12.0 ASSESSMENT OF LEACHATE MANAGEMENT OPTIONS

12.1 Overview

Leachate treatment is required for the organics processing and disposal components of the proposed CRRRC. Leachate generated from the landfill component will be collected within the landfill and removed from the leachate collection system by pumping. Surplus liquid wastewater from organics processing will be collected. Both of these wastewaters will require management and treatment. Runoff from the compost pad may also be removed for treatment.

The methodology of assessing the leachate management options was as follows in accordance with the approved TOR:

- Screen potential on-Site leachate treatment technologies;
- Select preferred on-Site treatment option based on criteria including performance and cost-effectiveness;
- Identify potential off-Site leachate receiver/treatment alternatives that may include on-Site pre-treatment;
- Determine off-Site leachate receiver/treatment alternatives potentially available to Taggart Miller;
- Describe potential alternatives to convey leachate to available off-Site leachate treatment alternatives;
- Develop leachate management system options; and
- Compare on-Site and off-Site alternative leachate management options using the evaluation criteria provided in Appendix B of the TOR (Appendix A).

The complete assessment is provided in TSD #10. This corresponds to Task 5 of the methodology described in Section 2.3.

12.2 Estimated Wastewater Volumes and Quality

12.2.1 Wastewater Volumes

The leachate quantity from the landfill component was estimated using local climactic data and a predictive model as explained further in Volume III. The leachate generated will be approximately 20,000 cubic metres per year during the initial years and will increase to about 88,000 cubic metres per year by year 10. The leachate generated will continue to increase to a predicted maximum in the range of 230,000 cubic metres per year at the time of filling the last stage of the landfill component and post-closure.

The liquor produced from processing 50,000 tonnes per year of organics has been estimated to be 30,000 to 35,000 cubic metres per year. During the initial period of Site operations it is proposed to pre-process the organics and send the material to off-Site anaerobic digesters for final processing. The BioPower demonstration project will likely produce a limited amount of liquor which would be re-used in the process, if possible. Hence, during this time no liquor has been accounted for requiring treatment.

12.2.2 Wastewater Quality

The quality of leachate from landfills changes with time. Typically parameter concentrations increase as a landfill is filled and then decrease following closure as the parameters are washed out via precipitation or undergo decay or reaction. Peak parameter concentrations were estimated in TSD #10 using data from municipal waste landfills and from the Otter Lake Waste Processing and Disposal Facility in Nova Scotia. The municipal waste landfill data represents data from comparably sized municipal solid waste disposal sites, literature and the MOECC Landfill Standards (MOE, 1998b). The Otter Lake Facility data was used as this facility removes organics prior to disposal and would better represent the type of waste the CRRRC is anticipated to receive for disposal. The maximum parameter concentration from any of the sources was used for this analysis.

The organic processing liquor quality was estimated based on information from the literature. Generally speaking, the peak ammonia concentrations are higher, total phosphorus is comparable and biochemical oxygen demand (BOD) and metals are lower than what is predicted as maximum concentrations in the leachate.

Parameters in the liquor or leachate that will likely require treatment include: BOD, nitrates, nitrites, ammonia, unionized ammonia, phenols, total phosphorus, aluminum, arsenic, boron, chromium, cobalt, copper, lead, nickel, vanadium, zinc, iron and pH.

12.3 Screen and Select Preferred On-Site Treatment Technology

12.3.1 Available Treatment Technologies

Available on-Site treatment technologies that include a variety of approaches were reviewed. Approaches considered ranged from chemical and mechanical treatment systems to passive treatment systems. From the review it was clear that there are more options available for the removal of the primary parameters of concern that include oxygen demand, nutrients and solids, while there are fewer technologies that can treat metals and minerals to the PWQO criteria.

For treatment of oxygen demand, nutrients and solids (BOD, total suspended solids, ammonia and total phosphorus) the following processes were evaluated:

- Suspended Growth Biological Nitrification Processes:
  - Activated sludge
  - Oxidation ditch
  - Sequencing Batch Reactor (SBR)
  - Membrane bioreactor
  - Aerated lagoon
- Trickling Filter
- Rotating Biological Contactor (RBC)
- Aerobic Submerged Fixed Beds

- Aerobic Submerged Mobile Beds
- Recirculating Sand Filters
- Intermittent Sand Filters
- Constructed Wetlands
- Siemens PACT® System (Powder Activated Carbon Treatment combined with aerobic biological treatment step)

12.3.2 Comparative Evaluation of On-Site Treatment Technologies

The technologies were compared in a preliminary way considering their performance to treat BOD, TSS, ammonia and total phosphorus, as well as any other benefits or drawbacks as outlined in TSD #10. Biological treatment systems were found to be the most effective at removing high BOD and ammonia concentrations through nitrification processes; however to maintain healthy biological processes certain other compounds are required to be reduced (if found to be elevated to a point of creating toxic conditions) through chemical precipitation.

Biological systems have minimal effect on reducing phosphorus; therefore, chemical coagulants and filtration will be required. Filtration can be achieved by a diverse range of methods and approaches with varying degrees of performance and operational requirements.

The best available technology to reduce the concentrations of the remaining parameters of concern with regard to the PWQO criteria (where possible) was identified as reverse osmosis (RO), with a possible contingency of an ion exchange (IE) stage. Treated effluent would be stored in an on-Site holding pond prior to discharge to the municipal drain. Sludge management and waste liquid management are required to complete the treatment system.

The evaluation of the available treatment technologies to treat the primary parameters is summarized in TSD #10 where it was concluded that the following options would be most suitable for use as the main treatment stage:

- Activated Sludge – which would include:

Raw Wastewater → Equalization Pond → Activated Sludge Process (aerobic) → Clarifier → Chemical Precipitation/Filtration → RO → IE → Phosphorus Removal→ Effluent Holding Pond

- Sequencing Batch Reactor (SBR) – which would include:

Raw Wastewater → Equalization Pond → SBR Process → Chemical Precipitation/Filtration → RO → IE → Phosphorus Removal→ Effluent Holding Pond

- RBC – which would include:

Raw Wastewater → Equalization Pond → RBC → Denitrification Unit(s) → Clarifier → Chemical Precipitation/Filtration → RO → IE → Phosphorus Removal → Effluent Holding Pond

- Siemens PACT® (Powder Activated Carbon Treatment combined with aerobic biological treatment step) – which would include:

Raw Wastewater → Equalization Pond → PACT® → Chemical Precipitation/Filtration → RO → IE → Phosphorus Removal→ Effluent Holding Pond

These options were compared considering flexibility, reliability, ease of use, capital costs, operational costs and operation and maintenance as described in TSD #10 and shown in Table 12.3.2-1. The activated sludge and SBR are comparable in estimated capital cost; however, the Siemens PACT® system has higher annual electricity and chemical costs, which over the lifetime of the CRRRC increases the total investment. The SBR and activated sludge processes offer similar performance; however, the activated sludge process will produce larger volumes of sludge that require additional digestion and dewatering. The anaerobic stage in the SBR limits sludge production and reduces the anticipated volume of sludge that will require dewatering and disposal. The nature of the SBR sludge also requires less treatment. Additionally, the SBR is less sensitive to operational changes (quality and quantity) and more flexible in operating scenarios to optimize treatment compared to the activated sludge process.

12.3.3 Identify Preferred On-Site Treatment Approach

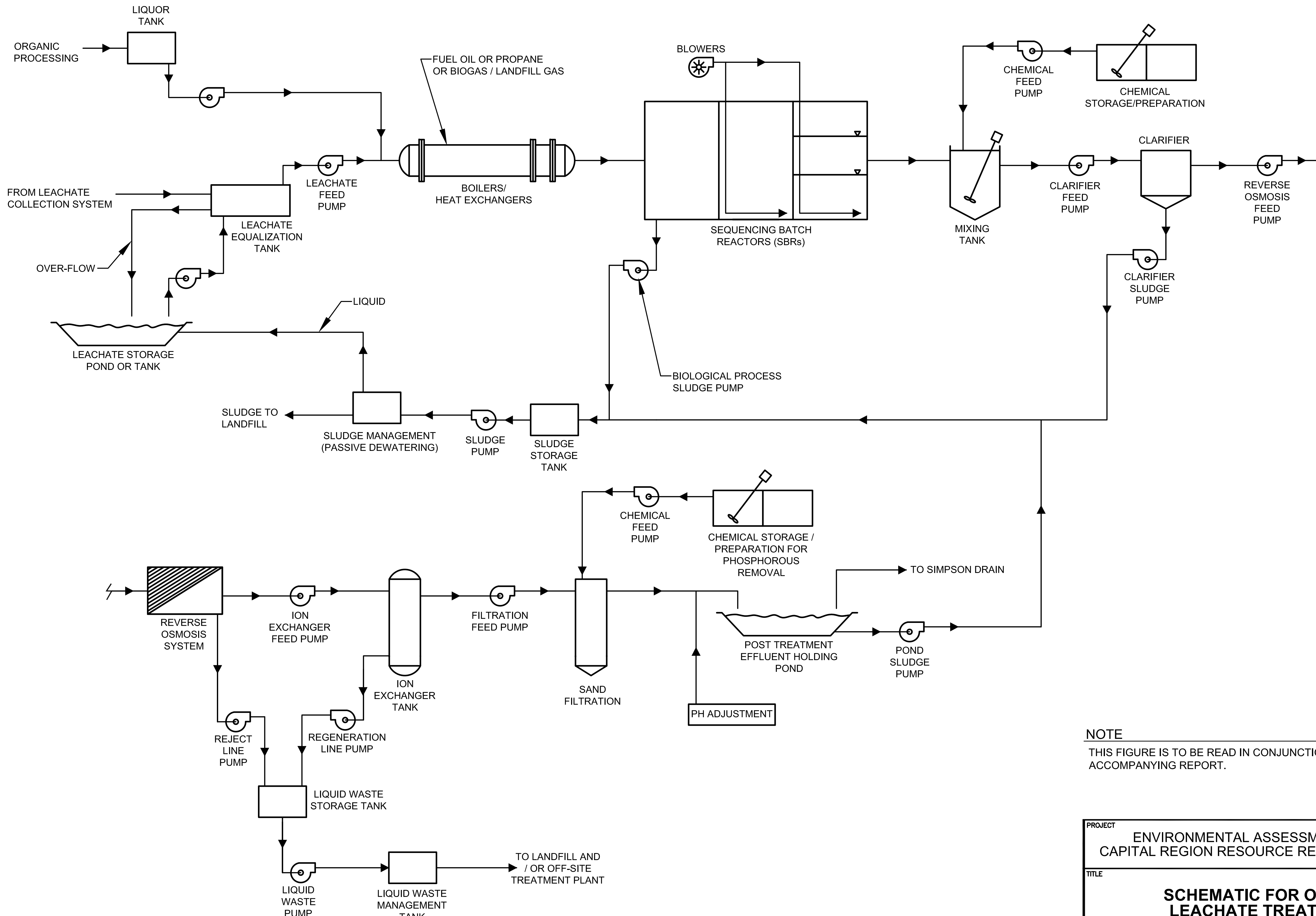
Based on this assessment, the SBR was identified as the preferred on-Site primary treatment approach. A flow diagram of the full on-Site treatment process is shown in Figure 12.3.3-1.

Table 12.3.2-1: Evaluation of Selected Leachate Treatment Systems

Criteria	Activated Sludge (AS)	Sequencing Batch Reactor (SBR)	Rotation Biological Contactor (RBC)	Siemens PACT® (Powder Activated Carbon Treatment combined with aerobic biological treatment step)
Flexibility	**Ranked 3rd because:** ■ May require adjustment to optimize treatment at different flow rates ■ May overcome increases in peak loadings ■ System can be expended by adding new AS units and clarifier	**Ranked 1st because:** ■ May require adjustment to optimize treatment at different flow rates ■ Susceptible to increases in peak loadings ■ Easier and less costly than the AS system to add additional treatment units to handle additional flow	**Ranked 4th because:** ■ Can handle flow changes ■ May be susceptible to increases in peak loadings ■ System can be expanded by adding RBC units	**Ranked 2nd because:** ■ May require adjustment to optimize treatment at different flow rates ■ Susceptible to increases in peak loadings ■ System can be expanded by adding new PACT® units and clarifier
Reliability	**Ranked 1st (tied) because:** ■ Aeration system and pump failure are only reliability concerns	**Ranked 2nd because:** ■ Restart of SBR would require a skilled operator (complex process control system) ■ Aeration system is equipped with jet aerators that allow mixing, self-cleaning and accessibility for maintenance. Pumps and automated switch failure are concerns	**Ranked 3rd because:** ■ Has a reputation for variable performance, sensitivity to variable inflow quality and weight imbalances causing rotating shaft damage ■ System upset would require cleaning discs and lengthy restart	**Ranked 1st (tied) because:** ■ Aeration system and pump failure are only reliability concerns
Ease of Use	**Ranked 3rd because:** ■ Requires regular maintenance of aeration system and the chemical addition system	**Ranked 4th because:** ■ Higher level of operation and maintenance required due to controls, aeration system, pumps, valves and automated switches	**Ranked 1st because:** ■ Minimal operation requirements	**Ranked 2nd because:** ■ Can be operated in continuous mode or SBR mode ■ In the case of SBR, higher level of operation and maintenance required due to controls, aeration devices, pumps, valves and automated switches

Criteria	Activated Sludge (AS)	Sequencing Batch Reactor (SBR)	Rotation Biological Contactor (RBC)	Siemens PACT® (Powder Activated Carbon Treatment combined with aerobic biological treatment step)
Capital Costs	**Ranked 1st (tied) because:** ■ Requires high efficiency aeration system ■ Continuous flow mode of AS requires external clarification stage following the AS unit ■ May require pre-treatment (chemical precipitation) ■ Requires equalization pond ■ Lower capital cost compared to Siemens PACT system but similar to SBR and RBC	**Ranked 1st (tied) because:** ■ Requires high efficiency aeration system ■ SBR does not require external clarification stage ■ May require pre-treatment (chemical precipitation) ■ Requires equalization pond ■ Lower capital cost compared to Siemens PACT system but similar to AS and RBC	**Ranked 1st (tied) because:** ■ Does not require aeration system but requires large motors for shaft rotation. ■ Requires external clarification stage ■ May require chemical precipitation treatment unit ■ Requires equalization pond ■ Lower capital cost compared to Siemens PACT system but similar to AS and SBR	**Ranked 2nd because:** ■ Requires high efficiency aeration system ■ SBR mode does not require external clarification stage ■ Continuous mode requires external clarification stage following the PACT unit ■ Requires equalization pond ■ Highest capital cost compared to the other options considered
Operational Costs	**Ranked 2nd because:** ■ Electricity is required for aeration system and pumps operating in continuous mode ■ Chemical cost to remove metals, non-biodegradable and toxic compounds prior to AS treatment unit ■ Requires heating of the AS tank to maintain optimal temperature (10-15ºC)	**Ranked 1st (tied) because:** ■ Electricity is required for pumps and blowers operating in intermittent mode (less electricity than continuous aeration systems) ■ Chemical cost to remove metals, non-biodegradable and toxic compounds prior to SBR treatment unit(s) ■ Requires heating of the SBR tank to maintain optimal temperature (10-15ºC)	**Ranked 1st (tied) because:** ■ Energy requirement for pumps and the shaft ■ Regular bearing maintenance ■ Requires heating of the RBC tank to maintain optimal temperature (10-15ºC)	**Ranked 3rd because:** ■ Electricity is required for pumps and blowers operating in continuous mode ■ Requires continuous addition of activated carbon (~ 220 kg/day) ■ Requires heating of the biological treatment unit to maintain optimal temperature (10-15ºC)

Criteria	Activated Sludge (AS)	Sequencing Batch Reactor (SBR)	Rotation Biological Contactor (RBC)	Siemens PACT® (Powder Activated Carbon Treatment combined with aerobic biological treatment step)
Operations and Maintenance	**Ranked 2nd (tied) because:** ■ Regular pump, blower and boiler maintenance ■ Sludge removal from AS treatment unit, chemical precipitation unit and clarifier on a regular basis ■ Plate air diffusers require shutdown and removal for cleaning and replacement	**Ranked 1st because:** ■ Regular pump, blower and boiler maintenance ■ Sludge removal from SBR treatment unit(s) and chemical precipitation unit on a regular basis ■ Less sludge volume from SBR treatment unit(s) compared to other selected options ■ Jet aerators are located above water for maintenance without shutdown and are self-cleaning	**Ranked 2nd (tied) because:** ■ Regular pump and boiler maintenance ■ Chemical cost to remove metals, non-biodegradable and toxic compounds prior to RBC ■ Sludge removal from RBC and chemical precipitation unit on a regular basis	**Ranked 2nd (tied) because:** ■ Regular pump, blower and boiler maintenance ■ Sludge removal from biological treatment unit, clarifier or SBR reactor and chemical precipitation unit on a regular basis ■ Plate air diffusers require shutdown and removal for cleaning and replacement
OVERALL RANKING	**2nd (TIED)**	**1st**	**3rd**	**2nd (TIED)**



NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

SCHEMATIC FOR ON-SITE LEACHATE TREATMENT

Golder Associates
Ottawa, Ontario

PROJECT No. 12–1125–0045			FILE No. 1211250045-V1-EAr-12.3.3-1.dwg	
DESIGN	I.T.M.	Nov. 2013	SCALE N.T.S.	REV. 0
CADD	M.L.F.	Nov. 2013	**Fig. 12.3.3-1**	
CHECK	P.L.E.	Aug. 2014		
REVIEW	P.A.S.	Aug. 2014		

12.4 Identify and Determine Availability of Off-Site Treatment Alternatives, Describe Alternatives to Convey Leachate and Develop Leachate Management System Options

12.4.1 Available Off-Site Treatment Alternatives

Based on available information, the following wastewater treatment facilities were identified for potential acceptance and treatment of wastewater from the proposed CRRRC. Information on these local municipal sewage treatment facilities is provided in TSD #10. The treatment facilities identified are as follows:

- Robert O. Pickard Environmental Centre (ROPEC);
- Embrun Sewage Treatment Facility;
- Russell Sewage Treatment Facility; and
- Village of Limoges Sewage Treatment Facility.

The ROPEC currently accepts leachate for treatment by agreement from three landfills (Waste Management's Ottawa landfill, BFI's Navan landfill, City-owned Trail Road landfill). The Trail Road landfill transports leachate by truck while the two private sites do so by forcemain into the City sewer system. ROPEC provides wastewater treatment for the City from residences, businesses and institutions as well as some industrial wastewaters under specific conditions. ROPEC is a large wastewater treatment facility that is operating well below its design hydraulic capacity. The landfills that send leachate to ROPEC do so under individual agreements with the City of Ottawa that generally have specific maximum concentrations for parameters of concern. Pre-treatment of the leachate is in some cases required to meet these limits, prior to discharging the leachate to the sanitary sewer or the plant headworks, but is dependent on the specific leachate characteristics and agreement requirements.

The Embrun, Russell and Village of Limoges wastewater treatment facilities all consist of lagoons and it is understood that future expansion is planned to accommodate anticipated population growth. The Embrun and Russell facilities are located within the Township of Russell and the Village of Limoges facility is located in the Township of Nation. The estimated CRRRC wastewater generation would represent a significant increase in loading in terms of the existing capacity and treatment ability of these facilities and would likely require modifications/expansion of some sort.

Based on the available information, and given that the proposed CRRRC is within City boundaries and will be servicing primarily City waste generators, ROPEC was therefore identified as the realistic and most appropriate off-Site wastewater receiver/treatment option for the proposed CRRRC. The City of Ottawa was accordingly consulted regarding this option. From those discussions the following conclusions were drawn:

- ROPEC is currently operating at well below its hydraulic capacity. The estimated wastewater quantity from CRRRC was discussed with City staff and it is very small compared to the available treatment capacity at ROPEC; and
- For ROPEC to accept wastewater from the CRRRC Site, the objective is to meet the Sewer Use By-law quality requirements. Certain parameters may be allowed to exceed and be subject to a surcharge cost. Methane, hydrogen sulphide and ammonia were highlighted as the parameters of greatest concern.

Based on the leachate and liquor quality estimates, in addition to the expected presence of methane and hydrogen sulphide, the following parameters are most likely to require pre-treatment:

Table 12.4.1-1: CRRRC Wastewater Parameters Likely to Require Pre-treatment

Parameters	City of Ottawa Sewer Use By-law Limits (mg/L)
BOD	300
TKN	100
Ammonia	--
Total Phosphorus	10
TSS	350
Aluminum	50
Cadmium	0.02
Copper	3

12.4.2 On-Site Pre-Treatment Technologies

Similar to the treatment options for full on-Site treatment described previously, high BOD and ammonia concentrations in the raw wastewater are the two main parameters of concern to comply with the City of Ottawa Sewer Use By-law (City of Ottawa, 2003b). The assessment used to evaluate on-Site treatment is also applicable for on-Site pre-treatment. The preferred pre-treatment technology is also identified as an equalization pond or tank(s), followed by the SBR system. Chemical precipitation may be required before the SBR system to reduce toxic conditions for biological removal, if they occur. The concentrations of the metals in the wastewater are expected to be below the By-law limits after discharge from the SBR system, eliminating the need for the RO → IE final treatment stages required for on-Site treatment. However, chemical precipitation is included as a contingency if the metal concentrations are found to be higher than the Sewer Use By-law limits. The effluent storage ponds or tanks will still be necessary and will be used to balance flows and provide storage for treated wastewater. The general process flow chart for on-Site wastewater pre-treatment is as follows:

Raw Wastewater → Equalization Pond or Tank(s) → SBR system → Chemical Precipitation of Metals (pH adjustment as required) → Effluent Holding Ponds or Tanks

The pre-treatment system will require sludge management similar to the on-Site treatment option.

Figure 12.4.2-1 shows the preferred on-Site pre-treatment system for subsequent off-Site treatment and disposal.

12.4.3 Leachate Conveyance Options

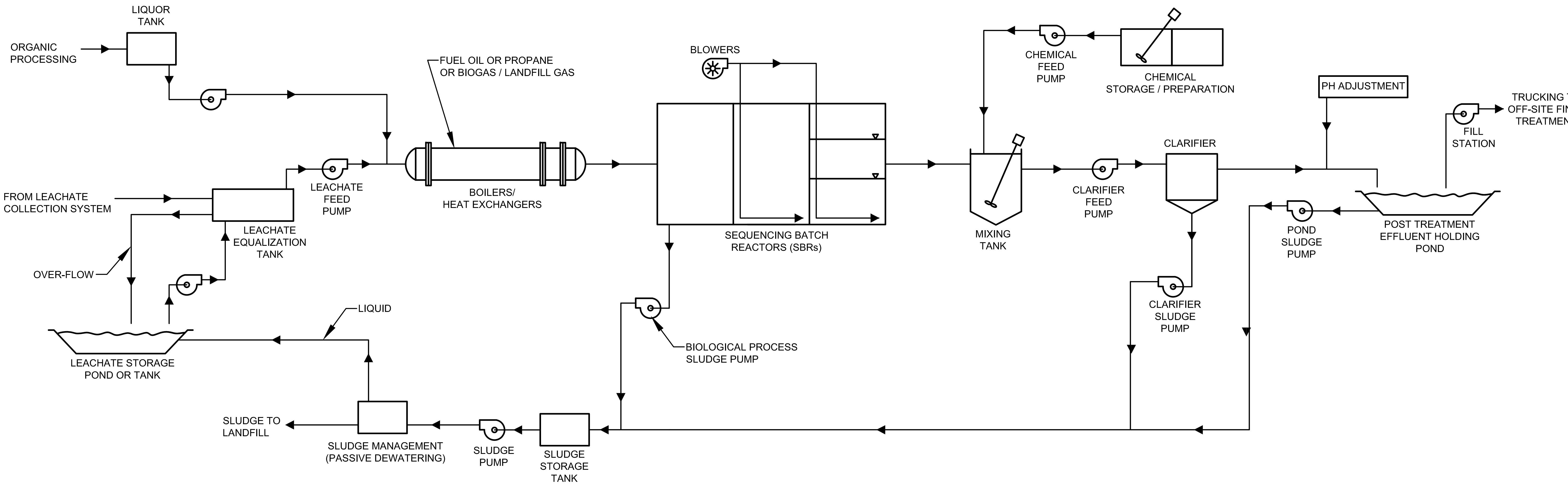
The two options available to convey pre-treated leachate from the CRRRC to ROPEC are: 1) tanker truck; and 2) a dedicated forcemain pipe to the City sanitary sewer system. As described in Section 12.4.1, both of these options are currently used to convey leachate from waste disposal facilities in Ottawa to ROPEC.

Based on consultation with the City of Ottawa, it is understood that the City would prefer the wastewater from CRRRC to ROPEC to be trucked, at least initially, so that information and assurance on leachate quantity and especially quality over time could be obtained. In view of the City's understood preference, the preferred method of conveyance is by tanker truck at this time.

The possibility of forcemain conveyance will be reconsidered in consultation with the City in the future, after leachate quality from the CRRRC over time is established and the requirements for and success of pre-treatment to meet City Sewer Use By-law requirements are established and confirmed.

12.4.4 Off-Site Leachate Management System Option

Based on the assessment of off-Site leachate receivers, the need for pre-treatment and the approach to convey leachate, the off-Site management system option proposed includes on-Site wastewater pre-treatment and off-Site delivery via truck for wastewater management at the City of Ottawa's wastewater treatment facility. A force main connection to the City system may be considered in the future.



NOTE

THIS FIGURE IS TO BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE CAPITAL REGION RESOURCE RECOVERY CENTRE

TITLE

SCHEMATIC FOR LEACHATE PRE-TREATMENT FOR CONVEYANCE TO OFF-SITE WASTEWATER TREATMENT PLANT

Golder Associates
Ottawa, Ontario

PROJECT No.	12-1125-0045		FILE No. 1211250045-V1-EAr-12.4.2-1.dwg
DESIGN	I.T.M.	Nov. 2013	SCALE N.T.S. REV. 0
CADD	M.L.F.	Nov. 2013	
CHECK	P.L.E.	Aug. 2014	Fig. 12.4.2-1
REVIEW	P.A.S.	Aug. 2014	

12.5 Comparative Evaluation and Identify Preferred Option

The comparison of the two identified wastewater management options, i.e., 1) on-Site treatment with discharge to the Simpson Drain, and 2) on-Site pre-treatment for off-Site treatment and disposal, considered the following environmental components as set out in Appendix B of the approved TOR:

- Atmosphere
- Geology and hydrogeology
- Surface water
- Biology
- Land use
- Traffic
- Technical effectiveness
- Regulatory approvability
- Capital and operating costs

Table 12.5-1 summarizes the comparison.

Table 12.5-1: Comparison of Wastewater Management Options

Environmental Component	On-Site Wastewater Treatment and Discharge to Simpson Drain	On-Site Wastewater Pre-Treatment and Off-Site Wastewater Management at City of Ottawa Wastewater Treatment Facility
Atmosphere – Odour	**Ranked 2nd because:** Treatment operations would have a greater number of more complex processes; hence potential odour generation is greater; disadvantage.	**Ranked 1st because:** Pre-treatment operations would have less complex processes; hence potential odour generation is less; advantage.
Atmosphere – Air Quality	**Ranked 2nd because:** Treatment operations would have greater number of more complex processes; hence potential air quality impacts are greater; disadvantage.	**Ranked 1st because:** Pre-treatment operations would have less complex processes, hence potential air quality impacts are less; advantage.
Atmosphere – Noise	**Ranked 1st because:** This option has more equipment, however does not require use of leachate transport vehicles; advantage.	**Ranked 2nd because:** This option has less equipment, however would require use of leachate transport vehicles; disadvantage.

Environmental Component	On-Site Wastewater Treatment and Discharge to Simpson Drain	On-Site Wastewater Pre-Treatment and Off-Site Wastewater Management at City of Ottawa Wastewater Treatment Facility
Geology and Hydrogeology – Groundwater Quality	**Ranked 1st (tied) because:** No predicted effect on off-Site groundwater quality; advantage.	**Ranked 1st (tied) because:** No predicted effect on off-Site groundwater quality; advantage.
Surface Water – Surface Water Quality	**Ranked 2nd because:** Although this option is designed to meet the PWQO within the receiving surface water course, there will still be a discharge to manage and monitor and some parameter concentrations will increase from the baseline conditions. Limited flow in the receiving surface water course to provide a mixing zone; disadvantage.	**Ranked 1st because:** No predicted effect on off-Site surface water quality. The surface water receiver for ROPEC provides a significant mixing zone and PWQO readily achievable in that receiver; advantage.
Surface Water – Surface Water Quantity	**Ranked 1st (tied) because:** This option would discharge to the Simpson Drain. The discharge quantity will be controlled and pre-development flows largely matched; advantage.	**Ranked 1st (tied) because:** This option would discharge to the Ottawa River and will have negligible effect on water quantity in the river; advantage.
Biology – Aquatic Biological Resources	**Ranked 2nd because:** Although this option is designed to meet the PWQO within the receiving surface water course, there will still be a discharge to manage and monitor and some parameter concentrations will go up from the baseline conditions; disadvantage.	**Ranked 1st because:** This option does not influence aquatic biological resources on or in the area of the Site and treatment of CRRRC wastewater by the City plant would not have any measureable effect on aquatic resources at that location; advantage.
Biology – Terrestrial Biological Resources	**Ranked 1st (tied) because:** No basis to distinguish the two options for this criterion as area in which facility will be located will be disturbed in any event: advantage.	**Ranked 1st (tied) because:** No basis to distinguish the two options for this criterion as area in which facility will be located will be disturbed in any event: advantage.
Land Use	**Ranked 1st (tied) because:** No predicted impact on off-Site existing or probable planned future land use; advantage.	**Ranked 1st (tied) because:** No predicted impact on off-Site existing or probable planned future land use; advantage.

Environmental Component	On-Site Wastewater Treatment and Discharge to Simpson Drain	On-Site Wastewater Pre-Treatment and Off-Site Wastewater Management at City of Ottawa Wastewater Treatment Facility
Traffic	**Ranked 1st because:** This option does not have trucks hauling wastewater; advantage.	**Ranked 2nd because:** This option has trucks hauling wastewater, which will generate additional Site-related traffic; disadvantage.
Technical Effectiveness	**Ranked 2nd because:** Full treatment required to meet the PWQO. Less flexible to variations in wastewater quality; disadvantage.	**Ranked 1st because:** Wastewater can be readily treated to meet Sewer Use By-law limits (City of Ottawa, 2003b). Not expected to adversely affect operation or performance of ROPEC; advantage.
Regulatory Approvability	**Ranked 2nd because:** This type of treatment system has been approved for the treatment of wastewater in the province of Ontario and has generally performed acceptably. However it will require greater regulatory scrutiny; disadvantage.	**Ranked 1st because:** Wastewater pre-treatment system readily approved. City treatment system already approved and in operation; advantage.
Capital and Operating Costs	**Ranked 2nd because:** Higher capital cost compared to the other option. Higher operational requirements and costs; disadvantage. Monitoring of discharge quality is required.	**Ranked 1st because:** Lower capital cost compared to the other option. Lower operational requirements and costs; advantage. Monitoring of discharge quality is required.
OVERALL RANKING	2nd	1st

The main advantages of on-Site pre-treatment and off-Site management at the City of Ottawa ROPEC facility, which also represent disadvantages for on-Site treatment and local discharge to the Simpson Drain are:

- The on-Site pre-treatment (only) process is less complex than full on-Site treatment;
- The Ottawa River is a preferable receiver for fully treated leachate compared to the Simpson Drain, which has a comparatively much lower flow regime and would be more susceptible to process upsets or unexpected variations;
- Expected more straightforward regulatory approvability due to simpler on-Site pre-treatment process, and an already approved City treatment plant at ROPEC that is already receiving landfill leachate from three disposal sites in Ottawa and performing acceptably; and
- Lower capital and operating costs.

The only disadvantage to the option of on-Site pre-treatment and off-Site management at the City of Ottawa ROPEC facility is the additional traffic associated with tanker trucks hauling the pre-treated CRRRC wastewater to ROPEC. The impact of this truck traffic was considered in the traffic assessment. A future forcemain to the City sewer system, if developed, would remove this disadvantage.

The preferred wastewater management option is therefore on-Site pre-treatment and trucking off-Site to ROPEC. .