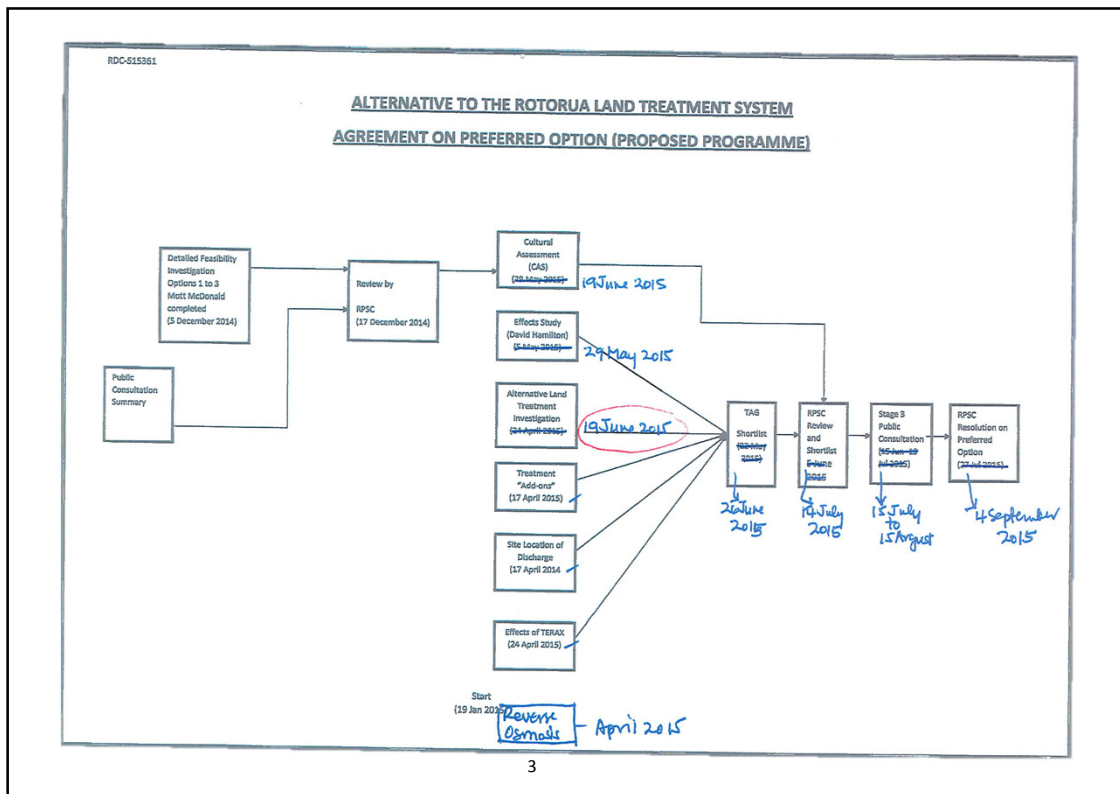


RLC Technical and Environmental Investigation Tasks Update to RPSC 22nd April 2015

- **TERAX and Wastewater Treatment Project Interaction**
 - In progress – Workshop update today. SCION and as independent assessor PDP
 - Completion 20th May 2015
- **WWTP Treated Wastewater Direct Discharge Options**
 - In progress – Workshop update today. RLC and TAG
 - To be integrated to output of Effects Study Output - 29th May 2015 (see below)
- **Alternative Land Treatment Investigation**
 - In progress through Mott MacDonald working with RLC
 - General location areas and GIS Mapping/Overlays prepared
 - Report due 19th June 2015
- **WWTP Strategy Study**
 - New task being undertaken by Mott MacDonald - Consultants
 - Focussed on “Best Overall Approach” to WWTP upgrading
 - Includes TAG/Mott MacDonald short-listed Treatment Options 1, 2 & 3, decommissioning primary treatment to obtain carbon source, full conversion to MBR Plant, options with and without TERAX
 - Draft Report 15th May 2015

RLC Technical and Environmental Investigation Tasks Update cont...

- **Environmental Effects Study of Treated Wastewater Discharge**
 - This major task well in progress
 - Being undertaken by University of Waikato led by Professor David Hamilton
 - Interacting with TAG activities and RLC direct discharge location task
 - Draft Report due 29th May 2015
- **Reverse Osmosis etc Treatment Considerations**
 - General information presented RPSC 19th March 2015
 - Additional information presented as Group B Questions 2 & 3 RPSC 22nd April 2015
 - Further direction sought from RPSC how much further to take this
- **Treatment Add-on's Update**
 - RLC/TAG update to RPSC 22nd April 2015
 - RPSC support for TAG approach to be considered at RPSC 22nd April 2015



TAG MEETING 8TH APRIL 2015 - SUMMARY

- Busy meeting – full attendance
- 18 Agenda Items – many included today's Technical & Environmental Updates
- Antoine Coffin (who TAG invited) updated on the CIA Workshops and the 10 objectives
 - Wide ranging discussion around effects, elaborated on by Antoine
 - Preferred discharge is to land
 - Target discharge water quality somewhere pristine and the current receiving environment
 - Key treated wastewater drivers are colour, smell, pathogens, human health and aquatic life – not so much N and P
 - Some emphasis so far on the "physical" matters, discussions on how metaphysical are being included
- Discussions/Update on TERAX
- Discussions/Update on Land Treatment System (LTS) alternatives including Fonterra position with respect to dairy cows
- Importance to keep door open for future industrial and other treated wastewater treated reuse options
- The Business Case approach incorporated in Mott MacDonald's engagement for the WWTP Strategy Study

TAG MEETING 8TH APRIL 2015 – SUMMARY cont...

- Potential discharge locations for discharge to water – including an “off-shore” - in lake discharge option
- Treated Wastewater Effects Study Update
 - 1D model looking at effects
 - 3D model looking a transport of nutrients etc
- Importance of the NPS Freshwater Management and demonstrating water quality improvement - recent RMA Wastewater Consent Cases
- “Add-On’s” update and TAG approach being developed to keep these as possible technologies for further periodic review in future years if there is a need and the technology is proven. Possibility of RLC suggesting such a Resource Consent Review Condition that would be consistent with a Wastewater Strategy as previously promoted to RPSC by TAG
- Options assessment - TAG’s recommendation being developed is that we assess the options from an effects-based approach on the receiving waters and other receiving environment(s) (includes consideration of cultural, life-supporting capacity, key contaminants, including nutrient, pathogens micro-contaminants). NB considering but not advising on cultural matters.

Group A: Questions & Answers

Mainly arising from RPSC 19th March 2015 Meeting and Field Trip

Please refer to the written Questions & Answers attached to the RPSC Committee Meeting and Field Inspections 21st March 2015 – copies also available today.

Recap - Summary Answers

Question 1 UV Disinfection Plant

- Depends on many factors as discussed previously - RPSC 19th March 2015 slides
- Initial estimates, Capital \$4.6M, Operating Electricity \$78,000pa – plus lamp replacements and other

Question 2 Cawthron Report Re Bioassay Results

- Conclusion - testing in Puarenga and Waipa Forest streams show levels below detection, in effect zero or very very low

Question 3 Engineering and operation of Activated Carbon Treatment

- Use of as powder or granulated activated carbon
- Removes residual colour, trace organics and other micro-pollutants (and in water treatment taste and odour) – refer Group B Question 2

Question 4 Colour scales used for wastewater

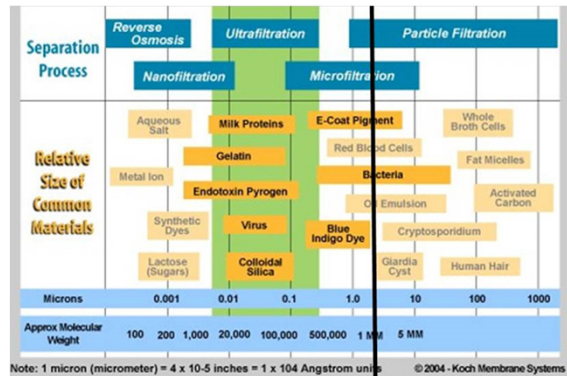
- APHA Colour, HUE, Turbidity,
- UVT (UV Transmissivity) – currently treated wastewater around 60% UVT – very good for UV disinfection – refer earlier information – RPSC 19th March 2015 slides

Group A: Questions & Answers cont...

Question 5 LTS System Power Cost and Static Head

- Total cost to operate is around \$870,000pa, a significant portion of which is power

Question 6 Particle Size Graph showing Rotorua WWTP MBR



Please note – micron scale is a log scale

Figure 1.0 Relative Particle Sizes (Koch, 2004)

Rotorua WWTPP – MBR
4 micron pore size (approx location)

Question 7 Wastes from Embalming Processes

- Handled as a “trade waste” as Health Practices, Mortuaries, Hospitals, Rest Homes
- Currently one embalming establishment in area – waste self-contained system not discharged to RLC sewer

GROUP B: QUESTIONS & ANSWERS

A number of these are still being worked on by RLC and TAG. Today covers interim answers and updates. Full written answers will be attached to following RPSC Minutes as investigations are completed.

Question 1 Effects of Wastewater Treatment of Health compounds in sewage

- Question related to US Department of Health Household Products List
- Yet “to match” some typical compounds listed to the work on micro-pollutants and removal in WWTP’s of the Rotorua type

Question 2 Reverse Osmosis (RO) Indicative Costs

- Refer RO information previously presented
- Would normally have an Ultra-Filtration (UF) unit before RO
- Obtained information from MWH Australia who are undertaking a UF/RO Project for Water Corporation in Perth (similar to Orange County)
- Based on Australian experience for a full Rotorua sized plant is being considered. A very indicative budget would be around, AU\$90M plus very significant operating costs
- A UF plant only would be around one third (AU\$30M)
- Stress these are very indicative
- Should RO be considered any further at this stage?
- Should other advanced treatment considerations, but less than RO be advanced e.g. Activated Carbon, UF, UV and Hydrogen Peroxide

GROUP B: QUESTIONS & ANSWERS cont...

Question 3 Reverse Osmosis (RO) Systems – What happens to the Waste Concentrate Scheme?

- Typically 15-25% of the incoming treated wastewater flow to the RO plant
- This waste stream is salty and can be difficult to handle/dispose of
- At coastal locations and desalination plants usually returned to the sea
- Inland plants discharge to freshwater, to land, bore injected into land, or evaporated to leave a salt
- Would be a significant issue in the Rotorua inland situation and taking into account the driver(s) for RO

Question 4 Water quality of unpolluted springs and lake water for comparison with treated wastewater and treated wastewater once discharged

- Regional Council has good information on key parameters that are being used in the Effects Assessment
- This information will be included as part of the Effects Assessment so that comparisons with previous and current water quality and ecology can be made to the discharge assessment

Question 5 Further information on Black Mica as an “Add-On”

- Refer RPSC 19th March 2015 information Slide 2 and “Add-On’s” update RPSC 22nd April 2015
- No new full scale “case history” had been obtained to date – still awaited

GROUP B: QUESTIONS & ANSWERS cont...

Question 6 Status of Various “Add-On’s”

- Refer following slides
- A table of the position with respect to each of these will be included in the written answers to these Group B Questions

Question 7 Information on TERAX

- Subject of the RPSC Workshop 22nd April 2015
- Refer RLC’s Technical Tasks Update Slide – Report due 20th May 2015

Question 8 Information on Treated Wastewater Discharge Options and Other Locations

- Subject of the RPSC Workshop 22nd April 2015
- Refer RLC’s Technical Tasks Update Slide – Report due 29th May 2015

Question 9 Option to Totally Use MBR for the Full Plant (100% MBR’s)

- Included in the Mott MacDonald WWTP Strategy Study
- Various configurations that could be use including trialling with current MBR Plant
- Draft Report due 15th May 2015

Please note that an updated Glossary of Terms has been prepared (Issue No.3 30th March 2015) and is attached to RPSC Minutes 19th March 2015

GROUP B: QUESTIONS & ANSWERS cont...

Question 6 Status of Various “Add-On’s”

Handout shows table of status of the various technologies

TAGs position is that

- the proposed ‘add-on’ technologies are ‘parked’ in this process as they may not be required to achieving the outcomes.
- Consider including revisiting the technologies as options once they have been developed to a stage where they are used and proven, and the performance can be tested and demonstrated stage where they are widely used



FURTHER TECHNICAL AND ENVIRONMENTAL QUESTIONS FOR RLC AND TAG

- Any further discussion on these topics today?
- How is the quality and way of communicating technical and environmental matters coming through from a RPSC perspective?
- What areas need further focus going forward?
- What areas are adequately dealt with to date?
- What else should we know?
- Other ???

