

Lyttelton Harbour Disposal Options –From Fragmentation to Efficiency

*Authors: Ash Deshpande (Harrison Grierson Consultants Ltd.)
Andrew Dakers (ecoEng Pacific Ltd.)*

Christchurch City Council is developing a long-term strategy for the management of wastewater in the Lyttelton Harbour Basin, especially 3 communities, i) Lyttelton ii) Governors Bay and iii) Diamond Harbour.

Out of a long list of 9 options for treatment and disposal, and 3 were nominated by the to be carried forward. EcoEng and Harrison Grierson undertook the preliminary design and costing of these options.

The three options were quite unique in terms of disposal, which also provided a good comparison of the benefits and downsides.

Option 1: The first option was to maintain status quo, i.e. continue discharging to the harbour but with improved effluent quality. The objective of this option was to provide a baseline for comparison. Under this option, the existing plants will be upgraded to achieve additional organic and nutrient levels to address issues around recreational use and shellfish gathering.

Option 2: The second option was to de-commission the existing treatment plants and convey the wastewater to the Christchurch WwTP. This option provided major challenges in terms of reticulating through either the Lyttelton Road Tunnel (Transit) or the Rail Tunnel (Ontrack) (consent required), shortage of “easy land” to build storage tanks for pumping stations at Diamond Harbour and Governors Bay, transferring wastewater across the harbour from Diamond Harbour to Lyttelton by means of submarine pipelines, hilly terrains.

Option 3: The third option was land disposal of treated effluent on the nearby areas. Sufficient field information was gathered to provide the basis for developing a robust concept and confidence that a scheme is practically achievable. The findings demonstrated that this option is technically viable and there is a sufficient suitable land within the catchment to accommodate a harbour wide scheme.

Since the working party had no desire to continue with the harbour disposal option, the other two options were compared. The risk and benefits/non-benefits evaluation found that both the options were practically and technically feasible. Therefore, the selection was to be based on costs. The following table presents the NPV costs.

Table 1: NPV Estimates		
Harbour Discharge	Land Application	Conveyance to Christchurch WwTP
\$ 36.3 M	\$ 34.5 M	\$ 31.9 M

As observed, the wastewater solutions under the Option 1 and 3 are individually oriented and hence fragmented. The “efficiency” is derived from providing a combined solution under Option 2!