SECTION 3.0

SECTION 3.0
WASTE WATER PRETREATMENT PLANT

3.1 EXISTING PRETREATMENT PLANT

Waste water from the Maple Leaf Pork processing plant passes through the existing pretreatment plant just prior to leaving the Maple Leaf site. The existing pretreatment plant is located near the northern boundary of the Maple Leaf property, which is a common boundary with the site of Brandon's IWWTF. The existing pretreatment plant has been in operation since late August 1999. A process flow diagram for the pretreatment system is shown in Figure 3.1. There are opportunities for changes at the pretreatment plant that would simplify operation and maintenance and result in an increase in the quality of the recovered materials for rendering off site. However, the effluent quality from the pretreatment plant will not be significantly improved by these changes. Changes at the pretreatment plant may take place over time as the planning evolves and budgets are obtained in the future.

The existing pretreatment facilities were designed for a peak hourly flow of 7.0 m^3/min (1850 gpm) and an instantaneous peak flow of 10.5 m^3/min (2775 gpm). The same parameters have been applied as the new design parameters since adding a second production shift doubles the period of production flows and moves sanitation to the third shift. As a result, there is little change in the design flow rates, the production period just lasts longer. The design of the pretreatment units will continue to adequately pre-treat the waste water from a two-shift production.

The existing pretreatment plant receives waste water from one production shift and one sanitation shift at the pork plant by gravity where it enters three separate wet pits in series. The raw waste water is pumped by two submersible pumps in each wet well to one of three externally-fed rotating screens located on an elevated platform above the wet pits. Ultrasonic level sensors in each wet pit activate the pumps. Alternation of the lead pump is done manually. The screens are equipped with 1.0 mm openings for recovery of coarse solids. The screenings are directed into a trailer for hauling offsite for rendering.

After screening, wastes flow by gravity to three parallel-dissolved air floatation (DAF) units for recovery of grease and fine solids. The above-grade, rectangular stainless steel DAF units are each equipped with high-pressure recycle pressurization systems for floatation. Each DAF tank has effective dimensions of 14.3 m (46.9 ft) by 3.0 m (9.8 ft) wide. Bottom solids are augered to the influent end of each DAF tank where they are periodically blown down to a pair of stainless steel classifiers by a time clock-activated electric valve. Heavy solids from each classifier are deposited on a belt conveyor that dumps this material into the screenings trailer for offsite rendering.

Material floating on the surface of each DAF is skimmed with a chain and flight mechanism into a small hopper at the influent end of each DAF tank. DAF skimmings are pumped to a flocculation tube (also called windings) on the elevated platform near the rotary screens. A polymer makeup unit mixes water and a dry cationic polymer that is metered into the DAF skimmings as they enter the windings to flocculate the solids. The flocculated solids enter a Pieralisi decanter centrifuge, with the centrate discharged back to the middle wet pit, while the solids are discharged into a trailer for disposal by offsite rendering.

After screening and flotation, the pretreated waste water flows by gravity to a large, below-grade wet pit. An ISCO, Inc. refrigerated sampler is available to collect time-composited samples of the influent in the waste pit. Three Gorman Rupp T-8 pumps (two duty, one standby) are available to pump this waste water to the City of Brandon's existing IWWTF. Steam can be injected into the waste water by Maple Leaf during production days as necessary to maintain the required 30^{o}C waste water temperature in the effluent from the anaerobic lagoon at the City's treatment system. There is no temperature regulator to control the amount of steam injected, so steam is regulated manually.

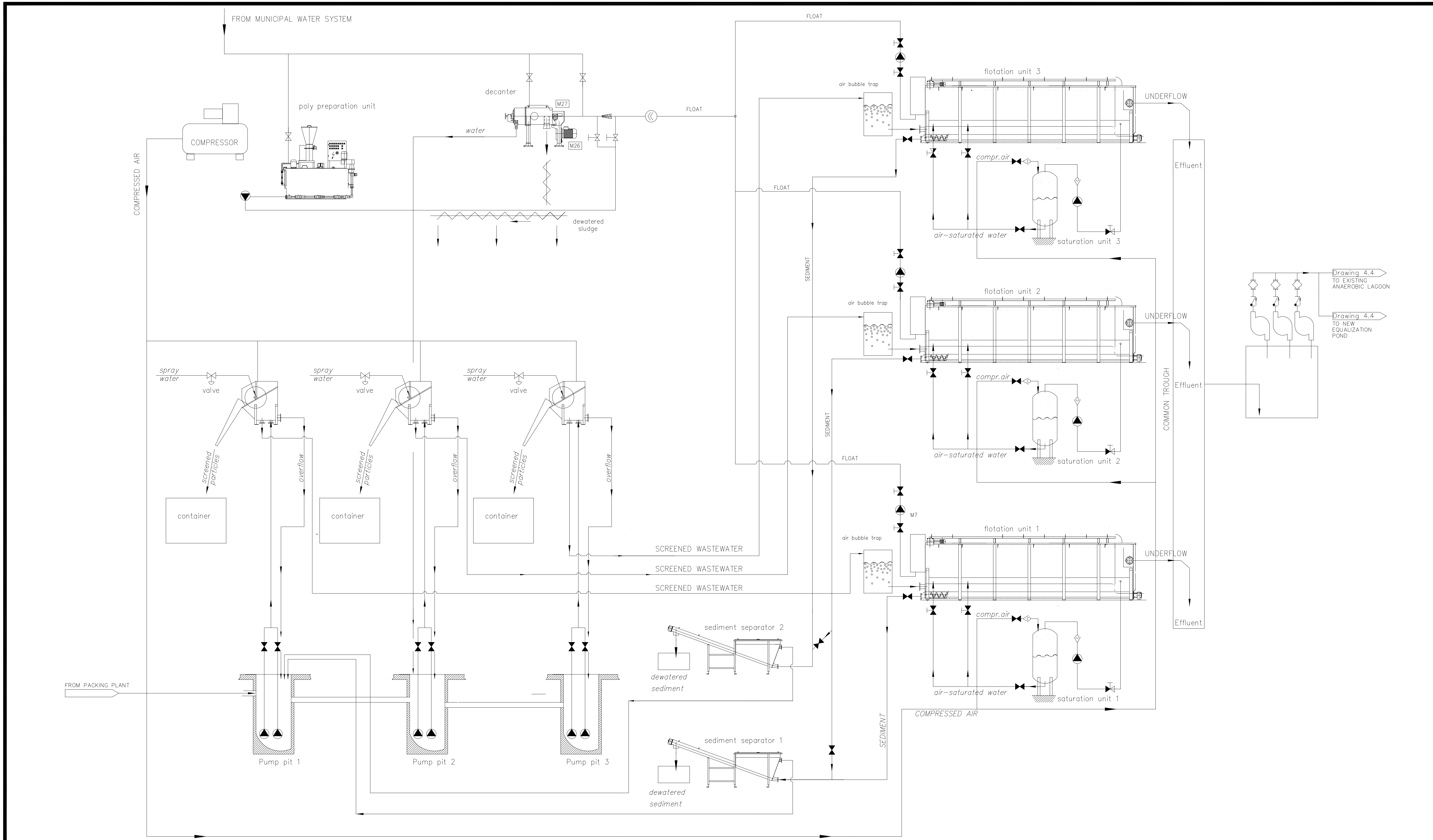
Waste water from the refrigerated-trailer wash facility on the Maple Leaf site flows by gravity to the influent wet pits for pretreatment. No livestock trailers are washed at this facility.

An estimated 138 m^3/day of sanitary wastes from toilets, urinals, lavatories, drinking fountains, the laundry, and cafeteria flow by gravity to the sanitary lift station located just west of the pretreatment building. This sanitary waste, from about 1460 plant personnel, is pumped with two submersible pumps from a wet pit to a screen for solids removal. After screening, the sewage enters a second pit where two submersible pumps lift the sewage to the anaerobic lagoon at the City's adjoining treatment plant. Flow of sanitary sewage is measured using an hour meter on the pumps.

The quality of the effluent from the pretreatment plant is the same as the influent to the IWWTF. The quality of this waste water can be found at the beginning of Section 4.0 – Expanded Industrial Waste Water Treatment Facility under the Introduction. The remainder of this section deals with the operational improvements to the existing pretreatment plant.

3.2 POTENTIAL PRETREATMENT IMPROVEMENTS

The existing pretreatment facilities were designed for a peak hourly flow of 7.0 m^3/min (1850 gpm) and an instantaneous peak flow of 10.5 m^3/min (2775 gpm). These are essentially the same parameters as the new design parameters since adding a second production shift doubles the period of production flows and moves sanitation to a third shift. As a result, there is little change to design flow rates; the production period just lasts longer. The design of the pretreatment units is essentially based on peak flow rates. Consequently, the existing



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Process Flow Diagram For Maple Leaf Pork Existing Pre-Treatment System

MAPLE LEAF FOODS INC.
ZENON Water for the World
HDR

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drawn: CB	project no.: 57730	
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pretreatment units will continue to pre-treat waste water from the two-shift production. There are numerous improvements that could be made to the existing pretreatment facilities, but these could be made irrespective of the second shift to minimize maintenance and operational problems or to improve the quality of the recovered materials for rendering. These operational improvements will have minimal impact on the quality of the pretreated effluent.

3.2.1 Pump Station and Piping Modifications

The three wet pits in the pretreatment building currently receive effluent from the processing plant. The original design placed these three pits in series; however, as a result the first pit receives the bulk of the load. It is planned to now isolate the third pit and operate the plant on two pits leaving the third as back up. This would tend to increase the velocity through the two pits and result in less settlement of solids, which currently have to be cleaned out periodically. The existing pumps will be replaced with pumps better suited to the application, two in each pit. Retaining the third pit will provide some flexibility to the operation of the wet pit system.

In future, all liquid pumped from the wet pits will feed into a common header and then into the screens in order to provide an even flow into each of the three new screens. Underflow coming off the screens will feed into a distribution hopper and from there the liquid will be directed equally to each of the three DAFs.

3.2.2 Screening

It is planned in the near future to replace the existing rotary screens with internally fed screen presses. The existing rotary screens have 1-mm-mesh openings that tend to pass about 40% of the solids. The new screens may have openings as small as 0.5-mm and will result in more solids going to rendering without first passing through the dissolved air floatation (DAF) units. These new screen presses will improve the quality of the waste water directed to the existing DAF units. This would improve the quality of the renderable material, but probably would not appreciably improve the quality of the DAF effluent.

3.2.3 Access to Elevated Screens, Centrifuge and Polymer Makeup Unit

The current access to inspect, maintain and operate the existing screens and centrifuge is by a long vertical ladder that is cumbersome and tiring. A staircase would make it easier to carry parts or other materials to enable good operation of these critical waste water pretreatment units.

3.2.4 Dissolved Air Flotation

Only minor operational changes are contemplated for the DAFs. Because waste water will enter the DAF on a near-continuous basis with two production shifts and a subsequent sanitation shift, the surface skimmers and bottom solids removal systems should be operated on a near-continuous basis during production days to remove the skimmings and bottom solids as they accumulate. Near-continuous removal minimizes the biological degradation of these materials and the resulting loss of soluble portions of these materials into the waste water. To minimize stirring up of the surface of the DAFs, the surface skimmers will be operated at their lowest speed.

3.2.5 Skimmings Handling

Currently, each DAF surface skimmer is turned off when the hopper is full. These hoppers are small and frequently limit operating time for the surface skimmers. This also requires switching back and forth between the three small hoppers to pump the skimmings to the existing dewatering centrifuge. Since the skimmings in the three different hoppers may be somewhat different in character, this complicates optimizing the polymer dosage and operation of the dewatering centrifuge. Skimmings will now be continuously pumped from the existing hoppers with new air-operated, double-diaphragm pumps equipped with flap valves. The flow rate for these pumps is easily adjusted and they can even run dry at times. In the future, skimmings may be pumped into a large, new stainless steel or glass-lined steel skimmings tank that will be equipped with a mixer to keep the contents homogenized. The existing progressing cavity skimmings pumps would be relocated to pump the skimmings from this new tank for further processing.

3.2.6 Pretreatment Sanitation

To encourage good sanitation in pretreatment, to minimize odours, and to aid in maintenance, one of the following may be installed: larger water heater, an in line steam mixer or a new sanitation water line from the packing plant to several locations in the pretreatment building. If so, one outlet will be located on the platform for the screens and centrifuge.

Much of the odour in the existing pretreatment building was due to old grease caked on the DAF units turning rancid. Grease accumulations along the top edges and other areas of the DAF tanks will be hosed off once each day. Once a month, at least one of the DAF tanks will be drained, thoroughly cleaned, and inspected. To simplify this effort, a new drain line with a valve was recently installed from the bottom of each tank to the effluent line.

3.2.7 Planned Additional Minor Changes to the Pretreatment System

In addition to the changes described previously, there are several minor changes contemplated over the next few years for the pretreatment building. The following minor changes are being contemplated:

- Construct a new electrical room within the pretreatment building.
- Remove the existing Stork Programmable Logic Control (PLC) system and replace with an Allen Bradley PLC.
- Provide a communication cable back to the powerhouse, so the pretreatment system can be monitored from the powerhouse.
- DAF skimmings may be processed centrifugly or through new screen presses.

3.2.8 Effect of Changes to the Pretreatment Plant

Changes to the pretreatment system as described above would be made to improve the ease of operation and maintenance of the facility or to improve the quality of the recovered material for rendering off site. These changes to the pretreatment plant would take place over time as the planning evolves and budgets are obtained in the future. Although there may be some minor improvements to the quality of the effluent leaving the pretreatment facility, the changes will be insignificant in the context of the quality of waste water presently discharged from the existing pretreatment plant. The intent of the changes is strictly as cited above and any minor improvements to the effluent quality would simply be an incidental benefit.

It is anticipated that the changes to the pretreatment plant will result in less risk of worker injury and easier handling of materials.