

Outline of Proposed Wastewater Treatment System for AFFCO Imlay and Land Meat

4 April 2017

Existing Treatment

AFFCO Imlay

Wastewater from AFFCO's processing operations is pumped through a Contra-Shear Milliscreen and then flows through a save-all tank. The wastewater solids removed by the screen are taken off-site by a contractor and composted.

The save-all tank settles out sand and grit, which is removed annually for disposal.

The save-all effluent discharges to a Whanganui District Council (WDC) sewer and flows to the Beach Road pump station. At the Beach Road pump station, AFFCO's wastewater is screened (again) together with the rest of the City's wastewater and pumped via a pipeline under the Whanganui River to the WDC's sea outfall pipe.

The discharge of the partially-treated (screened) wastewater to sea is temporary, and will largely cease once the WDC's new secondary treatment plant becomes operational.

Land Meat

As at Imlay, Land Meat's wastewater is screened to remove gross solids and then discharged to the WDC's sewerage network. Screenings are taken off-site by a contractor and composted.

Overview of Proposed New System

AFFCO proposes to install secondary wastewater treatment at the Imlay site to treat the combined wastewater from the AFFCO Imlay and Land Meat plants. This will include the installation of an effluent pipeline from Land Meat to Imlay.

The combined wastewater will be treated to a standard that would allow wastewater to bypass the WDC's proposed new wastewater treatment plant and be discharged directly to sea via the existing sea outfall. The WDC has agreed in principle to AFFCO using the outfall subject to the treated wastewater quality meeting the WDC's and Regional Council's discharge conditions.

The proposed new treatment system is based on the wastewater treatment system at AFFCO Wairoa, which has been operating since 1982. The new treatment plant will consist of a flow equalisation tank, reactors for coagulating dissolved solids in the wastewater using sulphuric acid and lime, and a gravity clarifier for separating the solids from the water. The solids will be dewatered and then taken off-site to be composted.

A new pipeline is proposed under the Whanganui river to enable AFFCO to discharge treated wastewater directly to the WDC's sea outfall.

After the treatment system has been commissioned, AFFCO and Land Meat will no longer discharge processing wastewater to the WDC's sewerage network. Amenities wastewater from plant kitchens, toilets and showers will continue to discharge to the network.

The design hydraulic loading on the new treatment system, after the balance tank, is 300 m³ per hour.

A schematic of the proposed on-site treatment system is shown in Figure 1. A site layout plan is attached in Appendix 1. Further details are summarised below.

Balance Tank

The 1,000 m³ balance tank will be approximately 13.5 m diameter and 9 m tall. The tank will provide flow balancing to the secondary treatment system, attenuation of effluent characteristics and contingency storage.

The tank will have a roof to contain any odour and the tank headspace will be ventilated to a biofilter.

The contents of the tank will be kept continuously stirred.

Imlay's wastewater will be pumped to the balance tank from the save-all tank. Land Meat effluent will be pumped separately into the tank.

Coagulation Reactors

Wastewater from the balance tank will be pumped to the first coagulation reactor at a controlled rate (based on the level in the balance tank), and then flow by gravity through the rest of the treatment system.

The first treatment step involves acidifying the wastewater to pH 3.0 with concentrated sulphuric acid. This process occurs in a continuously stirred reactor with pH monitoring and automatic acid dosing.

The second treatment step involves raising the pH with hydrated lime slurry in two stirred lime reactors operated in series. The pH is raised to 6.5 in the first lime reactor and to approximately pH 9.0 in the second lime reactor.

The sequential acidification and neutralisation process facilitates the removal of blood proteins that cannot be coagulated by acidification alone. The lime also assists in producing a floc with excellent settling and dewatering properties.

The total operating volume of the coagulation reactors will be up to 200 m³. The reactors will be enclosed and the headspace ventilated to a biofilter.

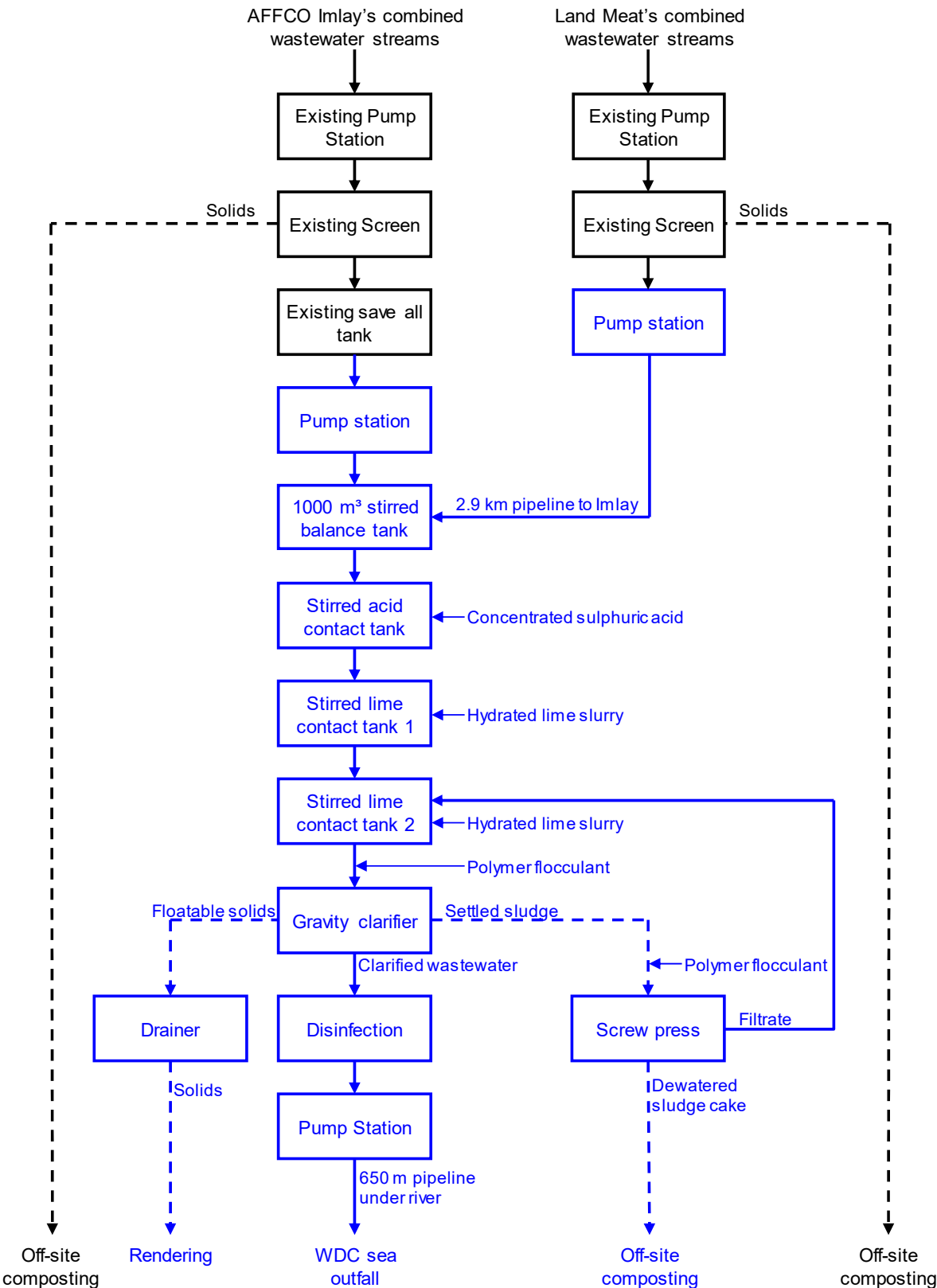


Figure 1.

Process flow diagram of proposed wastewater treatment for AFFCO Imlay and Land Meat. New components are highlighted in blue.

Flocculation and Clarification

After the second lime reactor, the coagulated solids will be flocculated with an acrylamide polymer and separated in a gravity clarifier with a diameter of 20 m.

Most of the solids will settle out in the clarifier and be pumped to the dewatering process.

Some fat particles will float to the surface. These particles will be collected by a scum skimming system, drained of excess water, and rendered.

The clarifier effluent will discharge to the disinfection process.

Disinfection

The treatment process will reduce numbers of pathogens and faecal indicator bacteria by at least 99%, but some additional disinfection will be required to meet consent limits for faecal indicator bacteria. The disinfection method is to be confirmed, but will most likely involve dosing the wastewater with chlorine dioxide solution in the disused save-all tank.

Final Pump Station and River Crossing

The treated wastewater will flow to an existing sump downstream of the save-all, from where it will be pumped via a new pipeline under the Wanganui River to the existing WDC ocean outfall pipe.

The proposed crossing consists of a new DN280 polyethylene pipe to be installed by directional drilling under the river at a depth of approximately 7m below the current river bed.

The pump station would contain duty and standby pumps. In the unlikely event of both pumps failing, the treatment process would automatically stop, with contingency effluent storage available within the balance tank and Imlay's effluent collection network.

Discharge Monitoring

The volume and quality of the wastewater will be monitored at the flume upstream of the pump station to verify compliance with discharge conditions.

Sludge Dewatering

Settled sludge pumped directly from the clarifier will typically have a dry solids content of 4-9%.

The sludge will be flocculated with acrylamide polymer and dewatered to 35-45% dry solids using two screw presses operated in parallel. For redundancy, each press will be sized to cope with the peak solids load, albeit with a reduced cake solids percentage.

It is proposed to locate the dewatering facilities in a building adjacent to the clarifier; and to raise the presses above the level of the coagulation tanks so that the filtrate can return by gravity to the second lime reactor.

The dewatering building may be up to 8 m tall.

Sludge Cake Handling and Disposal

Press sludge cake will discharge into a trailer/hopper and be transported to an off-site composting facility in 25-tonne truck and trailer loads, with up to two loads per day and 200 loads per year.

The trucks would enter and leave the site via the site entrance off Beach Road.

Odour Control

All stirred or agitated effluent and sludge vessels, including the balance tank and coagulation reactors will be enclosed and ventilated to a biofilter to control potential odour from these sources.

The dewatering process will operate at ambient temperature and, other than the cake discharge chute, be fully enclosed. Heat coagulation of the sludge before dewatering is no longer proposed, therefore avoiding the need to ventilate the dewatering facility to a biofilter.

Chemical Handling and Safety

Hydrated lime powder will be delivered to site in a tanker and stored in a 25 tonne silo. Lime slurry will be automatically produced on demand in a small mixing tank and pumped to the lime reactors.

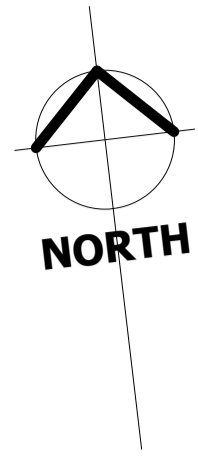
Concentrated sulphuric acid will be delivered in a bulk tanker and stored on site in a bunded tank with a volume of approximately 20 m³. Acid dosing will be via a bunded dosing pump.

Acrylamide polymer will be supplied and stored as powder in 25 kg bags, and automatically made up into a solution before use.

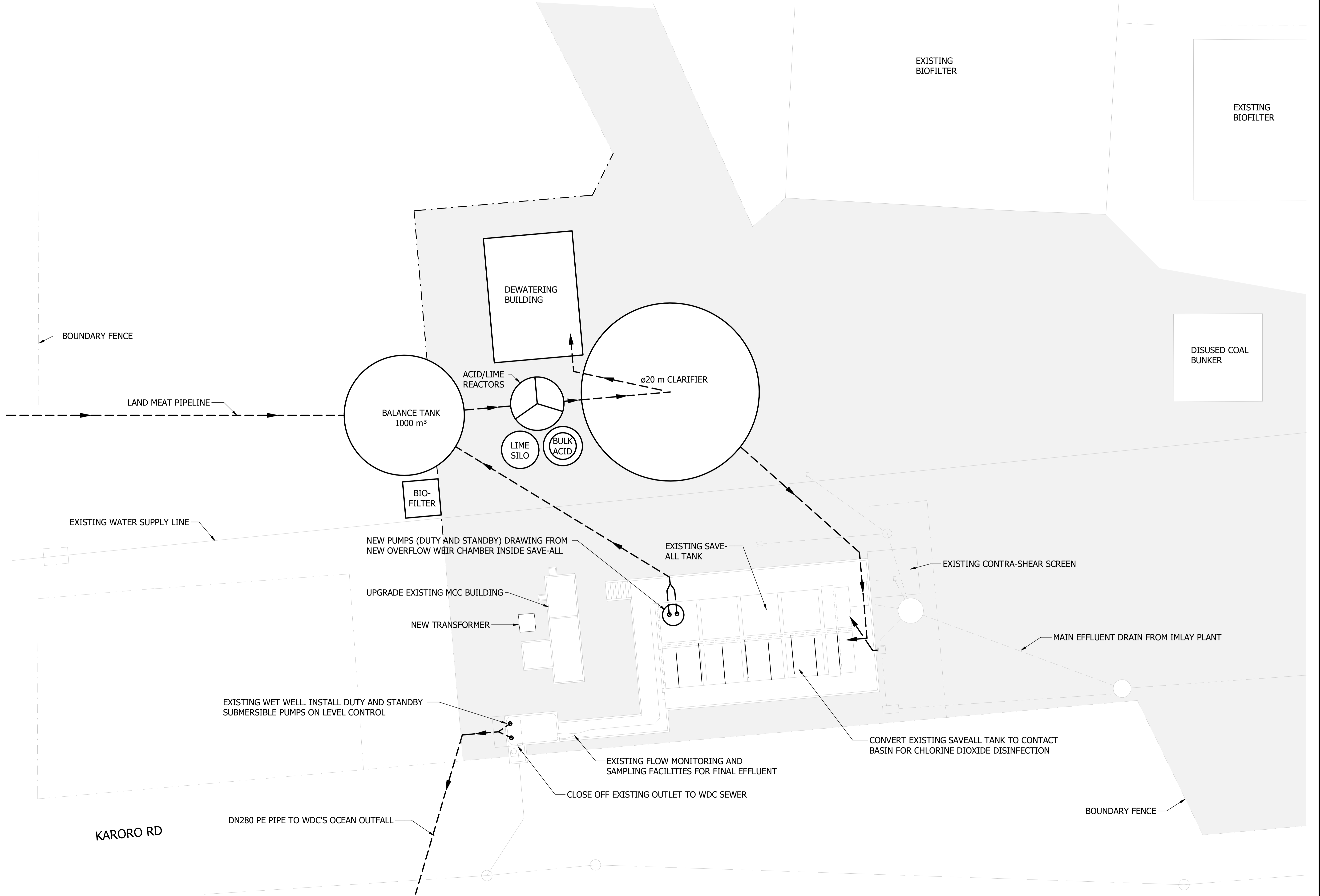
Safety measures will include an eye wash station, safety shower, and appropriate protective clothing and signage.

The secondary wastewater treatment and sludge handling facilities will be paved. All stormwater and wash-down water within this catchment will drain to the main Contra-Shear sump or save-all. This ensures that any effluent or chemical spills that are not contained at source would discharge to the wastewater stream, without any risk of entering stormwater or soil.

Appendix 1. Preliminary Site Layout Plan



BEACH RD



Client:

AFFCO NEW ZEALND LTD,
IMLAY PLANT, WANGANUI

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TREATMENT SYTEM

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