

BEFORE THE HEARING PANEL

IN THE MATTER the Resource
Management Act 1991 (the Act)

AND

IN THE MATTER of applications by
Tararua District Council to Horizons
Regional Council for application **APP-
2005011178.01** for resource consents
associated with the operation of the
Eketahuna Wastewater Treatment Plant,
including a discharge into the Makakahi
River, a discharge to air (principally odour),
and a discharge to land via pond seepage,
Bridge Street, Eketahuna.

REPORT TO THE COMMISSIONERS

**DR BRENT COWIE (CHAIR), MR REGINALD PROFFIT AND MR PETER
CALLANDER**

SECTION 42A REPORT OF DEBORAH ANNE RYAN – AIR QUALITY

7 March 2017

A. INTRODUCTION

Qualification and Experience

1. My full name is Deborah Anne Ryan.
2. I have a Bachelor's Degree in Biotechnology and Bioprocess Engineering from Massey University, Palmerston North (1991) and I am both a member of the Clean Air Society of Australia and New Zealand and a Certified Air Quality Professional with the Society. I am also certified under the Ministry for the Environment's Making Good Decisions programme for decision makers under the Resource Management Act.
3. I have 25 years' of experience in the air quality and resource management fields. I spent eight years as an Air Quality Specialist with the Manawatu-Wanganui and the Waikato Regional Councils. I have been employed as a Senior Air Quality Consultant with Jacobs New Zealand Limited (formerly Sinclair Knight Merz) for the last 15 years. I have extensive experience in air quality studies, in particular, preparing and reviewing a wide range of air quality effects assessments and in managing and reporting on air quality monitoring programmes. As an air quality specialist, I have been responsible for reporting and presenting specialist air quality advice to council resource consent hearings on multiple projects across the following sectors: industry; infrastructure; and government.
4. My experience with assessing the effects on air quality from Wastewater related activities and other activities that give rise to odour effects includes: sewage treatment plants at Hamilton, Wanaka, Levin and Shannon; waste disposal to land at Tarras and Synlait Milk (Canterbury); meat or fish meal facilities at Te Aroha, Tuakau, Horotiu, Dannevirke, Oringi, Whanganui, Nelson, Mosgiel, Dunedin and Levin; fellmongeries at Whanganui, Shannon, and Green Island (Dunedin); and landfills including those with leachate storage at Bonny Glen, Levin, Hampton Downs, Southland and Te Aroha.

5. I have been contracted to provide specialist advice on air discharge consent matters to regional councils and District Health Boards (DHB) including the Manawatu-Wanganui Regional Council, the Waikato Regional Council, the Otago Regional Council, Waikato DHB and Health Southland. I was the principal author of the Ministry for the Environment's Good Practice Guide for Assessing and Managing Odour in New Zealand (2003) and I was contracted as the peer reviewer for the Ministry for the Environment's Good Practice Guide to Assessing Discharges to Air from Industry (2008). I also contributed to the update of the above guides that were published in 2016.
6. I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court's Practice Note (2014), and I agree to comply with it as if this hearing were before the Environment Court. My qualifications are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Background

7. The air discharge consent application by Tararua District Council (TDC) is to replace the existing consent 103732 held for air discharges from the Eketahuna Wastewater Treatment Plant and is applied for as a discretionary activity under Rule 15-17 of the One Plan for the Manawatu-Wanganui Region.

B. OUTLINE OF EVIDENCE

My role

8. I am engaged by the Manawatu-Wanganui Regional Council (Horizons) to provide technical advice on the air quality aspects for the application by the TDC for an air discharge permit for the Eketahuna Wastewater Treatment Plant (APP-2005011178.01).
9. I undertook a site visit to the Eketahuna treatment plant with Horizons staff on the 23rd of February 2017.

10. I have read the assessment of environmental effects (AEE) of the treatment plant discharges TDC supplied in support of its application for resource consents¹. The AEE was prepared by OPUS and focused on water related matters including effects on the water quality of the Makakahi River and consideration of alternative methods of treatment and disposal.
11. I have read the S42A report prepared by Fiona Morton and the recommended conditions for the application, dated 7 March 2017. In my view, the recommended conditions are appropriate to address the potential adverse effects from the TDC discharges to air.

Scope

12. My evidence relates to the assessment of effects on air quality from the discharges to air from the Eketahuna Wastewater Treatment Plant. I describe the activity, and the potential sources of discharges to air. I then address submissions raising issues of air quality and I overview the possible effects on the environment from the discharge to air. I note that the applicant's proposal includes upgrades to the operation; and I consider the potential effects on air quality of the upgraded plant in this report. I provide recommendations for conditions that in my view are appropriate to address the potential adverse effects from the treatment plant's air discharges.

¹ OPUS, Eketahuna waste water treatment plant, Discharge of treated waste water, 2015

C. THE ACTIVITY

13. The Eketahuna Wastewater Treatment Plant is northwest of Eketahuna township. Figure 1 is a location map showing the nearest residential properties at around 200 metres to the south of Pond 1 along Bridge Street. The Eketahuna Golf Club is to the east and north of the ponds. Background odour in the area will typically be low due to the dominance of the golf course with limited rural activity in the vicinity of the site, but potentially including silage and animal manure. All residential properties in the vicinity of the plant would be considered highly sensitive to odours of an offensive nature, such as septic or anaerobic odours from waste water. Offensive odours have the potential to occur, in particular, under abnormal operating conditions at the treatment plant.

Figure 1 Eketahuna Wastewater Treatment Ponds Location



14. The treatment plant serves around 450 people (2013 census) and currently consists of two oxidation ponds discharging to the Makakahi River. The plant is gravity fed. Pond 1 is a facultative oxidation pond with mechanical aeration and Pond 2 is a maturation pond. Anaerobic biological activity will occur in the sludge layer at the bottom of the ponds and potentially at lower levels in the water in the facultative pond.

15. I understand that upgrades to the treatment plant are being proposed to improve the water discharge quality. The upgrades include:
- a. An at grade primary screen;
 - b. A contact tank for coagulation;
 - c. A lamella plate clarifier;
 - d. UV disinfection; and
 - e. a rock filter just prior to discharge.
16. In my view, the potential sources of air discharge as part of this consent application include of odour from the:
- a. Inlet works, primary wastewater screening and associated solids storage and handling;
 - b. Treatment ponds;
 - c. Contact tank;
 - d. Clarifier including solids handling and storage;
 - e. Filtration systems; and
 - f. Removal of pond sludge (as and when required).
17. Figure 2 is a photograph of the primary screen enclosure installed at the TDC's Pahiatua Wastewater Treatment Plant, with the screened solids storage arrangement shown. The same screening arrangement is in place at Eketahuna, although I understand that the screen needs to be altered in order that it is able to be gravity fed, so the Eketahuna screen is not currently in use.

18. Pond 1 receives the incoming waste water. It is important that the dissolved oxygen is maintained above zero to maintain aerobic conditions for biological activity. This requires sufficient aeration capacity to be provided, which can be achieved both through natural and mechanical aeration. I understand the aeration in Pond 1 has been upgraded to improve the aeration rate in order to maintain aerobic conditions throughout the system.

Figure 2 Primary Screen Installed at Pahiatua (February 2017)



19. The third aspect with potential for offensive odour is pond desludging and sludge storage. Anaerobic conditions can be present at lower levels within ponds and within sludge that can release sulphides and other compounds when disturbed. The ponds have been desludged in the last 12 months and sludge is currently being dewatered and stored on site within geobags to the south of Pond 1.

D. SUBMISSIONS RECEIVED

20. The applications were fully publically notified with twelve submissions received. The Eketahuna Golf Club was the only party that mentioned air discharges in their submission. The Club sought ongoing monitoring to ensure there is no deterioration in air quality. In my view, compliance with conditions of the general form as I set out below will ensure that monitoring and controls at the wastewater treatment plant are adequate to address the submitter's concern.

E. EFFECTS ASSOCIATED WITH THE ACTIVITY

21. My review of the potential air discharge effects has been undertaken by considering the potential sources of odour discharge to air from the wastewater treatment operation; the controls in place; the potential failures of controls, the odour complaint and compliance history; and the mitigation and management required to ensure the potential for objectionable effects from odour is low.
22. In Section 2.3 of the AEE, OPUS noted that there have been no odour complaints at the site and assessed the effect of air discharges as being no more than minor. This assessment was linked to a recommendation that a management plan be adhered to as part of the consent conditions. The application did not, however, document specific aspects needing to be addressed in such a management plan.
23. Odorous compounds can discharge from all operations at the plant, either where untreated wastewater is exposed to air, and/or where wastewater becomes anaerobic. Where oxygen levels drop to zero anaerobic biological activity is promoted, which results in pungent and offensive odorous compounds, such as hydrogen sulphide and mercaptans. These compounds have a high potential to create adverse effects from odour off-site due to their offensive nature and low concentration thresholds for detection in air. In addition stored waste solids by nature are odourous with the potential for anaerobic conditions to occur.

24. I consider the key aspects that require management and maintenance to minimise or avoid the potential for adverse odour effects are:
- a. the primary screen and screenings storage area;
 - b. maintaining the wastewater/effluent in an aerobic state throughout the ponds and the additional treatment stages;
 - c. handling and storage of clarifier sludge; and
 - d. pond desludging and sludge storage and handling activities.
25. The inlet works (primary screen) are commonly one of the most significant odour sources, particularly at sites where wastewater has travelled long distances, or the sewerage system design has long dwell times within pipes. At Eketahuna, there is a short travel distance in the sewerage system. Dwell times should, therefore, be relatively short with low potential for anaerobic conditions and subsequent high strength odours.
26. I understand that TDC proposes to semi-enclose the screening operation and to discharge the screenings into a mobile garbage bin lined with a plastic bag. Provided the screen and screenings are enclosed, and the screenings regularly removed, these measures should be adequate to avoid offensive odours from incoming wastewater and solids handling.
27. During the site visit to Eketahuna there was little discernible odour that would be generally associated with wastewater treatment plant activities with the influent being directed straight to Pond 1. I also visited the Pahiatua site on the same day, which has the same processes as proposed for Eketahuna. There was a discernible odour in the immediate vicinity of the treatment plant and discharge outfall, but this was contained within a small area and not discernible beyond the boundary. The screened solids storage area at Pahiatua had a low level of odour.

28. Pond desludging has been undertaken in the last year at Eketahuna using bio-bags that retain and dewater sludge. Horizons staff advised that the desludging activity did not result in any odour complaints being received. We note however, that if poorly managed, pond desludging and dewatering does have potential to result in offensive odours. This is due to the typically anaerobic nature of the sludge if sludge is still biologically active. The geotextile bags used to hold the sludge are still being stored at the plant and may result in odour if they are opened up to move the sludge material for disposal. Lime is generally used to control odours should odours arise when the bags are opened. I recommend that this aspect be addressed in the management plan.
29. Odour is a subjective issue and the effects can be difficult to assess. The Ministry for the Environment (2016) has published guidelines for assessing and managing odour². The Ministry recommends tools for odour assessment for existing activities, which include: complaint records; industry or regional council experience with the discharge; community consultation; and odour annoyance surveys. The Applicant has principally referred to complaint records and experience to assess the potential environmental effects in this case and reported that no complaints regarding odour from the plant have been received.
30. Horizons' staff confirmed that no complaints regarding odour from the Eketahuna treatment plant have been received by the Regional Council. The Horizons consents monitoring officer also advised that over the last five years of monitoring, he had not detected an odour beyond the property (or within the site itself) that he deemed to be objectionable³.
31. No consultation appears to have been undertaken with potentially affected neighbours regarding air discharges. Therefore, no direct community feedback on odour is available, other than that obtained through submissions received. The lack historical complaints, however, and the report from the Horizons compliance monitoring officer, indicate that the plant has not historically had adverse effects as a result of air discharges.

² Ministry for the Environment, *Good Practice Guide for Assessing and Managing Odour*, November 2016.

³ E-mail, Fiona Morton, Horizons Regional Council, June 2016

F. CONCLUSION

32. In summary, the treatment plant including the proposed upgrades, include new equipment items and activities that will require management and maintenance to avoid conditions where offensive or objectionable odours arise. Accordingly, I agree with the recommendation in the application that air discharges be addressed through a management plan as part of the consent conditions.
33. To address the potential effects of odour from the plant, I support conditions of consent to address the following:
- a. No odour across the property boundary.
 - b. Maintenance of a complaint log.
 - c. Notification to the Regional Council of any complaints received
 - d. Ensuring dissolved oxygen (DO) in the pond is kept positive.
 - e. Notification of any pond desludging works, including methodology and duration.
 - f. Provision of an Operation and Management Plan for the wastewater treatment plant, detailing inspections, management procedures of primary screenings and other solid wastes and procedures for monitoring and managing pond sludge levels.
34. I consider that provided the applicant complies with conditions which include the above criteria, then any odour from the operation will be likely to have an effect on the environment that is no more than minor.
35. I have viewed the conditions in Appendix one of Ms Morton's report relating to the air discharge permit. I consider that these conditions address the points noted above (a-f).