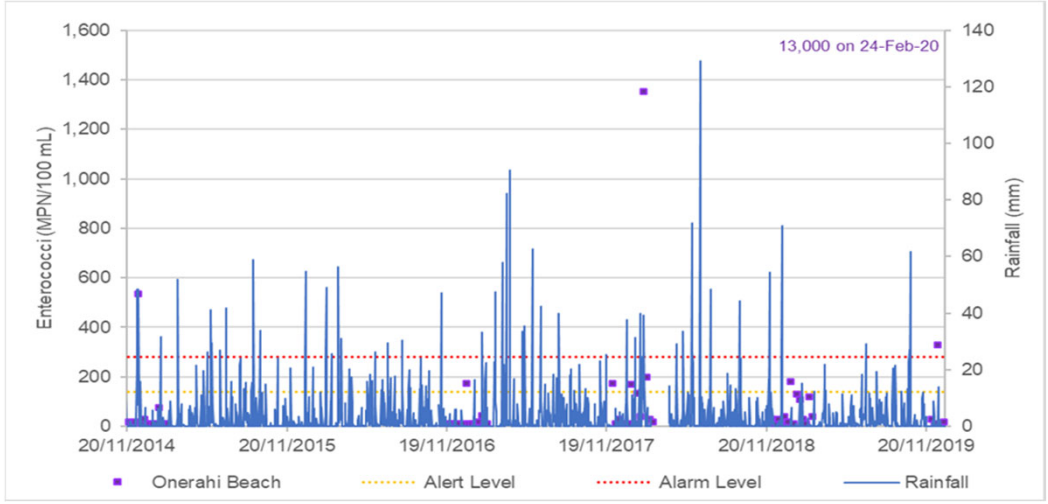


Grade	Unit	Compliance metric	Guideline value
A	Enterococci/100 mL	95th percentile across annual swimming season	<40
B			41-200
C			201-500
D			>500

Water Quality – Public Health Swimming

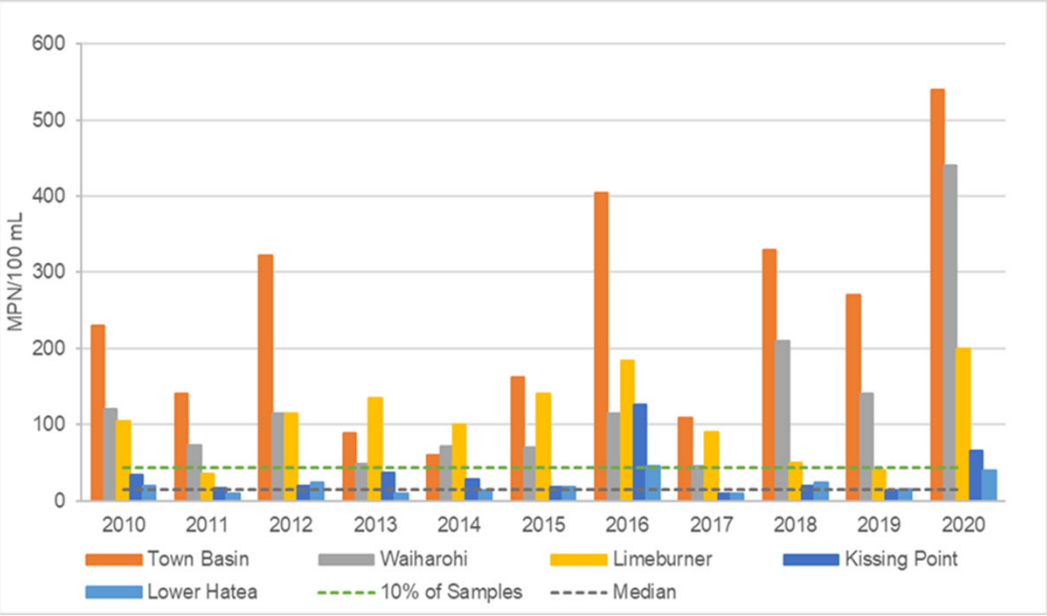
- Onerahi Beach is the nearest regularly used swimming location
- Monitored by NRC weekly during summer
- Typically has good quality and not apparently influenced by WWTP.
- Sources closer to Onerahi likely to cause increases in microbiological contaminants

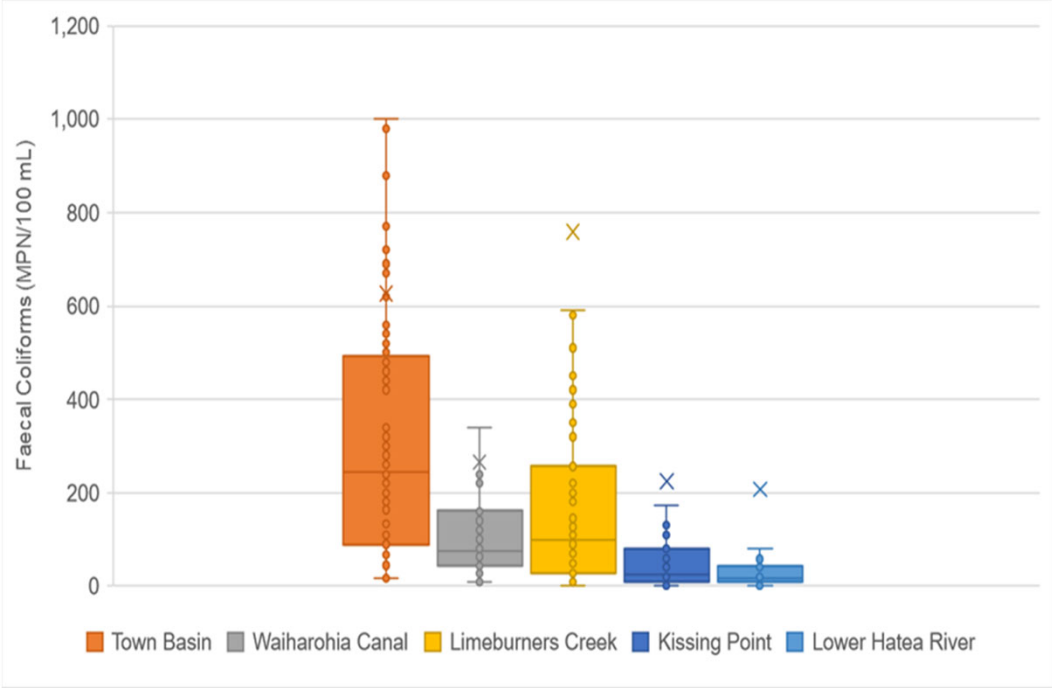




Water Quality – Public Health Shellfish Gathering

- Considered the Hatea River to be unsuitable for shellfish gathering.
- Influence of urban catchment is significant
- Flushing with marine water provides notable mitigation improvement





Unit	Compliance metric	Guideline value
Faecal Coliform - Most Probable Number (MPN) / 100 mL	Median across shellfish-gathering season	>14
	No more than 10% of samples across shellfish-gathering season	>43

WWTP Influence

WWTP Influence on Hatea River:

Is resulting in:

- Intermittent high N and P
- Limeburners sediment high in P

Is not considered to be causing:

- High turbidity and muddiness
- Excessive growth of algae
- Impacts to benthic ecology

Significant influence of broader catchment discharges

Parameter	Total Limeburner Creek contribution to nutrient load	
	Summer	Winter
Total Nitrogen	25% - 40%	15% - 25%
Total Phosphorous	25% - 50%	15% - 30%
Ammonium Nitrogen	15% - 35%	10% - 20%
Inorganic Nitrogen	20% - 55%	10% - 30%

Water Quality Next Steps

Adaptive management of water quality requires:

- Identification of changing WWTP influence
- Reliable means informing decision making
- Transparency for stakeholders
- Flexibility to refine with learnings and new risks

1) Define the indicator/s for monitoring the effects of WWTP discharge
   - What is measured?
   - Representative of WWTP influence?
2) Develop the environmental monitoring framework to support the adaptive plan
   - Trigger levels and actions
   - Monitoring methods
   - Information management
   - Review methods

Air Quality Assessment

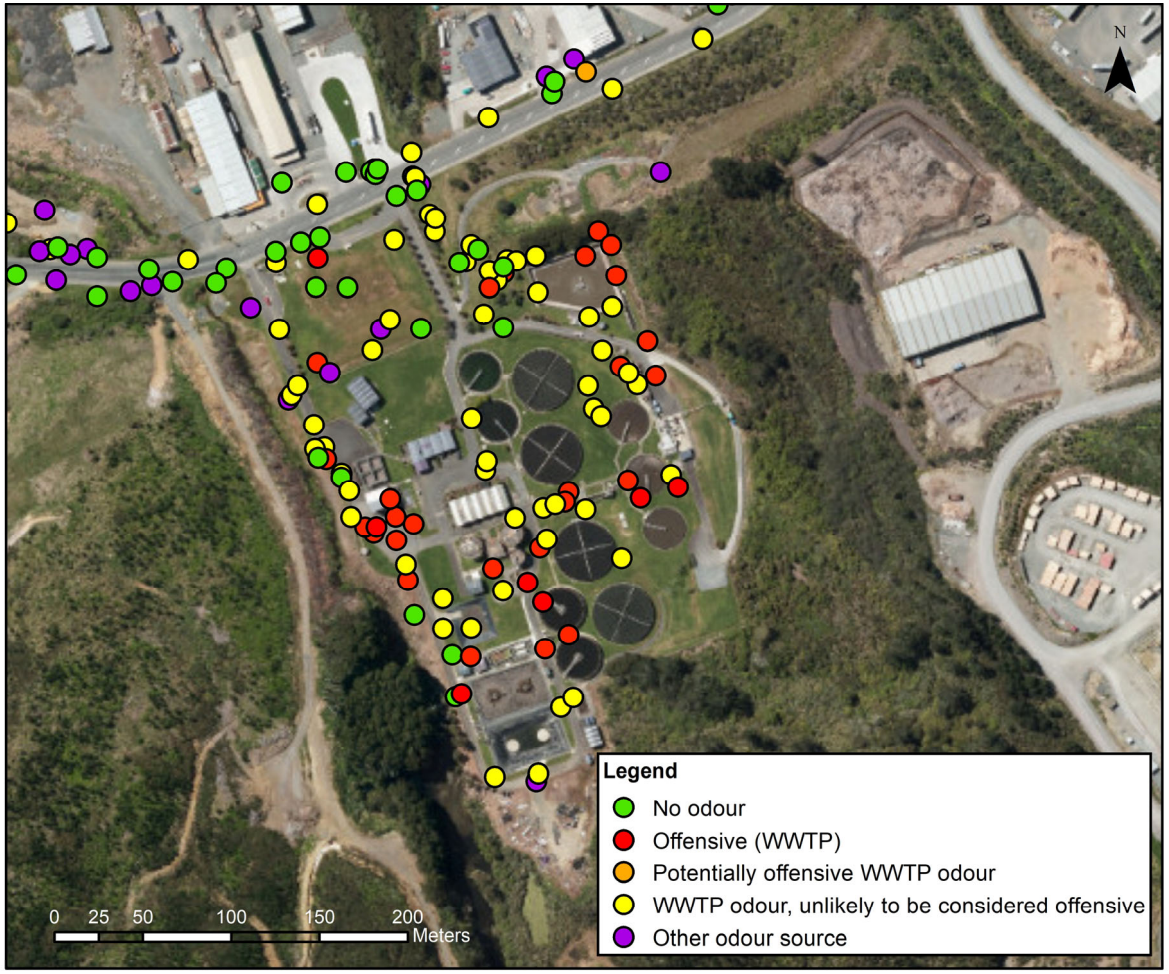
FIDOL Assessment Tool

FIDOL Factor	Description
Frequency	The frequency of odour discharges relates to how often an individual is exposed. Factors determining this include the frequency that the source discharges odour, prevailing meteorological conditions, and the topography.
Intensity	The intensity relates to the concentration of odour. An increase in intensity of odour will increase the potential for odour complaints.
Duration	The duration relates to the length of time that an individual is exposed.
Offensiveness	Offensiveness relates to the 'hedonic tone' of the odour, which may be pleasant, neutral or unpleasant. Offensiveness is related to the sensitivity of the 'receptors' to the odour emission
Location	The sensitivity of locations in the receiving environment, which is characterised by land uses surrounding the site.

The approach to assessment:

1) Understand the current impacts of odour from the Site.
2) Identify any key odour sources which need immediate improvement.
3) Determine compliance with the requirement that any off-site odours should not be considered offensive or objectionable. Assessment undertaken using the FIDOL assessment tool, which considers a number of factors relating to odour - see insert to the left

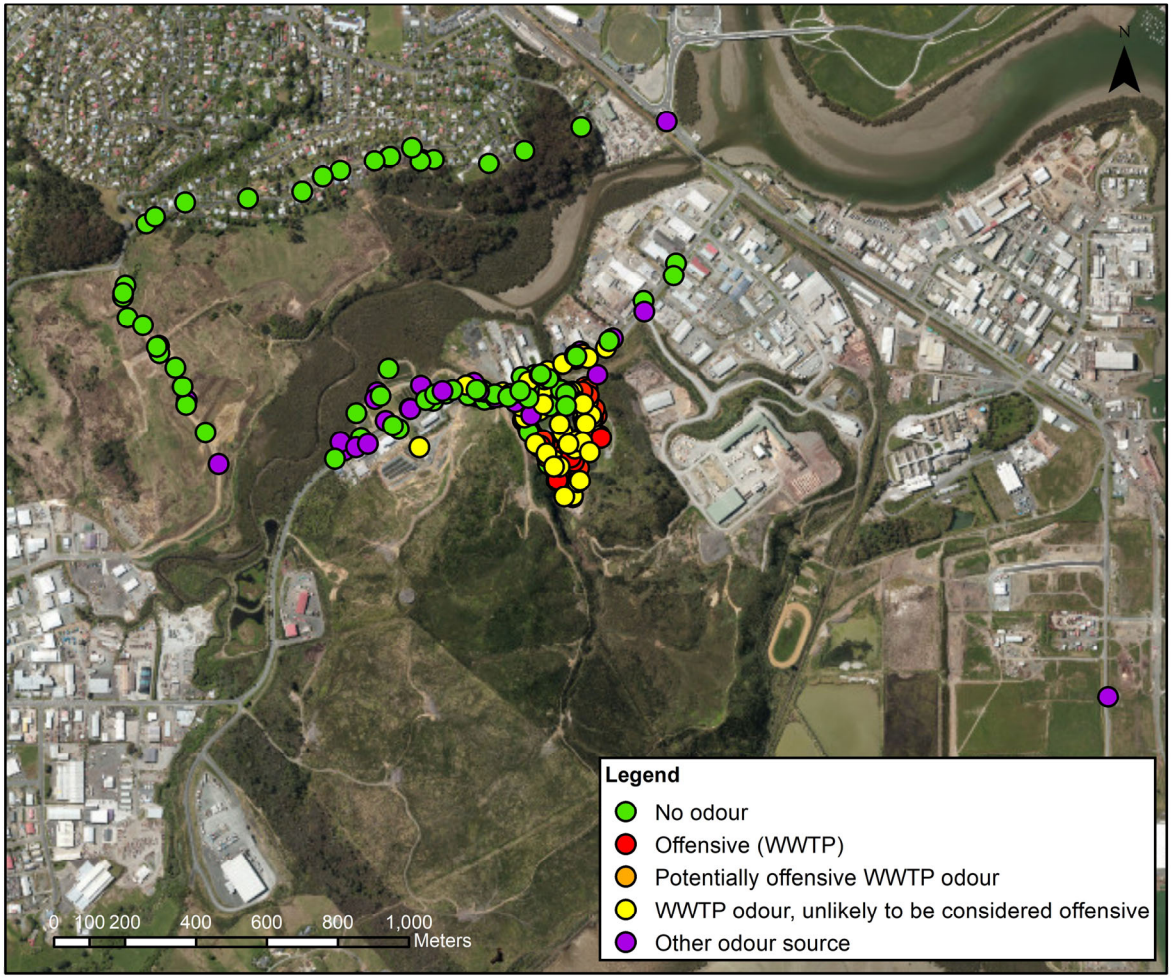
WWTP Site Air Quality Monitoring



Findings:

- Offensive type odours are identified within the Site from several sources over the entire footprint of the Site.
- Particularly odorous locations include the equalisation basin, sludge works and on-site bins.

Air Quality Monitoring in surrounding areas



Findings:

- In general, odour from the WWTP is not experienced further than 100 metres from the main odour sources.
- No site related odour was identified in the residential areas around the WWTP.

Air Quality Next Steps

Adaptive management of air quality requires:

- Identification of changing WWTP influence
- Reliable means informing decision making
- Transparency for stakeholders
- Flexibility to refine with learnings and new risks

1) Addition of a further pathway within the DAPP relating to odour management.
2) Develop the environmental monitoring framework to support the adaptive plan
   - Trigger levels and actions
   - Monitoring methods
   - Information management
   - Review methods
3) Finalise the air quality assessment to support the consent application.

Consent Application Preparation Update

- Draft outline Assessment of Environmental Effects (AEE) being prepared currently – Early June.
- Draft Master Plan and Finalised Technical Assessments – Late July.
- Stakeholder Workshop #4 – to discuss above – Early August.
- Final Draft of AEE – Mid September.
  - Incorporating findings from Master plan and technical assessments,
  - Statutory assessment,
  - Draft management plan,
  - Proposed Conditions.
- Working Group Feedback on Application – Early October
- Lodgement of Application – 29th October

* Thank You

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Minutes

19 August 2021

Project name	Whangarei WWTP Consenting	**From**	Sarah Sunich
Subject	Technical Working Group – Workshop #4	**Tel**	+6421446925
Date / Time	2nd August 2021, 10 – 12:30pm, held both on MSTeams and at WDC Offices.	**Project no.**	12528591
Attendees	Mira Norris (Te Parawhau – Resource Management Advisor) Nikki Wakefield (Rewarewa Block D representative) Georgina Olsen (CIA consultant) Simon Charles (WDC) Sarah Irwin (WDC) Hai Nguyen (WDC) Andy Keith (WDC) Ian Ho (GHD) Anthony Kirk (GHD) Peter Stacey (GHD) – remote Sarah Sunich (GHD) - remote	**Apologies**	Shane Henare (Forest and Bird) Rudi Hoetjes (Fish & Game Regional Manager) Johanna Dones (NDHB) Laura Wakelin (DOC) – confirmed no longer feel need to contribute to WWG
Objective	Update group on Master Plan and Technical Assessments for Air Quality and WQ and confirm final steps. Feedback on any concerns going forward.		

Minutes	Notes	Action
Welcome	– Georgina gave a karakia to open the meeting.	
Re-cap	– Ian Ho gave a re-cap of the DAPP approach, how the DAPP approach is to be implemented, Drivers, (refer to presentation attached) – Te mana o te wai – comes into legislation in 2024, some updates needed to the drivers slide #5 to correct the terminology given around legislative changes and governance changes (e.g. 3 waters reform) to avoid confusion	– Ian – update Master Plan and Options Report at the next revision/issue (final)
Receiving Waters investigation	– Anthony Kirk gave a summary of (i) receiving environment drivers, (ii) revisited the Adaptive pathway thinking diagram and discussed the proposed Receiving Environment Monitoring Plan (REMP) and its purpose, (iii) Proposed preliminary triggers (iv) Adaptive Response (refer to presentation attached). – Limeburners - Hāhā referred to throughout documentation, means luscious in mahinga kai and historically was rich in mahinga kai for local and visiting iwi. – Mira discussed the desire for Tangata Whenua to participate in the monitoring, genuine partnership, potentially through the development of a Mātauranga	– WDC to incorporate Māori name through consent documentation.

Minutes	Notes	Action
	Māori monitoring plan/framework – perhaps for the wider catchment than simply the WWTP. What form this would take will become clearer through the CIA/work being done by Georgina. – Simon raised that this DAPP process is focused on the WWTP discharge and thus acknowledged there is a need for a wider focus needed on catchment wider inputs into the Hāhā (e.g. hydrocarbons from SW inputs / industrial inputs). – Simon commented on the example given around Copper used for Adaptive Response – is there a step needed to identify the source? – Anthony suggests it would be dealt with through Step 2. – Hai raised question whether at Step 3 the assessment of trigger level would need to be undertaken independently. Anthony suggested the 6 yearly statistical reviews will inform step 3 going forward. – Nikki raised the need for more information on how the plans talk to each other, and how the Mātauranga Māori monitoring and results from this will integrate into the adaptive planning process. – Further discussion had on the 12 month or more sampling campaign proposed in the first year of consent to gather robust monitoring data to develop future triggers for the consent and finalisation of the REMP.	– Mira/Simon to discuss further as to how WDC can support their broader catchment Mātauranga Māori monitoring. – WDC proposes to include as a condition of consent that any "western monitoring" carried out by WDC for the WWTP will be reported through to Te Parawhau to inform their own monitoring. – Hope to capture this through proposed conditions of consent.
Master Plan	– Ian presented the (i) Pathways that have been developed, (ii) summarised plant augmentation works proposed in short-term (2021 – 2025) to deal with high solids and pathogen removal predominantly (iii) Pathway 1b – expansion to the existing activated sludge process, (iv) Pathway 1d – MBR (different technology to that currently on-site) sidestream (v) Ongoing Monitoring and Trigger Review (iv) WWTP Master Plan Implementation (refer to presentation attached). – Andy raised the question around the need for a new septage receiving station – Ian advised it was due to the blinding of inlet screens resulting in solids carry through. – Andy raised the point WDC should be focusing on leachate inputs if there is concern of emerging contaminants.	–
Air Quality Monitoring Update	– Peter presented the (i) methodology (meteorology, odour complaints, odour survey, odour interviews, FIDOL assessment) used (ii) results of assessment and recommended odour mitigation (refer to presentation attached). – Georgina raised Mira's previous comment on odour being observed along the road down by the River (Riverside Drive) as far down as Kissing Point particularly at times when there is fog/mist (perhaps not a seasonal issue). Odour noted over in Otaika area but this was found to be associated with the landfill in the area (hasn't been covered). Sarah Irwin has also smelt something a couple of times along Riverside Drive on her way out to Whangarei Heads (purposely opened window to observe). – Sarah Irwin felt it was questionable whether extending the community interviews to Kissing Point based on the results obtained to date – Peter agreed. – Nikki asked whether the Papakainga land could be included in any survey, Sarah I to discuss further with	– Could include within future independent odour surveys

Minutes	Notes	Action
	Nikki, no intent currently to carry-out any further community interviews.	as part of the proposed monitoring plan
Consent Application Preparation	– Technical investigations now completed, Master Plan and Water Quality assessment with WDC for comment, and Air Quality Assessment finalised. – AEE draft preparation to occur over the next 2 weeks. – CIA to be commenced alongside 3 hui, Georgina advised there may be a need for technical input to these. – Working group feedback on AEE will be requested in late September/early October. – Lodgement end of October.	– Sarah S and Georgina to correspond to understand timeframes associated with CIA.

Whangarei WWTP

→ Wastewater Working Group Workshop – 2nd Aug 2021

Agenda

- Welcome
- Recap from past workshops (10 mins)
- Water Quality Assessment (25 mins)
- Master Plan (25 mins)
- Air Quality Assessment (20 mins)
- CIA status update (10 min)
- AOB (10 mins)

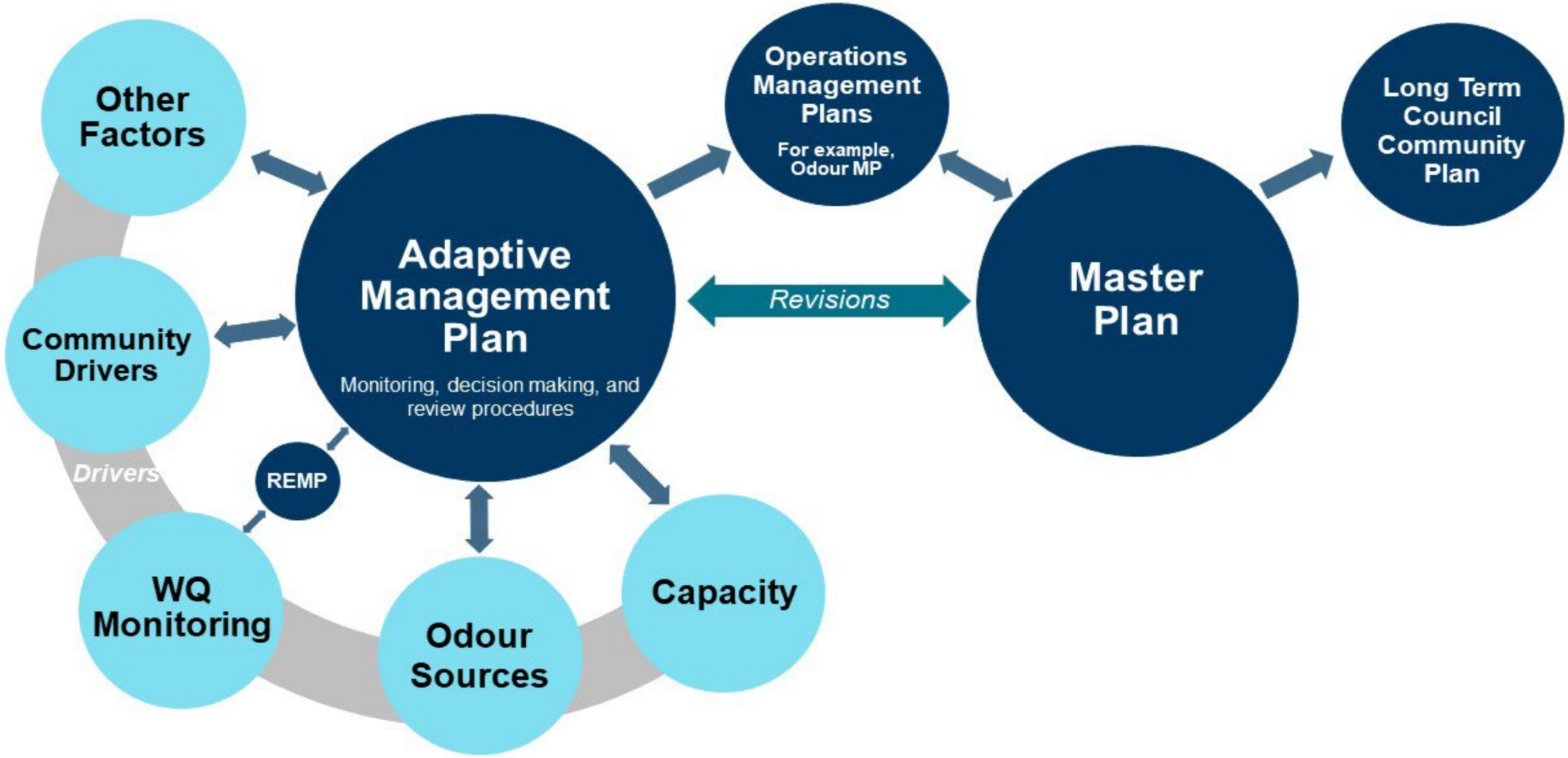
Table 1 Long-list options evaluation results summary

No.	Option title	MCA scoring	Carry forward?
1	Existing Discharge - Plant Expansion	2	*Yes*
2	Existing Discharge - Process Intensification	1	*Yes*
3	Existing Discharge plus a Satellite Plant (Nth Whangārei)	-	*No, considered difficulty to complete the necessary investigations within the pre-consent timeframe. Could be investigated as part of future consent review and may not be limited to North Whangārei.*
4	Existing Discharge plus a Satellite Plant (Whangārei Head)	-	*No, fatal flaw – caters for small flow only and increased complexity.*
5	Ocean Discharge - Relocate Whangārei WWTP	-	*No, significant hurdles associated with consent and construction of pipeline and outfall.*
6	Ocean Discharge - Existing WWTP and pump to ocean	-	*No, significant hurdles associated with consent and construction of pipeline and outfall although could be investigated as part of future consent review in line with Ruakaka WWTP upgrades.*
7	Land-based Discharge (dry weather) - Existing WWTP site	-	*No - fatal flaw around land availability and land costs but could be investigated as part of future consent review.*
8	Existing Discharge supplemented with reuse and/or partial summer land-based discharge regime.	3	*Yes*
9	Deep Bore Injection - Existing WWTP site	-	*No - fatal flaw around aquifer impact, aquifer recharge necessity, cost, and consent uncertainty.*
10	Lower harbour discharge - Existing WWTP	-	*No - fatal flaw around no/lack of support from Tangata whenua.*

Recap from Past Workshop

- Adaptive Pathways approach
- Pathway 1 – prevent degradation of receiving environment
- Pathway 1b and 1d taken forward for Master Plan (rough order costing)
- Three work streams in the past 2 months:
  - Water Quality Assessment
  - Air Quality Assessment
  - Master Plan

Adaptive Pathway Thinking



Drivers

Included as proposed upgrade works in the current Master Plan	Incorporated as part of ongoing monitoring and review	Excluded in the current Master Plan
Improved plant performance. Prevention degradation of receiving environment Population growth. Recycled water for parks and reserves. Odour mitigation.	Changing Discharge and Environmental Standard. Impact of Climate Change. Alternative Treated Effluent Disposal. Landfill capacity and restrictions. Alternative Technology and Innovation. Contaminants of Emerging Concerns.	Legislative and Governance Changes. Industrial reuse of recycled water. Regional solids waste and biosolids strategies. Satellite scheme. National greenhouse gas targets. Plant structure and remaining asset life.

Water Quality Assessment
→

Receiving Environment Drivers

Driver	Description	Location	Medium	Metrics
Water quality	Aquatic ecosystem health as indicated by trophic state	1) Hātea River – Confluence with Limeburners Creek 2) WWTP – Wetland discharge	Water	Total nitrogen Inorganic N Total phosphorus TSS Clarity Chlorophyll-a
Ecotoxicity	Contaminant concentrations in water and sediment that cause acute toxicity to ecology	1) Limeburners Creek – in the vicinity of WWTP mixing 2) Hātea River – Confluence with Limeburners Creek	Water & Sediment	Water: Ammonia Sediment: Heavy metals
Public health risk	Risk of infection from public use of the receiving environment for shellfish gathering and swimming	1) Hātea River – Confluence with Limeburners Creek 2) WWTP – treatment 3) Upper Harbor - Onerahi	Water	Enterococci Faecal coliforms
Emerging contaminants	Greater understanding of contaminant toxicity and introduction of new environmental regulations and criteria.	1) Limeburners Creek 2) Hātea River – Confluence with Limeburners Creek 3) WWTP – Wetland discharge 4) Upper Harbour – as needed	Water Sediment	Regulations

Proposed preliminary triggers

Driver	Location	Medium (compliance metric)	Metric	Preliminary Trigger	Description
Water quality	Hātea River	Water (maximum concentration)	Total Nitrogen	6.3 g/m^3	From NRC SOE monitoring data (2010 to 2020)
			Inorganic Nitrogen	4.1 g/m^3	
			Total Phosphorous	1.0 g/m^3	
			TSS	45 g/m^3	
			Chlorophyll-a	0.011 g/m^3	
	WWTP Wetland discharge	Water (upper quartile mass or upper quartile concentration)	Total nitrogen	210 kg/d (flows < 10,000 m^3/d)	From wetland effluence discharge monitoring
				360 kg/d (flows from 10,000 - 15,000 m^3/d)	
				553 kg/d (flows from 15,000 - 20,000 m^3/d)	
				553 kg/d (flows > 20,000 m^3/d)	
			Total Phosphorous	80 kg/d	
			TSS	100 kg/d (flows < 20,000 m^3/d)	
				120 kg/d (flows from 20,000 to 30,000 m^3/d)	
				320 kg/d (flows >30,000 m^3/d)	

Proposed preliminary triggers continued

Driver	Location	Medium (compliance metric)	Metric	Preliminary Trigger	Description
Ecotoxicity	Limeburners Creek	Water (maximum concentration)	Ammonia	19.5 g/m^3	From 4Sight monitoring in the Limeburners Creek from January 2020 – January 2021.
		Sediment (maximum concentration)	Heavy metals (maximum concentration)	Copper: 65 mg/kg Lead: 50 mg/kg Zinc: 200 mg/kg Chromium: 80 mg/kg Nickel: 21 mg/kg Cadmium: 1.5 mg/kg	As per the coastal sediment quality guidelines in the PNRP and presently used by NRC
	Hātea River	Water (max concentration)	Ammonia	2.4 g/m^3	From NRC SOE monitoring data (2010 to 2020)
		Sediment (maximum concentration)	Heavy metals (maximum concentration)	The same as the Limeburners Creek Limits	As per the coastal sediment quality guidelines in the PNRP and presently used by NRC
Public health risk	Hātea River	Water	Enterococci (annual 95th percentile)	≤500 enterococci/100mL	As per the coastal water quality standards in the PNRP.
	Upper Harbour	Water	Enterococci (95th percentile during swimming season)	As per the Microbial Assessment Category definitions provided in MfE (2003).	
			Faecal Coliform (median and no more than 10%)	As per the Recreational Shellfish-gathering Bacteriological Guideline Values (MfE, 2003).	

Adaptive Response

Trigger level exceedance will result in a series of responses:

- **Step 1** - Reporting of the exceedance.
- **Step 2** - Actions and assessment to validate inferred degradation is a result of WWTP discharges.
- **Step 3** - Assessment of trigger level.
- **Step 4** - Determination of operational and WWTP process changes required to respond.
- **Step 5** - NRC and stakeholder reporting of the proposed WWTP changes in the context of DAPP.
- **Step 6** - Implementation of the appropriate WWTP changes.

A preliminary receiving environment monitoring plan (REMP) be developed, detailing:

a. Receiving environment drivers for WWTP upgrade and metrics for monitoring.

b. Triggers reflective of deviation from current conditions and the methodology used to determine these.

c. Contingency actions for compliance and implementation of the adaptive WWTP improvements.

d. Monitoring requirements.

e. Data management, interpretation and reporting requirements.

f. Responsibilities.

The preliminary REMP should incorporate the proposed preliminary trigger levels (Table 17), to be implemented until such time as additional information is available to inform development of long-term trigger levels and a monitoring programme.

Further water quality investigations, including high resolution and continuous monitoring of physical and water quality conditions, should be undertaken to characterise the influence of the dynamic setting on water quality in Limeburners Creek and the Hātea River. To assist in providing a comparable, reliable dataset, this investigation should confirm:

a. The locations for intensive monitoring to characterise the dynamic processes.

b. The frequency and timing of intensive monitoring to standardise conditions as much as practicable.

A one-year period of intensive monitoring of the receiving environment and WWTP discharges. The monitoring should be sufficient to characterise the broad range of receiving environment conditions and WWTP discharges and how these change in response to weather, climate and other dynamic influences.

Finalisation of the long-term REMP, including:

a. Analysis of collected receiving environment and WWTP discharge data.

b. Review of preliminary triggers and refinement of trigger levels.

c. Develop a long-term monitoring programme adequate to detect degradation of the receiving environment as a result of WWTP discharges.

d. Confirm the appropriate reporting and responses to trigger level exceedance, including the escalation of decision making for WWTP improvement.

e. Preparation of a technical assessment, detailing the findings of intensive monitoring and basis for the proposed REMP approach, for approval by NRC and stakeholders.

Air Quality Assessment
→

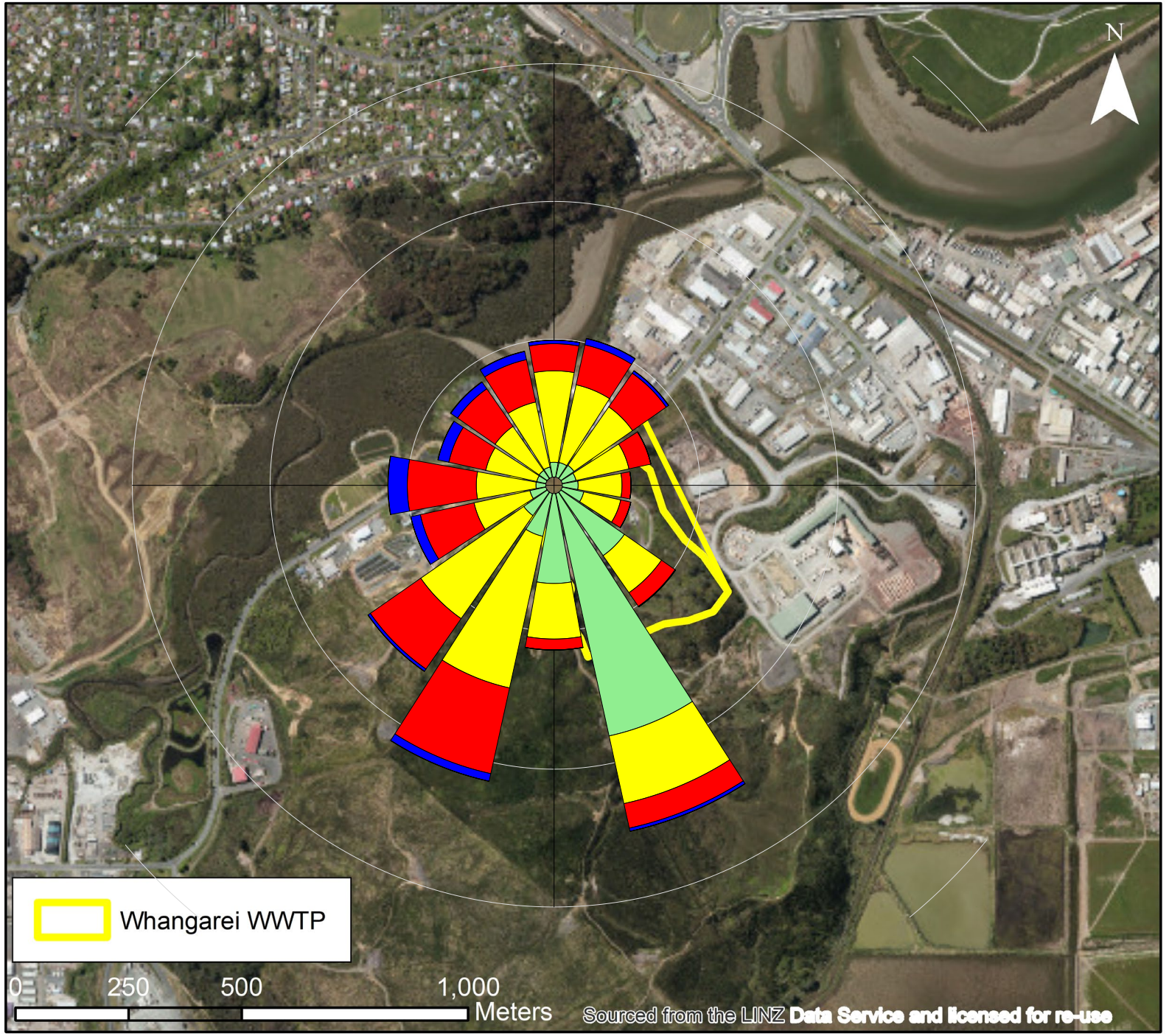
Overall Methodology

→ Methodology

- Understand existing environment
- Review odour complaints
- Undertake odour surveys
- Undertake community interviews
- Assess impact of odour from the WWTP on the local community
- Develop odour mitigation methods

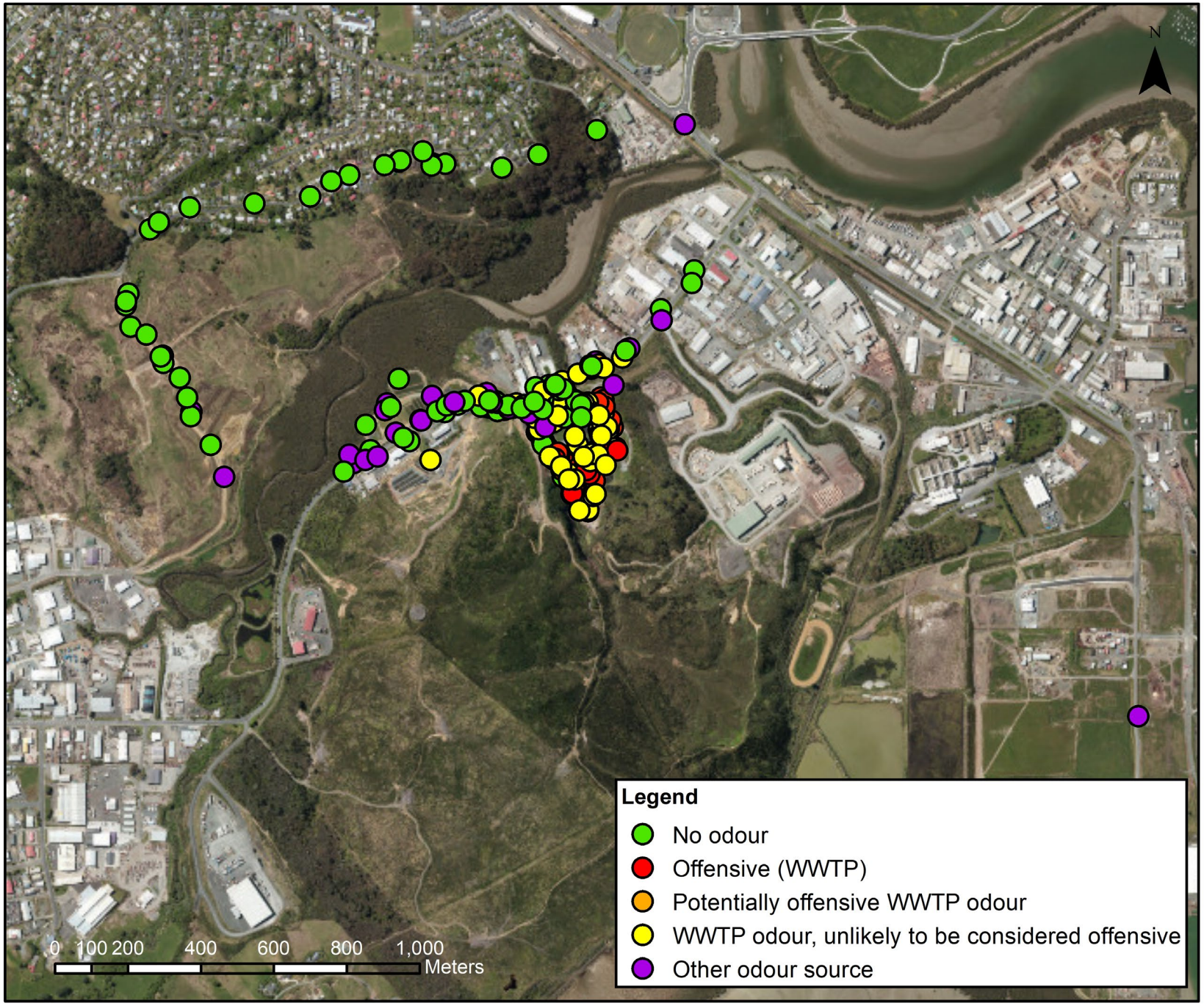
Meteorology/ Topography

→ Background



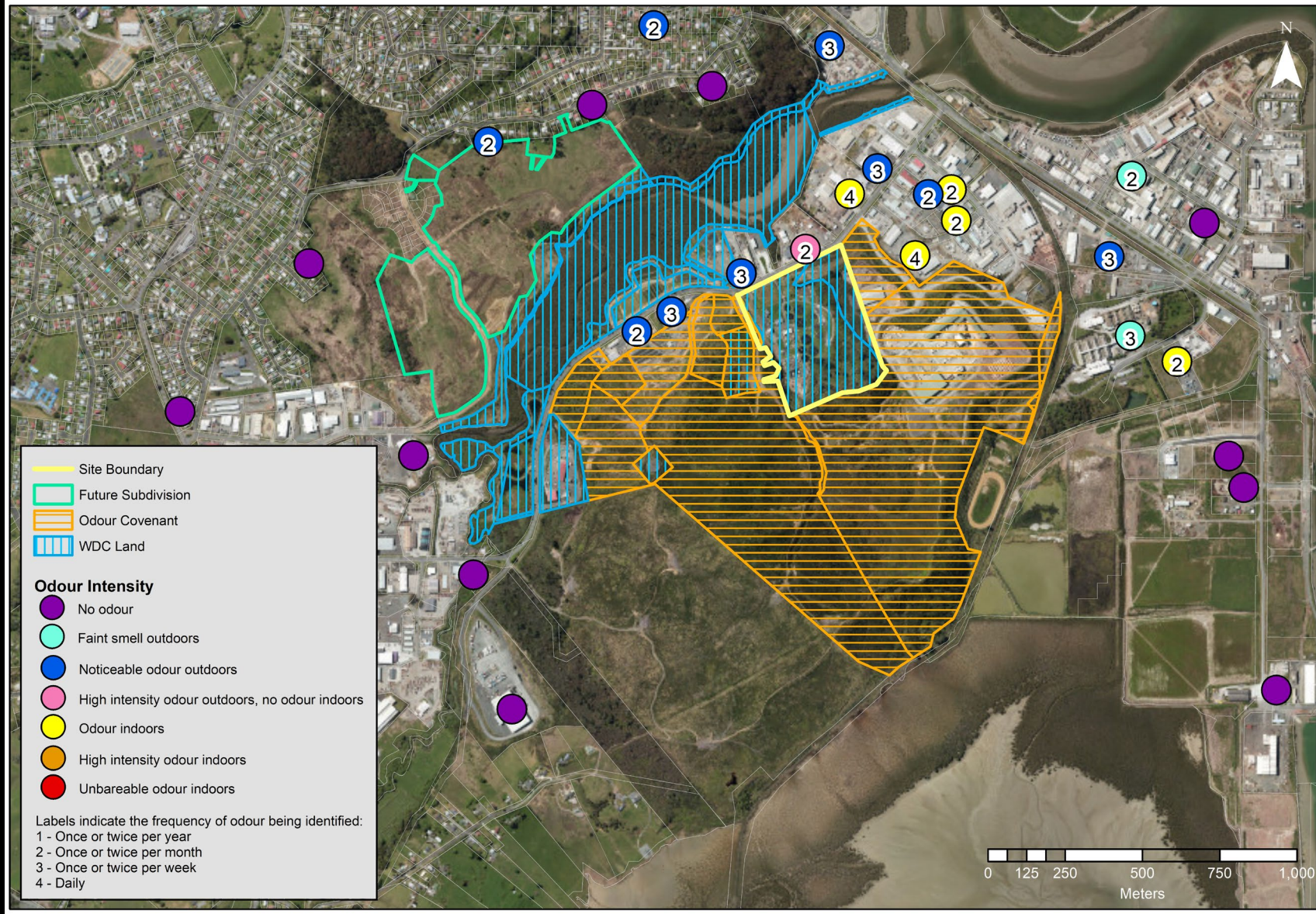
Odour Observations

→ Findings



Community Interview Results

→ Findings



Recommended Odour Mitigation

→ Findings

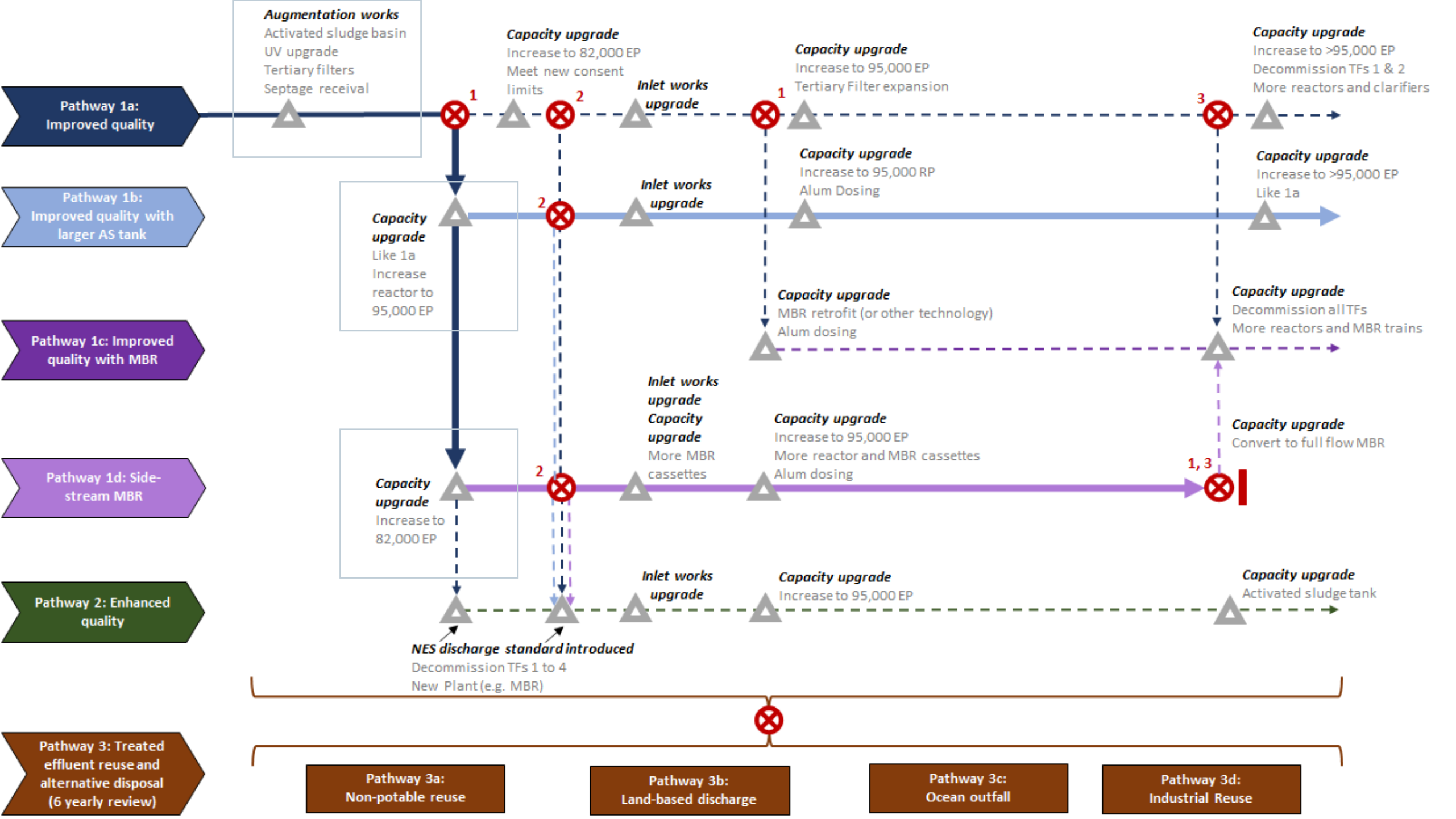
- Cover all waste bins and investigate opportunities to reduce odour from the EQ Basin
- Develop a robust odour management plan
- Six-monthly odour surveys which trigger additional odour mitigation measures

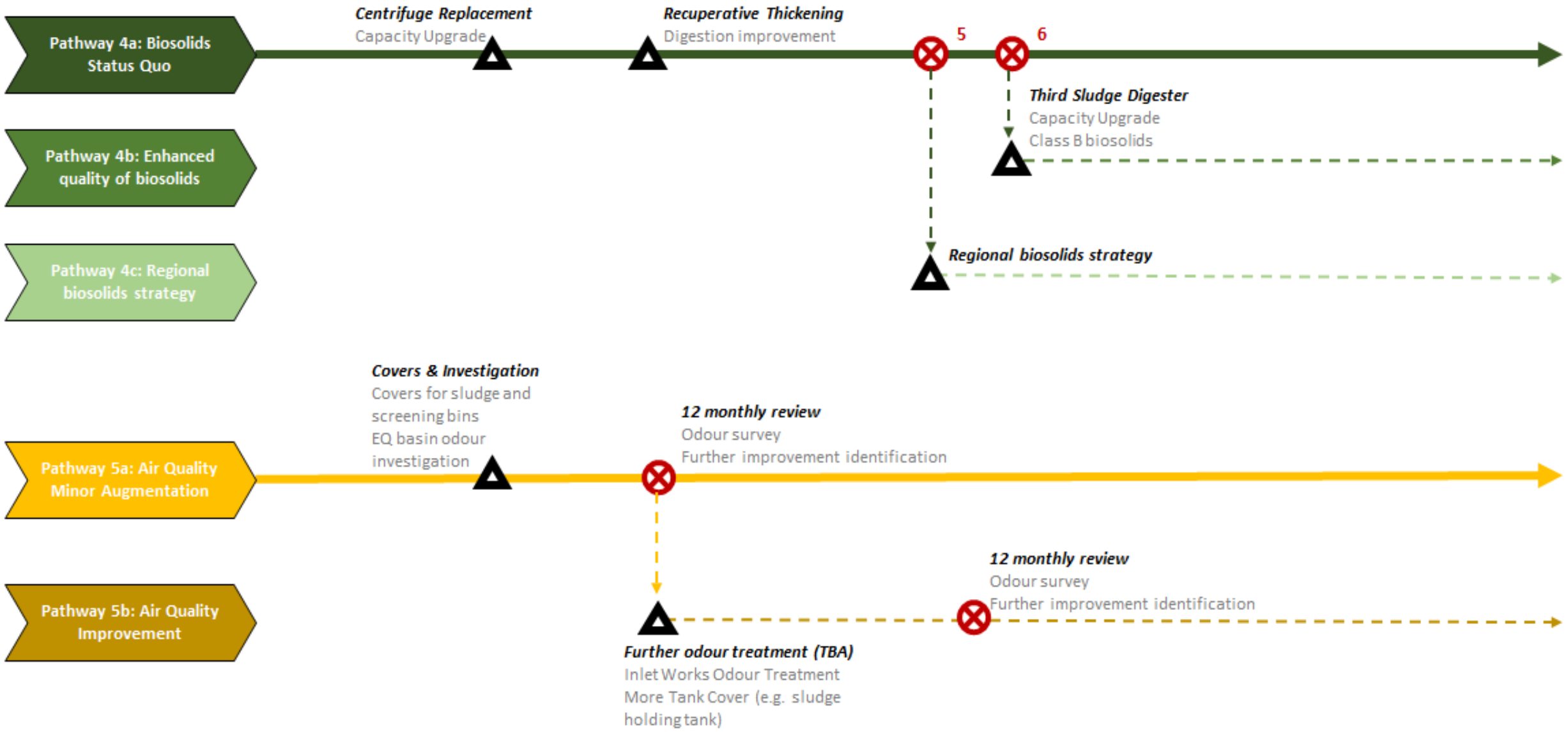
Conclusions

→ Findings

- Odour has the potential to travel offsite, however is generally not experienced within residential areas at a level which could cause offense.
- Higher levels of odour is generally only experienced within 200-400 m of the Site – however considered commensurate with industrial zoning.
- Odour mitigation methods proposed are expected to reduce odour – Six Monthly monitoring will trigger additional improvements if required.

Master Plan Report
→


Pathway 1a: Improved quality
Pathway 1b: Improved quality with larger AS tank
Pathway 1c: Improved quality with MBR
Pathway 1d: Side-stream MBR
Pathway 2: Enhanced quality
Pathway 3: Treated effluent reuse and alternative disposal (6 yearly review)
Augmentation works
Activated sludge basin
UV upgrade
Tertiary filters
Septage receival
Capacity upgrade
Increase to 82,000 EP
Meet new consent limits
Inlet works upgrade
Capacity upgrade
Increase to 95,000 EP
Tertiary Filter expansion
Capacity upgrade
Increase to >95,000 EP
Decommission TFs 1 & 2
More reactors and clarifiers
Capacity upgrade
Like 1a
Increase reactor to 95,000 EP
Inlet works upgrade
Capacity upgrade
Increase to 95,000 RP
Alum Dosing
Capacity upgrade
Increase to >95,000 EP
Like 1a
Capacity upgrade
MBR retrofit (or other technology)
Alum dosing
Capacity upgrade
Decommission all TFs
More reactors and MBR trains
Inlet works upgrade
Capacity upgrade
More MBR cassettes
Capacity upgrade
Increase to 95,000 EP
More reactor and MBR cassettes
Alum dosing
Capacity upgrade
Convert to full flow MBR
Capacity upgrade
Increase to 82,000 EP
Inlet works upgrade
Capacity upgrade
Increase to 95,000 EP
Capacity upgrade
Activated sludge tank
NES discharge standard introduced
Decommission TFs 1 to 4
New Plant (e.g. MBR)
1
2
1
3
2
2
1, 3
Pathway 3a: Non-potable reuse
Pathway 3b: Land-based discharge
Pathway 3c: Ocean outfall
Pathway 3d: Industrial Reuse


Pathway 4a: Biosolids Status Quo
Pathway 4b: Enhanced quality of biosolids
Pathway 4c: Regional biosolids strategy
Pathway 5a: Air Quality Minor Augmentation
Pathway 5b: Air Quality Improvement
Centrifuge Replacement
Capacity Upgrade
Recuperative Thickening
Digestion improvement
5
6
Third Sludge Digester
Capacity Upgrade
Class B biosolids
Regional biosolids strategy
Covers & Investigation
Covers for sludge and screening bins
EQ basin odour investigation
12 monthly review
Odour survey
Further improvement identification
12 monthly review
Odour survey
Further improvement identification
Further odour treatment (TBA)
Inlet Works Odour Treatment
More Tank Cover (e.g. sludge holding tank)

Plant Augmentation

- **CapEx: ~$ 8 to 13M**
- **Studies/Investigation/Design:**
  - **2021/22** Performance Monitoring, BioWin modelling
  - **2022/23** Design of augmentation works (2024)
  - **2024/25** Design of centrifuge replacement and odour treatment (2025)

Pathway 1b

- **2030 CapEx: ~$ 50 to 75 M (current)**
- **Studies/Investigation/Design:**
  - **2026** First 6th yearly review
  - **2027-29** Design of upgrades (2030)
  - **2038 (~78,000 EP)** Technology review and design for upgrade to 95,000 EP

Pathway 1d

- **2030 CapEx: ~$ 30 to 50M (current)**
- **Studies/Investigation/Design:**
  - **2026** 1st 6 Yearly Review
  - **2027-9** Design of Upgrades (2030)
  - **2038:** Technology review and design for upgrade to 95,000 EP

Ongoing Monitoring and Trigger Review

Period	Monitoring of Triggers and Review	Related Drivers
From 2022 onwards	Receiving environment monitoring – refer to Water Quality assessment (GHD 2021c) for details.	Change in receiving environment
	6 monthly independent odour survey and annual review – refer to Air Quality assessment (GHD 2021b) for details.	Odour
	Review of population growth/forecast – allow 2 to 3 years lead-in time for design and construction	Population Growth Alternative Technology and innovation
From 2026 onwards	Every 6 yearly review (TBC – new consent condition) to examine the best practicable option (BPO) with the latest performance, regulations/standards, community aspiration and other factors	Alternative Treatment Effluent Disposal Impact of Climate Change Carbon Neutrality Target Contaminants of Emerging Concerns Landfill capacity and restriction Alternative Technology and innovation
From 2024 onwards	Monitor other potential governance or significant changes, e.g. Regional solids waste or biosolids strategy, Water Reform Frequency: as it happens	Regulation and Governance Changes Industrial reuse opportunities Regional solids waste and biosolids strategies

WWTP Master Plan Implementation

This is a living document, with ongoing monitoring, review and sharing of lessons learnt to refine the approach with better understanding of how drivers change with time.

2021- Finalisation of Resource Consent Application

AEE and Consent Application by Oct 2021	Continue monitoring/sampling and build environmental data dashboard

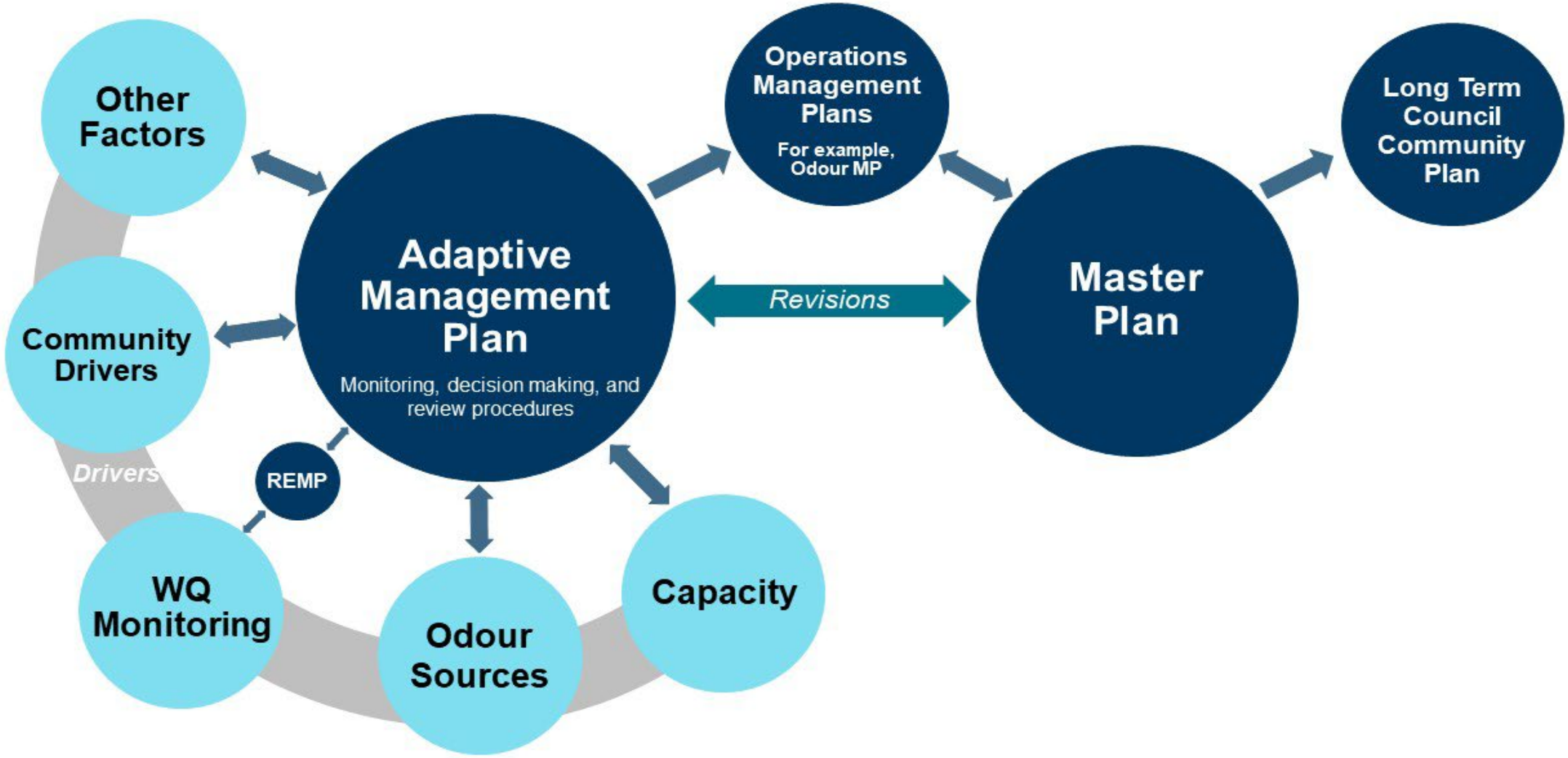
2022-2025

Ongoing review of environmental water quality, air quality (odour) performance	Commence investigations and design for augmentation upgrades (2024/25 implementation)

2026-2030

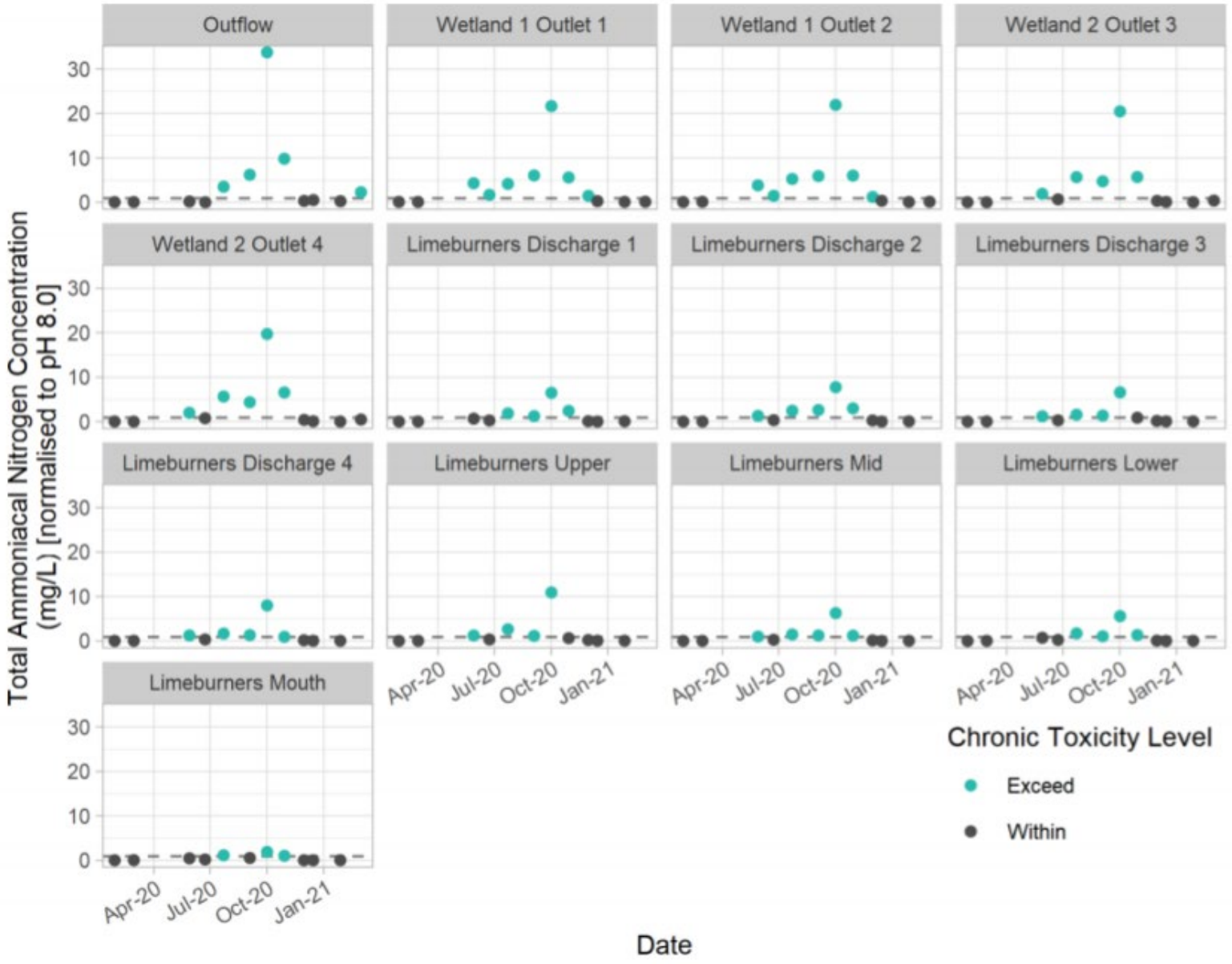
1st 6 Yearly Review to re-examine drivers and BPO for Whangarei WWTP - decide Pathway 1b or Pathway 1d (could also be other alternatives)	Commence concept design and associated investigations (e.g. geotechnical) for the first major upgrade (2030 implementation)

Linking ongoing reviews to updates of Plans

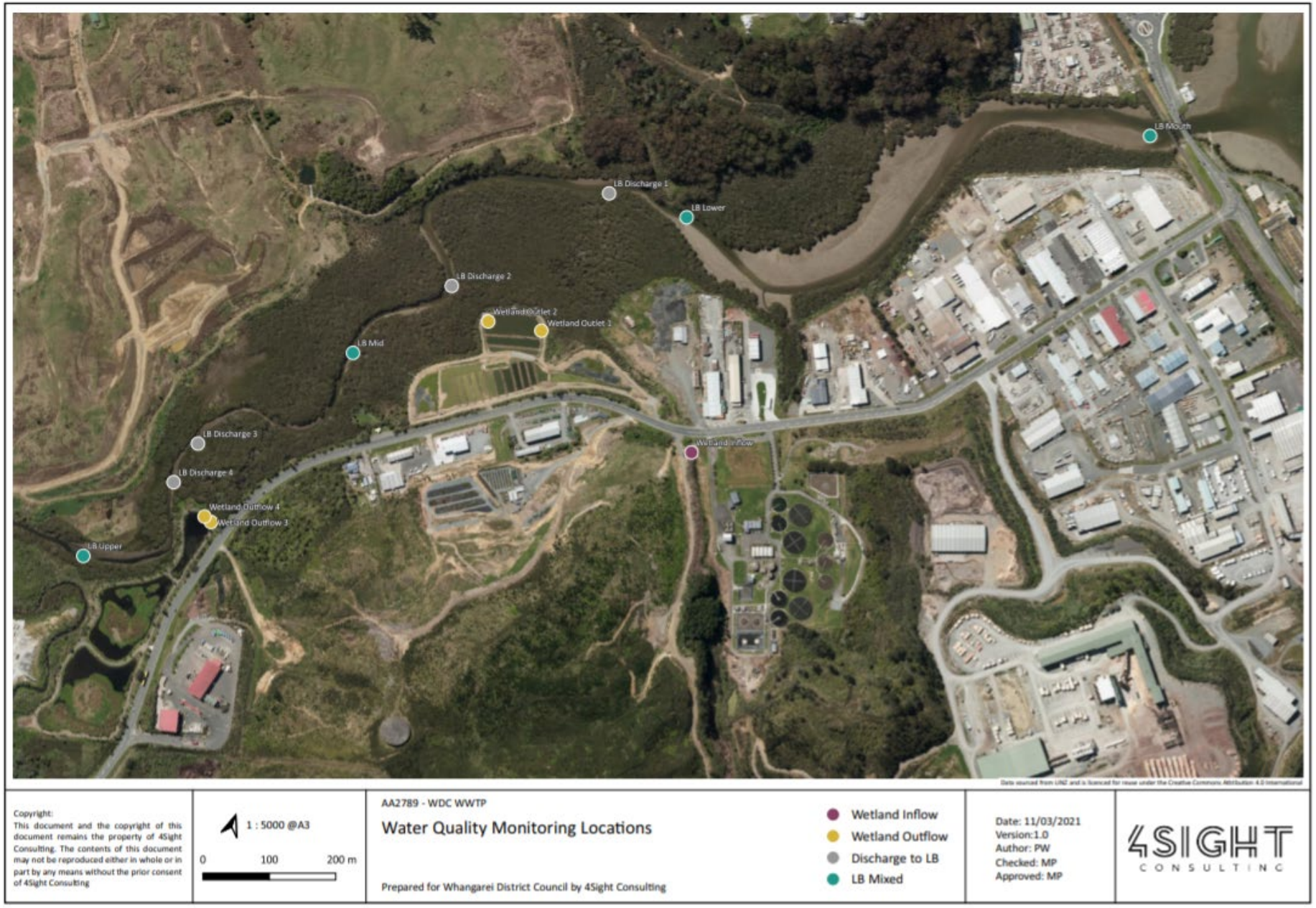


CIA Status Update
→

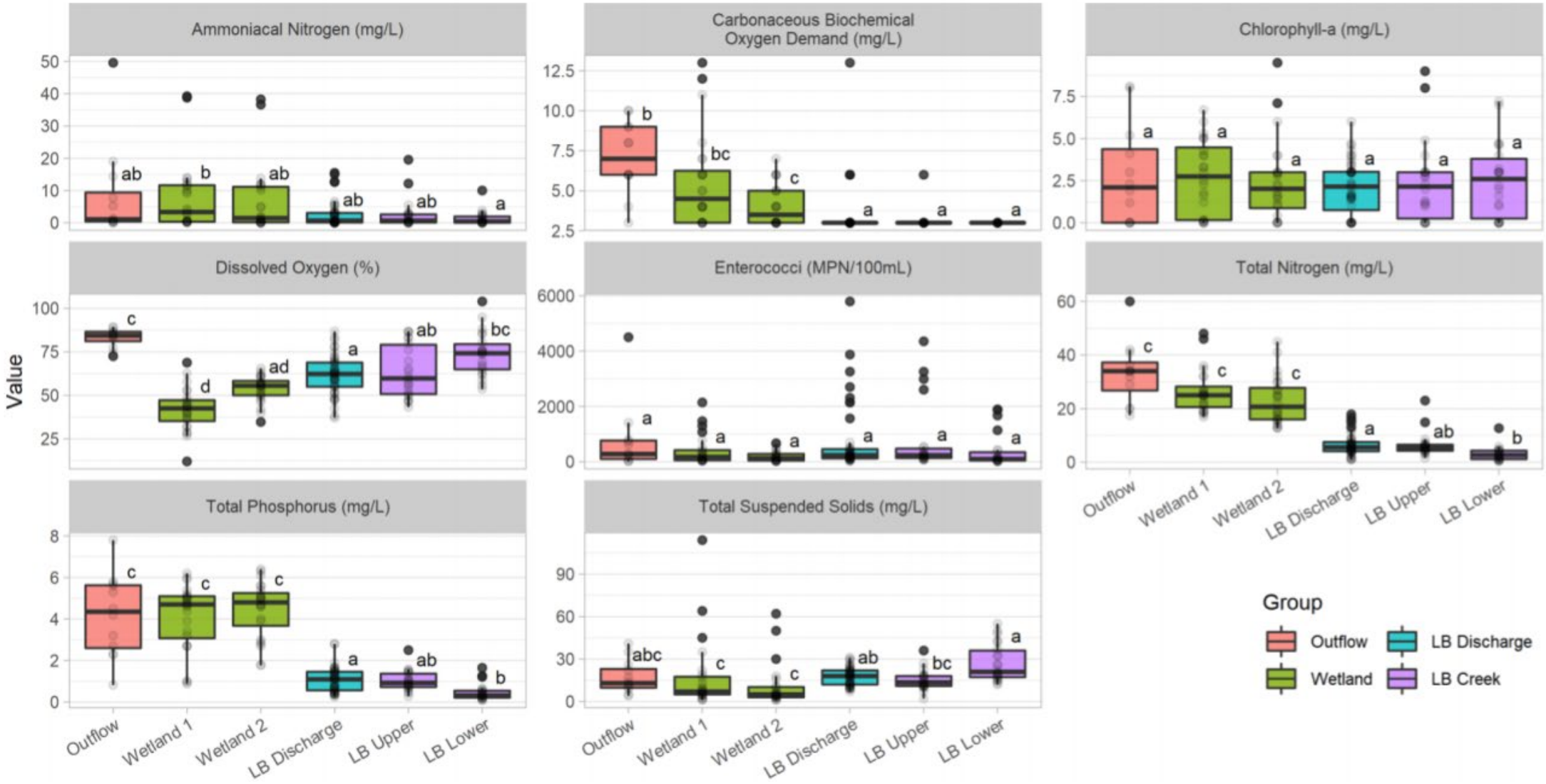
Water Quality - Ammonia



Water Quality - Limeburners



Water Quality – Limeburners Creek



Tidal dynamics

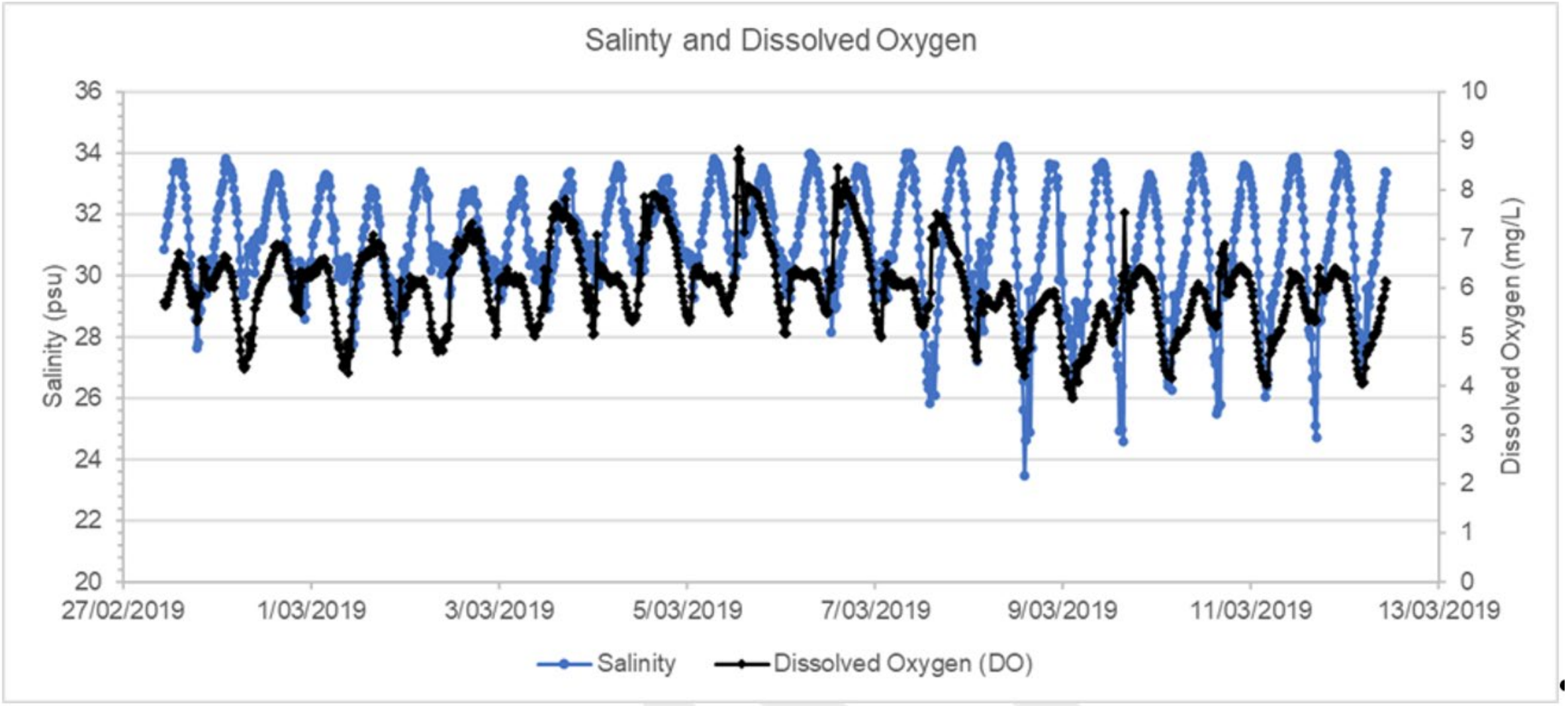


Figure 7 → Salinity and dissolved oxygen concentrations at Limeburners Creek

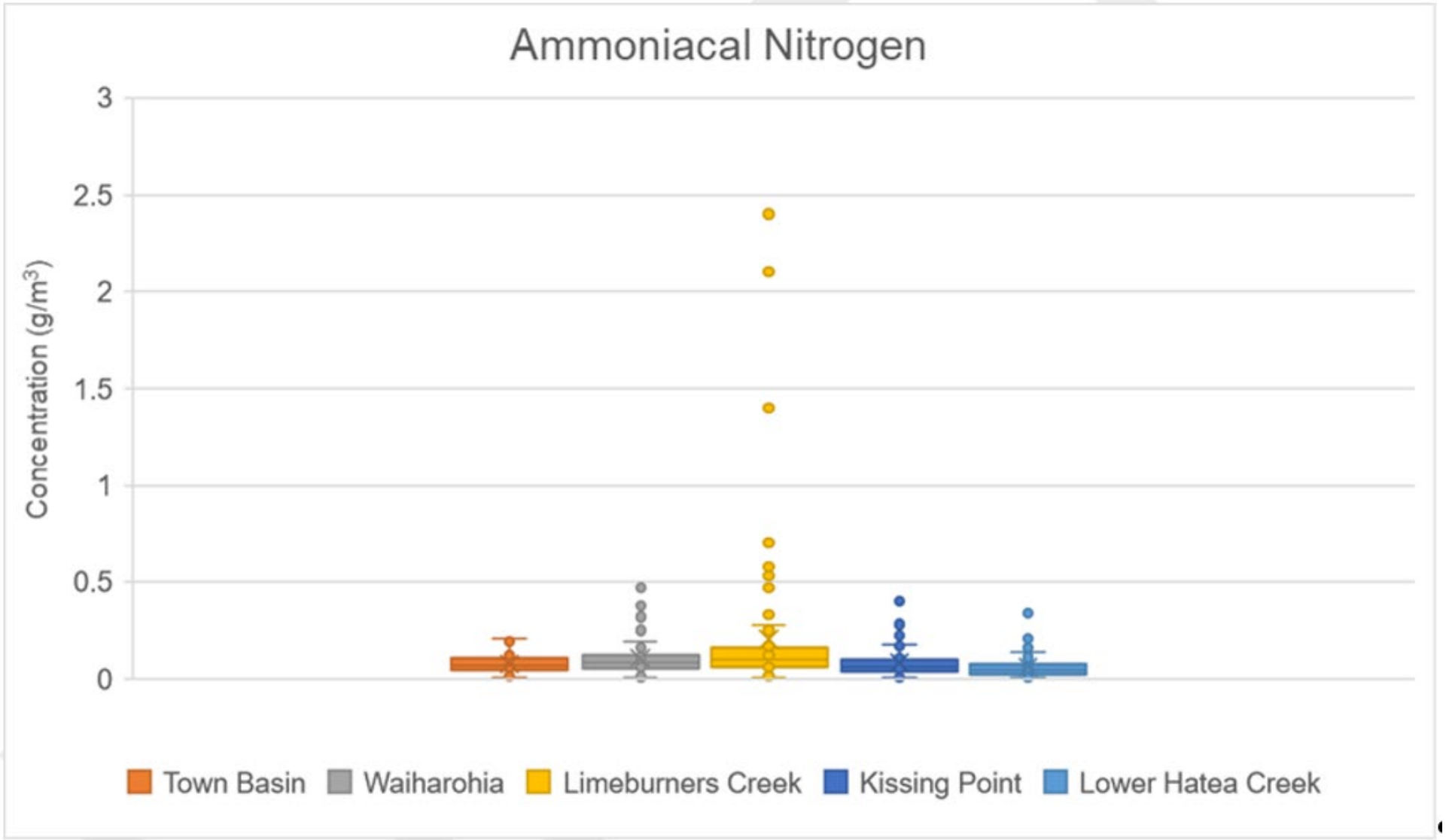


Figure 20 → Distribution of ammoniacal nitrogen concentrations at SOE monitoring sites

Ammonia – annual median

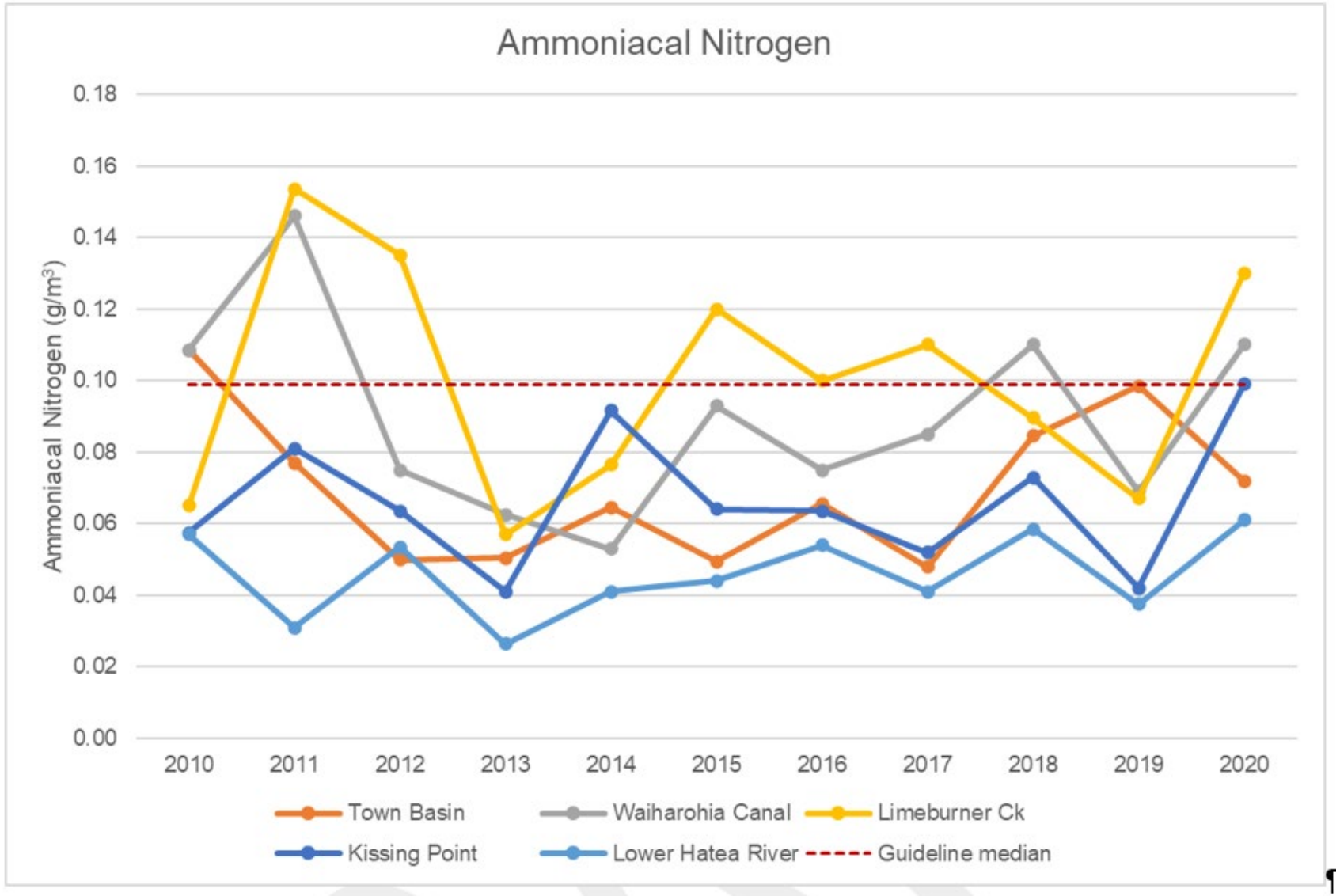


Figure 21 → Ammoniacal nitrogen annual median at each SOE monitoring site compared against PNRP criteria

Water Quality – Dissolved Oxygen

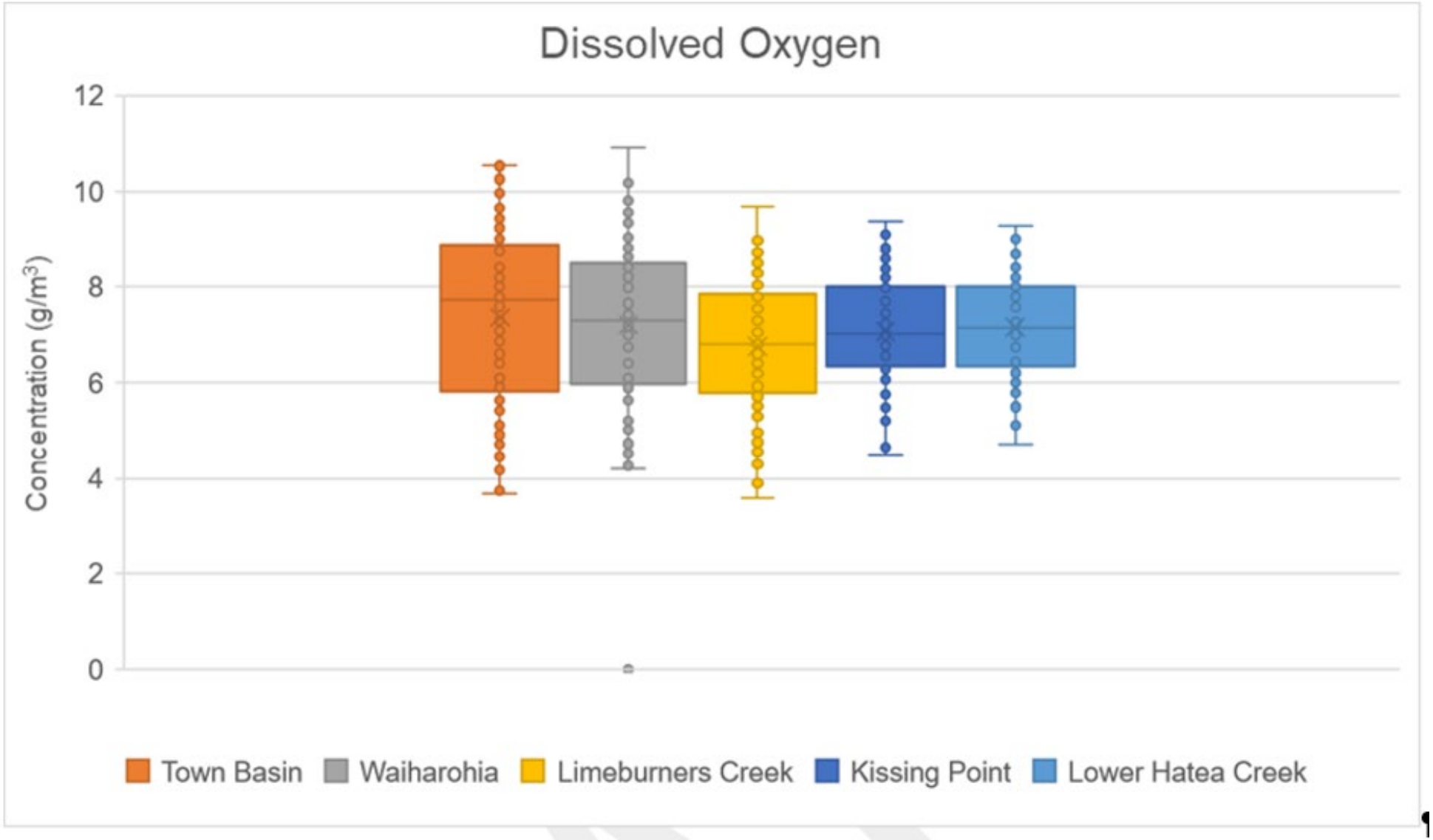


Figure 24 → Distribution of dissolved Oxygen concentrations at SOE monitoring sites

Thank You

ghd.com

Whangarei District Council

WHANGĀREI *Wastewater Treatment Plant*

CONSENT RENEWAL

Have your say!

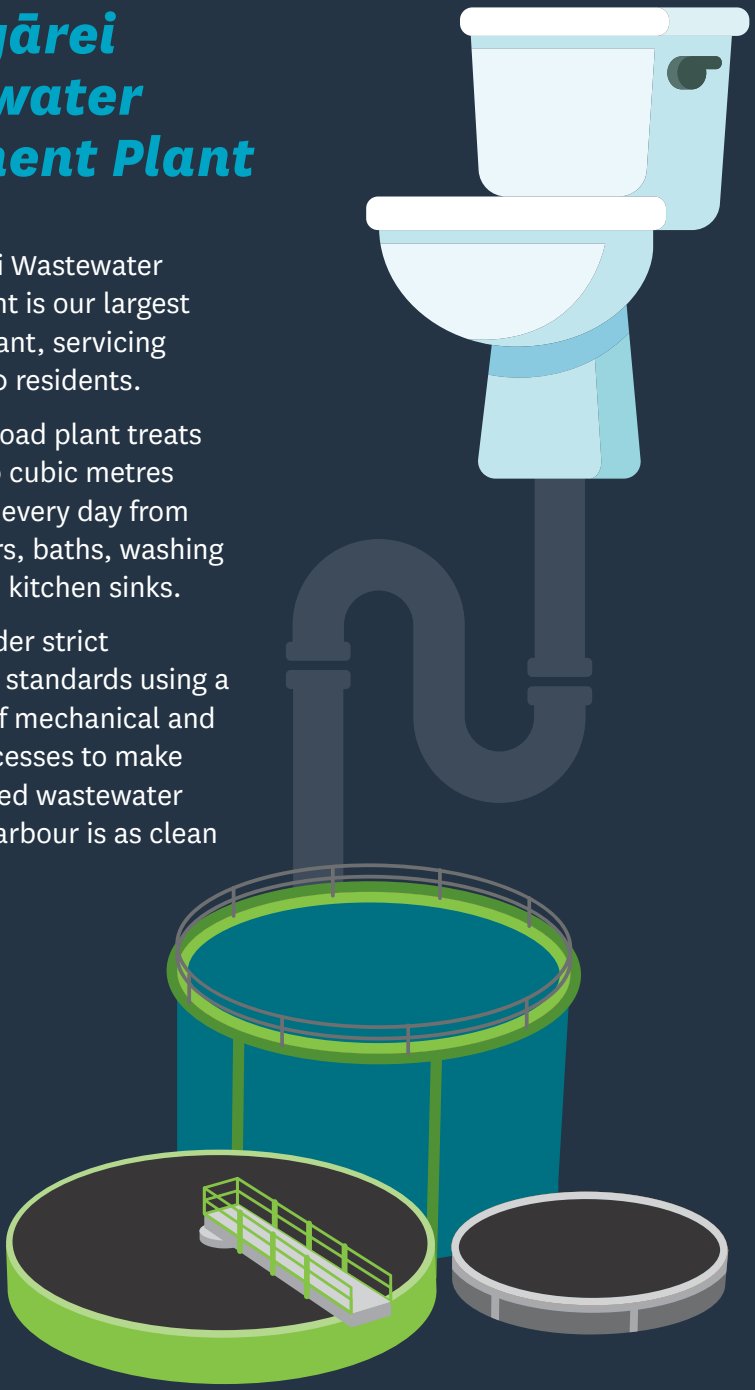
www.wdc.govt.nz/HaveYourSay

Whangārei Wastewater Treatment Plant

The Whangārei Wastewater Treatment Plant is our largest wastewater plant, servicing around 65,000 residents.

The Kioreroa Road plant treats around 21,000 cubic metres of wastewater every day from toilets, showers, baths, washing machines, and kitchen sinks.

It operates under strict environmental standards using a combination of mechanical and biological processes to make sure that treated wastewater entering the harbour is as clean as possible.



Whangārei Wastewater Treatment Plant Consent Renewal

Whangārei's Wastewater Treatment Plant (WWTP) discharge consent is expiring in 2022 and we need to apply to the Northland Regional Council to renew it.

Our goal is to provide this necessary waste treatment service to the community with the least impact on the surrounding environment.

We want to make sure the discharge into the environment stays the same as it currently is or if possible is improved over the term of the consent.

We are not proposing to increase discharges or change the discharge locations in Limeburners Creek.

The maximum permitted discharge volume is expected to stay the same as it is under the current consent at 140,000 cubic metres a day (on a normal day we process around 21,000 cubic metres a day but this increases during heavy rainfall).

Get involved and share your views

As part of the consent process we want to talk to you, consider the issues you feel are important and explore possible solutions.

Our goal is to provide this necessary waste treatment service to the community with the least impact on the surrounding environment.

We want to hear your concerns and expectations. Your input will help us as we develop our consent application over the next year.

We will also be involving local hapū and other groups such as Department of Conservation, Forest and Bird, Fish and Game and the Whangārei Harbour Advisory Catchment Group.

Visit: **www.wdc.govt.nz/HaveYourSay** to find out more.

Improving harbour water quality

We are always looking for ways to improve the wastewater system.

In the past during heavy rain, extra stormwater and groundwater flooded into the wastewater system and caused sewage spills in the harbour.

Over the last decade we've invested more than $60 million to improve harbour water quality, including installing storage tanks to hold and treat extra water during storms. We've also boosted UV treatment at WWTP so no untreated water goes from here into the harbour during storms.

The multi-million dollar projects completed to date include:

- New storage and treatment facilities at Whareora Rd and Tarewa Park which contain and treat extra water that enters the system during storms
- Major upgrades to the WWTP which means all wastewater receives UV and other treatments before being discharged into the wetlands
- Upgrades to the Okara Park pump station and pipeline
- Wastewater pipe renewals across the network

These improvements have dramatically reduced the number of sewer spills into the harbour and improved harbour water quality.

Council has also increased spending on stormwater as part of the 2018-28 Long term Plan to further improve harbour water quality.

A natural floating filter

Treated wastewater receives a final filter through thousands of native plants in the Limeburner Creek Wetlands. In 2014, these man-made wetlands had a major makeover and instead of the plants being planted in the ground they are now planted on floating mats, their roots extending down into the water. The wetlands, which provide a great habitat for native birds, can be explored via a timber boardwalk.

WWTP Consent FAQs

DOES UNTREATED WATER STILL GO INTO THE HARBOUR DURING STORMS?

Untreated water does not go into the harbour from the wastewater treatment plant. When it rains extra water enters the wastewater system and the plant struggles to cope with the extra flow. On a normal day discharged water goes through the full treatment process but during storms this process is shortened. During storms wastewater, as a minimum undergoes screening, settlement, UV and wetland treatment.

IS THERE ANYTHING YOU CAN DO TO FIX THE SMELL?

Reducing the odour of the plant is something we will be considering as part of the consent process and the best practicable options analysis. Technology is improving all the time and we are always looking for ways to reduce the smell. One option could be to cover part of the plant to reduce smells.

DOES THIS FUTURE PROOF US?

Yes, future growth is something we will be considering as part of the consent process and the best practicable options analysis.

ARE CLIMATE CHANGE AND SUSTAINABILITY BEING CONSIDERED?

Yes, climate change and sustainability is something we will be considering as part of the consent process and the best practicable options analysis.

What to do with all that poo?

Whangārei produces tonnes and tonnes of poo every year. Around 6.5 million cubic metres of it is piped to the Whangārei WWTP every year for treatment.

When you flush your loo, your poo races down the sewer system, joined by wastewater from showers, baths, washing machines and kitchen sinks, to the plant for processing.

Here it is strained, mixed, filtered, feasted on by live bacteria, dried and disinfected. Solid waste is taken to landfill and treated water is discharged into the Limeburners Creek Wetlands.

Keeping your pipes clean

Things can go wrong when people flush wet wipes, cooking fat or other rubbish down their wastewater pipes.

Grease and fat lump can together with other trash as giant ‘fatbergs’ in the sewer system, causing raw sewage overflows into the environment and costly repair bills for ratepayers. One of the largest ‘fatbergs’ ever discovered was a 130 tonne, 250m long monster, found in a London sewer.

These things can block drains:

- baby wipes
- cotton buds
- band-aids
- sanitary products and nappies
- fats, cooking oil and food scraps

The wastewater treatment *process*

1 SCREENING

Screening removes paper and other debris.

2 SEPARATING

In large settling tanks the solids (sludge) sink to the bottom, while fats and oils float to the top.

3 MAGICAL MICROBES

Our wastewater treatment plant uses natural biological process – millions of microbes that clean the water by eating the bugs. These bugs are our heroes, doing all the hard work for us without the need for nasty chemicals. These living organisms are very susceptible to chemicals which is why it is important not to flush things like paint down our drains!

4 SUPERBUG SOUP

Two giant aerators add oxygen to the wastewater to create a nutrient-rich soup for superbugs that continue the cleaning process.

5 UV TREATMENT

Filters remove fine particles from the water before ultraviolet (UV) tubes kill any remaining bugs.

6 A FINAL FILTER

Thousands of native wetland plants give the treated water a final filter.

7 SLUDGE DIGESTORS

Solid waste is heated and dried. Two biogas generators harness the poo power created by methane gas during the sludge treatment process and turn it into electricity.

8 LANDFILL

The treated sludge is taken away to landfill.

Whangarei District Council

Private Bag 9023, Whangarei 0148, New Zealand
Forum North Building, Rust Avenue, Whangarei
Ruakaka Service Centre, Takutai Place, Ruakaka
P 09 430 4200 | 0800 932 463 (24/7)
mailroom@wdc.govt.nz | www.wdc.govt.nz
Facebook.com/WhangareiDC

WHAT TO DO with all that *poo*

Whangarei produces tonnes and tonnes of poo every year. Around 6.5 million cubic metres of it is piped to the Whangarei Waste Treatment Plant every year for treatment.

When you flush your loo, your poo races down the sewer system, joined by wastewater from showers, baths, washing machines and kitchen sinks, to the plant for processing.

Here it is strained, mixed, filtered, feasted on by live bacteria, dried and disinfected. Solid waste is taken to landfill and treated water is discharged into the Limeburners Creek Wetlands.

LIQUIDS

1 *Screening*

Screening removes paper and other debris.

2 *Separating*

In large settling tanks the solids (sludge) sink to the bottom, while fats and oils float to the top.

3 *Magical microbes*

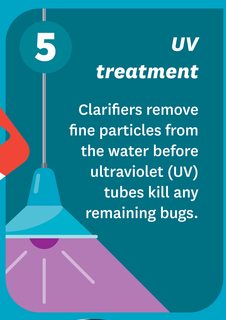
Millions of microbes clean the water by eating the bugs. These bugs are our heroes, doing all the hard work for us without the need for nasty chemicals.

4 *Superbug soup*

Two giant aerators add oxygen to the wastewater to create a nutrient-rich soup for superbugs that continue the cleaning process.

5 *UV treatment*

Clarifiers remove fine particles from the water before ultraviolet (UV) tubes kill any remaining bugs.



6 *A final filter*

Thousands of native wetland plants give the treated water a final filter.

1 SOLIDS

7 *Sludge digestors*

Solid waste is heated and dried. Two biogas generators harness the poo power created by methane gas during the sludge treatment process and turn it into electricity.

8 *Landfill*

The treated sludge is taken away to landfill.

Keeping your pipes clean

Things can go wrong when people flush wet wipes, cooking fat or other rubbish down their wastewater pipes.

Grease and fat can lump together with other trash as giant ‘fatbergs’ in the sewer system, causing raw sewage overflows into the environment and costly repair bills for ratepayers. One of the largest ‘fatbergs’ ever discovered was a 130 tonne, 250m long monster, found in a London sewer.

These things can block drains:

- baby wipes
- cotton buds
- band-aids
- sanitary products and nappies
- fats, cooking oil and food scraps

Community Survey (6 April - 5 May 2021)

Receipt Number	Response Submission DateTime	Are you happy with this approach?	Which of the following issues are most important to you for us to consider?	What other steps should we be taking to improve harbour water quality?	General comments	Would you like to receive updates about the Whangarei Wastewater Treatment Plant Consent Renewal?
WWTP2021-1	06/04/2021 07:13 PM	Unsure	Discharge quality of water to harbour,Sustainability (using renewable energy to run the plant, reusing water)	Rain gardens in carparks to reduce and control run-off,Install waste traps on stormwater outlets to harbour		No, I do not want to receive updates.
WWTP2021-2	07/04/2021 11:36 AM	Yes	Discharge quality of water to harbour,Sustainability (using renewable energy to run the plant, reusing water)	Rain gardens in carparks to reduce and control run-off,Install waste traps on stormwater outlets to harbour,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change.	Please keep up the high quality of wastewater treatment in our district, and anticipate future needs and invest early. If it takes more money to stay on top of it, I'm happy to contribute with a higher rate. Please also consider introducing volumetric wastewater charges, to create an incentive for water users to reduce their amount of wastewater.	Yes, I want to receive updates.
WWTP2021-3	08/04/2021 01:40 PM	Unsure	All of the above	Rain gardens in carparks to reduce and control run-off,Install waste traps on stormwater outlets to harbour,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change	Petition Central government to allow water recycling to be used	No, I do not want to receive updates.
WWTP2021-4	08/04/2021 02:06 PM	Unsure	Discharge quality of water to harbour,Plant odour,Location	Install waste traps on stormwater outlets to harbour,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change	WDC need to look at putting in another treatment plant to take the pressure off the existing plant, all the new builds in Tikipunga are being connected to the already overloaded sewerage network	Yes, I want to receive updates.
WWTP2021-5	08/04/2021 03:52 PM	Yes	Discharge quality of water to harbour,Sustainability (using renewable energy to run the plant, reusing water)	Rain gardens in carparks to reduce and control run-off,Install waste traps on stormwater outlets to harbour	The goal to a Harbour that is swimmable is important, for fish, sustainability and health of our harbour.	No, I do not want to receive updates.
WWTP2021-6	08/04/2021 05:53 PM	Yes	Discharge quality of water to harbour,Plant odour	Rain gardens in carparks to reduce and control run-off,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change		No, I do not want to receive updates.
WWTP2021-7	10/04/2021 08:36 PM	Yes	Discharge quality of water to harbour	Rain gardens in carparks to reduce and control run-off,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change		No, I do not want to receive updates.
WWTP2021-8	23/04/2021 11:34 AM	Unsure	Discharge quality of water to harbour,Plant odour	Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change	I would not like the odour to increase or Whangarei will be called Pong-a Rei and ridiculed as what happened in Whanganui. In the summer time the odour is absolutely awful and I am surprised that the Council have not had a complaint lodged in the Environment Court	No, I do not want to receive updates.

WWTP2021-10	30/04/2021 01:47 PM	Yes	Discharge quality of water to harbour,Sustainability (using renewable energy to run the plant, reusing water)	Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change	Are you happy with this approach? Is there provision for those unable to do the online survey i.e. hard copies made available and information on where to find them? Did the survey reach enough people? Which of the following issues are most important to you for us to consider? Discharge quality of water to harbour: Lack of adequate treatment has potential to contaminate the environment and increase the burden on human health. Sustainability: Objectives in wastewater treatment should look to create climate-resilient, enduring systems - as well as systems that close the loop and encourage resource re-use and recycling.	Yes, I want to receive updates.
WWTP2021-11	01/05/2021 12:44 PM	Yes	Discharge quality of water to harbour,Plant odour,Sustainability (using renewable energy to run the plant, reusing water),Location	Rain gardens in carparks to reduce and control run-off,Install waste traps on stormwater outlets to harbour,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change	The council need to urgently look at setting up another treatment plant to stop overloading the present one. You cannot keep putting new subdivisions sewerage into an already overloaded sewerage system	Yes, I want to receive updates.
WWTP2021-12	01/05/2021 12:56 PM	Yes	Sustainability (using renewable energy to run the plant, reusing water)	Rain gardens in carparks to reduce and control run-off,Install waste traps on stormwater outlets to harbour,Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change		No, I do not want to receive updates.
WWTP2021-13	04/05/2021 10:39 AM	Unsure	Discharge quality of water to harbour,Sustainability (using renewable energy to run the plant, reusing water)	Investigate where stormwater is getting into our wastewater network,Upgrades to networks to prepare for climate change		No, I do not want to receive updates.

From:	Sarah Sunich
To:	Georgina Olsen
Cc:	Sarah Irwin (sarah.irwin@wdc.govt.nz); Simon Charles; sarah.brownie@wdc.govt.nz
Bcc:	12528591
Subject:	Whangarei WWTP Discharge and Reuse Consent Application(s) - Notes from the hui on 19/10/2021
Date:	Wednesday, 20 October 2021 10:27:00 pm
Attachments:	image001.png image002.png image003.png image004.png image005.png

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Kia ora Georgina,

As it wasn't discussed at the hui yesterday who would be preparing minutes and circulating to the group, I've jotted down some of the key points I noted. Please feel free to add to these and circulate to the wider group (apologies for any mis-spelling).

Hui held on 19th October 2021 at 9am via Google Meet
Attendees: - Georgina Olsen (CIA consultant), Mike Kake (Te Parawhau), Pari Walker (Te Parawhau), Mira Norris (Te Parawhau), Simon Charles (WDC – Water and Waste Manager), Sarah Brownie (WDC – Council Planner), Sarah Sunich (GHD – consultant providing technical support and preparation of AEE)
Absent/Apologies – Sarah Irwin (WDC – Manager of Infrastructure Planning)

- WDC hold 5 resource consents in relation to the WWTP (1) discharge of treated wastewater to the Limeburners (Hāhā) Creek, (2) discharge of primary and UV treated wastewater via emergency bypass overflow outfall to the Limeburners (Hāhā) Creek (which hasn't been used since the wetlands were modified in 2014), (3) discharge of contaminants to land (seepage through base of wetland treatment system), (4) discharge of contaminant to air (primarily odours) and (5) establishment and use of bypass overflow outfall structure in Limeburners (Hāhā) Creek.
- These 5 consents are expiring end of April 2022, WDC have sought and NRC have agreed to a waiver to the 6 month lodgment date and thus the consent application must be made by 31st January 2022.
- WDC also hold a short-term consent to apply treated wastewater to Council owned gardens/sports-fields during times of water restrictions only, and would like to seek a longer-term consent for this activity.
- An adaptive pathway planning approach has been identified as the preferred approach going forward – much of the detail behind this approach is set out in the WWTP Master Plan (Appendix H of the AEE).
- Concerns raised around re-use of wastewater on sportsfields, continued discharge to Limeburners Creek, lack of engagement by Council with the wider Te Parawhau members, and that the CIA development is happening too late in the consent application process.
- Process for preparing the CIA is approximately 12 weeks – 6 weeks to enable 3 hapu hui, 4 weeks for writing time, 1 week for review time and 1 week for changes.
- Timing of CIA delivery likely to be towards end of February due to Christmas shut-down period falling in the middle.
- General agreement for the development of a MoU addressing Council and Te Parawhau's commitment to working together to prepare a CIA by end of February on the understanding the application will be lodged 31st January but then put on hold pending the CIA – signed by both parties – as evidence to NRC.
- Acknowledged there is no need for Council to take the application to Te Huinga.
- AEE to recognize the CIA work is in progress and request the application go on hold.
- WDC can assist with organising and hosting hui, with the focus to hold at least one hui before Christmas. Technical support can be provided by GHD if needed however it would need to be provided virtually due to lockdown restrictions currently.
- GHD to commence large file transfer of those parts of the AEE that are complete (COMMENCED)
- Te Parawhau advised a Hapu EMP is in the process of being developed (and is being used) and will inform the MACA and other RMA processes.
- Also discussion regarding the development of a Cultural Environmental Design Framework for sewerage (or perhaps a broader scope to encapsulate stormwater). Further discussion warranted to

understand how this may relate to the Hapu EMP and the Hāhā management plan also being proposed as part of other Council roading projects (Simon to discuss with Mark Seakons).

Kind regards

Sarah Sunich

MSc, BSc(Tech)
Technical Director of Environment and Resource Management

Work Days – Monday, Tuesday, Wednesday and Thursday

GHD

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Name of CMT Applicant Group

C/- (Name(s) of contact)

(Postal address for CMT applicant)

Tēnā koe,

In accordance with section 62(3) of the Marine and Coastal Area (Takutai Moana) Act 2011, on behalf of the Whangarei District Council, I am notifying you of our intention to lodge an application with the Northland Regional Council for the renewal of the consent for the Whangarei Waste Water Treatment Plant (AUT.004352 (01-05)) to discharge treated wastewater to land and water and as well as to occupy the CMA with an outfall structure.

As the consent application and accompanying reports are very large, we will make them available on Whangārei Wastewater Discharge Consent Renewal - Whangarei District Council (wdc.govt.nz) from Tuesday 14 December 2021. We seek your view on the application if you have any.

For further details regarding the application, please contact Sarah Irwin at sarah.irwin@wdc.govt.nz or the Consents Department at Northland Regional Council.

Nga mihi nui

Sarah Irwin
Manager, Infrastructure Planning
Whangarei District Council