Technical Memorandum
Rangitoopuni Retirement Village

Wastewater Response to S67 Queries
Rangitoopuni Developments LP

TO:	The Hearing Panel	**REF:**	J6438-1
FROM:	GWE Consulting	**DATE:**	19 August 2025

The queries presented by Council has been reprised in *blue italics* below with GWE's response to each directly following.

Missing Info:

1. *Water treatment plant waste – it is likely that the water treatment plant will create a liquid waste stream (from softener) which might need to be disposed of within the on-site wastewater system. This needs to be confirmed and, if discharging to the system, the volume, concentration, and effects of this stream needs to be reviewed and commented on.*

   The Water Supply philosophy for Rangitoopuni is based on roof water collection with bore water top up. Roof water is treated using cartridge filtration followed by disinfection via UV and Chlorination.

   Based on the results that we have been provided with from the bore testing it is anticipated that there will be no waste stream from the Water Treatment Plant. The cartridge filters are not backwashed, but they are replaced on a regular basis.

2. *Odour management plan – a portion of the northwestern retirement village is in close proximity to the gravity sewer outlet and treatment plant. The application discusses the treatment plant as being unlikely to generate odours, but it does not provide any details on the sewer outlet and whether an odour monitoring or management plan is proposed to monitor and mitigate any potential odours from the entire system.*

   Please refer to draft Odour Management Plan. This should be finalised as part of the Operation and Maintenance Plan for the wastewater system once it is installed.

3. *Discharge Field Construction – The design presented for the discharge field construction indicates a total of two sector each with 6 zones. This creates the requirement to construct 12 zones each of an equal size (~0.48 ha). The site plan provides three discharge areas each of an unknown size (not indicated on plans). More details should be provided on the plans showing the extent and size of each zone and which zones are to be installed as part of the three identified system installation stages.*

Further analysis of the zones, and layout of the disposal field has been undertaken to address this query. As such the following layout parameters have been determined, noting that the detailed disposal field design is yet to be done.

Total Effluent Disposal Field:	58,000 m^2
Sectors:	3 of 19,333 m^2
Zones per Sector:	6, split using a mechanical sequencing valve.
Zone Sizing:	3,222 m^2
Emitter Flow Rate:	1.6L/hr @0.5 m centres.
Flow Rate per Zone:	10,311L/hr

Please refer to revised layout plan.

The treated effluent shall be delivered to the disposal field by 3 pumps located in the treated effluent chambers of the WWTP. The pump selection shall be finalised by the contractor as part of the detailed design of the WWTP.

4. *The proposed discharge system is located entirely within existing or historically production forest land which, as part of the logging process, has resulted in land that is stripped of topsoil (as identified in the ground investigations presented). Wastewater irrigations systems are reliant on topsoil to provide appropriate lateral dispersion of wastewater and prevent point accumulation and subsequent runoff during normal operation. No details have been provided (for the Integrated Māori Development or rural subdivision) within the application which provide any discussion on the following (other than a brief discussion on the removal of unsuitable surface materials):*

   - *The impact of the historical activity on the soil profile and its ability to receive treated effluent (primarily focussing on hydraulic acceptance, retention and minimising runoff).*
   - *Proposed remediation of soils (if required).*
   - *Proposed planting or maintenance of vegetation with the irrigation area.*

a. Impact of Forestry Activities

The report acknowledges that the site has been in production forestry use since the 1930s. Ground investigations found that:

- The soil profile includes a thin layer of topsoil/fill, often uncontrolled and uncompacted, overlying natural silty clay and clay soils (classified as Category 5/6 under TP58).
- Such soils have slow-to-moderate drainage and low infiltration rates, making them more prone to runoff if overloaded.
- Pine forestry has historically depleted nutrients and acidified soils (pH ~5.0–5.5), but this is expected to improve with treated effluent application, which can raise pH towards 6.0–6.5 and add beneficial nutrients (N and P).

- Despite topsoil removal, the clay-based subsoils provide sufficient hydraulic retention, allowing for lateral dispersion at a conservative loading rate of 3 mm/day.

The low-permeability clay reduces the risk of rapid percolation or groundwater contamination but necessitates careful management of irrigation rates to prevent surface runoff or ponding.

A loading rate of 3 mm/day is considered appropriate to mitigate the potential effects on the receiving soils and reduce the risk of run off. Further to this, conservative setback distances from streams have been proposed in accordance with TP58 guidelines.

b. Proposed Soil Remediation (if required)

The design includes several remediation measures:

- Disposal Field Preparation: Forestry debris, compacted areas, and tracks will be removed. Compacted soils will be loosened by tilling before dripline installation.
- Nutrient Balance: The addition of effluent nutrients is expected to help re-establish fertility depleted by decades of pine forestry.
- Monitoring and Adaptive Management:
  - Baseline soil sampling (pH, nutrients, sodium, conductivity, etc.) before operation.
  - Biennial soil monitoring thereafter to track any signs of sodicity, phosphorus accumulation, or declining infiltration.
  - Adaptive interventions (e.g., gypsum application if sodium levels rise) are included as contingency measures.

The proposal recognises forestry-induced soil depletion and includes both initial physical remediation and long-term adaptive management to sustain soil acceptance capacity.

c. Proposed Planting and Vegetation Management

The irrigation areas will be actively replanted and managed to support soil function in accordance with the Landscape Plans for Lot 1 and Lot 2 contained with Appendix O and O.1 and summarised again in Appendix F – Ecological Impact Assessment within the wider application.

Vegetation is central to system performance, both enhancing hydraulic capacity and stabilising soils while creating a long-term transition from post-forestry land to regenerating native cover.

LIMITATIONS

This report has been prepared for the sole benefit of **Rangitoopuni Developments LP** as our Client, and their appointed representatives, according to their instructions, for the specific objectives described herein. This report is qualified in its entirety and should be considered in the light of our Terms of Engagement with the Client and the following:

a. Data or opinions contained within the report may not be used in other contexts or for any other purpose without our prior review and written agreement. Any reliance will be at the parties' sole risk.

b. No responsibility is assumed for inaccuracies in reporting by the information providers. In no event, regardless of whether GWE 's consent has been provided, does GWE accept any liability, whether directly or indirectly, for any liability or loss suffered or incurred by any third party to whom this report is disclosed placing any reliance on this report, in part or in full.

c. GWE has relied on information provided by the Client and by third parties to produce this document and arrive at its conclusions. GWE has not verified information provided (unless specifically noted otherwise) and we assume no responsibility and make no representations with respect to the adequacy, accuracy, or completeness of such information.

Prepared by:	**Reviewed by:**	**Approved by:**
		
Patrick O'Riordan	Dylan Walton	Patrick O'Riordan
Technical Director	Wastewater Specialist	Director

enc Appendix A: Draft Odour Management Plan
Appendix B: R2 Site Plan

Https://Gweconsult.Sharepoint.Com/Sites/Activeprojects/LD/Rangitoopuni (Retirement Village)-J6438-1/04-WW/04-Reports/TM02v1-Rangitoopuni-WW Treatment Responses.Docx

APPENDIX A

DRAFT ODOUR MANAGEMENT PLAN

GWE
CONSULTING ENGINEERS

RANGITOOPUNI WASTEWATER TREATMENT PLANT
DRAFT ODOUR MANAGEMENT PLAN

Rangitoopuni
Riverhead, Auckland

RANGITOOPUNI DEVELOPMENTS LP

August 2025 | V1

Creative Thinking | Better Environments

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DOCUMENT CONTROL RECORD

Client:	Rangitoopuni Developments LP
Project Location:	Rangitoopuni , Riverhead, Auckland
Job Number:	J6438-1
Document:	Rangitoopuni Wastewater Treatment Plant | Draft Odour Management Plan
Version:	V1
Document Status:	Draft Only
Date:	August 2025
Prepared by:	Patrick O'Riordan, Technical Director
Reviewed by:	Gareth Williams, Director
Approved by:	Gareth Williams, Director
Filename:	https://gweconsult.sharepoint.com/sites/ActiveProjects/LD/Rangitoopuni (Retirement Village)-J6438-1/04-WW/04-Reports/RWW02v1 Draft-Rangitoopuni-Odour Mgmt Plan.docx

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DOCUMENT STATUS

STATUS	DATE	DETAILS	AUTHOR	CHECKED	APPROVED
Draft	August 2025	RWW02v1 Draft	PO	GW	GW

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1 INTRODUCTION

This draft Odour Management Plan has been prepared for the Rangitoopuni Retirement Village Wastewater Treatment Plant to set out the measures in place to minimise and manage odour. The purpose of this report is to identify potential sources of odour, assess the level of risk, and outline the systems, processes, and maintenance practices that ensure odour is controlled effectively.

The plan highlights both preventative and responsive actions. Preventative measures are built into the design and operation of the treatment plant, such as sealed tanks, carbon filters, and active ventilation. Responsive measures include clear procedures for handling equipment faults, extended power outages, or any system failures that may cause odour to occur.

This report also provides a framework for responding to odour complaints. It outlines how odour events should be recorded, investigated, and addressed, ensuring both compliance and accountability.

Overall, the Odour Management Plan supports the ongoing reliable operation of the wastewater treatment plant, while safeguarding the surrounding community and environment from nuisance odours.

2 IDENTIFICATION AND MITIGATION OF RISKS

The following table identifies the various risks around the Rangitoopuni Site which poses an Odour Escape Risk. The table also quantifies the risk (A being high risk & C being low risk) & then details the measures installed to mitigate the risk as part of the design & supply of the system:

Table 1: Overview of Potential Odour Sources, Risk posed and Mitigation Measures

POTENTIAL ODOUR SOURCE WASTEWATER TREATMENT PLANT	ODOUR RISK ASSESSMENT REFER SECTION 2.1	MITIGATION MEASURES
Septic and Pre Anoxic Stages	B	• Tank Sized Correctly for application – ensuring adequate detention time of solids. • Septic tanks constructed and fitted with water tight pipe penetrations & access riser joins. • Lids upon Manhole risers include gaskets to provide air tight seal when locked. • Air vent on tank installed with activated carbon – scrubs any odours from gasses escaping tank.
AX-100 Units Stage 1 and Recirculation	B	• All lids on AX 100 units locked and sealed with rubber gaskets. • All penetrations through side walls of AX 100 units sealed with rubber grommets • All Passive inlet vents upon AX 100 Units contain activated carbon

POTENTIAL ODOUR SOURCE WASTEWATER TREATMENT PLANT	ODOUR RISK ASSESSMENT REFER SECTION 2.1	MITIGATION MEASURES
AX- 100 Units Stage 2 and Recirculation	B	• Agitating fan (sucking all air from tank) draws air and forces through an activated carbon granule bed. • Fan housed in fully sealed riser unit – all penetrations through housing sealed and lid upon housing sealed with rubber grommets.

2.1 Odour Risk Assessment Detail

Illustrated in the table above is a risk score given to each potential odour creating sources of the wastewater treatment plant. To expend on and describe the risk scores given the following detail can be used:

Risk Score: A

Facets of treatment system which hold or pass raw wastewater without any biological treatment breakdown. High risk of odour.

Risk Score: B

Facets of system which could be exposed to raw wastewater but have biological breakdown occurring within. Medium risk, however risk could be high if efficient treatment does not occur.

Risk Score: C

Facets of system with low risk odour potential. Most likely aspects of system dealing with effluent treated to some degree. Assumption of low odour risk on the basis system is operating correctly, could be upgraded to medium or high risk otherwise.

3 ODOUR OPERATION AND MAINTENENCE MEASURES

It is important to note that the operation and maintenance of the plant will include preventative actions and measures to minimise odour. The presence of odour is typically a clear indication that the treatment system is not functioning as intended, and that a particular process or component within the system may require adjustment or correction.

Odour generation is usually a by-product of reduced treatment performance. It can be linked to system alarms, component failures, or external factors that disrupt the biological processes within the plant. In most cases, if an odour complaint arises, the treatment system is underperforming or there has been damage to the plant —an issue that is also reflected in effluent quality testing carried out at the plant.

As outlined in the table above, the treatment system incorporates measures to prevent odour issues. These include the installation of activated passive carbon vents and active ventilation units. Both systems require regular preventative maintenance checks and periodic replacement to remain effective.

It should also be acknowledged that certain operation and maintenance activities can themselves generate odour on site e.g. desludging the tanks, lids being removed for service visits. These actions are identified in this section of the report, together with recommended preventative measures to reduce potential impacts. However, it is unrealistic to expect complete elimination of odour during such activities. For this reason, it is recommended that scheduled tasks likely to produce odour be undertaken during quieter periods at the retirement village, thereby reducing the potential for nuisance and complaints.

Table 2: Overview of O&M Measures of Ventilation and Venting Systems

ODOUR MITIGATION ASPECT OF PLANT	INSPECTION FREQUENCY	ROUTINE INSPECTION/PREVENTATIVE MAINTENANCE AND REPLACEMENT DETAIL
CF4 Passive Carbon vents (also known as mushroom vents) – Placed in lids of Septic tanks, Grease Traps, Pumps stations, fibreglass lids of various treatment plant manholes	Quarterly	• Inspect CF4 filter for any damage – replace mushroom cap if required. • Ensure screen holding activated carbon source in place is in good order with nothing blocking the screen. • Inspect activated carbon source for any moisture infiltration – replace carbon if saturated. • Replace carbon within vent on a 5 year frequency.
CF1818 active carbon vents (located on AX-100 Units)	Quarterly	• Inspect CF1818 fan assembly housing for any damage – replace Lids/mushroom cap if any damage noticed. • Ensure screen holding activated carbon source in place is in good order with nothing blocking the screen. • Inspect activated carbon source for any moisture infiltration – replace carbon if saturated. • Replace carbon within vent on a 5 year frequency. • Inspect fan electrical connections for any moisture infiltration. • Ensure fan is active and ensure amperage pull of fan unit (note TCOM panel does this automatically and also send fan fail alarms if it recognises no current draw). • Replace fan as deemed necessary (if fan has failed/amperage draw is low indicating insufficient air flow).

Table 3: System O&M Actions which could cause Odour Onsite

O&M ACTION CAUSING/POTENTIALLY CAUSING ODOUR BREAKOUT	FREQUENCY	RECOMMENDED ACTION TO MINIMISE ODOUR POTENTIAL
General and Unscheduled system Maintenance	Quarterly	• General system maintenance – access lids to treatment system tanks will be required – for some time open hatches will allow any build-up of gas to escape. Mitigation measures should include the service technician only having lids open when required, Scheduled servicing at times of low retirement village occupancy. • Other general maintenance actions such as removal and cleaning of internal system components – service agency to ensure this is completed in timely manner and no spillages which could cause odour breakout.
Treatment Plant Tank Septage Removal	As deemed required	• Removal of solid accumulation in septic tanks, and grease traps. This should be completed in a timely manner and care should be taken to ensure such action is completed at time where minimal disruption will take effect onsite. The septage contractor needs to ensure no spillages and no other action takes place to cause excessive odour production.

4 RISK MANAGEMENT

4.1 Loss of Power

In the event of a total power outage, the treatment plant will act as a holding tank and store all wastewater until power is restored and normal processing can resume. Under a standard outage, it's highly unlikely that odour will become an issue. The only risk of odour would be in the rare case where tank levels rise to the emergency threshold during an extended power cut. Note, that if there is a general power cut at the retirement village it is unlikely that any water generating fixtures will be able to be used.

According to the Operation & Maintenance manual, every tank in the system has 24 hours of emergency storage capacity. If the outage goes beyond this timeframe, a septage removal service must be brought in. In that situation, all mitigation measures listed in Table 3 should be followed.

Once power is restored, the system automatically returns to normal operation.

4.2 Alarm Activation/Odour Detection

The wastewater treatment system is supported by a dedicated ventilation network, consisting of enclosed ducting and three fans servicing different areas of the plant. The ventilation fan(s) shall be connected to the centralised TCOM control panel, which provides both local audio/visual alarms and remote alarm notifications to the service agency.

The control panel continuously monitors fan amperage during operation. Alarms are triggered if amperage readings are abnormally high, low, or absent, indicating potential fan malfunction. Failure of the ventilation system can compromise treatment processes and, over time, is likely to result in odour generation.

Given this risk, it is recommended that any alarm notifications relating to the ventilation fans be investigated immediately by the service agent. In addition to the fans, the control system also monitors other key treatment components and is capable of issuing both remote and local alarms. As with the primary treatment processes, odour may also arise from component failures or external factors that disrupt system performance.

In all cases, odour-related complaints should be thoroughly investigated and addressed without delay (see Section 5 for further detail).

5 COMPLAINTS PROCESS/REPORTING PROCEEDURES

Any odour complaints should be investigated as soon as is practicable. As described the complaints could be as a result component failure, process failure or as a result of 'external' issues.

To correctly investigate it is recommended the consent holder or system facilitator should capture the general information regarding the complaint. A complaint record document should be developed which will allow the consent holder to capture the following information:

- Time, date and place of odour detection.
- Nature of odour – strong/weak/chemical type smell other.
- Wind and weather conditions at time of detection.

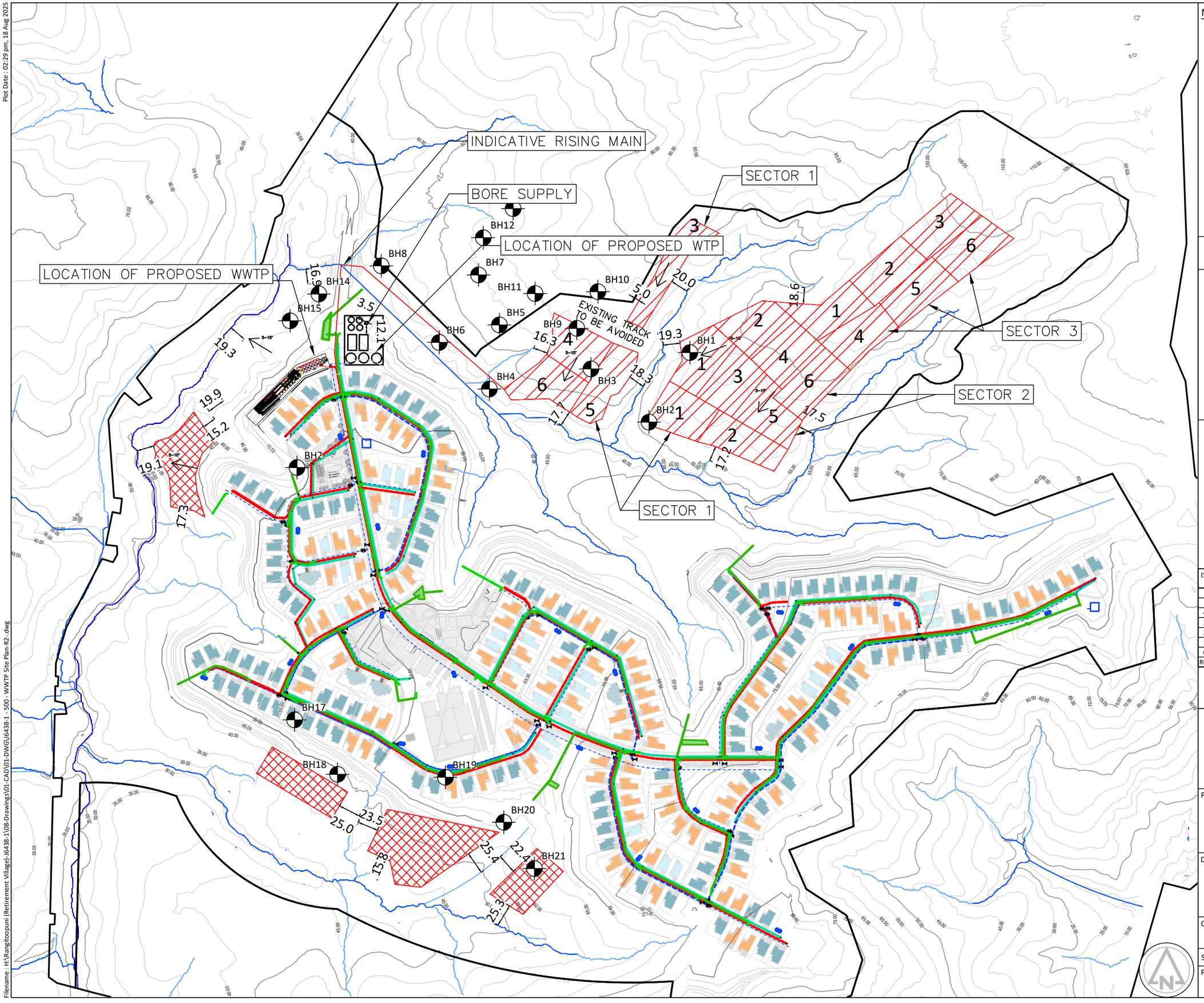
It is then recommended that the consent holder or person who received the complaint should contact the service agent of the system. It is recommended from there that the service agent can comment upon any Operation & Maintenance action which may have been carried out at the time, or comment upon any alarms which were received at the time of the complaint. As a result, the service company can review & complete the following:

- Should the detection of odour be as a result of any operation and maintenance action it is recommended that this action could be reviewed to mitigate any future complaints generated. The service company to make comment, take copy of complaint form and send complaint original form back to consent holder for filing.
- If the complaint is as a direct result of a process or equipment failure to which the service agent has been notified, it's recommended the problem (where possible) should be managed remotely or be remedied onsite as soon as practically possible. The complaint form should highlight the corrective action taken copied and be returned to the consent holder for filing.
- Should the detection of odour be as a result of no alarm or equipment alarms, the service agent should make note and investigate as soon as practically possible & based upon the severity of the complaint.

APPENDIX B

R2 SITE PLAN

Plot Date : 02:29 pm, 18 Aug 2025



NOTES:

1. DRAWING IS BASED ON SITE PLAN PREPARED BY CROSSON LTD.
2. ADDITIONAL DATA FROM AUCKLAND COUNCIL GEOMAPS (CAPTURED 25/12/2025).
3. LOCATION OF FEATURES ARE INDICATIVE ONLY.
4. WASTEWATER FLOW: 172 M^3/DAY
5. CATEGORY 5/6 SOILS
6. TERTIARY TREATMENT SYSTEM
7. SURFACE PCDI
8. WASTEWATER DISPOSAL RATE: 3 MM/DAY
9. PROPOSED PRIMARY DISPOSAL AREA: 5.8 HA (100%)- SUBDIVIDED INTO 3 EQUAL SECTORS, EACH COMPRISING 6 EQUAL ZONES.
10. PROPOSED RESERVE AREA: 2.85 HA (50%)
11. DO NOT SCALE FROM THIS DRAWING

LEGEND

- PROP. PRIMARY DISPOSAL AREA
- PROP. RESERVE AREA
- OVERLAND FLOW PATH
- HAND AUGER BOREHOLE (AH1)

ISSUE STATUS: FINAL

REV	AMENDMENT	CAD	ENG	APPD	DATE
4	REVISION	MM	PO	PO	18/08/25
3	REVISION	PH	PO	PO	29/04/25
2	REVISION	MM	PO	PO	31/03/25
1	REVISION	NG	PO	PO	24/03/25
0	FIRST ISSUE	PO	PO	PO	17/03/25

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PROJECT ADDRESS:
RANGITOOPUNI RETIREMENT VILLAGE

DRAWING TITLE:
PROPOSED RETIREMENT VILLAGE WASTEWATER PLAN

CLIENT NAME:
RANGITOOPUNI DEVELOPMENTS LP

SCALE: 1:4000		A3
PROJECT No: J6438-1	DRAWING No: 500	REV 3

Filename : H:\Rangitoopuni (Retirement Village)-J6438-1\08-Drawings\01-CAD\01-DWG\J6438-1 - 500 - WWTP Site Plan-R2-.dwg