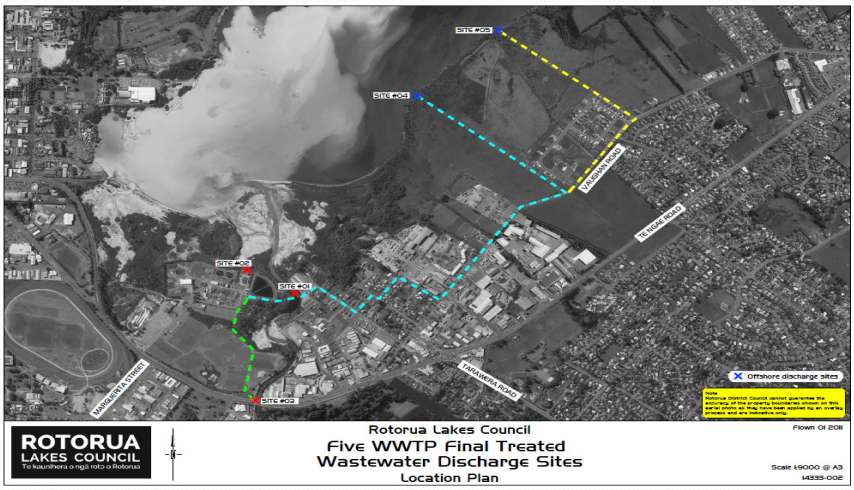
WWTP Treated Wastewater Direct Disposal Option

Potential Discharge Points

Key Considerations:

- Final treated wastewater quality is achieved from tertiary treatment and/or UV treatment and there is resource consent(s) and approval for direct discharge.
- Accessibility for ease of maintenance.
- "Hydraulics" Gravity Flow to discharge.
- Utilisation of existing infrastructures, i.e. holding ponds, pump station, final treated wastewater rising main.
- Offshore discharge sites to be determined by David Hamilton in the "Effects Study".
- Geothermal field part of the lake not considered as a constraint (to be determined in the "Effects Study".

Initially Identified Discharge Points



Site #1:

- Situated east of the final treated wastewteter holding ponds, about 240m from the existing pump station.
- Easy and suitable access from the treatment plant facility.
- Has a small area prior to stream populated with raupo plants (NZ bull rush) that is apparently good for further nutrient uptake.
- Simple design and economical to construct.
- Easy to maintain/least maintenance cost.
- Could gravitate from plant to the point of discharge.
- No ROW issues.

Site #1 continued…

- Pipe direct discharge to Puarenga Stream (refer to Mott McDonald conceptual detail, Fig 5.1). Approx. Capex: $0.60 M.
- Or, with riparian gabions (Figure 5.5). Approximate capex: $ 0.70 M.
- Alternative option to utilise existing ponds as monitoring ponds (Fig 5.6) then direct to discharge. Will reduce above costs by $0.30 M respectively.

Figure 5.1 Pipe to direct discharge

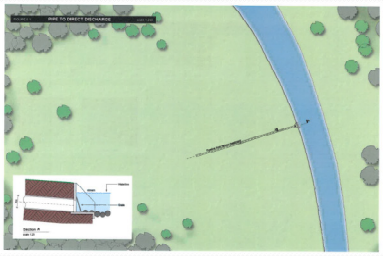


Figure 5.6 Monitoring ponds

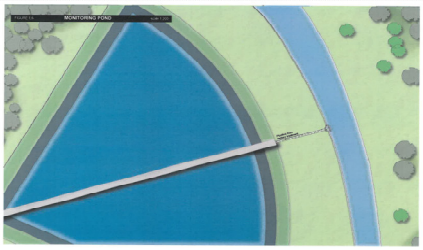
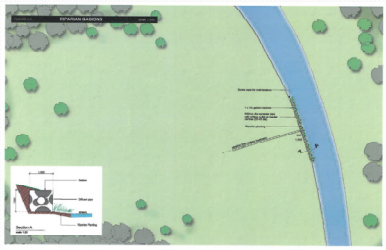


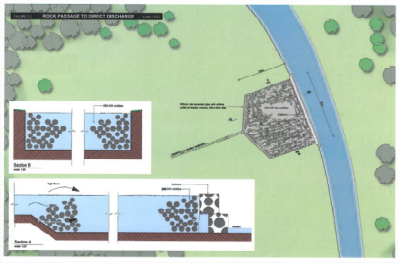
Figure 5.5 Riparian Gabions



Site #2:

- Situated north of MMD's proposed location of tertiary and UV treatment plant on the WWTP Site, about 125m away from the existing pump station.
- Discharge to natural ditch that flows towards the lake. This ditch is the treatment plant's stormwater overflow channel.
- Could gravitate from plant to the point of discharge.
- No ROW issues and easy access
- Discharge to rock passage (Fig 5.2). Estimated capex: 0.85 M.

Figure 5.2 Rock passage



Site #3:

- Downstream side of Puarenga Stream at Te Ngae Bridge about 650m from the WWTP pump station.
- Discharge to Puarenga Stream or to the adjacent stormwater ditch.
- Could utilise existing 600 mm diameter steel pipe rising main with low pumping head.
- No ROW issues.
- Suitable access from the treatment plant facility for easy maintenance.
- Simple design and easy to construct.
- Suitable distance from lake to allow treated wastewater dispersion.
- Pipe to direct discharge (Fig 5.1), estimated capex: $1.6 M.
- With riparian gabions (Fig 5.5): $1.7 M.

Site #4:

- Located along the southeast shore of Lake Rotorua, Owhata West, (mesh block 1254300).
- Pipeline route: WWTP - Puarenga Stream crossing- private property (alongside alignment of DN600 Hona PS rising main) - Hona Road – Hakopa Road – Moses Road – RDC road reserve – Vaughan Road – unformed RDC road reserve (before Caroll Place) – lake discharge point.
- Approximate size/length of pipe: 750 mm diameter 1,850 meters length.
- Pipe to direct discharge (Fig 5.1), estimated capex: $4.6 M.
- With rock passage (Fig 5.2): $5.2 M.

Aerial photo at discharge point

Entrance of paper road off Vaughan Road

Site #5:

- Located southeast shore of Lake Rotorua, Owhata West, (mesh block 1254300).
- Route: WWTP - Puarenga Stream crossing - private property (alongside alignment of DN600 Hona PS rising main) - Hona Road – Hakopa Road – Moses Road – unformed RDC road reserve – Vaughan Road – unformed RDC road reserve (top of Caroll Place) – lake discharge point (refer to map).
- Approximate size/length of pipe: 750 mm diameter, 3,115 meters length.
- Pipe to direct discharge (fig5.1), estimated capex: $7.8 M.
- With rock passage (Fig 5.2): $8.3 M.

Aerial photo at discharge point

Entrance of paper road off Vaughan Road