

Our File/N/Réf. **50 14-93-0021V**
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DATE 20 October 1998

TO/DEST. Co-ordinator
 Planning and Environment Committee

FROM/EXP. Director Engineering Division
 Environment and Transportation Department

SUBJECT/OBJET **LEACHATE TREATMENT AND DISPOSAL OPTIONS**
 TECHNICAL REVIEW REPORT - SEPTEMBER 1998
 RESPONSE TO INQUIRY NO. P&E - 8 (98)

DEPARTMENTAL RECOMMENDATION

That the Planning and Environment Committee receive for information the Leachate Treatment and Disposal Options Technical Review Report, dated September 1998.

BACKGROUND

At the Planning and Environment Committee of 9 June 1998, Councillor McGoldrick-Larsen tabled an Inquiry (#8-98) dealing with the Trail Road Leachate Pipeline project. Specifically, her inquiry outlined the following issues for staff to examine and report back to Committee:

1. The original recommendation of piping the leachate, addressing the economics and environmental risks;
2. The timing of the expansion of the West Rideau Collector, examining the premise and the economics of moving forward with this capital project to permit the piping of leachate directly to this sewage line;
3. More detailed information regarding treatment on-site; and
4. Should the pipeline concept be reconfirmed, that a higher level of Environmental Assessment (EA) be carried out for the various pipeline routes.

DISCUSSION

At the Planning and Environment Committee meeting of 22 June 1998, staff responded to the McGoldrick-Larsen inquiry by proposing a two-stage approach. This report is to provide an update on our progress to date.

In stage 1, staff have carried out a peer technical review of the 1995 Leachate Management Study. The Executive Summary is attached as 'Appendix A'. This technical review updates the previous study with respect to new technologies which may have emerged for on-site treatment of leachate as well as to incorporate groundwater that has been contaminated with leachate from the old Nepean Landfill site. With completion of this assignment, in accordance with Committee direction, the study is to be tabled at Planning and Environment Committee and a public meeting is to be held in Barrhaven to provide an opportunity for public comment on the technical review. Upon completion of public consultation of the technical review, staff will summarize the findings in a report to Committee and also address the stage 2 components of the inquiry (i.e. items 1, 2 and 4).

CONSULTATION

A meeting has been scheduled for 3 November 1998 as part of the public consultation process on this report. Staff will record the comments received and issues raised at this meeting. These will be summarized in a report to Committee along with a recommended process to be followed in finalizing the preferred conveyance and/or treatment option.

*Approved by
J. Miller, P.Eng.*

TW/ln

Executive Summary

Background

The Region of Ottawa-Carleton (The Region) operates the Trail Road Waste Facility in the City of Nepean, Ontario. The Trail Road Waste Facility began receiving municipal solid waste from surrounding communities in about 1980, and presently operates under Certificate of Approval A461303, issued on April 14, 1992.

Concerns about the eventual build-up of leachate within the landfill and of potential ground water contamination led to the design and construction of a leachate truck loading facility to remove the leachate from the site. Beginning in 1996, leachate from the Trail Road Waste Facility has been hauled to the Robert O. Pickard Environmental Centre (ROPEC) for treatment and disposal.

A 1995 Leachate Management Plan for the Trail Road Waste Facility recommended the periodic removal of leachate to a central sewage treatment plant (ROPEC) through a dedicated pipeline to the existing sanitary sewer system.

In addition to the Trail Road Waste Facility, The Region is also responsible for the management of the closed Nepean Landfill Site. The 1996 Nepean Landfill Bufferlands Assessment recommended the construction of an engineered groundwater collection system for the closed landfill, with the leachate-contaminated groundwater and the surface water from the Goldie Mohr pond to be treated in a constructed wetland. Subsequently, it was determined to be more cost-effective to transfer the leachate-contaminated groundwater and surface water via pipeline to the Trail Road Waste Facility, where it would be combined with the Trail Road leachate and piped to the Region's sanitary sewerage system for ultimate treatment and disposal.

However, prior to pipeline construction, a public meeting was held to discuss the proposed pipeline route. As a result of comments received at that meeting, The Region decided to obtain an independent review of the recommended solution in the Leachate Management Plan.

This report describes the background, objectives, methodology, results and recommendations of CH2M Gore & Storrie Limited's evaluation of treatment technologies for leachate from the Trail Road and Nepean Landfills in the Regional Municipality of Ottawa-Carleton.

Study Objectives

The objectives of the study were to:

- Identify any “new technologies” for the treatment of leachate and leachate-contaminated groundwater, particularly on-site alternatives; evaluate their suitability for use at the Trail Road site; and determine their related costs.
- Assess the evaluated alternatives for treatment of excess leachate outlined in the 1995 Leachate Management Plan for the Trail Road Waste Facility. Identify the appropriateness of the preferred alternative for Trail Road, for the management of contaminated ground and surface waters from the Nepean site.
- Document the findings and recommend a course of action in a report suitable for Regional use in further Environmental Assessment activities.

Study Approach

The study approach followed that of the Class Environmental Process. First, the problem was defined in terms of leachate quantity and quality characteristics and the on-site concerns. Criteria were then developed for use in the evaluation of leachate treatment and disposal alternatives. Leachate treatment and disposal technologies were identified and described, under two categories: Off-site Treatment technologies and On-site Treatment technologies. On-site alternatives included those with a surface water discharge, those with land based discharge, and those with zero discharge potential. On-site treatment technologies were further classified as natural treatment systems, biological engineered treatment systems, and physical/chemical treatment systems.

The technical evaluation of the alternatives for leachate treatment was carried out in two stages. First, an exhaustive list of potential technologies and practices was compared to a set of “Pre-Selection Criteria”. The preferred alternatives from this screening process were then developed into complete treatment technology train options and evaluated in more detail. The preferred option was then selected through the use of a risk management assessment, and the development of a weighted matrix using project specific selection criteria. Risk management considered public health and safety, natural environment, social environment and technical considerations. The weighted matrix also included economic criteria.

Pre-selected Options

The pre-selection process identified certain technologies including some from each of the three categories as being unsuitable for further consideration for Trail Road. Reasons for their exclusion included inadequate site/soil conditions, need for detailed site specific testing to confirm applicability of technology, lack of regulatory acceptance for this application, cost-effectiveness, and non-applicability to the specific characteristics of the Trail Road leachate.

The pre-selection process led to the development of eight treatment train options for detailed evaluation. Four were dependent upon a receiving water based effluent discharge (Jock River); one

with land based effluent discharge (spray irrigation on poplar forest); one with combined land based and receiving water based discharge (Snowfuent™); one with zero discharge potential (LFG evaporation); and two off-site options (pipeline to ROPEC with and without pre-treatment).

The pre-selected technology treatment trains were identified as:

1. On-site combined physical/chemical and combined biological leachate treatment with effluent disposal to Jock River
2. On-site combined physical/chemical and activated sludge/membrane leachate treatment with effluent disposal to Jock River
3. On-site combined physical/chemical and biological/membrane (ZenoGem) leachate treatment with effluent disposal to Jock River
4. On-site physical/chemical treatment and storage with effluent spray irrigation to poplar forest
5. On-site physical/chemical treatment with lagoon storage/treatment and Snowfuent™ with effluent disposal to land and the Jock River
6. On-site combined physical/chemical and LFG evaporative treatment with zero discharge potential
7. Off-site conveyance of leachate to the ROPEC for treatment and disposal.
8. On-site pre-treatment and off-site conveyance to the ROPEC for final treatment and disposal.

Preferred Option

The matrix selected preferred option is Off-site Activated Sludge Process Treatment and Disposal of both the leachate from the Trail Road Waste Facility and contaminated ground and surface water from the Nepean Bufferlands at the ROPEC. Conveyance by pipeline is preferred to that of truck haulage on the basis of public health and safety, environmental impact and technical considerations.

On-site pre-treatment of the Trail Road leachate prior to conveyance is an alternate option to alleviate the concerns of the public with respect to the conveyance of raw leachate. Another alternative of alleviating public concerns is to construct the forcemain using a double walled pipe with provision for leak detection. Either alternative would considerably increase the capital and operating costs of the system.

Capital and annual operating costs for the preferred option have been estimated at \$2.1 million in capital and \$100,000 in operating costs for an amortized capital and operating cost of \$4.75 per cubic meter of leachate.

Pre-treatment is expected to increase the capital and operating costs to \$3.9 million and \$200,000 respectively, for an amortized capital and operating cost of \$8.20 per cubic meter of leachate.

It should be noted that these costs are ballpark only and were developed for comparative purposes only. A more detailed assessment of individual pre-treatment component capital and operating costs would be required to develop budget estimates for the pre-treatment option. The capital costs for the pumping station and forcemain were provided by The Region.

The capital and operating costs are based on an anticipated average leachate flow rate of 185 cubic meters per day. The capital costs will not be affected by moderate variations in leachate quantity. However variations in both leachate quantity and quality will be reflected to some extent in operating costs both for pre-treatment (i.e.: energy, chemicals and sludge management in the pre-treatment option), and for pumping energy in both options.

Recommendations

It is recommended that The Region implement a public consultation and education program that stresses the public health and safety, social, environmental and economic advantages associated with the off-site treatment and disposal of Trail Road leachate and Nepean Bufferlands contaminated ground and surface water at the ROPEC.

It is recommended that The Region consider pre-treatment of Trail Road leachate as required to alleviate the concerns of the public with respect to the conveyance of raw leachate to the ROPEC.