MINUTES OF ROTORUA PROJECT STEERING COMMITTEE MEETING
HELD WEDNESDAY, 28 July 2015 AT 1.00pm
AT THE ROTORUA LAKES COUNCIL COMMITTEE ROOM 2

PRESENT:	Warren Webber (Chair)	–	Lakes Water Quality Society Inc
	Geoff Rice	–	Tapuika Iwi Authority
	Peter Staite	–	Ngati Te Kahu/Ngati Hurunga Te Rangi
	Andrew Te Amo	–	Ngati Whakaue/CNI
	Geoff Palmer	_	Rotorua Lakes Community Board
	Fred Whata	_	Ngati Pikiao
	Tamara Mutu	–	Ngati Hurunga Te Rangi
	Marama Meikle	–	Ngati Hurunga Te Rangi
	Annaka Davis	–	Toi Te Ora – Public Health Services
	Joe Tahana	–	Ngati Pikiao
	Andy Bruere	–	Bay of Plenty Regional Council
	Manu Pene	–	Ngati Whakaue
	Gina Mohi	–	Ngati Rangiwewehi Iwi Authority (left at 2.00)
	Antoine Coffin	–	Te Onewa consultants
	Alamoti Te Pou	–	CNI Iwi Land Management Ltd
	Gareth Bowen	_	Timberlands
	Geoff Palmer	_	Lakes Community Board
	Leilani Ngawhika	_	Te Arawa Lakes Trust
	Shane Gibbons	_	Tuhourangi Tribal Authority
	Antoine Coffin	_	Te Orewa Consultants
	Jim Bradley	–	TAG Chairperson
	Wally Lee	–	Tuhourangi/NgatiWahio (arrived 12.00)
STAFF PRESENT:	Hilda King	_	RLC, Administrator
	Dave Donaldson	–	RLC, Deputy Mayor, Councillor
	Alison Lowe	_	Environmental Scientist, Solid Waste & Sustainability
	Greg Manzano	–	RLC, Manager, Water Planning, Water Solutions
APOLOGIES:	Jimi McLean	_	Ngati Makino (email received)
	Pia Bennett	_	Ngati Makino
	Roku Mihinui	_	Te Arawa Lakes Trust (had to leave after workshop)

1. APOLOGIES

Apologies noted above

Resolved

Warren Webber Geoff Rice	))	***That the apologies above be received.***

CARRIED

2. REVIEW AND APPROVAL OF PREVIOUS MINUTES FROM 25 JUNE 2015

Resolved

Anaru Te Amo Geoff Rice	))	***That the minutes from 25 June 2015 have been received and accepted.***
		CARRIED

3. ACTIONS FROM PREVIOUS MINUTES/MATTERS ARISING

Agenda Item No	Action	Assignee
8d	To consider the membership BOPRC/MOH representatives on the RSPC	Warren

- MOH attendance covered by Annaka
- BOPRC attendance covered by Andy Bruere & Neil Oppatt

4. NOTIFICATION OF GENERAL BUSINESS ITEMS

None

5. UPDATES

5a) Antoinne: At the CAS meetings we're making sure that everyone is comfortable where we're at ie: technical queries and work through issues where required.
Topics we cover are:

- Pretreatment plant – ie: educating people to conserve water at home, at business to reduce the amount of water ending up at the treatment plant. More sustainable use of the water resource.
- Treatment plant – CAS committee are very interested in selecting the best option that's durable and gives optimal performance and have confidence in the information they are receiving.
- Discharge methods & discharge locations are our 2 most contentious issues – we've had talks about rapid infiltration beds
- Life of the plant over 35 years – what type of options would facilitate upgrades or add ons
- Offsets and mitigations
- What are the Processes that come into play when things go wrong. ie: overflow:
- Consent conditions relevant to discharges
- UV and MBR options for pathogens
- Ecological effects
- Wastewater discharge
- Alum dosing and its long term effects.

Gina – Now that we're getting closer to the decision making time, we are going to open CAS meetings to all iwi representatives on the wider RPSC Committee.

Alamoti – Antoine mentioned a flood plan and we talked about an overflow pipe that was utilized at one of those times. Does this pipe exist?

Contingency plan

Alison talked about the emergency overflow process they have in place and the extra storm water storage currently in place. She explained where this pipe is and how it works.

Peter Staite talked about a pipe that appears to have some type of discharge coming out which you can see from the road and seagulls often congregate at that point.

A Request was made to check out a pipe that is flowing back to the wastewater treatment.

A question was raised around the storm water presentation that was given at the last RPSC meeting. Members from CAS wanted to know why this presentation was given at that time. Concern was around the team using Iwi in this forum as some sort of mandate.

Warren – Andy Bell advised that the RPSC committee is doing well and they are looking to set up a similar committee regarding Storm water. The Stormwater information needs to go out to the public. The presentation was made to this committee as they wanted our opinion as an initial screen of content. Stormwater issues were not intended to be incorporated part of the RPSC process.

5b) Alison – talked to the following powerpoint introducing the comparison of options 1 to 6 against the TAG's "minimum technical requirements"

TAG – Minimum technical* requirements

*technical = engineering, environmental, economic

TAG minimum requirements	Criteria
Economically viable	• Total cost and specify $/kg N
Meets LGA purpose	• Meets current and future needs in a way that is most cost-effective for households and business
Technically viable	• Integrates with WWTP • Complete solution, technically possible, proven robust, reliable, flexible • Engineering resilience (natural hazards and climate change)
Legally viable and consentable from a technical perspective	• Meets key planning and statutory requirements • Appropriate available land access and long term use
Meets Consent order (following abatement notice March 2012)	• To select and pursue a "viable alternative", "the objective being to minimise, as far as practicable, the discharge of nutrients entering Lake Rotorua and its tributaries"
Meets previously agreed upon principles from the Clean Water workshop (Oct 2013)	• If discharging to water, is pure enough to support life • Discharge in Rotorua Catchment (unless agreed by those outside catchment) • Pathogen kill eg UV light
Meets previously agreed upon conditions in principle relating to use of CNI land	• Does not discharge to CNI land • Could potentially be commissioned by 2019
Protects Public health and avoids nuisance	• Protects Public health and avoids nuisance • Protects water supplies, food sources, recreation
Consider cultural acceptability	• Cultural goal is nil para out of catchment, and if that cannot be achieved then an agreeable compromise may be needed

Rotorua 5

A handout of a Table was given that relates to the options
(Minimum Technical Compliance of options 1-6, **Attachment 1**)

Options

An initial long-list of options was inititally identified. It was narrowed down to a short-list of 5 options as having potential to meet the agreed goals and minimum technical requirements. Options 1-5 were developed with a view to integrating TERAX. The options aimed to meet the minimum technical requirements, including a maximum annual discharge of 30 t/yr N and 3 t/yr P (3.4 mg/l N and 0.34 mg/l P based on predicted 2051 flows). Option 6 was developed at a later date an alternative if TERAX is decoupled from the WWTP, ie the TERAX return liquor is not returned to the WWTP process, as a WWTP configuration that could meet the 30 and 3 t/yr TN and TP limit and maximise the use of carbon (reduce ethanol requirments without the TERAX return liquor).

Option 1 WWTP base upgrade: flow balancing, DRP-removal, UV treatment

Option 2 WWTP base upgrade + tertiary filtration (disc filters, sand filtration, in-line membranes)

Option 3 WWTP base upgrade + denitrifying tertiary filtration (sand filtration, carbon beds)

Option 4 Dual Discharge. No WWTP upgrade. MBR discharge to surface water. Bardenpho discharge to land at 5 mm/d or 20 mm/d application rate.

Option 5 Land Treatment. No WWTP upgrade. Current flow discharged to land at 5mm/d or 20 mm/d.

Option 6 WWTP base upgrade (UV as a second pathogen removal barrier), primary bypass (decommission primary treatment), full MBR for the secondary process, sludge dewatering with centrifuges.

Minimum Technical Requirements

The options were assessed for compliance with each of the previously agreed Minimum Technical Requirements (Table 1), where:

✓ achieves minimum technical requirement
P could "Potentially" achieve minimum technical requirement
? uncertainty around achieving the minimum technical requirement
✗ does not achieve the minimum technical requirement

Option 1 – does not achieve minimum technical requirements

A base-upgrade to the WWTP reduces DRP but the clarifiers do not reduce particulate-P sufficiently. Both TN and TP in the discharge exceed the minimum requirement. With a variable concentration of suspended solids in the discharge, the single barrier approach to pathogen kill is more risky.

Option 2 – does not achieve minimum technical requirements

A base-upgrade to the WWTP with tertiary filtration reduces DRP as well as particulate-P (depends on the filtration). TP levels below the minimum requirement of 0.34 mg/l (3 t/yr) can be achieved using sand filtration or in-line membrane filters. While this option also removes particulate nitrogen, the requirement for a TN concentration of 3.4 mg/l (30 t/yr) can not be met. Suspended solids are low and UV treatment provides an effective single barrier approach to pathogen kill.

Option 3a – achieves minimum technical requirements

A base-upgrade to the WWTP with a denitrifying sandfilter to provide both filtration of the particulate fractions as well as an additional nitrate removal. This upgrade can achieve TP around the minimum requirement of 0.34 mg/l (3 t). This upgrade option provides the lowest risk of meeting the N limit of 3.4 mg/l (30t/y) during normal operations as more nitrogen is removed (having two N-removal processes in series is more efficient than just one). Sandfiltration, as part of the filtration process, returns the back-wash to the treatment plant which can add to the variability in the plant. During storm flows or when other issues occur that impact settlability in the clarifiers, and the frequency of backwashing to clear the filters is high, the performance of the plant will reduce. Recovery time depends on the volume and mass of solids being received by the sand filter. There is a risk with this option that during extreme events bypass of filtration may be required. UV treatment provides an effective single barrier approach to pathogen kill, but there is some risk if the capacity of the sand filter is exceeded.

Option 3b – does not achieve minimum technical requirements

A base-upgrade to the WWTP with a carbon bed to provide both filtration of the particulate fractions as well additional nitrate removal. TP levels will be around the minimum requirement of 0.34 mg/l (3 t/yr) can be achieved and TN levels will be reduced to around the minimum requirement of 3.4 mg/l (30 t/yr). While potentially technically possible, carbon beds have not been proven on this scale, with these very low concentrations of nitrate or over a long timeframe. With a variable concentration of suspended solids in the discharge (either pre- or post- Ca-bed), the single barrier approach to pathogen kill is more risky.

Options 4 and 5 – currently parked

Option 6 – achieves minimum technical requirements

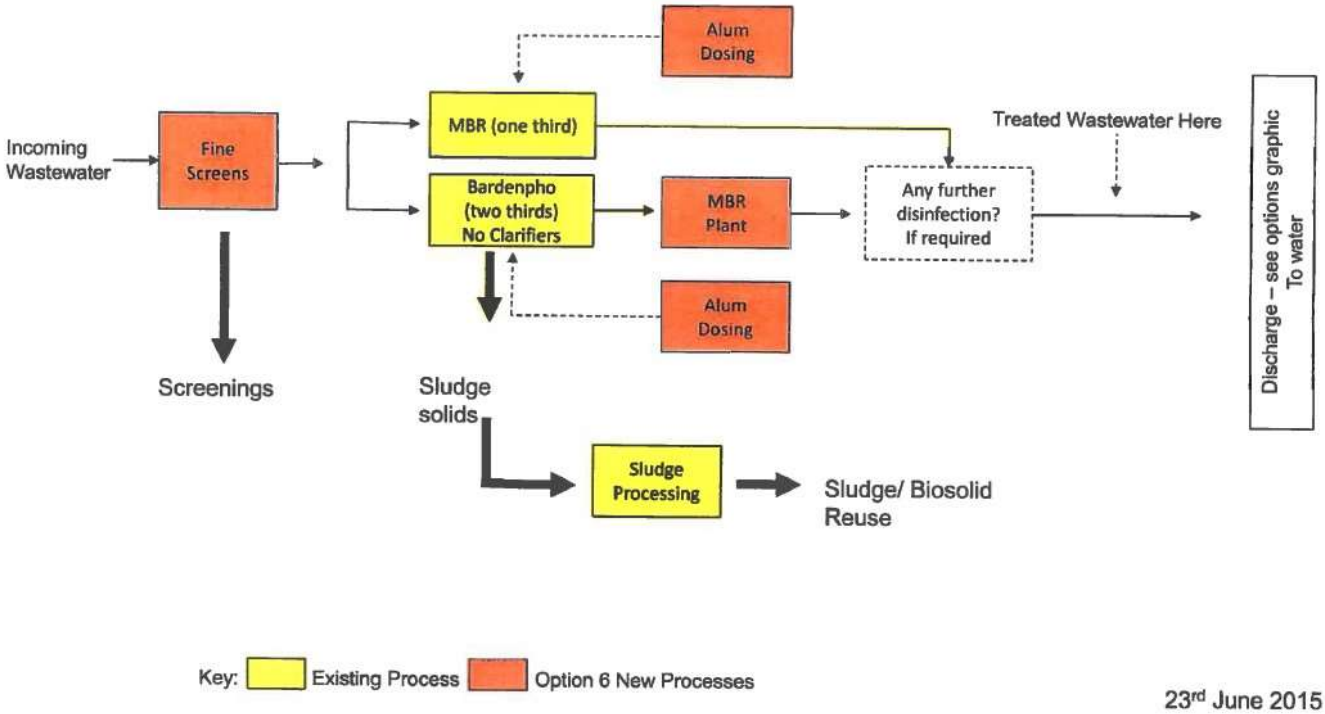
A base-upgrade to the WWTP that bypasses the primary tanks to make full use of the carbon, int the raw sewage, in the secondary processes, reduces sludge production, some reconfiguration of the Bardenpho to optimise N-removal, with full MBR incorporated into the secondary process. This can achieve the lowest TP in the WWTP discharge, below the requirements of 0.34 mg/l (3 t). Reduces TN to around the required 3.4 mg/l (30 t) TN. Has the disdvantage of being hydraulically limited (can only pass a fixed amount through membranes) so careful selection of membranes and management of stormflows is essential Membranes and UV provide an effective double barrier approach to pathogen kill.

Warren – That was an overview of all the options. As discussed previously there are 2 options for the plant upgrade. Option 3a & Option 6 which currently appear to be the most pragmatic options. (It is actually 6a)

5c) Jim talked to the following slides to refresh the Committee's understanding of these options: (Alternative to Rotorua Land Treatment System - Attachment 2)

Option 6 – Full MBR Treatment Plant with Phosphorus Removal

Add in
- Alum dosing for phosphorus removal
- Membrane filtration to remove most of pathogens (germs)
- New discharge to water



23rd June 2015

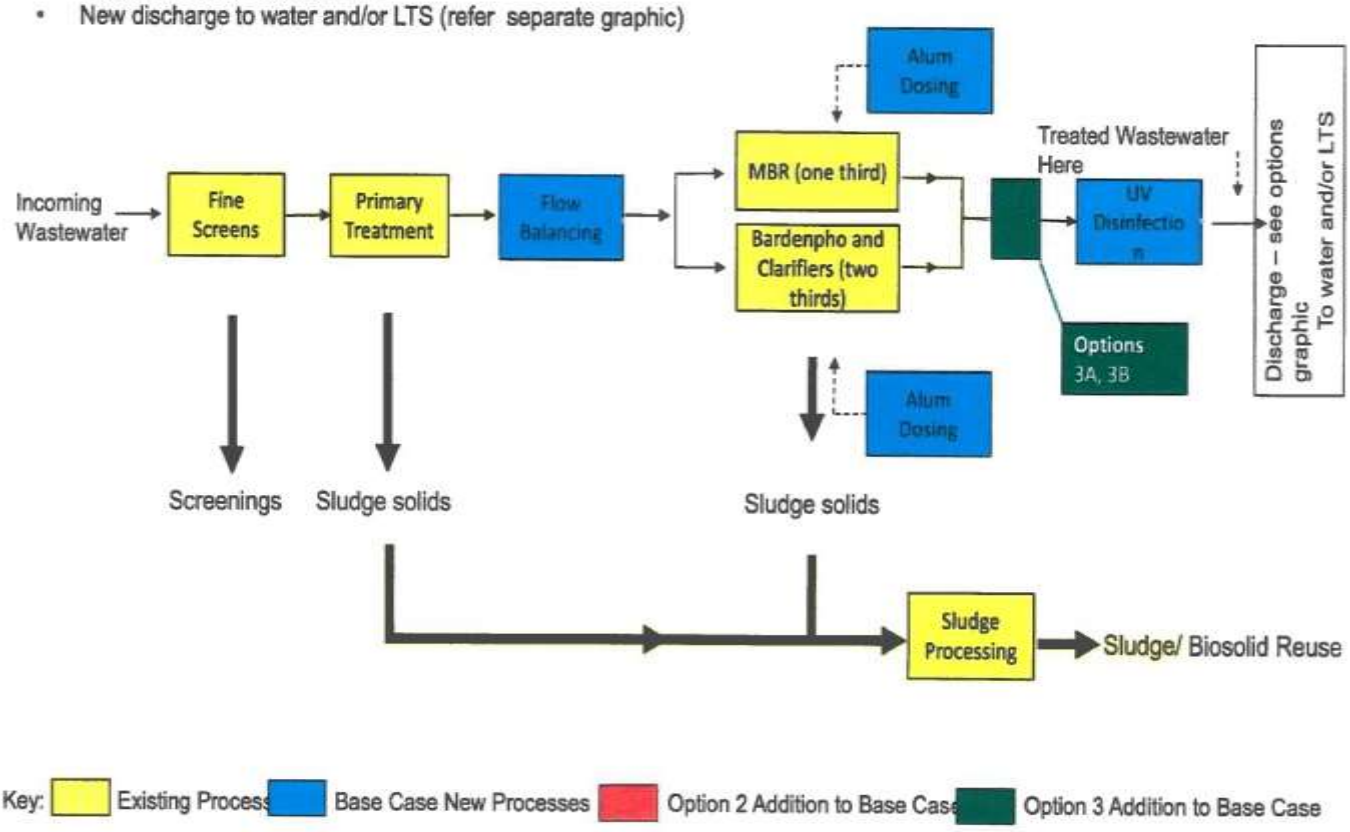
Options 3A & 3B - The Base Case and Denitrifying Filtration / Carbon Beds

Add to the Base Case

- Option 3A – Denitrifying Filters

or

- Option 3B - Carbon Beds and
- New discharge to water and/or LTS (refer separate graphic)



Jim talked to the following presentation. Comparison of Options 3a and 6:

ALTERNATIVE TO ROTORUA LAND TREATMENT SYSTEM

Technical Advisory Group's Relative Comparison of Option 3a (Base Option + Denitrifying Sand Filter) and Option 6 (Full MBR + UV) - (Refer to attached diagrams)

Item No.	Attribute Description	Option 3a (Base Option + dN Filter)	Option 6 (Full MBR + UV)	Best Fit
1.	**Proven technology**	No wastewater reference sites in New Zealand. Many in use in Australia and around the world, particularly USA (Florida etc.) UV disinfection totally proven.	Current Rotorua WWTP has MBR as major component (largest MBR in New Zealand.) UV disinfection totally proven.	6
2.	**Operation and Maintenance**			
2.1	Operator requirement	Additional operator skill and attention needed for denitrifying sand filter and UV. (More training required.)	Current operator skills sufficient for MBR. (Training for UV required.)	6
2.2	Complexity of operation	Denitrifying sand filter has carbon dosing that needs to be monitored and controlled as an additional tertiary process. Being at the end of the treatment process, any overdose of ethanol is likely to have immediate effect on the wastewater COD and BOD concentrations. This situation gives more complexity to plant operation and more risk to meeting requirements.	Denitrification at Bardenpho and filtration at MBR, within current secondary processes. Similar operational complexity as existing.	6
2.3	Operational risks	Excess solids from clarifier could "blind" the sand filter requiring constant backwash which could impact on nutrient removal performance.	Risk of filter clogging minimal. Membrane cleaning happens continuously through pulsed system. (Current operation provides evidence of requirements.)	6
2.4	Energy (electricity cost)	Medium	High	3a
2.5	Additional (supplementary) chemical costs e.g. ethanol carbon source	Denitrification depends on additional ethanol carbon source.	"Free" carbon from by-passing primaries reduces ethanol carbon dosing from current requirements.	Without TERAX 6 With TERAX 3a
3.	**Reliability / Flexibility**			
3.1	Risk of non-compliance to consent conditions.	Period to recover from backwash process could result in periods of non-compliance.	Stable process. Membrane filtration could provide buffer for upset biological process.	6
3.2	Ability to handle wet weather flows.	Solids carry over from clarifier due to stormflow, resulting in solids in excess of 50mg/l will cause continuous backwash at the sand filter resulting in decreased hydraulic through flow.	Has higher level of flexibility in terms of solids carry over.	6
3.3	Future flexibility or potential to increase treatment capacity	Reasonable flexibility but need to design this initially for cost efficient expansion	Good flexibility by adding additional treatment modules.	6
4.	**Sludge Production**	32m^3/day at 17% dry solids	21m^3/day @ 18% dry solids (i.e. 32% less sludge	Without TERAX 6 With TERAX 3a
5.	**Predicted Performance**			
5.1	TN	< 30t/yr) - Potentially more N removal but also more variability risks	<30t/yr N	Similar
5.2	TP (with Alum)	<3t/yr P	<3t/yr P	Similar
5.3	Bacteria removal by filtration	100 Ecoli	<1 Ecoli	6
5.4	Virus removal by filtration	Noru virus removed	Noru virus removed	Similar
5.5	Pathogen removal by UV	Relatively more variable UV requirements to achieve high pathogen destruction due to slightly higher SS and variability. Single Barrier Removal	Consistently very high pathogen destruction due to consistently low SS. Double barrier removal	6
6.	**Ability for upgrade to be staged but still stay within the consent limit requirements.**	Possible	Possible	Similar
7.	**Costs**			
7.1	Capex	M$ 24.40 M	M$ 30.55	3a
7.2	Opex	M$ 2.56 M	M$ 1.92	6
7.3	NPV	M$ 75.79 M	M$ 68.05	6

ALTERNATIVE TO THE ROTORUA LAND TREATMENT SYSTEM

SUMMARY OF OPTIONS AND TERAX

1. TERAX was initially developed based on the WWTP effluent being discharged into the Whakarewarewa Land Treatment system.

2. Rotorua Lakes Council (RLC) and the owner of the existing Land Treatment System (LTS) – Central North Island Iwi (CNI), agreed to cease the operation of the LTS by the end of 2019.

3. Options for the proposed upgrade of the Rotorua Wastewater Treatment Plant were developed with the assumption that the carbon rich liquid produced by TERAX would be returned to the Wastewater Treatment Plant.

4. Following is a summary of options identified as alternative to the existing land treatment system.

Option No.	Option Description	Comments
1	Base Option Flow balancing + P removal + UV Sludge disposal through TERAX.	Does not comply with current consent limit of 30T N and 3T P.
2a	Base Option + Disc Filtration Sludge disposal through TERAX.	Does not comply with current consent limit of 30T N and 3T P
2b	Base Option + Sand Filtration (RGF) Sludge disposal through TERAX.	Does not comply with current consent limit of 30T N. Complies with 3T P requirement.
2C	Base Option + In-line Membrane Filtration Sludge disposal through TERAX.	Does not comply with 30T N consent limit. Complies with 3T P limit.
3a	Base Option + Denitrifying Sand Filtration Sludge disposal through TERAX.	Complies with 30T N and 3T P limits.
3b	Base Option + Carbon Beds Sludge disposal through TERAX.	Carbon bed performance unknown at low effluent nitrogen levels.
4	Current plant with MBR (1/3 flow) flow discharge to water and Bardenpho (2/3 flow) flow discharge to land at 5mm/day or 20mm/day loading rates. Sludge disposal through TERAX.	Complies with 30T N and 3T P limits
5.	Current plant with all flows discharged to land at 5mm/day or 20mm/day loading rates. Sludge disposal through TERAX.	Complies with 30T N and 3T P limits.
6.	Full MBR Option. - Bypass primary with MBR after the Bardenpho. - Sludge dewatering + offsite disposal.	Complies with 30T N and 3T P limits.

5. RLC and TERAX Project Team identified several risks related to the inclusion of TERAX (the return of the TERAX liquor) to the WWTP upgrade. These are:

   - Colour to the effluent.
   - Recalcitrant nitrogen to the plant and effluent.

- Calcification in the TERAX plant.

6. Mitigation of the above risks were identified and included in the costing of the options.

7. Options 4 and 5 were parked by RPSC in their meeting on 25 June 2015. This was based on concerns with availability of land and the relatively high cost.

8. Options 3a and 6 are the only options that complies with the current resource consent limits of 30T N and 3T P. RPSC in their meeting on 25 June 2015 considered these as the preferred options.

9. With Option 3a, sludge is processed through TERAX. The liquid by-product is returned to the plant as a source of carbon.

10. With Option 6, sludge is dewatered and disposed offsite. This option is totally decoupled with TERAX (no return of TERAX liquor to WWTP.)

11. RLC decision on whether TERAX is to proceed as an integral part of the WWTP, will influence the choice of preferred upgrade option.

12. RPSC could proceed with public consultation based on preferred options 3a and 6 with their discharge options.

.....
Greg Manzano
Manager, Water Planning

.....
Jim Bradley
Chairperson
Technical Advisory Group

28 July 2015

Andy Bell - TERAX is a great piece of work design to go without the current treatment plant. But we're going to move the goal post and TERAX hasn't been able to keep up with the changes. TERAX is still a work in question. No decision has been made on it yet and its not a decision that you need to make today.
It's important for you to understand that the 2 options

3a (keeps the primary sedimentation tanks in there – TERAX is involved in 3a).
Option 6 (No primary sedimentation).

More discussion took place regarding TERAX. In the long term TERAX offers reduced cost.

Warren: - The feedback that I'm getting is Option 6a, known technology, less risks, less costs.
I've had the benefit of reading Davids report and listening to his presentation to TAG.

Remember: We're working in a consent restraint of 30tonnes of Nitrogen per year.

David's report shows 23.81MLitres per day going through the plant. This allows only approximately 4Mlitres for increased growth over time (Currently its 19 – 20ML)

Option 3a has the potential to reduce N to 2.63 mg/l = 22.9TN per year
Option6 has the potential to reduce N to 3.53 mg/l = 30.7TN per year

Option 6 doesn't give room for growth, but I believe it has more going for it than Option 3a.
This does present a consenting challenge. There maybe ways around it either by negotiation with Regional Council, off set mitigations etc.
If we're constrained to the 30tonne per year limit we need to think extra hard about these options.

Warren asked the Committee for their opinions to date.

Option 6 with possible add-ons is the preferred at this stage.

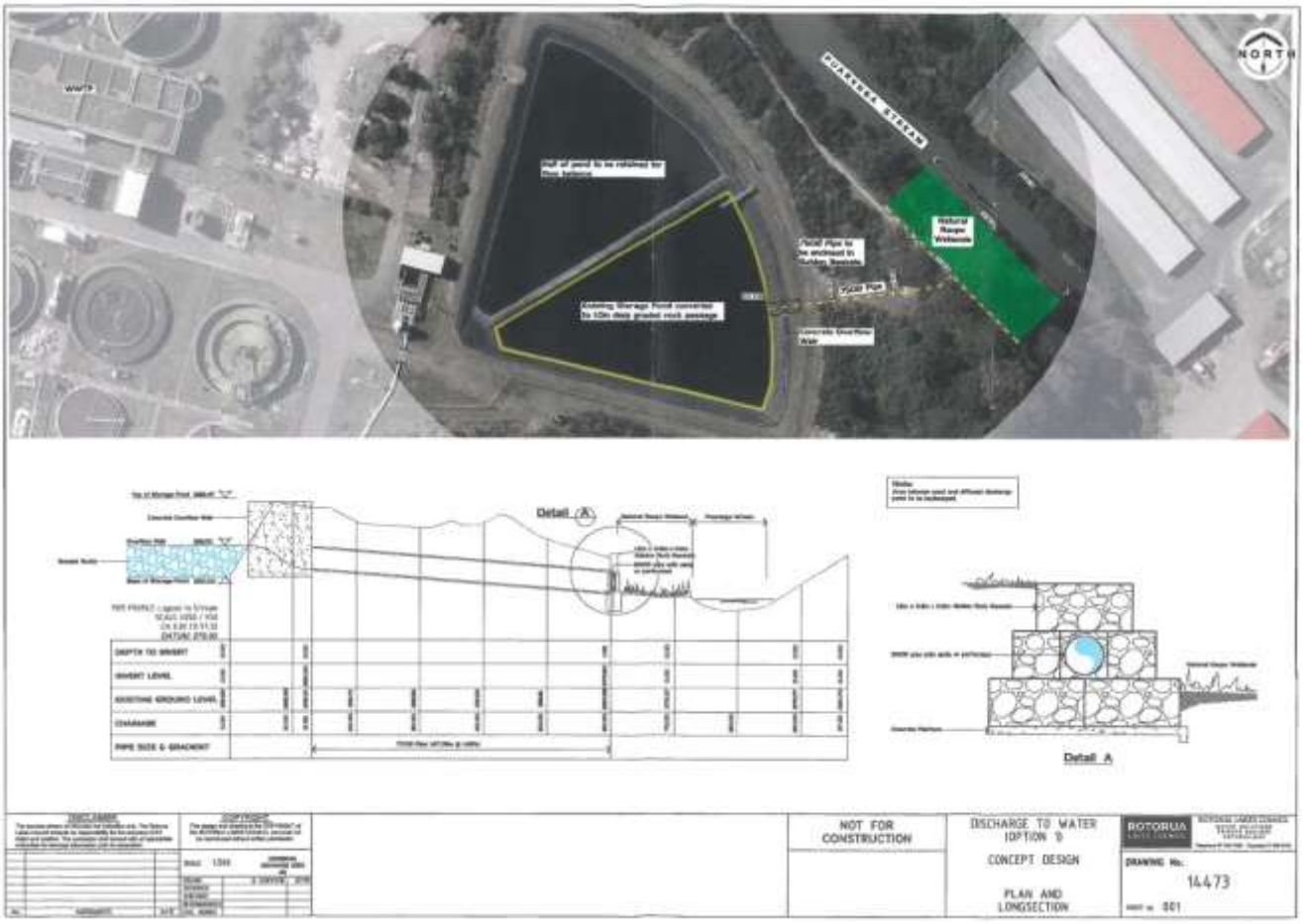
Q – Is there an indication that Regional Council are working alongside us?
Warren – I believe they want to be on the same side and work together with us and they appreciate the problems. They have some aspirational targets for TN reduction in the catchment by 2032. I would anticipate that the Regional Council will work with us to address the impact of medium term TN inflows which derive directly from the WWTP after 2019, together with the LTS legacy load.

Discussion took place around the consent expiry date and consent requirements for the transition period during which the LTS legacy load will decline.

Since the 30TN consent was put in place all the septic tanks from Otara marae, Whangamarino, Okere Falls, Brunswick, Rotokawa, Hamurana, Awahou, Okareka and others have all been reticulated into this waste water treatment plant. There's been no consideration of all that nutrient that's gone into ground water and into the lakes now being part of our 30TN consent.

Warren to Geoff – What do you see as the impediment to going forward with options 3a and 6?
Geoff –Looking at whats been presented to us option 6 seems to be the obvious one.

Gregg talked to the following slides – Maps of discharge options – Attachment 3



Reminder that it's just a concept of how it could look like. Utilising the existing storage pond.

Discussion took place around the discharging to the lake and the effects on algae bloom.

Warren – My understanding is that we are currently sitting on a TLI of 4.2 and its still a vulnerable Lake in terms of algal bloom. So we need to take out everything we possibly can in terms of risk factors.

We keep talking about Discharge Location Options 1 and 2 and it can start to get a bit confusing when we're talking about treatment options at the same time. I suggest the following as descriptors for these two discharge location options:

- Puarenga Option (Option 1)
- Sulphur Bay Option (Option 2)

5d) From this morning's workshop I'd like to record that Professor Hamilton's report presented be received.

Resolved

Fred Whata Manu	))	***That the draft report "Lake Rotorua Treated Wastewater Discharge: Environmental Effects Study" be received and accepted.*** CARRIED

Action: Hard copies of report to be posted out to those requesting a copy. – Hilda

- Electronic copy attached as Attachment 4
- Electronic copy downloaded to the Rotorua Te Arawa Lakes programme website:

www.rotorualakes.co.nz/project_steering

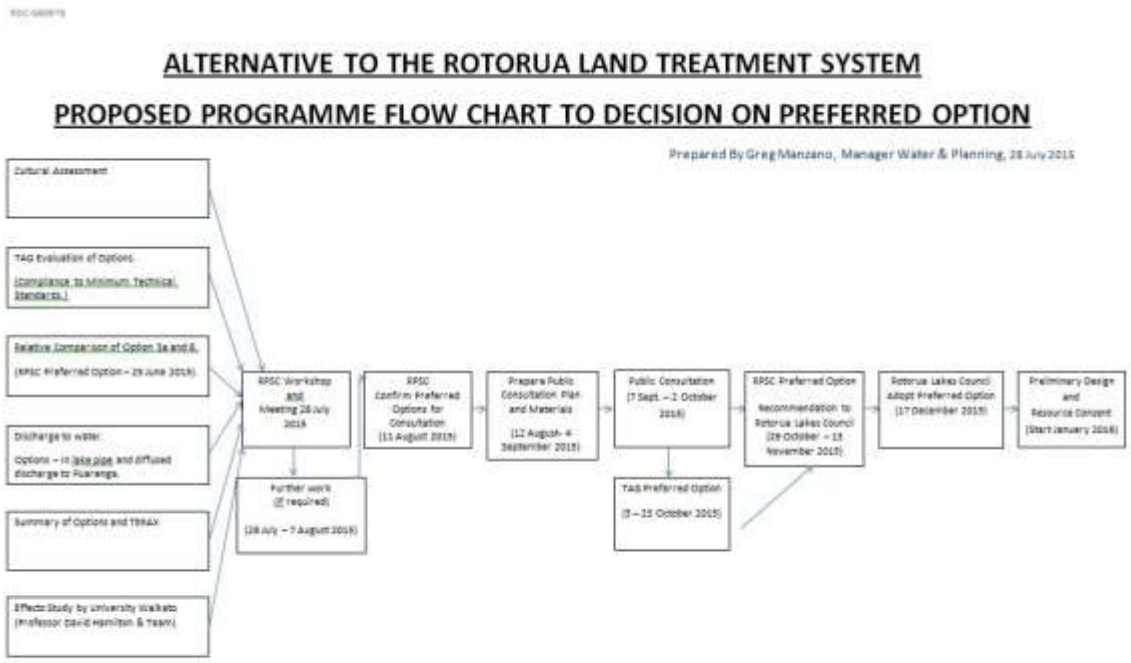
Username: RLPSC
PW: sediment

Q – Is this Committee and TAG still receptive to new ideas?
A – Ideas welcome, remember we need to back them up too.

Due to time shortage Alison will talk about "Endocrine disruptors/micro and emerging pollutants" at the next meeting.

6. MOVING FORWARD

6b) Greg talked to the proposed programmed flow chart Attachment 5



Public consultation process discussion to be deferred to the next meeting.

6a) Warren - If you have technical questions you would like addressed by TAG, or if you have other ideas you would like to discuss, please email them to me so I can ensure they get incorporated.

Items I have noted from today are:

- Extra work that's required for CIA
  a) More information on the environmental and ecological impact of a land treatment system.
  b) Work on Taonga species (perhaps via Ian Kusabs and Joe Butterworth)
- More work on Sulphur Bay options in terms of sizing of a field, retention rates, how it could be configured
- Clarification of the discharge point in relations to Peters earlier comment.
- More descriptive information on the offshore discharge location (pipe going 2km into the Lake with a diffuser mechanism). ie: does it sit on the lake bed, what's it made of.?
- Need clarity on ownership of land within the vicinity of the WWTP and Puarenga Stream.
- From Davids report, why does the off shore discharge option increase the likelihood of algal blooms? And the others don't? Need to clarify with David. (may be related to improved pre-lake dilution of nutrients with the Puarenga option)

7. GENERAL BUSINESS

Confirmed next meeting Thursday 20th 9am to 12pm

8. KARAKIA WHAKAMUTANGA

Meeting closed at 3.50pm with a closing Karakia by Fred.

Attachments to Minutes of
Rotorua Land Treatment System Project Steering Committee Meeting
Tuesday 28th July 2015

Attachment 1

Minimum Technical Compliance of option

Attachment 2

Summary of Options and Terax.pdf

Attachment 3

A3 maps - Discharge to water options.pdf

Attachment 4

Lake Rotorua Effects Study Report_DRAFT

Attachment 5

Proposed programme Flow chart to decision

ACTIONS:

Agenda Item No	Action	Assignee
5d	Hard copies of the draft report "Lake Rotorua Treated Wastedwater Discharge – Environmental Effects Study" to be posted to members requesting a copy.	Hilda King