Appendix K:

Gisborne Wastewater Discharges to Rivers

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Attention: Wolfgang Kanz

Dear Wolf

Gisborne Wastewater Discharges to Rivers

Background

To prevent wastewater overflows from manholes and private property during heavy rainfall, Gisborne District Council (GDC) open designated scour valves to allow the dilute wastewater to discharge to local rivers. Consequently GDC are applying for resource consent to authorise these river discharges during rainfall events. To inform the consent application Assessment of Environmental Effects (AEE), river dispersion modelling is being undertaken by MetOcean under a separate GDC commission.

Inputs to the river dilution modelling are needed. These will be outputs from the Gisborne wastewater network hydraulic model being, overflow volume, duration, and peak flow rate from each of the designated scour valves for specific rainfall events as outlined below:

Scenarios Modelled

Two year and ten year Annual Recurrence Interval (ARI) rainfall events were modelled. The 2 year ARI represents the GDC DrainWise containment standard for zero overflows from the wastewater network. To achieve this containment standard GDC is targeting 85% removal of direct stormwater inflows to the wastewater network, as well as a number of network upgrades. The 10 year ARI event represents the building code design standard.

Model simulations were run without stormwater removal and network upgrades (Current) and with the stormwater removal and network upgrades (Future). Therefore a total of four scenarios were modelled being:

1. Current 2 year ARI (no stormwater removal or network upgrades)
2. Current 10 year ARI (no stormwater removal or network upgrades)
3. Future 2 year ARI (85% direct stomwater removal & upgrades to contain the 2 year ARI)
4. Future 10 year ARI (85% direct stomwater removal & upgrades to contain the 2 year ARI)

From experience of opening the river scour valves during storm events, GDC provided the following scours which were simulated as being open for 48h:

- 2 Year ARI Wainui Road (WNUISC119.2)
  Seymour/Turenne (SEYMSM015.2)
- 10 Year ARI Wainui Road (WNUISC119.2)
  Seymour/Turenne (SEYMSM015.2)
  Oak Street (OAK_SM070.2)
  Palmerston Road/Peel Street (PALMSN008.2)

Results

The modelled overflow volumes and durations for each scour valve are shown in Table 1.

Table 1 - Modelled Overflow Volumes and Durations

ARI (Yrs.)	Wainui Road		Seymour/Turenne		Oak Street		Peel Street/ Palmerston Road	
	Volume (m^3)	Duration (Hrs)	Volume (m^3)	Duration (Hrs)	Volume (m^3)	Duration (Hrs)	Volume (m^3)	Duration (Hrs)
2 Current	17,643	46	914	21	Scours not opened for event			
10 Current	17,849	47	1,710	29	1,358	29	25,782	47
2 Future	No Spill	N/A	No Spill	N/A	Scours not opened for event			
10 Future	1,545	28	No Spill	N/A	No Spill	N/A	8,010	28

Table 2 shows the peak instantaneous flows during the modelled discharges.

Table 2 - Modelled Peak Flows

ARI (Yrs.)	Wainui Road (L/s)	Seymour/ Turenne (L/s)	Oak Street (L/s)	Peel St/ Palmerston Rd (L/s)
Current 2 Year	145	23	N/A	N/A
Current 10 Year	162	25	31	110
Future 2 Year	N/A	N/A	N/A	N/A
Future 10 Year	56	N/A	N/A	79

Discussion

Significant discharges to the rivers occur from all open scour valves for the current 2 and 10 year ARI scenarios. There is only a minor increase in the discharge volume from Wainui Road for the 10 year ARI event. This is due to the Wainui scour valve operating at peak or throttled capacity regardless of the ARI. Consequently for the 10 year ARI, the increased flow travels to the Peel St/Palmerston Rd scour and discharges from there.

As expected, no discharges occur for the 2 Year ARI future scenario which confirms previous modelling undertaken. The river discharge durations range from 21h to 47h for the both current scenarios. These durations are both 28h for the Wainui Rd and Peel St/Palmerston Rd scours that discharge during the future 10 year ARI scenario.

There is a significant reduction in discharges volumes from all scour valves from the current to future 10 year ARI events, mainly associated with the 85% reduction in direct stormwater inflow. This emphasises the importance of implementation of the DrainWise Strategy.

Conclusion

The above results can be used as inputs for river dispersion modelling, either as discrete events or a number of events within a year to simulate a 'worst case' scenario. As the modelled river discharge durations range from 21h to 47h they will coincide with at least one low and high tide cycle.

Yours sincerely

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on behalf of

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