

**BEFORE A HEARINGS PANEL OF THE GREATER WELLINGTON REGIONAL  
COUNCIL**

**UNDER** the Resource Management Act 1991 (“the Act”)  
**IN THE MATTER OF** Resource Consent Applications to Greater  
Wellington Regional Council pursuant to section  
88 of the Act to discharge contaminants to land,  
air and water  
**BY** South Wairarapa District Council  
**FOR** the proposed staged upgrade and operation of the  
Featherston Wastewater Treatment Plant

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**BRIEF OF EVIDENCE OF LAWRENCE STEPHENSON ON BEHALF OF SOUTH  
WAIRARAPA DISTRICT COUNCIL**

**WASTEWATER TREATMENT AND OPERATIONAL MANAGEMENT**

**DATED 2 APRIL 2019**

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**EVIDENCE OF LAWRENCE STEPHENSON ON BEHALF OF SOUTH WAIRARAPA  
DISTRICT COUNCIL**

1. My full name is LAWRENCE GLEN STEPHENSON.

**RELEVANT EXPERIENCE**

2. I am the Assets and Operations Manager (“AOM”) for the South Wairarapa District council (“SWDC”). I am a Chartered Professional Engineer specialising in Water and Wastewater Treatment with an Honours Degree in Chemical and Process Engineering with over 3 years of experience in local government engineering and over 15 years in water and wastewater treatment plant in New Zealand, Australia and the United Kingdom.
3. I am a member of the following relevant associations including:
  - a. Engineering New Zealand
  - b. Water New Zealand
4. I have been the AOM since September 2015 at which time the two wastewater consents for Martinborough, Greytown had recently commenced for SWDC and the Featherston consent was in development. This work was a part of my management brief to develop, and conclude the consent application for Featherston.

**CODE OF CONDUCT**

5. I have read the Code of Conduct for Expert Witnesses in section 7 of the Environment Court’s Practice Note (2014). I agree to comply with that Code of Conduct. Except where I state that I am relying upon the specified evidence of another person, my evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions which I express.

## **MY ROLE IN THE PROJECT**

6. I provided updated data for the Assessment of Environmental Effect (“AEE”), assisted with preparation of AEE, in particular, review of the proposed consent conditions based on the experience in implementing similar conditions for the other consents. I also provided advice during the s92 discussions about potential technologies for clarity improvement and assessment of options to implement timelines. I lead some of the public meetings, explaining the consent application and encouraging people to make a submission to the application.

## **SCOPE OF EVIDENCE**

7. My evidence will address the following:
  - a. Current operational / maintenance of the current wastewater networks.
  - b. Preparation of the management plans.
  - c. Risk of Odours.
  - d. Ability to comply with proposed conditions.
  - e. I/I work done to date since AWT 2013 report, planned renewals.
  - f. Population growth changes and ability to manage.
  - g. Review of alternatives and potential enhancements.
  - h. The rationale for the proposed staging.
  - i. Workshops.
  - j. Conclusion.

## **CURRENT OPERATIONS AND MAINTENANCE**

8. This consent proposal is in context of being one of three urban WWTP which have been consented recently with the Martinborough and Greytown consent commencing in April 2016. The costs of this proposal, sits in a framework of capital improvement and renewal programs for the South Wairarapa District Council (SWDC). The long-term expenditure plan for the Featherston plant (including I&I) is

balanced firstly amongst the other two waste water expenditure plans and also takes into consideration the potable water upgrades and renewals. This consideration is due to the accumulated effect on the water rate and the affordability of the works on urban households. I prepared the forecast capital spend for the Long Term Plan (LTP) process in 2018-2028, to enable the implementation of the first stages for all three plants. Since I prepared that forecast there have been additional costs for the current consenting process and additional “add-ons” such as the proposed riparian planting and the replacement of at risk potable water supplies. The total estimated capital cost of the upgrade up to and including the implementation of stage 2B and including I&I is estimated to be between \$14 to \$17 million spread over 13 years. That does not include the cost of the Golf Course.

9. SWDC owns and operates four separate water and wastewater (WWTP) plants and networks. These are operated by Council contractor, Citycare, who have operated the treatment plants since starting the operation and maintenance contract in October 2012. At the start of the contract a comprehensive set of Operations and Maintenance (“O&M”) manuals were produced for the sites.
10. Each plant is monitored using the Council supervisory control and data acquisition (“SCADA”) system, enabling the operators to assess ongoing operation and respond to alarms. Each site is visited daily on weekdays as a check of the instruments, monitor the changes in the plants and additional onsite testing. The exception of Lake Ferry WWTP and Pirinoa water which are visited at least one day a week.
11. The SCADA system also allows remote operation of plants. This control varies between sites depending on the amount of control is available, depending on the response time and criticality. For instance, for water treatment, the immediate risk to public health has a greater amount of control and monitoring. The pond systems operated by SWDC provide robust and effective treatment for wastewater as covered in Steve Couper evidence. The retention time within the pond systems mean that issues rarely occur rapidly and the daily visit coupled with remote

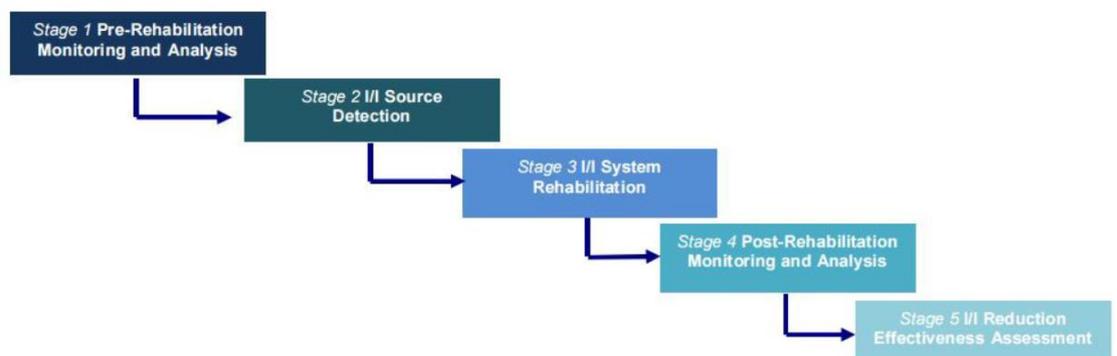
monitoring ensures smooth operation. The trending capacity within the SCADA system along with the daily records enable the operators to manage the majority of issues, except for emergencies which are monitored and alarmed.

12. I started in my current role in late 2015 and since then my staff and I have reviewed the operation and completed the compliance reports in-house. This has assisted in improving the overall understanding of the systems and the operation.
13. The current environment is rapidly changing, with increased levels of reporting, and a changing policy framework with:
  - a. Meetings and hearings for the Wellington Regional Council's proposed natural resources plan. (PNRP)
  - b. Review and input into the Ruamahanga Whaitua process.
  - c. Workshops on recommendations following the Havelock North inquiry and the subsequent Government three waters review.

#### **MANAGEMENT PLANS AND COMMUNITY LIAISON GROUP**

14. For Martinborough and Greytown WWTP, the consent required the preparation of a suite of management plans. The development has been valuable for the learnings within the operations team in terms of the improved understanding of the operation, monitoring and the response plans.
15. The operations and maintenance (O&M) management plans were updated from the existing O&M manuals including links to the management plans, in particular the Environmental monitoring plan (EMP). The change to discharge to land has added a new consideration for the operators and the SCADA system as outlined in 11 was upgraded from monitoring only to include elements of process control.
  - a. Martinborough has been discharging summer flows to land since November 2017 with remote monitoring and control of operations. The discharge is controlled based on river flow and the land discharge area moisture levels. A weather station

- monitored the weather conditions and also links to a number of soil moisture probes within the irrigation field.
- b. Greytown land discharge is currently under construction with irrigation planned to start this summer.
  - c. Weather stations have been installed at Greytown and Featherston in preparation for the discharge to land. This information is web-based and available to the public. This information has been compared by Katie Beecroft to the long term weather data for the last 8 months.
16. Discussions with Madeliene Playford, GWRC Compliance officer, have assisted in the development of:
- a. Agreed protocols with WRC for response to events.
  - b. Reporting and monitoring schedules.
  - c. Monitoring and investigations to review the potential for further reduction of the flow to the river by improving land discharge at Martinborough.
17. The inflow and infiltration (I&I) was developed referring to a number of international references<sup>1</sup> for I&I control. This will be critical for the Featherston network to reduce the additional water and the effect on the downstream. It outlines the circular process of analysis, identification, action and review as shown in Figure 1.



*Figure 1: 5 stages of I&I reduction (NZ I&I manual 2015)*

<sup>1</sup>Example: NZ Water and Wastes Association, Inflow and Infiltration Control Manual, 2015

18. As shown in Chris Park's evidence, the proposed reduction is achievable and will be incorporated into the I&I Management Plan. Figure 1 above shows part of the process is evaluation, which will occur on an annual basis comparing historic records and the theoretical quantity for the population. This will be incorporated into the planning for the Stage 2B storage pond.
19. The adaptive management process has enabled a more flexible and cost-effective approach.
  - a. For example, in the I&I management plan we have used Distributed Temperature Sensing (DTS) to assess 20% of the network in Greytown in 2017 and Martinborough in 2018. This technology is placed within the network and monitors the response during a rainfall event allowing targeted response to renewals or repairs. Sources can be identified to the accuracy of 2m length of pipe. A source of inflow can be checked with a couple of house inspections, in comparison to a blanket approach for a street.  
  
(In contrast, CCTV can only be used during low flow period so that the water doesn't obscure the lens.)
20. A calibrated model of the Martinborough network has been developed and a model of Greytown and Featherston is in progress. This has helped identify areas of capacity constraints and to organise with the reticulation staff to enable closer monitoring of pinch points and direct long term renewals or upgrades.
21. There is a basic Odour management plan (OMP) in operation for Featherston WWTP currently, which outlines the response to complaints or if odour is noted during the operation of the plant. This plan will be updated to align with the OMP developed for the other WWTPs. There is an odour complaint register that documents complaints received since 2012, there are none recorded for Featherston WWTP. There have been some calls recorded prior to 2012, however none were confirmed as

originating from Featherston WWTP. The operators have commented that they have not experienced any odour from the existing ponds.

22. The tangata whenua values monitoring plans for Martinborough and Greytown have been slow in production and are currently not certified. We now have a draft plan for each of the other WWTPs which obviously incorporates the unique characteristics for each area. The plan is designed to provide an ongoing engagement with the local Iwi as each stage of the upgrade progresses and to monitor the performance.
23. The Community Liaison Group (CLG) has been meeting for both Martinborough and Greytown, quarterly since June 2016 to discuss progress with both schemes and generally around compliance. This is useful to help explain events and allows the group to provide comments on the management plans being prepared prior to certification. Members representing Greytown community have been very helpful in developing the riparian planting plan. Submitter 146 has commented about compensation, this was discussed in the first couple of meetings in relation to the number of members in the group. It was agreed that because some submitters didn't want any restriction on the number of members, there was no compensation for meeting attendance.
24. It is also planned for the CLG to assist with the design of the screening planting for the irrigation sites. A diagram is shown in Appendix A, however involvement of the CLG will allow the unique features to be incorporated into the plantings. The group has usually met together for discussions however these can be discussed at a smaller group.
25. Katie Beecroft in her evidence has outlined the land management approach. The preferred operation will be a cut and carry, however this this operation allows for some flexibility in terms of the crop. The Reporting Officer mentions an application made to the "billion trees" scheme. There has been no application, but SWDC has made enquiries about growing seedlings under irrigation for planting out. It was concluded that this was not a viable option.. The adaptive management approach allows for crop flexibility which will be outlined in the land

management plan. Irrespective of the crop, the nutrients will be monitored by the condition of the nutrient balance. This option of growing trees as a crop is discussed by Katie Beecroft

26. The proposed treatment system offer a lot of benefits from a sustainability point of view. The long retention times in the existing ponds once I&I is reduced will allow more efficient robust operator control. The lower energy system mean potential power costs or carbon costs are efficiently used, and Katie Beecroft also highlights that the current form of nutrient (ammonia in particular) is more readily accessible to plants. Also, the nutrients in the treated wastewater are used to grow beneficial crops. Holistically it is a much more sustainable and beneficially utilises the resources for agriculture.

#### **RISK OF ODOURS**

27. My wastewater treatment experience has also included the evaluation of odour risk with the design of odour containment and treatment, an example in New Zealand which I have been involved with is Wanganui WWTP.
28. Odours from wastewater can be created by a wide range of contaminants, however the likelihood of odours can be linked to the following considerations:
  - a. Anaerobic conditions, such as pump stations, solids retention tanks.
  - b. High concentration of contaminants.
  - c. High turbulence or agitation creating volatilisation of contaminants.
  - d. Presence of odourous trade waste.
29. Pond systems have a low risk of odour production, particularly in comparison to other wastewater treatment systems. The causes of odours is usually the creation of anaerobic or low dissolved oxygen (“DO”) conditions from high sludge levels or high contaminant loading.

Occasionally pond upsets can occur, such as shock loading for example an illegal discharge or adverse seasonal conditions.

30. As outlined in Steve Couper's evidence, Featherston WWTP has sufficient capacity for a much larger population than currently, and the trade waste portion is very low, estimated at less than 5%. This means the risk of high contaminant loading is very low and the 2013 sludge survey also shows that the sludge levels are not a concern. Trade waste discharges are controlled through the trade waste bylaw for quantity and quality. The main trade waste discharge is the overflow from the Davis Sawmill stormwater retention pond.
31. Historically the ponds have always maintained a high DO, with no recorded odour complaints in the register. Also as mentioned earlier, the operators visit the site daily during the week monitoring the performance for any changes. This will also be improved with the development of updated odour management plan, which will outline the response in the unlikely event of an odour complaint.
32. The irrigation is also unlikely to create any problem odours, due to the low concentration of contaminants in the treated wastewater, and the buffer areas. The design of the irrigation system with the buffer distances and a low pressure irrigation at less than 1.5m above the ground all mitigate aerosol creation and spray drift. The large droplet size also means that the chance of volatilisation of contaminants such as ammonia is very low. This is reinforced by the experience of existing installations in Martinborough, Carterton and elsewhere in New Zealand.
33. I have read through the report and evidence for Wairarapa District Plan Change 3 which formed the basis for the 125m and 25m buffer distances in the proposal. These distances are conservative and formed around the risk to public health from spray drift and aerosols. The report is based on modelling and testing of systems mainly in the United States over a range of droplet sizes and wind speeds. I am confident that these buffers along with the controls within the proposal will contain the spray drift

within the boundaries of the site. Katie Beecroft discusses this report in more detail in her evidence.

34. The screening planting to be developed with the CLG is unnecessary in order to address this risk but will in practice provide another level of assurance.

## CONSENT CONDITIONS

35. I helped with the development the consent conditions, which are based on the Martinborough and Greytown consents that commenced in 2016. Working through the existing consents which have similar conditions, and from the learnings during the development of the existing management plans, I am confident that we will be able to comply with the conditions as currently proposed.
36. Normally the officers report would include comment on conditions and suggested amendments. Unfortunately, in this instance the s42A report is largely silent on conditions. That means that I am not in a position to comment on any changes to conditions which the officers may seek. Accordingly I will comment on the conditions as proposed in the AEE and any changes to those. An amended set of draft conditions is attached to the evidence of Sven Exeter.
37. Since notification there have been a few changes to the proposed consent conditions. This is mainly the timelines for each stage with changes to:
  - a. Condition 2, Table 1: Stage 2A which was shortened by 5 years, with implementation by the end of Year 5, not Year 10 of the consent.
  - b. This led to the resultant deletion of conditions 38 and 39 for the 3 year review of the efficacy of Stage 1 land treatments.
  - c. Condition 2, Table 1: Stage 2B which was shortened by 8 years, with implementation by Year 13, not Year 20 of the consent.
38. The reason for these changes is to minimise as much as possible and as quickly as possible the effects due to the continued discharge to Donalds Creek whilst balancing the changes against the capital cost to the ratepayers in the district.
39. The water quality and ecological evidence as provided by Emma Hammond and Keith Hamill shows that while there is a significant reduction in effects at Stage 1B the discharge to Donald Creek is likely

to continue to have some short term ecological and clarity effects until Stage 2A is implemented. In view of this advice, and the section 107 (RMA) issues raised by Regional Council staff during 2018, the Council decided that it was desirable to advance stage 2A as much as possible both from a sustainability perspective and so as to that this stages could be regarded as “temporary”<sup>2</sup>

40. It also decided to bring forward Stage 2B from the end of year 20 to the end of year 13. That was considered to be desirable by management and the Council because of the strong preference to minimise discharge to the stream as soon as is reasonably practicable. The timing of Stage 2B takes into account I/I rehabilitation which is outlined earlier. The evaluation of the work will take time following the renewals and this will feed into the sizing of the storage pond as oversizing it will lead to sunk capital which is under-utilised.
41. It is important to note that these changes will bring forward the costs of the proposal with a resultant impact on overall spending of the Council and the rating impact of the scheme.
42. I will now explain the rational for the timing of each stage.
43. Stage 1A is proposed to be completed by the end of year 2 after commencement of consent, allowing sufficient time to choose the inlet screen and design the irrigation. Currently there is a shortage of contractors available for work, which needs to be planned at least 6 months ahead whilst allowing sufficient time to tender and complete construction.
44. The implementation of Stage 1B (which as described by Ms Hammond and Mr Hamill has significant benefits) will also be complete within 2 years of commencement of consent. Again this is a worst case scenario and it may be possible to advance this.

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<sup>2</sup> There was some indication from Regional Council officers/legal advisor that they considered anything more than 5 years to not be temporary.

45. SWDC is in the process of preparing a separate application for land treatment for the 30 - 35 ha of land to the south (Site B). This application advances part of Stage 1B using the existing irrigation system (Hodder Farm) in close proximity to the plant. That application is being prepared to cover the possibility that the current application will be delayed by appeals. The Councillors have a strong desire to get land treatment and consequential reductions of stream discharges underway as soon as is possible. If that application is granted as a non-notified (or there are no appeals on the current application) it may be possible to commence limited irrigation to land on this areas during 2020.
46. Stage 2A has been advanced from the end of year 10, to the end of year 5. Five years is sufficient time to carry out the detailed design for the irrigation system for the rest of the property, connection to the existing system and confirm the assumptions in the AEE as well as incorporate lessons learned from the first stage of land discharge (1B). This will also allow the screening plantings to be agreed with the CLG and planted reducing further any chance of spray drift. As mentioned in Mark Allingham's evidence, this is also an affordability consideration, the staging of the capital works is the most cost-effective plan and it will smooth the impact on rates.
47. The rationale for the 13 years for Stage 2B is outlined in the Memo to the Panel dated the 21 August 2018. This will allow the I&I reduction to be fully implemented to finalise the deferred storage volume, while allowing sufficient flexibility to carry out the corresponding I&I work and renewals in Greytown and Martinborough. SWDC is confident that a reduction of at least 35% for I&I is achievable and may be exceeded. Katie Beecroft and Chris Park have provided evidence that the proposed 35% reduction and 90<sup>th</sup> percentile discharge to land is the most cost-effective option.
48. Although it would be practicable to further advance stage 2B, that would have rating implications for the Council and is not justified by the relatively modest additional environmental benefits which accrue from

this stage (see the JWS and the evidence of Ms Hammond and Mr Hamill as to the relative benefits from each stage.) I also note that pond sizing is dependent upon the extend of I&I achieved. Accordingly if this stage was further advanced it is possible that the pond would be incorrectly sized. Oversizing the pond would be costly and inefficient. The 13 years allows for I&I to be completed. It also allows for the possibility of obtaining a consent to utilise the Golf Course land for further irrigation. That too would have implications for pond sizing. The I and I programme will take at least 8 years to complete to accommodate contractor availability, investigation, construction and an evaluation period for the 3-4 areas highlighted by Chris Parks. This will allow time for the final sizing and design of the storage pond.

49. Martinborough and Greytown commenced in April 2016 and since then, have been generally compliant except for delays in certification of the management plans. The annual reports for the plants did not assign a compliance grade (fully complying etc) but only outlined some further investigations.
50. SWDC's overall compliance record has not been great in the past, however to my knowledge there have been no abatement notices, fines issued by the Regional Council.

We are working to improve this and have had some success as demonstrated by the compliance record for the last 2 years is shown - in Appendix B "SWDC FWWTP Compliance - LS Jul 2018".

51. Featherston WWTP compliance has been good for the past 5 years since the UV system installation and the replacement flowmeter. As noted by Emma Hammond, the water quality has been compliant and GWRC Compliance Report have noted missing data for the trials and the incomplete meetings with the wastewater steering group which has not been functional since 2014.
52. Based upon the advice of Mr Hamill, the Council has also agreed to propose riparian planting of Donald Creek within the boundaries of its

land in order to further mitigate the residual effects of the discharge and further enhance the stream environment.

53. Based upon the advice of Dr McBride, the Council has agreed to address the health risk issue by providing a potable water supply to those within the risk area, who currently use their shallow bores to source potable water.

#### **POND MANAGEMENT - ADAPTIVE MANAGEMENT**

54. The flow out of the pond is currently controlled manually by the operator moving the butterfly valve downstream of the UV units. The automation of the valve can be incorporated for the land discharge management. This management as outlined in Katie Beecroft's evidence will manipulate the pond level to use the existing storage during periods when the moisture levels are too high or weather conditions are unsuitable.
55. The installation of an automated weir, or valve is a simple upgrade and I have commissioned a number of similar units in the UK. The control can be linked with a feedback loop from the downstream flowmeter to ensure there is no flow when needed to meet consent conditions. This can also be used to maintain a set dilution rate with Donald's creek. If required through an adaptive management approach, the rate of discharge could be set to maintain, for example 1:15 to the stream so as to minimise the effects.
56. This management also includes the management of the sludge. As outlined by Steve Couper, the solids settle to the base of the ponds and accumulate over time until it is necessary to be desludged. It is usually required once the sludge levels exceed 25% of the water depth as this can start affecting the performance, however the latest sludge survey in 2012 showed that the levels were low at approximately 13%. This will be rechecked in 2020.

## PLANNED INFILTRATION RENEWALS

57. As part of the initial consent application there was some initial monitoring of the network to estimate I/I. AWT completed a nightflow monitoring programme in 2013 which was included in the AEE. As outlined in Chris Park's evidence, the report identified the areas with the highest rates of I&I and estimated the proportion of flow.
58. Following this report there was some renewal work completed for the following sections:
  - a. 180m Brandon 300mm PVC - 2014
  - b. 100m William Benton 150mm PVC - 2014
  - c. 180m Hardie Grove at 150mm PVC - 2016 including laterals
59. There are planned renewals currently underway due for completion by the end of April 2019. The sewer trunk main feeding to the Wastewater Treatment Plant running down Waite Street was identified as contributing a significant portion of I&I. The closed circuit television (CCTV) of the 375mm pipe showed that the majority of the pipes were in good condition, however there were frequent joint defects and damage pipes that had been poorly repaired. The main is being renewed with 1800 meters of 400mm Polyethylene pipe. This pipe will be butt-welded reducing the number of joints and a smoother bore for conveyance of the wastewater. The laterals and manholes were also refurbished at the same time.
60. Based on Tables 4 and 5 in AWT Featherston Groundwater Infiltration Investigation 2013 (Appendix 4A of the AEE), this renewal is estimated to reduce the night flow from 25-37%.
61. One of the key constraints will be the availability of contractors, as most need to be booked at least six months ahead. However, the next renewal for Featherston will be the pipe trunk main on State Highway 2 and down Donald Street. This pipe main crosses underneath Donald Creek and will be the main impacted by further population growth in Featherston. This is estimated to provide a further 8-10% reduction in night flows.

## POPULATION GROWTH CHANGES

62. A number of submitters have noted that the statistics are at odds with the recent population growth in Featherston. This is covered in the GWRC officer's report and in evidence by Mr Exeter. The ponds were designed in the early 1970s when Featherston was planned to have a population of approximately 5,000, so a lot of the infrastructure has capacity to accommodate population increases. Referring to Steve Couper's evidence, the pond system is lowly loaded and has capacity for greater loads. There are also process modifications available that can assist with the treatment, for example, mechanical aeration of the ponds to maintain the DO and improve mixing/treatment through the first pond.
63. A population increase will also decrease the impact of any rates increases as the cost is spread over a large number of properties, making the upgrades more affordable.
64. A better way to accommodate a population increase will be further decreases in I&I beyond the proposed 35%. This will have additional benefits of greater retention time in the existing ponds and reduced deferred storage volume.
65. There are also the buffer areas along the boundaries, which will be planted with trees to screen the irrigation area. The council could provide filtration and install surface drip irrigation lines in these areas, increasing the discharge to land area and assisting with the tree growth. Planting is a permitted activity up to 5m from the boundary and has been used successfully in Carterton WWTP.

The recent purchase of the golf course also means that there is additional land available for irrigation. This land has a higher groundwater level, which is likely to limit the application rate. If this site is used, this would be utilised through adaptive management with expansion of the irrigation and could be incorporated through a further consent. (It may be a permitted activity if the draft recommendations are adopted from the Whaitua Implementation Process.)

## CONSIDERATION OF ALTERNATIVES

66. There have been comments regarding the alternatives considered from Mark Allingham and Steve Couper. This is further information, based on my review of the historic data, evidence and the reports.
67. In my experience, the plant and upgrades are designed based to improve the discharge parameters, given the size of Donalds Creek I would expect that the nutrient levels are the main drivers for the upgrade. High rate treatment is usually used when there is a high level of treatment needed or there are space constraints for the site.
68. The normal considerations are: status quo, improvement of the existing infrastructure or further stages to improve the effluent quality unless it is obvious that the plant cannot produce the quality required then a new WWTP would probably be required unless the wastewater could be pumped to another nearby WWTP (refer to the combined scheme assessment by AWT 2013 - Appendix 3 of the AEE).
69. For the 2012 high rate treatment application in July 2014, a number of reports were reviewed:
  - a. NZET, Featherston Wastewater Treatment Plant: Review of Potential Upgrade Technologies, prepared for SWDC, 24 May 2012.
  - b. g2e, Featherston Wastewater Treatment Plant 2013 Assessment, Draft, prepared for SWDC, July 2013.
  - c. g2e, Summary Featherston Upgrade, prepared for SWDC, October 2013.
  - d. g2e, Comparison Upgrade Options, prepared for SWDC, October 2013.
  - e. LEI, Featherston WWTP Land Discharge Scenarios, prepared for SWDC, Draft, August 2013.
70. The report contained an assessment that a 25-31% reduction in I&I was required for the high rate treatment plant, however if the reduction reached 35% then a full land disposal option became the best practicable option.

71. This option was obviously evaluated at the time against the availability of the land, as the LEI report indicated at least a 90ha area would be required, it could be called fortuitous that the Hodder Farm became available about the time.
72. Other options that were evaluated are covered by Steve Couper, however I produced a report for a dissolved air floatation (DAF). This would be considered as an adaptive management option if it was found that the aquatic ecology or water clarity was still affected after the first stage of land treatment. There are two blanked pipes upstream of the UV which could be used to incorporate a DAF if monitoring in Stage 1B shows that solids in the discharge is having undesirable adverse effects on aquatic ecology.
73. A DAF injects fine bubbles into the water and these bubbles cohere with solids particles, algae for removal at the surface. This is a mechanical process, so can work intermittently to improve the discharge to water. The discharge of the algae to land is considered beneficial as a soil conditioner, as long as the algae does not affect the UV disinfection.
74. The cost of a DAF add-on is approximately \$6million as a whole life cost when stage 2B was still at 20 years. This will have reduced for the operating cost but then this would be offset by the increased depreciation over 13 years. The only way to reduce this would be a portable unit which can be sold or relocated which is unlikely given the flow rates. A DAF plant makes no sense within the context of the proposed land treatment where most of the benefits will be achieved within 5 years.

## **CONSULTATION**

75. Mark Allingham has covered some of the consultation that has been undertaken since the wastewater strategy was agreed in 2010.
76. As the wastewater application was developed and prior to notification there was frequent communications with potential submitters and adjoining neighbours. In addition, there were workshops with interested parties in 15 March 2016, and 8 April 2017 to updated them with progress and on the discussions with the regional council.

77. There were meetings held during the submission period to try to help assist people and enable people to make a submission or receive information about the application. These were held in 15 May 2018 and 23 August 2018. The Powerpoint presentation and summary of the questions asked with responses were also sent out to people unable to attend the meeting.
78. I presented to the Maori Standing Committee on the 9 May 2018 on the application so that the members could be updated from the previous written update and to introduce myself to the representative of Pae tu Mokai o Taurira.
79. In order to inform concerned neighbours a general invite went out to people to attend a demonstration at the Martinborough WWTP and irrigation site on 9<sup>th</sup> April 2018. I had about a dozen people attend and those people received the information well.
80. The Council has had a number of meetings with GW officers to discuss the officer's/management's views. In particular there have been significant discussions and advice around the section 107 and 104D issues which culminated in the various joint reports prepared last year. I note that during these discussions there has been no indication from GW officers as to what they consider should be changed in the proposal. The Officer's report expresses disappointment that additional treatment has not been added to the proposal, however there is no indication of what the officer means by this or why she considers it to be desirable. There has been no engagement by the reporting officer over proposed conditions and the officers report contains no detailed comment on conditions.
81. There is a suggestion in the officer's report that consent should be declined so that further consideration can be given to alternatives and further consultation occur. In my opinion the process to date for considering alternatives and developing the proposal has been robust. Declining consent would inevitably lead to significant delays to the

upgrades, which the ecologists and water quality experts agree are desirable.

## RESPONSE TO SUBMISSIONS

82. Submitter 146 commented that there has been no evaluation on the effects of stormwater and the retention dam on Donald Creek. This question has been looked at in detail for the SWDC submission for PNRP hearings. Research has shown that if the impermeable area of the town is less than 5% of the catchment area there is no measurable effect of stormwater, Featherston is approximately 3.75%. This is before there is any account taken of the fact since the 1990s the policy has been all stormwater is disposed of onsite. The majority of contaminants from stormwater is contained onsite and the predominant stormwater is runoff from the hills and roads.
83. The retention dam is designed to accumulate water up to a 1 in 50 year event by restricting flow through culverts downstream. This is irrelevant in terms of dilution due to the fact all flow gauging and modelling has been downstream of the confluence with Torohanga Stream and there is a disclaimer about the accuracy of flows above 500L/s. My understanding is that the main concerns are the shoulder periods, autumn, spring when the I&I will increase and there is not a corresponding increase in stream flow, this would not be the case if the retention dam in operating.
84. Some submitters have suggested clumping may compromise the UV unit. While this is true, that is not the case for algae. If algae clumped it would form larger particles and settle. UV transmissivity is a measure of the light penetration and the UV unit is designed for UVT above 20%. UVT has been measured sporadically at Featherston WWTP and usually exceeds 50%.
85. Some submitters have suggested returning to the 2012 application for the high rate treatment. It should be pointed out that the application was proposed to be completed by year 10 after a 5 year planning and detailed design period. In comparison the discharge to land will achieve

a similar reduction to the stream within 5 years and a significant reduction within 2 years. The continued discharge full time to water is also out of line with the Ruamahunga Whaitua recommendations and Regional Policies.

## **FEATHERSTON GOLF COURSE**

86. Featherston Golf Course was purchased by SWDC in November 2018. The golf course is located adjacent to the FWWTP site Western boundary, so offers an extension of the current available land. This could be used as adaptive management either moving part of the discharge land in stage 2A (S127 RMA variation required) if it is deemed necessary or extension to a greater area to achieve a reduced discharge to water.
87. The Council has not yet decided whether to utilise the Golf Course Land for irrigation. That decision will be made once the current proposal is implemented. The Council will need to investigate the suitability of the site and consider the costs and benefits of using that land before making any decision on that. The critical point is that the Golf Course Land does not provide an alternative to the use of the proposed site. At most, it offers potential options to reduce stage 2B storage.

## **CONCLUSION**

88. Operation and maintenance of the Featherston WWTP is undertaken by the council contractors, Citycare in accordance with the existing O&M. The experienced operators visit site daily on weekdays to monitor the performance of the plant or as needed in response to alarms from the SCADA system.
89. The management plans prepared for the Martinborough and Greytown WTP have provided valuable feedback and learning which will assist in the preparation of the management plans for Featherston. These will provide operational detail as well as flexibility to adapt to improve the treatment for the wastewater. The CLG will also allow the community

to have ongoing operational involvement and input into the development of the management plans.

90. My experience has shown that pond systems and irrigation to land treatment areas offer robust consistent treatment of the wastewater with a very low risk of odours.
91. Based on the experience since commencement of the consents for Martinborough and Greytown, I am confident of maintaining compliance with the proposed consent conditions. Pond systems provide a consistent robust treatment of wastewater and the irrigation to land will be provide a significant improvement for the environment with the reduction of flows during low river flows. The management plans will allow operational flexibility for further improvements and inputs from the CLG.
92. The control of the outlet flow from the ponds will be required for the land treatment system during high soil moisture periods and can be quickly installed. The discharge control can be easily modified to manage the pond flows, if solids in the discharge is deemed to have a more than minor effect for the consent.
93. The current renewal of the trunk main to the Featherston WWTP based on the AWT 2013 report is estimated to reduce the night flows by at least 25%. This and future renewals will be included in the I&I reduction management plan to exceed the 35% flow reduction required as part of the proposal.
94. Featherston WWTP has capacity to accommodate future population growth, due to the fact that the original design was for a population of 5,000 people. More connections to the sewer system will assist by reducing the impact of the rates increase that the future wastewater upgrades will require to cover the increased capital and operating costs.
95. I have presented at a number of meetings to help inform people of the plans and help people interested in making a submission. This included a site visit to Martinborough WWTP so that people could see the irrigator in action.

96. The recent purchase of the land, formerly used as the Featherston Golf Course could also be used to accommodate population growth or as adaptive management, but this would require a further consent in the future. Based on the conservatism described in Katie Beecroft's evidence the use of this land is unlikely to be necessary.
97. The proposal offers an efficient robust solution from a sustainability point of view. Effectively treating the wastewater with a low carbon footprint with beneficial use of the resources for agriculture with staged transfer to land to increase environmental impacts.
98. There is no alternative to continued discharge to water for short to medium term. Land treatment provides a proven and reliable means of reducing discharge to the stream and that will be implemented as soon as is reasonably practicable. The Council does not have any access to land which would provide an alternative land treatment area. Nor does the evidence suggest that there is a need to use a different area. If consent was declined the significant benefits which will be achieved during the first 2 years of consent and the further later benefits will be delayed for some years whilst some alternative proposal is developed. I am not aware of any readily available alternative which would achieve the Councils objective of minimising discharge to the stream as quickly as possible. There is no need for any further level of treatment from stage 2A onwards. Adding additional treatment during stages 1A and 1B would be inefficient because that treatment would have a high degree of redundancy within 5 years of commencement and would itself take time to implement. I note that on the officer's view of the PNRP this too would be regarded as a non-complying activity because it would be alteration of the discharge.

Signed:



Lawrence Stephenson

2 April 2019

## APPENDICES

Appendix A - Visual representative of planned planting around irrigation areas



Appendix B - SWDC FWWTP Compliance - LS Jul 2018.pdf

Site	File Reference	Consent ID	Consent Type	Annual Reporting		Self Monitoring		Compliance Date	notes	Expires	SWDC Contact	Compliance Officer	2016 Result	2017 Result	2018 Result	Reasons for not Fully Complying
				Required? Yes/No/Freq	Submitted? Yes/No/Month	Required? Yes/No/Freq	Submitted? Yes/No/Month									
Hautotara Quarry	WAR050126	24716	Industrial Waste Discharge	No	No	Yes	No	By 30/09/2018		2025	Mark Allingham	Dayna Calkin	Minor Non Compliance	Minor Non Compliance		Works not done as per remedial operation plan. Erosion and sediment controls in poor repair.
Featherston sewage	WAR97008001	30723	Discharge to Water	Yes	June	Yes	quarterly	By 31/12/2018		2012	Lawrence Stephenson	Madeliene Playford				
		23139	Discharge to Land	Yes	June	Yes	quarterly	By 31/12/2018			Lawrence Stephenson	Madeliene Playford				
		30723	Discharge to Water	Yes	June	Yes	quarterly	By 31/12/2018			Lawrence Stephenson	Madeliene Playford				
Greytown and Featherston water supply	WAR120244	31689	Take	Yes	By July 31	No	No	By 31/12/2018		2037	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Greytown and Featherston water supply	WAR99014201	33567	Take	Yes	August	Yes	quarterly	By 31/12/2018		2019	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Greytown sewage	WAR080254	26633	Discharge to Water					By 31/12/2018		2051	Lawrence Stephenson	Madeliene Playford				
		33180	Discharge to Land					By 31/12/2018			Lawrence Stephenson	Madeliene Playford				
		33181	Discharge to Air					By 31/12/2018			Lawrence Stephenson	Madeliene Playford				
		33182	Discharge to Land and Water via Seepage					By 31/12/2018			Lawrence Stephenson	Madeliene Playford				
Lake Ferry sewage	WAR040096	30785	Sewage Discharge to land	Yes	July	Yes		By 31/12/2018		2025	Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
		30786	Sewage Discharge to water	Yes	July						Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
		30787	Discharge to Air	Yes	July						Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
Martinborough Sewage	WAR120258	31707	Discharge to water					By 31/12/2018			Lawrence Stephenson	Madeliene Playford	Fully Complying			Conditions 1, 2, 7 & 15
		32044						By 31/12/2018			Lawrence Stephenson	Madeliene Playford	Not Ready			
		32045						By 31/12/2018			Lawrence Stephenson	Madeliene Playford	Fully Complying			
		33045	Discharge to Air					By 31/12/2018			Lawrence Stephenson	Madeliene Playford	Fully Complying			
Longwood Water Race	WAR010201	34190	Take	Yes	September (May)	Yes	quarterly	By 31/12/2018		2020	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
		21593	River/Stream Diversion	Yes	September (May)	No	No	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
			General Conditions	Yes	September (May)	No	No	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
		21594	Comprehensive Stormwater Discharge	Yes	September (May)	Yes	May	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Martinborough Landfill	WAR950016	21435	Landfill Discharge to land	Yes, by agreement.	July/August	No	No	By 31/03/2019		2010	Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
		21436	Discharge to air	Yes, by agreement.	July/August	No	No				Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
		21437	Discharge stormwater	Yes, by agreement.	July/August	No	No				Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
		21438	Discharge leachate	Yes, by agreement.	July/August	Yes	biannually				Lawrence Stephenson	Madeliene Playford	Minor Non Compliance	Minor Non Compliance		Minor exceedences of MoH guidelines. Spike in TOC. Dry bores.
		21439	Water divert	Yes, by agreement.	July/August	No	No				Lawrence Stephenson	Madeliene Playford	Fully Complying	Fully Complying		
Martinborough water supply	WAR120245	31690	Take	Yes	By July 31	Yes	quarterly	By 31/12/2018		2037	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Moroa Water Race	WAR010200	34189	Take	Yes	September (May)	Yes	quarterly	By 31/12/2018		2025	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
		21379	River/Stream Diversion	Yes	September (May)	Yes	No	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
			General Conditions 1 - 10	Yes	September (May)	No	No	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
		21586	Comprehensive Stormwater Discharge	Yes	September (May)	Yes	May	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Pirinoa Water Supply	WAR050099		Take	Yes	By July 31	Yes		By 31/12/2018		2025	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Gravel Extraction	WAR130295	32301	Extract 1000m3/year from Awheia.	No		Yes	Within one month	By 30/06/2019		2024	Tim Langley	Steven Orr	Fully Complying	Fully Complying	Fully Complying	
		32302	Extract 400m3/year from Hurupi Stream	No		Yes	Within one month	By 30/06/2019			Tim Langley	Steven Orr	Fully Complying	Fully Complying	Fully Complying	
		32303	Extract 3000m3/year from Opouawe	No		Yes	Within one month	By 30/06/2019			Tim Langley	Steven Orr	Fully Complying	Fully Complying	Fully Complying	
		32304	Extract 3000m3/year from Pahaoa River	No		Yes	Within one month	By 30/06/2019			Tim Langley	Steven Orr	Fully Complying	Fully Complying	Fully Complying	
		32305	Extract 200m3/year from Makara River	No		Yes	Within one month	By 30/06/2019			Tim Langley	Steven Orr	Fully Complying	Fully Complying	Fully Complying	
		32306	Extract 2000m3/year from Otakaha Stream	No		Yes	Within one month	By 30/06/2019			Tim Langley	Steven Orr	Fully Complying	Fully Complying	Fully Complying	
Boar Bush / Taits Creek	WAR120050	31362	Surface Take - Taits Creek	Yes	By July 31	No	N/A	By 31/12/2018		2030	Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		Nil water taken during the period
		31364	Surface Take - Boar Bush Stream	Yes	By July 31	No	N/A	By 31/12/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		Nil water taken during the period
		31366	Surface Take	Yes	By July 31	Yes	No				Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Mboro Water Supply	WAR120051	27566	Occupy coastal marine areas with structures	Yes	June			By 30/06/2018		2046	Mark Allingham	Dayna Calkin	Fully Complying	Fully Complying	No Inspection	
		27567	Reclaim land within coastal marine area	Yes	June			By 30/06/2018			Mark Allingham	Dayna Calkin	Fully Complying	Fully Complying	No Inspection	
		27568	Disturb the coastal marine area	Yes	June			By 30/06/2018			Mark Allingham	Dayna Calkin	Fully Complying	Fully Complying	No Inspection	
		27569	Install structures in the coastal marine area	Yes	June			By 30/06/2018			Mark Allingham	Dayna Calkin	Fully Complying	Fully Complying	No Inspection	
		27570	Deposit materials in the coastal marine area	Yes	June			By 30/06/2018			Mark Allingham	Dayna Calkin	Fully Complying	Fully Complying	No Inspection	
Hodders Farm 1	WAR130244	32220	Groundwater Take	Yes	By July 31			By 30/09/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
		32227	Groundwater Take	Yes	By July 31			By 30/09/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		
Hodders Farm 2	WAR130251		Take	Yes	By July 31			By 30/09/2018			Lawrence Stephenson	Steven Orr	Fully Complying	Fully Complying		