

**Before the Hearing Panel appointed by Canterbury
Regional Council**

IN THE MATTER OF The Resource Management Act
1991

AND

IN THE MATTER OF Applications CRC172455,
CRC172522, CRC172456 and
CRC172523 by Lyttelton Port
Company Limited to undertake
various activities within Lyttelton
Harbour and offshore surrounds

**Summary and response evidence of Dr Lesley Bolton-Ritchie
Canterbury Regional Council**

TABLED AT HEARING

9 May 2017

Application:

.....

Date: 9 May 2017

1. My name is Lesley Bolton-Ritchie. I provided evidence for the Canterbury Regional Council S42a report, dated 3 March 2017.

Since the writing of my evidence for the S42A report

2. Data has been collected on the grain size and compaction of the deeper sediments that will be dredged (see evidence of Dr. Mike Page). This allays many of my concerns about the nature of the sediment to be deposited, and hence potential for species recolonization, in the spoil ground.
3. Data has been provided on contaminant concentrations in the surface sediment in the southern half of the ship turning basin, off the end of the Cashin Quay breakwater and along the southern face of the reclamation.
4. There will not be turbidity trigger values for benthic turbidity. The trigger values will only be established for surface/sub surface turbidity values. This is a change from what was originally proposed. At the spoil grounds in particular, much of the sediment plume during disposal and from re-entrainment will be benthic. The turbidity depth profiles do show there is a naturally high turbidity layer above the seabed. This result suggests that the sediment in this layer is not well mixed through the water column. If there is limited mixing of this sediment from this layer through the water column then there will be no way to assess and react to changes in benthic sediment concentrations as a consequence of the CDP activities.
5. At the time of my evaluation of the number of data points being used to assess for the correlation between turbidity and TSS I was not aware that Vision Environment undertook spot sampling on an additional 13 occasions (Vision Environment, 2016) early on in the sampling programme. This means that there will be 27 data points on which to assess for correlations between TSS and turbidity, not the 14 that I discuss in paragraph 78 of my evidence.
6. From comments made by Jared Pettersson in a meeting on the 30th March 2017, I understand that the mussel farmers, except Ngai Tahu, do not consider that monitoring of mussels on the mussel farms is warranted.

Significant points from my conclusions and recommendations

7. There is the possibility that turbidity will **not** be strongly correlated with total suspended solids concentrations. All correlations will need to be evaluated on a site by site basis. If there are not strong correlations the proposed adaptive management framework does not have any values on which to base adaptive management decisions. Should this situation arise, the adaptive management framework will need to be changed and a different monitoring regime and set of triggers established.
8. There must be a peer review of the calculations used to develop trigger values. There also needs to be consensus between stakeholders on the trigger values. There needs to be validation of any trigger values to ensure they actually work.
9. Whether the trigger values should include modelled values added to background values, is still a matter of contention. It would be useful to have the

modelled suspended sediment concentrations for each monitoring site (according to Dr Beamsley, these have already been calculated) and information on how they have been calculated.

10. In my conclusions and recommendations I wrote 'there is no collection of continuously logged data to assess for the presence of mid water plumes from the dredge hopper.' Leonie Anderson has stated that the water is well mixed, which I take to mean that mid water plumes become mixed through the water column over time and with distance from the source. I am still wondering if these mid water plumes will be well mixed through the water column over the distance between plume generation and the location of the monitoring stations.
11. The benthic monitoring programme for the capital dredging programme needs to change if it is to achieve what it is designed to do, i.e. identify **any** changes to subtidal soft sediment communities that could be attributed to the dredging and disposal activities. The following issues need to be addressed:
 - location of sampling sites, including potential impact and control sites;
 - alignment of some sampling stations with water quality logger stations;
 - number of samples collected per site;
 - sampling of epifauna;
 - details on the data analyses to be used to identify for any changes that could be as a consequence of the dredging and disposal activities;
 - development of trigger values for acceptable and non-acceptable changes in the physical, chemical and biological parameters;
 - the frequency of sampling during the dredging and disposal activity and the time frame for sampling after all activity has been completed.
12. The intertidal and subtidal rocky shore monitoring programme needs to change if it is to achieve what it is designed to do, i.e. identify **any** changes to rocky reef communities that could be potentially be attributed to the dredging and disposal activities. The following issues need to be addressed:
 - Location and number of sampling sites including potential impact and control sites;
 - the alignment of sampling stations with water quality logger stations;
 - quantitative, replicate sampling of the rocky intertidal communities;
 - replicate sampling of the paua and Cook's turban shell in the littoral fringe;
 - measurement of sediment deposition on the subtidal rocky reef;
 - time frame for sampling after all activity has been completed;

- details on the data analyses to be used to identify for any changes that could be as a consequence of the dredging and disposal activities;
- development of trigger values for acceptable and non-acceptable changes in biological parameters including: the prevalence and cover of psammophytic taxa, canopy-forming macroalgae species, the depth distribution of canopy forming and other algae and the prevalence and community structure of grazers.

References

Vision Environment (2016). Lyttelton Port Company Channel Deepening Project Water Quality Environmental Monitoring – Monthly Report – September/October 2016. Vision Environment, Gladstone, QLD, Australia