



**Eastland Port Southern Logyard  
Sampling Report –  
August 2015**

For Eastland Port Limited

September 2015

## REPORT INFORMATION AND QUALITY CONTROL

<b>Prepared for:</b>	Eastland Port Limited
----------------------	-----------------------

<b>Author:</b>	Christine Oakey	
	Environmental Management Consultant	
<b>Reviewer:</b>	Mark Poynter	
	Principal Ecologist	
<b>Approved for Release:</b>	Aaron Andrew	
	Managing Director	

<b>Document Name</b>	SLY Quarterly Sampling Report August 2015 Final
----------------------	---

<b>Version History:</b>	Final	September 2015
-------------------------	-------	----------------



<b>1</b>	<b>INTRODUCTION .....</b>	<b>2</b>
<b>2</b>	<b>SAMPLING DETAILS.....</b>	<b>2</b>
2.1	Relevant Site Information .....	3
<b>3</b>	<b>ANALYSIS OF LABORATORY RESULTS .....</b>	<b>4</b>
3.1	Results.....	4
3.2	Findings on Consent Condition Compliance.....	5
3.2.1	Current trigger levels .....	5
3.2.2	Proposed trigger levels .....	6
3.3	Further Actions Required in Light of Findings .....	7
<b>4</b>	<b>CONCLUSIONS .....</b>	<b>9</b>

**List of Tables**

Table 1: 2015 Sampling schedule .....	2
Table 2: Sample time and dates .....	2
Table 3: Sample Information.....	3
Table 4: August 2015 sample results.....	4
Table 5: Pre and post Downstream Defender sampling .....	8

**List of Figures**

Figure 1: Total Suspended Sediment results for MH1 and MH11 for 2015. Red line is current trigger level (150g/m <sup>3</sup> ).....	5
Figure 2: Total metal results 2015.....	6
Figure 3: August 2015 metal results above/below proposed trigger level. Red line is trigger level factored at 1. .	7

**List of Appendices**

Appendix A: Sampling Locations
Appendix B: Hill Laboratories Analysis Reports August 2015
Appendix C: Hill Laboratories Analysis Report Particle Size
Appendix D: Field Forms
Appendix E: Southern Logyard Results

## 1 INTRODUCTION

Under consent CD-2010-104664-00 condition 10 stormwater monitoring is required. Quarterly sampling is collected at four locations; Manhole 1, Manhole 11, Manhole 9 and the manhole after of the downstream defender in the debarker area. An additional/voluntary sample is also collected at the Kaiti Beach Road catchpit at the request of Eastland Port Limited (EPL), as stormwater runoff from the public road enters the EPL stormwater network. Refer to Appendix A for a plan of the sample sites.

As a result of the May 2015 sample round EPL have changed from quarterly to bimonthly (once every two months) sampling until a meaningful median and 95 percentile can be provided for Total Suspended Solids.

The sampling schedule for 2015 is shown in Table 1.

Table 1: 2015 Sampling schedule

Sample round	Date of sampling
Quarter 1 – January/February/March	16 March 2015
Quarter 2 – April/May/June	23 May 2015
Bimonthly – July/August	10 August 2015
Bimonthly – September/October	-
Bimonthly – November/December	-

The Bimonthly – July/August samples were collected on 10 August 2015.

Sampling was undertaken in accordance with the Stormwater Management Plan and the Sampling Protocols and Standard Operating Procedures prepared by 4Sight Consulting (formerly known as Andrew.Stewart Ltd). The sampling was undertaken by Logic Forest Solutions.

This report has been prepared for Gisborne District Council and provides the results and analysis of the Southern Logyard August 2015 sampling round. This is the third sampling report. The last report, titled “Eastland Port Southern Logyard Quarterly Sampling Report – May 2015 (Quarter 2)”, was prepared for the May 2015 sample round.

## 2 SAMPLING DETAILS

Table 2: Sample time and dates

Location	Date	Time
Manhole 1 (MH1)	10/08/2015	8:40am
Manhole 11 (MH11)	10/08/2015	8:20am
Manhole 9 (MH9)	10/08/2015	9:50am
Post Downstream Defender (Post DSD)	10/08/2015	7:53am
Kaiti Beach Road Catchpit	10/08/2015	9:25am

Two samples were collected from each manhole 5 minutes apart and composited for analytical purposes.

## 2.1 Relevant Site Information

Table 3: Sample Information

Location	Rainfall event	Number of dry days prior to sampling	Discharge/water colour	Obvious or visual features	Pipe flow depth
Manhole 1 (MH1)	17mm	0	Brown	No debris or scums/foams present	0.6m
Manhole 11 (MH11)	17mm	0	Brown	No debris or scums/foams present	0.4m
Manhole 9 (MH9)	17mm	0	Brown	Debris present	0.6m
Post Downstream Defender (Post DSD)	17mm	0	Brown	No debris or scums/foams present	0.6m
Kaiti Beach Road Catchpit	17mm	0	Brown	Debris present	n/a

The Manhole 11 sample was collected at the discharge outlet as logs were stored on top of the manhole. The sample was collected of stormwater flowing out of the outlet.

### 3 ANALYSIS OF LABORATORY RESULTS

#### 3.1 Results

Table 4 shows the results from the 10 August 2015 sample round. For MH1 and MH11 (the last manholes before the discharge points) exceedances of the current/consent trigger limits are highlighted in purple and exceedances of the revised limits proposed in the Section 127 application which is presently before Council, are bold.

Table 4: August 2015 sample results

Parameter	Units	Trigger Levels For Assessing Effects			Sampling Locations				
		Current trigger level (metals freshwater) <sup>1</sup>	Trigger level (metals marine) <sup>2</sup>	Proposed s127 trigger levels (marine with 20x dilution) <sup>3</sup>	MH1	MH11	MH9	Post DSD	Kaiti Beach Road
cBOD <sub>5</sub>	g/m <sup>3</sup>	30	30	n/a	360	400	250	320	18
pH	-log(H <sup>+</sup> )	6.7-8.5	6.7-8.5	>6	n/a	n/a	7.3	7.0	8.3
TSS	g/m <sup>3</sup>	150	150	150 (median) 250 (95%ile)	860	810	1130	430	1750
VSS	g/m <sup>3</sup>	n/a	n/a	n/a	250	220	n/a	n/a	n/a
TPH	g/m <sup>3</sup>	15	15	15	1.0	<0.7	<0.7	<0.7	<0.7
Total Zn	g/m <sup>3</sup>	0.015	0.023	0.46	0.21	0.26	0.35	0.148	0.37
Total Cu	g/m <sup>3</sup>	0.0018	0.003	0.06	<b>0.141</b>	0.052	0.192	0.197	0.038
Total Pb	g/m <sup>3</sup>	0.0056	0.0066	0.132	0.0138	0.041	0.0184	0.0074	0.025

pH was not sampled at MH1 and MH11 due to an error in the sampling quote with Hill Laboratories and field analysis was not undertaken.

<sup>1</sup> Current trigger level required under consent.

<sup>2</sup> Metal trigger levels are ANZECC 2000 Marine 90% protection level for metals.

<sup>3</sup> Metal trigger levels are ANZECC 2000 Marine 90% protection level for metals with 20 times dilution.

## 3.2 Findings on Consent Condition Compliance

### 3.2.1 Current trigger levels

All results except for total petroleum hydrocarbons at both Manhole 1 and Manhole 11 exceed the current consent trigger levels.

Biochemical Oxygen Demand (BOD) exceeds the current trigger level by 12 times at MH1 and 13 times at MH11. The inappropriateness of BOD as a monitoring tool for this type of discharge at these locations is discussed in the current section 127 application.

pH was not sampled at MH1 and MH11 as discussed above, however the result of pH at MH9 and Post DSD are both within consent trigger limit range.

Total Suspended Solids (TSS) results were above the current consent trigger of 150g/m<sup>3</sup> at both MH1 and MH11. The inappropriateness of the current consent trigger values is also a matter before the Council as part of the S127 application. 2015 TSS results are shown in Figure 1.

It is important to note that the TSS result at the Kaiti Beach Road catchpit was 1750g/m<sup>3</sup>. This is stormwater from the public road which discharges into the EPL stormwater network and is likely to influence results at MH1.

The levels of Volatile Suspended Solids (VSS) show that 29% of the TSS is organic material at MH1 and 27% at MH11. This VSS component is more representative of the bark and wood-derived constituents in the TSS.

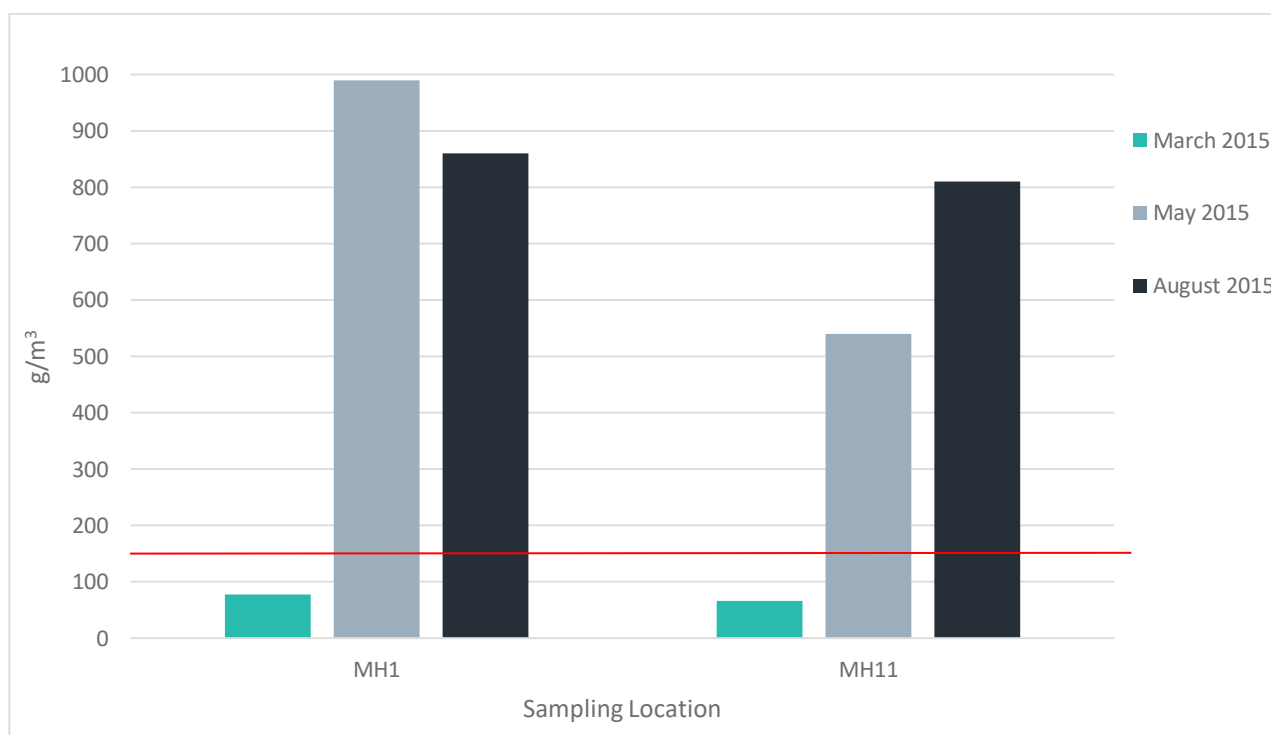


Figure 1: Total Suspended Sediment results for MH1 and MH11 for 2015. Red line is current trigger level (150g/m<sup>3</sup>).

All total zinc, total copper and total lead results were above the current trigger levels at both locations. However, sample results are for pipe concentrations which make no allowance for mixing and dilution whereas the trigger levels are for receiving environments (freshwater rather than marine receiving environments). Direct comparison between the sample results and the trigger levels is not valid.

All metal results at MH1 and MH11 for 2015 are shown in Figure 2.

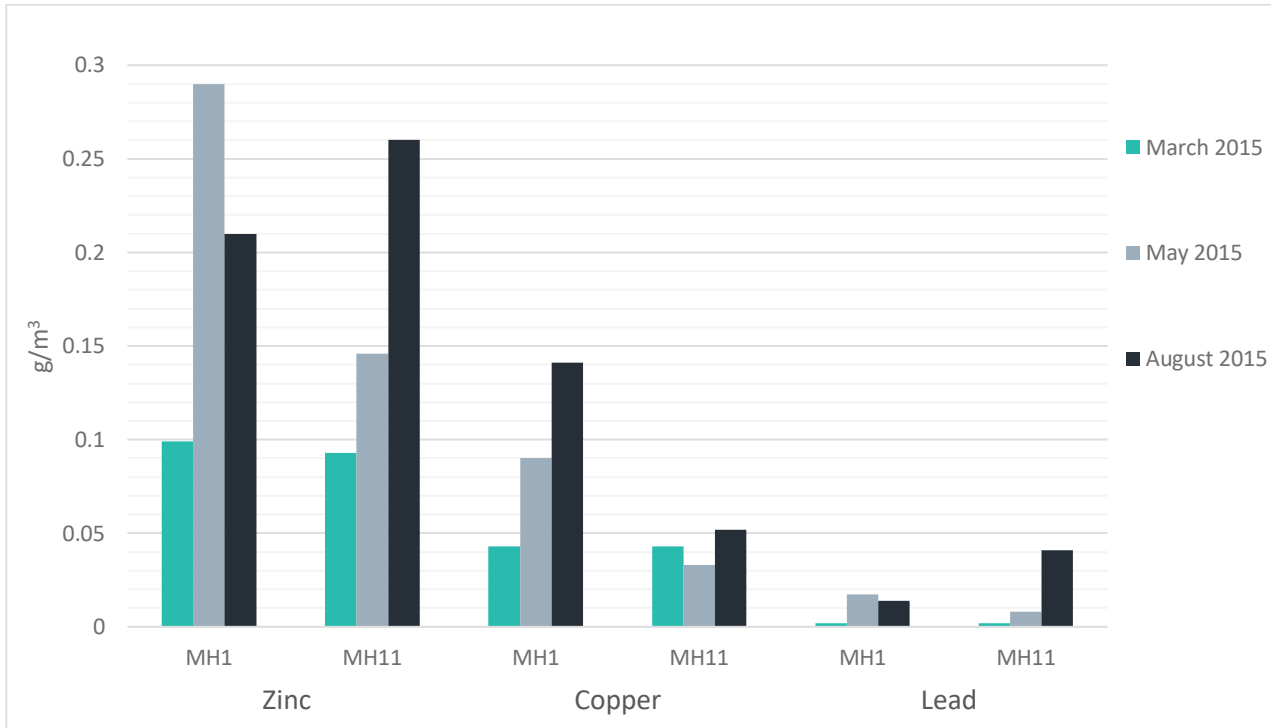


Figure 2: Total metal results 2015

### 3.2.2 Proposed trigger levels

Assessing the results against the proposed trigger levels applied for under the current s127 application and as noted in previous reports, pH results are incidental and of little interest due to the buffering potential of the seawater.

The proposed trigger level for TSS is a median of 150g/m<sup>3</sup> and 95 percentile of 250g/m<sup>3</sup>. Since the development of the Stormwater Management Plan and the Standard Operating Procedures 4 sample rounds (including the additional June samples) have been conducted which will not provide a meaningful median and 95 percentile. As such compliance with the proposed TSS trigger levels cannot be assessed until more results are obtained.

To reduce the period to obtain a meaningful median and 95 percentile, sampling has changed from quarterly to bimonthly.

The proposed trigger levels for metals are based on a marine environment with a dilution factor of 20. Compared to these trigger levels all results except for total copper at MH1 are below the proposed trigger levels (Figure 3). Total copper is only marginally high at 2.4 times the proposed trigger level.



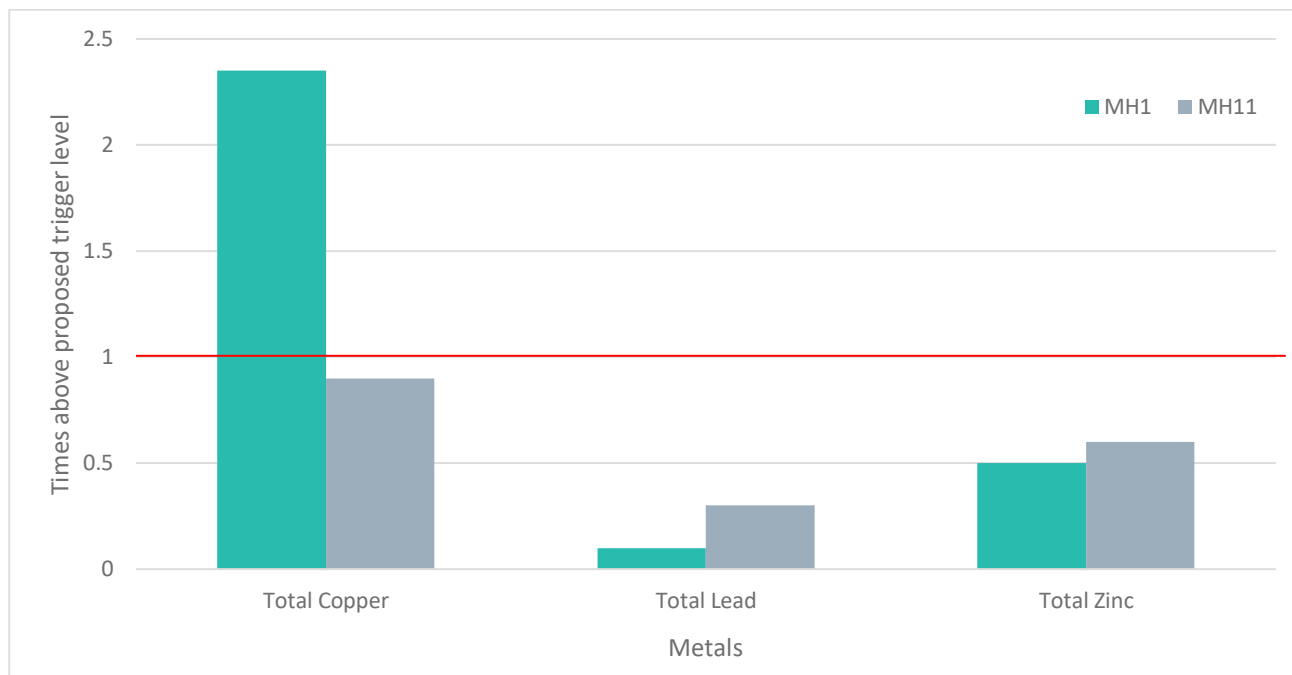


Figure 3: August 2015 metal results above/below proposed trigger level. Red line is trigger level factored at 1.

### 3.3 Further Actions Required in Light of Findings

In response to the exceedances of the current and proposed trigger levels the procedure from the Stormwater Management Plan was followed.

The Plan states:

*Condition 10 (b) requires that if any exceedance is identified then the Council shall be advised in writing of the results within 2 working days of EPL (through its environmental consultant) receiving the results from the testing laboratory. This will be done by EPL’s nominated environmental consultant, in conjunction with EPL staff.*

*Investigations to be Carried Out: Where one or more trigger values as stated in The ‘Discharge’ Column of Table 2 are exceeded, investigations to clarify if possible the source of exceedance may include a review of activity in the log yard on the day of sampling; an inspection of the manhole sampling locations in terms of accumulated material and requirements for maintenance thereof; and review of the field sampling record including the intensity and duration of the rainfall and event. A decision will be made by EPL’s nominated environmental consultant and EPL based on an assessment of the significance of the exceedance, as to re-testing and follow up actions and these will be conveyed to the Council within 15 working days of receipt of the analytical results.*

*Re-Testing: Where retesting is required or recommended, all parameters will be sampled in accordance with the sampling protocols as soon as is practicable. This is expected to be the next time a rainfall event results in a significant amount of water enters the stormwater system.*

Sample results were received from Hill Laboratories on 19 August 2015, and Dennis Crone and Paul Murphy of Gisborne District Council were notified via email from Christine Oakey (4Sight Environmental Consultant) on 19 August 2015.

After the May 2015 sample round an investigation into the exceedances of TSS and total copper commenced. An update of this investigation is provided in this section.

Monthly maintenance of the stormwater drains and manholes is being completed, with the last maintenance prior to sampling undertaken on 20, 21, 22 July. Since sampling, maintenance was undertaken on 18 and 19 August.

As discussed in the letter from Martin Bayley to Dennis Crone of GDC on 22 July 2015, the implication of replacing the slot drains with dish drains that are easily cleaned from the surface with EPL's sweeper truck, is being looked into. This is ongoing.

In response to the overtopping of the seawall, both the seaward and yard side of the seawall is currently being reformed with geo-fabric and rip rap to prevent further scouring of the seawall where it has been affected. The first section should be completed by the first week of September.

An investigation into the performance and suitability of the Downstream Defenders is being undertaken. In addition to the routine sampling, samples were collected pre and post the Downstream Defender in the Manhole 1 catchment and analysed for TSS on 10 August 2015. The pre-Downstream Defender sample was collected at the pre-treatment chamber and the post Downstream Defender sample was collected at MH 1. The results are shown in Table 5. The results show that the TSS level increased post treatment in the Downstream Defender. Indicating that this Downstream Defender is a potential source of sediment or is not functioning as designed.

Table 5: Pre and post Downstream Defender sampling

Parameter	Unit	Pre Downstream Defender	Post Downstream Defender
Total Suspended Solids	g/m <sup>3</sup>	380	820

Particle size analysis was also performed on the above samples. Downstream Defenders are designed to remove 90% of all particles larger than 150 microns, so particle size analysis provides an indication as to whether this device is suitable for this site.

The results of the particle size analysis are shown in Appendix D. The results show that prior to the Downstream Defender 100% of the sample was under 710microns and 97.15% was under 149 microns. Post the Downstream Defender 100% of the volume was under 53microns. This indicates that the Downstream Defender is removing the small volume of sediment particles larger than 150 microns as designed. However, the high TSS levels at MH1 are particles smaller than 150 microns which the Downstream Defender is not designed to remove. The results also show that the increase in TSS post the Downstream Defender is of particles less than 150 microns. This is potentially from re-suspension of these small particles collected in the Downstream Defender during rain events.

The sediment in the stormwater from the logyard is predominantly less than 150 microns. As such, this initial investigation shows that Downstream Defenders are not an appropriate treatment device to remove these particles at this site. Discussions with Hynds and Beca, who were involved in the set-up of the stormwater system are in progress. The performance and suitability of the Downstream Defenders is being discussed, along with other options for treatment, if any. At this point indications are that in situ devices to remove such fine particles may not be available and are not used in other similar yards. Primary reliance to reduce TSS is likely to need to focus on routine site maintenance such as sweeping and the ability to prevent particulates accumulating in the stormwater system, and also the ability to access such material before it becomes entrained in stormwater flows.

EPL looked into the penetration times of copper. The provider of the chemical stated that it takes one hour to penetrate but the effect of temperature via shading from Kaiti Hill on penetration times was investigated. A report by Koppers Performance Chemicals New Zealand dated July 2015 has been prepared. The results show that no significant difference in the level of copper fixation at different temperatures (5, 20 or 40°C) occurred. At these three temperatures the copper has fixed to above 90% after 30 minutes. The use of heat did not increase the total level of fixation that occurred. As such, finding an alternative location to store the logs or heating the treatment solution or the log storage areas would not change the levels of total copper.

Reducing the level of TSS will help to decrease the levels of copper and other metals as these metals bind to the sediment particles. As work to reduce the levels of TSS is occurring no further investigation into the level of total copper will be conducted. It is noted that copper concentrations only marginally exceed the derived pipe

concentration currently stated in the s127 application and the dilution factors used may still be too conservative. This is a matter still under discussion and on this basis no further action is required at this point.

The performance of the interceptor in the wash down area has also been assessed and it has been determined that the interceptor needs to be cleaned out more regularly. A maintenance schedule is currently being set up.

The next round of sampling is due in by the end of October.

## 4 CONCLUSIONS

---

- All results except for total petroleum hydrocarbons at both locations, exceed the current consent trigger levels. However these values cannot be assessed at face value as they do not account for dilution within the receiving environment.
- TSS results were relatively high and above consented limits but these are subject to reconsideration as part of the Section 127 application to vary conditions of consent. The organic component of the TSS (as measured by VSS) was consistent between the discharges (29% at MH1 and 27% at MH11) notwithstanding the significant contribution to TSS in the MH1 sample which appears to be sourced to Kaiti Road runoff.
- Compared to the proposed trigger levels all results except for total copper at MH1 are below the proposed trigger levels. The copper level at MH1 is slightly above the estimated concentration required after dilution (interim figure in the S127 application) in the mixing zone (2.4 times).
- Further investigations into the MH1 catchment Downstream Defender shows that TSS levels are increasing post treatment due to remobilisation of very fine particles.
- Particle size analysis shows that sediment in the site stormwater is predominantly less than 150 microns, and the Downstream Defenders are not able to effectively capture this fine particle size range.
- The penetration times of copper in relation to temperature has been investigated. It has been determined that temperature has no significant effect on the penetration times of copper.
- The interceptor in the wash down area will be cleaned more frequently.
- The next round of sampling will be collected by the end of October.



**Appendix A:**

**Sampling Locations**



**Appendix B:**

**Hill Laboratories Analysis Reports August 2015**



**Appendix C:**

**Hill Laboratories Analysis Report Particle Size**



**Appendix D:**

**Field Forms**



**Appendix E:**

**Southern Logyard Results**



### E.1 Southern Logyard Results

Summary table of results starting at Quarter 1 2015. Exceedance of the current triggers at MH1 and MH11 are shown in purple, and exceedance of the proposed triggers are shown in bold.

Parameter	Units	Trigger Levels For Assessing Effects			Quarter 1 (Jan/Feb/March)				Quarter 2 (Apr/May/Jun)					Additional	
					15 March 2015				23 May 2015					24 June 2015	
		Current trigger level (metals freshwater)	Trigger level (metals marine)	Proposed s127 trigger levels (marine with 20x dilution)	MH1 S1	MH1 S2	MH11 S1	MH11 S2	MH1	MH11	MH9	Post DSD	Kaiti Beach Road Catchpit	MH1	MH11
cBOD <sub>5</sub>	g/m <sup>3</sup>	30	30	NA	220	210	270	250	360	330	280	240	6	n/a	n/a
pH	-log(H <sup>+</sup> )	6.7-8.5	6.7-8.5	>6	6.3	6.4	6.3	6.3	6.8	6.5	6.6	6.4	8.0	n/a	n/a
TSS	g/m <sup>3</sup>	150	150	150 (median) 250 (95%ile)	80	75	65	67	990	540	440	400	360	2300	1520
VSS	g/m <sup>3</sup>	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	790	570
TPH	g/m <sup>3</sup>	15	15	15	<0.7	0.7	<0.7	<0.7	0.7	<0.7	2.5	<0.7	<0.7	n/a	n/a
Total Zn	g/m <sup>3</sup>	0.015	0.023	0.46	0.099	0.093	0.074	0.095	0.29	0.146	0.25	0.184	0.081	n/a	n/a
Total Cu	g/m <sup>3</sup>	0.0018	0.003	0.06	0.043	0.043	0.0083	0.0089	<b>0.090</b>	0.033	0.25	0.29	0.0105	n/a	n/a
Total Pb	g/m <sup>3</sup>	0.0056	0.0066	0.132	0.00180	0.00177	0.0028	0.0035	0.0172	0.0081	0.0095	0.0056	0.0054	n/a	n/a

Parameter	Units	Trigger Levels For Assessing Effects			Bimonthly (July/August)				
					10 August 2015				
		Current trigger level (metals freshwater)	Trigger level (metals marine)	Proposed s127 trigger levels (marine with 20x dilution)	MH1	MH11	MH9	Post DSD	Kaiti Beach Road Catchpit
cBOD <sub>5</sub>	g/m <sup>3</sup>	30	30	NA	360	400	250	320	18
pH	-log(H <sup>+</sup> )	6.7-8.5	6.7-8.5	>6	n/a	n/a	7.3	7.0	8.3
TSS	g/m <sup>3</sup>	150	150	150 (median) 250 (95%ile)	860	810	1130	430	1750
VSS	g/m <sup>3</sup>	-	-	-	250	220	n/a	n/a	n/a
TPH	g/m <sup>3</sup>	15	15	15	1.0	<0.7	<0.7	<0.7	<0.7
Total Zn	g/m <sup>3</sup>	0.015	0.023	0.46	0.21	0.26	0.35	0.148	0.37
Total Cu	g/m <sup>3</sup>	0.0018	0.003	0.06	<b>0.141</b>	0.052	0.192	0.197	0.038
Total Pb	g/m <sup>3</sup>	0.0056	0.0066	0.132	0.0138	0.041	0.0184	0.0074	0.025

