Richmond Sanitary Landfill Site
OS-08-570-13-OS

Monitoring Report No. 24

Part of Lots 1, 2, and 3, Concession IV

Township of Richmond

County of Lennox and Addington

Prepared for:
Waste Management of Canada Corporation
1271 Beechwood Road
NAPANEE, ON K7R 3L1

Prepared by:
GENIVAR Inc.
945 Third Avenue East, Suite 212
Owen Sound, Ontario N4K 2K8

Project No. 081-12459-00

GENIVAR

OS-08-570-13-OS

March 29, 2011

Mr. Randy Harris, Landfill Manager,
Waste Management of Canada Corporation
1271 Beechwood Road
RR#6
Napanee, ON K7R 3L1

Re: Richmond Landfill Site
Annual Monitoring Report #24

Dear Randy:

We are pleased to provide Monitoring Report #24 in accordance with the conditions of the Provisional Certificate of Approval.

Please find enclosed **nineteen (19) copies** for your distribution as you see fit. **Two (2) copies** should be provided to the Ministry of the Environment, **one (1) copy** to Wayne Jenken, retain **one (1) copy** for your records, and the remainder can be distributed as needed at the landfill. If you require additional copies, please let us know.

We trust the enclosed is satisfactory. However, if you have any additional questions, please do not hesitate to contact the writer.

Very truly yours,

GENIVAR Inc.

Jeff E. Armstrong, P.Eng.
Designated Consulting Engineer
Director, Solid Waste Management
JEA/bdl
Encl.

cc: Mr. Wayne Jenken, Area Landfill Engineer, Waste Management of Canada Corporation

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1.0 Introduction

This monitoring report for the Waste Management of Canada Corporation (WM) Richmond Landfill site is prepared to comply with part of the Conditions of Provisional Certificate of Approval (C of A) No. A371203 dated March 30, 1988 and Certificate of Approval of Industrial Sewage Works No. 5268-7E8LJW dated August 19, 2008. This report was prepared following a field survey on November 3rd, 2010, site inspections and discussions with management.

On March 31, 2010, the Ministry of Environment issued Notice 5 to amend C of A No. A371203. The amendment approved the closure plan for the site, but also revoked and replaced several conditions of the C of A, including Condition 9, which formed the basis for previous annual monitoring reports. As a result of the amendment, this report has been prepared to satisfy Conditions 9(b), (c), (e) and (f) of the C of A in effect from January 1, 2010 to March 31, 2010 (referred to hereafter as the "former" C of A), and Conditions 9(a) and (b) (i through xxv) for the amended C of A in effect from April 1, 2010 to December 31, 2010 (referred to hereafter as the "existing" C of A). A separate monitoring report prepared by Water and Earth Science Associates Limited (WESA) addresses the items covered by 9(a) and (d) of the C of A in effect from January 1, 2010 to March 31, 2010.

Condition 10(4) (a), (b), (c), (d), (e), (f), (g) and (h) of Certificate of Approval for Industrial Sewage Works No. 5268-7E8LJW have been addressed in this report.

All amendments for the Certificate of Approval No. A371203 are contained in **Appendix A** of this report. The most recent amendment, dated March 31, 2010, contains the following updates:

March 31, 2010 Amendment (**Appendix A.1.6**)

> Imposed Condition 35, revoked and replaced Conditions 6, 8, and 9, and 14 through 28, revoked Condition 30, and added Conditions 36 through 140. This amendment accepted the final closure plan for the site, and imposed new conditions regarding operations during the remaining site life, date of site closure, capping schedules, monitoring and reporting requirements, and the establishment of a Public Liaison Committee. The amendment also requested an updated financial assurance plan, including contaminating lifespan, groundwater, odour, and surface water monitoring plan, groundwater and surface water impact plan, a quality assurance/quality control plan for placement of the final cover material, and details regarding the proposed reconstruction of the compost pad and pond.

The following other Certificates of Approval concerning the site are included in **Appendix A**:

- Certificate of Approval (Sewage) No. 3-1720-90-916 (Leachate Treatment and Disposal by Spray Irrigation) dated September 4, 1991 (**Appendix A.2**).

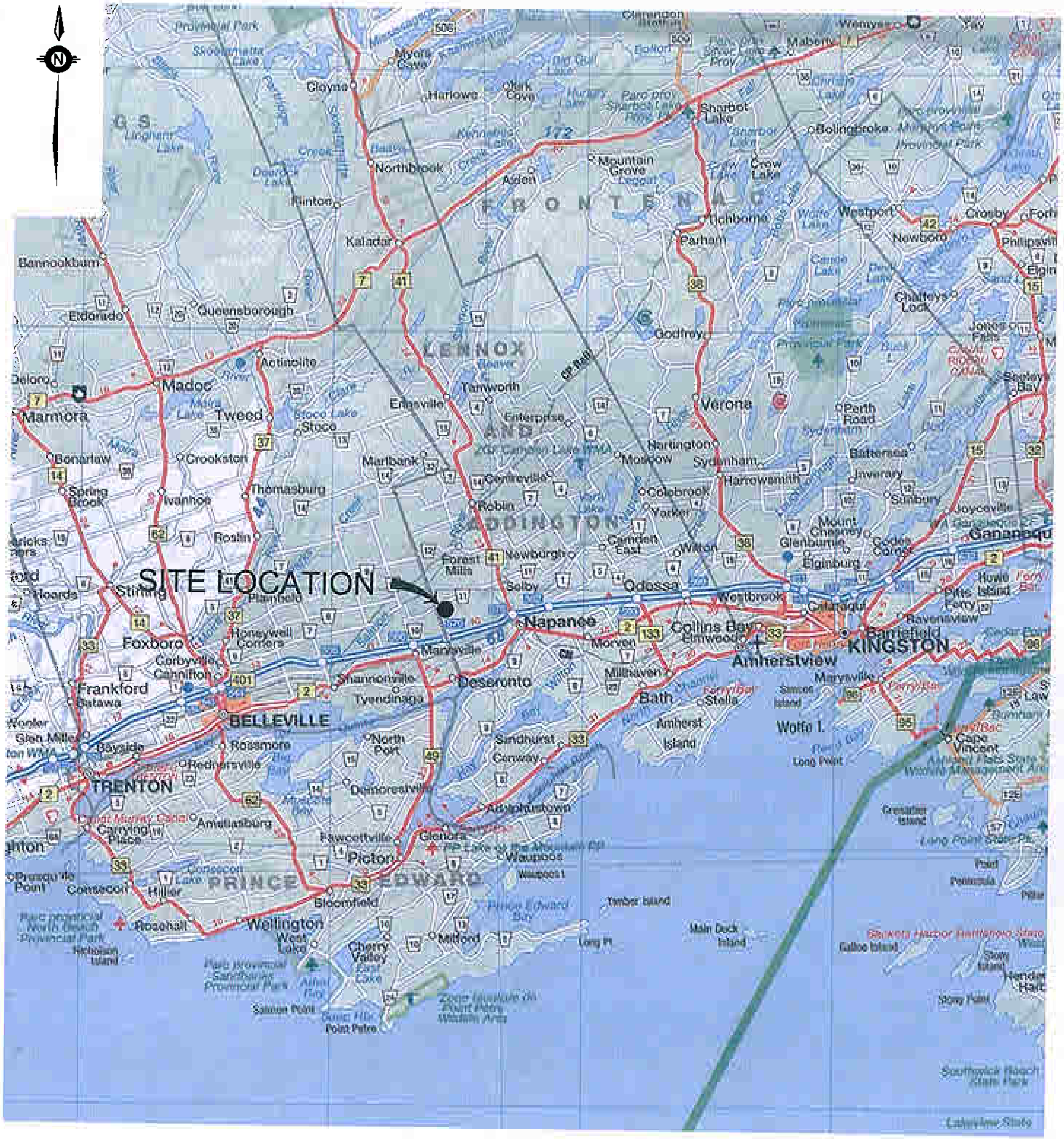
- Certificate of Approval (Air) No. 8-4028-92-006 (Spray Irrigation System) dated March 11, 1992 (**Appendix A.3**)

- The new Certificate of Approval Number 5268-7E8LJW dated August 19, 2008 is found in **Appendix A.4**, outlining the requirements for the operation of the leachate and stormwater management systems.

- Certificate of Approval for a Waste Disposal Site No. A710003 (Soil Recycling) dated December 20, 1993 (**Appendix A.5**).

- Certificate of Approval (Air) No. 8-4078-99-06 (Gas Flare System) dated December 21, 1999 (**Appendix A.6**).

The site location can be seen in the following **Figure 1.1**.



G:\1085\8570\DRAWINGS\2011\8570-F1-GENIVAR.dwg PLOTTED Wednesday, March 30, 2011 11:24:40 AM

SHEET 1.1	DWN BY: T C G DATE: MAR 2004 CHK BY: J E A SCALE: SEE BAR SCALE WASTE MANAGEMENT OF CANADA CORP. DRAWING NO. 0857013 – F1.1	SITE LOCATION PLAN RICHMOND LANDFILL	WM WASTE MANAGEMENT	GENIVAR 945 Third Ave E, Suite 212, Owen Sound, ON, N4K 2K8 Telephone: (519) 376-7612 / Fax: (519) 376-8008 Toll Free: 1-888-376-7612

2.0 Previously Submitted Reports

Several reports have been completed and filed with the Ministry of the Environment in compliance with requirements of the Conditions of the Provisional C of A. Those prepared by GENIVAR Inc. (formerly Henderson Paddon and Associates Limited.) are as follows:

Monitoring Report No. 1, March 1988

1987 Annual Monitoring - Complying with Conditions 10(b), 10(c), and 10(e) of the C of A dated August 11, 1987.

Final Design Report, September 1988

Complying with Conditions 2(a) and 11(a) of the C of A dated August 11, 1987, (Condition 2(a) and 10(a) of the C of A dated March 30, 1988).

Application for the Approval of Sewage Works for the Leachate Collection and Treatment Facilities, October 1988

Monitoring Report No. 2 to 23

1998 to 2009 Annual Monitoring Reports - Complying with Conditions 9(b), 9(c), 9(e), and 9(f) of the C of A dated March 30, 1988.

Clay Liner – Design Construction and Testing, October 1989

Complying with Condition 2(b) of the C of A dated March 30, 1988.

Condition No. 7 Report, December 1991

This report was prepared and filed on December 31, 1991 by Laidlaw in connection with requirements of Certificate of Approval (Sewage) No. 31720-90-916.

Condition No. 29 Report, December 1991

This report was prepared and filed on December 31, 1991 by Laidlaw in connection with requirements of Certificate of Approval No. 19-371203 dated September 4, 1991.

Development & Operations Report

Report dated March 1996, to comply with Condition 2(a) of the C of A and as requested in the Amendment to the C of A on August 1, 1995.

Final Closure Plan

Final Closure Plan dated June 2007, was submitted to satisfy Condition 34 of the C of A that required a detailed closure plan pertaining to the termination of the landfill site, post closure inspection, maintenance and monitoring, and end use.

Construction Quality Assurance/Construction Quality Control (CQA/CQC) Plan for the Final Cover System

CQA/CQC Plan dated June 25, 2010, to comply with Condition 6(b) of the amended C of A issued March 31, 2010.

Odour Monitoring Plan

Submitted June 25, 2010 as part of the Environmental Monitoring Plan (EMP) prepared by WESA, to satisfy Condition 8(d) of the amended C of A.

Financial Assurance Update

Revised Financial Assurance Plan dated June 25, 2010, to satisfy Condition 19 of the amended C of A.

Operations and Procedures Manual

Updated Operations and Procedures Manual, dated June 25, 2010, to satisfy Condition 66 of the amended C of A.

Leachate Collection System Contingency Plan

Dated June 25, 2010, to satisfy Condition 84 of the amended C of A.

Landfill Gas Collection System Contingency Plan

Dated June 25, 2010, to satisfy Condition 88 of the amended C of A.

Design of Low Permeability Surface and Low Permeability Liner for Compost Pad and Pond

Dated June 25, 2010, to satisfy Conditions 138 and 139 of the amended C of A.

3.0 Reporting Requirements – Certificate Of Approval No. A371203

3.1 Monitoring Data Results and Interpretative Analysis

This condition, listed as 9(a) in the former C of A, and 9(b) (i) in the existing C of A, requires that all leachate, groundwater, surface water and landfill gas monitoring results be provided in the annual report, along with an interpretative analysis of the results and an assessment of the need to amend the current monitoring programs.

This information has been provided by WESA under separate cover.

3.2 Assessment of Engineered Facilities, Design and Operation of the Site, and Adequacy of, and Need to, Implement Contingency Plans

Condition 9(b) (ii) in the existing C of A requires an assessment of the operation and performance of all engineered facilities. The following describes the facilities reviewed and the assessment completed.

3.2.1 Landfill Mass

The existing landfill mass was reviewed for slope stability, areas of settlement, integrity of the final cover, vegetation, leachate and gas seeps, and areas requiring remediation. The landfill slopes are regularly reviewed by WM, and were inspected in the past year by GENIVAR. No areas were discovered with slope instability, and settlement is still occurring mainly in the higher elevations of the landfill. The landfill final cover was inspected, and leachate seeps were repaired as found, and regular surface emission surveys were used to locate weak areas on the final cap. During the last year, final cover material was placed on the remainder of the Phase 1 portion of the landfill. Vegetation of the final cap was reviewed and is becoming established. We concluded that no remedial work that is not currently being completed is required on the landfill mass.

3.2.2 Leachate Collection System

The existing leachate collection system and pump stations were reviewed to determine if they are operating as designed, and if any remedial work is required. WM staff regularly reviews the operation of the leachate system, and completes repairs as required. It is understood that leachate is being collected from the system, and no blockages are present. High-level alarms were installed in the north chamber in 2010. No remedial work is required on this system.

3.2.3 Gas Collection System

The existing gas collection system is regularly monitored by WM, to ensure that landfill gas is being collected and destroyed in the flare system. No new gas extraction wells were installed during 2010. The gas system is operating as required, and no additional remedial work is recommended at this time.

3.2.4 Stormwater Management System

Three stormwater sedimentation ponds collect stormwater runoff from the landfill site, and remove sediment prior to discharge. Ponds are regularly inspected by WM staff, to monitor water levels, and to determine when discharge is required. The ponds in the northwest and northeast corners of the site had no issues this year, and require no remedial work. The pond in the south was recently reconstructed, and some problems have been encountered with the construction quality of the pond. In 2010, the pond outlet structure was reconstructed to repair seepage problems. As added security, a steel sheet pile wall was installed to prevent any further seepage problems through the outlet berm. It is expected that no further remedial work is required on this pond.

3.2.5 Site Access and Roads

The site entrance and roads were inspected by GENIVAR during the annual site inspection, and no problems were identified.

3.2.6 Leachate Holding Lagoon

The leachate holding lagoon was inspected, and was found to be in acceptable condition. The lagoon was decommissioned by WM in 2010, and will remain dry and remain a contingency for leachate storage. The pond was slowly siphoned using a 50mm diameter pipe, discharging into a sedimentation basin to prevent erosion, and the date and volume is described in Section 4.25

3.2.7 Conclusions

After a review of the engineered facilities at the site, it was concluded that there is currently no need to amend the design, or adjust the operation of the Richmond Landfill site.

Since all engineering works are performing as designed, and no monitoring indicates that contingency plans should be implemented, it is our conclusion that at this time, there is no need to implement the contingency plans.

3.3 Leachate Collection System Efficiency

This condition, listed under 9(b) (iii) of the existing C of A, requires an assessment of the efficiency of the leachate collection system. A review of the leachate volume removed from the landfill site was determined to be of a reasonable volume to determine that the leachate collection system is continuing to operate effectively. WM regularly inspects the infrastructure, and has determined that there are no blockages in the system.

3.4 Existing Site Conditions

This Condition, listed as 9(c) in the former C of A, and 9(b) (iv) of the current C of A, requires a map of surface contours in the active landfill area, and plans showing the existing contours of the site, respectively, to be provided.

GENIVAR completed a GPS survey in November 3rd, 2010 for volume and remaining airspace calculations.

The information was then incorporated into an existing conditions drawing labelled **0857013-2010**, which is contained in **Appendix B** of this report.

3.5 2010 Landfill Operations Area

This Condition, listed as 9(b) (v) in the current C of A, requires information regarding the areas of landfilling operation during the reporting period.

In 2010, landfilling operations continued in the upper portions of the landfill site, with waste being placed in the upper east end of the landfill mass, and in the location of the former haul road located on the south central slope. Prior to landfilling in the area of the old access road, the gravel subgrade was removed to prevent any leachate flow paths in the granular material. The landfill mass is nearing final contours and will progress to final elevations. Final grades are regularly set to control landfilling activities and to ensure that landfilling operations do not proceed above final contours. Landfilling operations will continue until June 30, 2011, when the Richmond Landfill will cease to accept waste after this date in accordance with Condition 35 of the current C of A.

Since access to the active landfill face is restricted by the removal of the old access road, waste is hauled to the active area by an off road haul truck. Waste brought to the site by the garbage trucks is dumped in a receiving area at the toe of the landfill, within the footprint, and then loaded into WM's off road truck to be deposited at the active face.

Landfilling tonnage was less than the approved annual limit again in 2010 due to the decreasing air space remaining at the landfill site, and the need for WM to service the local customers. Hydrocarbon-impacted soil received at the landfill site was temporarily stockpiled on the contaminated soil pad to the south of the landfill site. The material was used as daily cover in landfilling operations as required.

3.5.1 Equipment

During 2010, a D7R Caterpillar dozer was used to spread and compact waste material, and to spread daily cover. Other equipment on the site included:

- a Cat 235 excavator;
- a 1989 Pelican sweeper;
- a Case International farm tractor with a compost windrow turner and rotary mower;
- Two (2) pick up trucks;
- a roll off truck
- Two (2) Volvo rock trucks (one 25 tonne, one 40 tonne);
- a CAT 966 rubber-tire loader; and
- a Holder mower.

If additional equipment was required for construction or other auxiliary uses, they were acquired from local contractors.

3.6 2011 Landfill Operations Area

This Condition, listed as 9(b) (vi) in the current C of A, requires information regarding the intended area of landfilling operations during the next reporting period.

WM will continue to landfill on the upper east end of the landfill mass, and on the south slope at the location of the former haul road, in order to bring these areas to the final approved contours prior to the placement of the final cover system. Landfilling operations at the Richmond Landfill will cease after June 30, 2011, as per Condition 35 of the current C of A.

3.7 2010 Excavation Areas

This Condition, listed under 9(b) (vii) of the current C of A, requires information regarding areas of excavation during the reporting period.

No borrow pit operations for cover material were undertaken in 2010, as a sufficient quantity of hydrocarbon-impacted soil or other soil material for daily cover requirements was stockpiled at the landfill site and/or received at the landfill gate.

Material was removed from the southwest borrow area and used as fill prior to placing the final cap on Phase 1. Soil was placed on top of the landfill to provide the 5% slope on top of the landfill, prior to placing the final cover on the Phase 1 portion of the landfill.

3.8 Cover Placement Progress

This Condition, listed under 9(b) (viii) of the current C of A, requires information regarding the progress of final cover, vegetative cover, and any intermediate cover application.

In 2010, WM completed the placement of the final cover system on Phase 1 of the Richmond Landfill. The final cover, comprised of a minimum 900mm thick low permeability soil layer, and a minimum 150mm thick topsoil layer, and hydroseeding, was placed on a 0.6 hectare area on the upper west central section of the landfill, as shown in Drawing 0857013-2010 in **Appendix B.** The placement of the final cover was supervised by GENIVAR to ensure compliance with the MOE approved Construction Quality Assurance/Construction Quality Control (CQA/CQC) Plan for the Final Cover System.

Due to inclement weather, the Phase 1 capping project was not completed by the September 30, 2010 deadline as listed under Condition 35 of the amended C of A. WM requested and received from the MOE a one-month extension, to October 31, 2010. Work was completed on the final cover on October 28, 2010, and hydroseeding was applied at this time. The area will be inspected in 2011 to ensure vegetative cover has been well established, and will be re-seeded as needed.

Intermediate cover was placed on the lower section of the south central slope, in the area of the old access road.

3.9 Previously Existing Site Facilities

This Condition, listed under 9(b) (ix) in the current C of A, requires information regarding previously existing site facilities.

3.9.1 Buildings and Signage

The landfill site office is located to the south of the landfill site on the main access road. The building houses management staff, secretarial and record services, communications equipment, weigh scale recording devices and operating staff facilities.

Landfill equipment is serviced in the existing maintenance building. Fuel storage is located in this area and a staff room for the landfill equipment operators is attached.

Signs are erected along the access road near Beechwood Road identify the landfill site. The main sign supplies the following information:

Additional signs on the site direct traffic to working faces and vehicles to the storage area for white goods. The signs are considered satisfactory and informative to the landfill users.

In compliance with Condition 109 of the amended C of A, a sign has been posted at the main entrance directing residents with questions, concerns, or complaints to contact the WM Help Line after hours, or the Landfill Manager during operating hours.

Site hours for the public have been changed as of December 1, 2006 to Monday to Friday from 9am to 3pm, and closed Saturdays. The site is open the regular hours for commercial haulers.

3.9.2 Staff

WM staff manages and operates the site. Mr. Randy Harris is the Landfill Manager. The site was managed by the Eastern Canada Market Area office with Mr. Dave White being the Director of Disposal Operations - Ontario.

Other landfill staff presently consists of two (2) full-time equipment operators, a mechanic/operator, office clerk/bookkeepers, a weigh scale gate attendant to oversee incoming waste traffic and volumes, and part-time staff, as required.

Other equipment operators are brought on the site for additional excavating, stockpiling of cover materials and for contract work as required for ongoing site development. Temporary workers are obtained from placement agencies to handle litter-picking duties.

The on-site mechanic handles equipment preventive maintenance programs.

3.9.3 Tonnage Control

A truck weigh scale records net tonnages received at the site on a day-by-day basis.

In 1998, an 80' Active Mod-U-Dec pitless truck scale with a Toledo digital weight display and printer was connected to a computer for data management. Truck traffic is controlled from the office by traffic light signals and by an air phone intercom system as trucks approach the scale.

In 2004, electrical work was completed to allow the scale facility to be run by a generator in the event of power failure to the site. Standby power can be easily connected to the scale house facility to operate the necessities for the acceptance of waste vehicles.

3.9.4 Soil Recycling Pad

A soil recycling pad is located to the east of the existing maintenance building and is used for temporary storage of hydrocarbon-impacted soil. This pad is used sporadically and allows incoming soil vehicles to avoid conflict with the waste vehicles. The soil is moved to other stockpiles on top of the landfill or to the active face for daily cover, as required.

Surface runoff from this pad is collected at an oil/sediment separator located at the south end of the pad. The oil and sediment captured by the separator is pumped out as required and trucked offsite by a licensed hauler.

3.9.5 Small Vehicle Transfer Area

The mini-transfer area continued to be used successfully in 2010. This area is used for small vehicles off loading waste, recyclables and compostable materials. This practice keeps small vehicles away from the working face and facilitates the transfer of material from the smaller vehicles into the roll-off bins.

In 2009, WM constructed a reuse centre where residents can donate and exchange reusable goods. This building is located in the public drop off area. WM also entered the Ontario Electronic Stewardship program and the Ontario Tire Stewardship program, and collect electronics and tires for recycling offsite.

White goods, including scrap metal, are presently separated from the waste stream and temporarily stored on the site. WM removes these materials regularly for recycling and it is anticipated this practice will continue.

3.9.6 Landfill Gas Collection and Flaring System

The landfill gas collection and flaring system was implemented for odour control at the Richmond Landfill in 2000. The construction of Phase I of the system was carried out in the years 2000/2001 with the installation of a 2.1 metre OD x 12.2 metre high enclosed flaring system, according to Certificate of Approval (C of A) (Air) No. 8-4076-99-006, issued by the Ministry of Environment (MOE) on December

21, 1999. The C of A can be found in **Appendix A.6.** Subsequent expansions and upgrades to the gas collection system have been made since the installation of the initial system in order to burn the landfill gas produced by the decomposing waste. The present system collects gas from five (5) leachate clean-outs, three (3) leachate collection manholes and 55 vertical gas wells.

Regular operation and maintenance of the landfill gas collection and flare system was completed in 2010. The landfill gas flare has been effective at reducing odour around the landfill site. In the rare occurrence of flare shutdown, operators, who are automatically notified by a paging system, attend the site to restart the flare or correct any alarm situations. The flare has operated successfully to date.

3.9.7 Organic Waste Compost Facility Operation

WM operates the organic waste compost facility as part of its waste diversion initiative. Leaf and yard waste, wood, paper sludge from local paper mills, manure and biosolids are presently composted at this facility, although other wastes can be accepted under the organic waste composting approval. No paper sludge or biosolids was used in 2010. In 2010, some compost material was processed in windrows, but the completed compost was used on site in construction activities as topsoil amendment.

Raw material is separated into piles. Brush and large wood pieces are stockpiled for tub grinding. If incoming material is contaminated (plastic bags, etc.), the load is set aside and labourers will separate the load. **Table 3.1** shows the amount of material received during 2010.

TABLE 3.1

2010 Compost Quantities

Incoming Materials by Type	
Type	**Quantity (tonnes)**
Leaf and yard waste	633.57
Sludge	0
TOTAL	**633.57**

When material arrives on site, the components of the windrow recipe are placed in a windrow by the bucket of a farm tractor. A Sittler windrow turner pulled by a farm tractor turns new windrows two to three times per week. Pertinent information about each windrow is recorded in a daily record book. Operations of the compost pad follow the operation manual written for the compost facility, which is updated regularly.

A monitoring program was established to ensure safety and quality standards are maintained throughout the composting process. The program includes daily (five days per week) monitoring of temperature and moisture. Approximately three to five temperatures are taken along a windrow. All temperatures are

recorded in a daily logbook. Ontario Ministry of the Environment Guidelines require that a minimum temperature of 55°C be achieved for fifteen days to achieve pathogen reduction.

Compost windrows are turned following the guidelines outlined in the operations manual. Once the temperature reaches 55°C, the windrow is turned at least five (5) times and must reach 55°C after the fifth turning. Once ambient temperature is reached, compost is moved from the originating location to the curing location. After curing, the compost is screened to remove all oversized material from the finished product. The oversized material is recycled back into a new windrow. If a windrow does not reach 55°C for the required time, the windrow will be recycled into a new windrow.

Any precipitation that lands on the compost pad, is collected and contained within the compost runoff pond. This water is either used in the composting process to increase windrow moisture content, or removed from the site and treated at the Napanee Sewage treatment plant, and is included in the volume presented in Section 3.13 and 4.1.1 of this report. The MOE has required that a liner be installed in the compost runoff pond, and a low permeability surface be installed on the compost pad. WM has decided that the compost pad and pond will be decommissioned, and will be preparing an outline of this work.

3.9.8 Sedimentation Ponds

The three sedimentation ponds remained in place in 2010, with work being completed on the outlet structure of the south pond. Pond discharge is controlled, and not permitted without prior testing and approval from MOE District staff.

3.10 Facilities Installed in 2010

This Condition, listed under 9(e) of the former C of A, and under 9(b) (x) of the current C of A, requires information about the installation of any facilities at the site during the reporting period.

No new facilities were installed in 2010.

3.11 Site Preparations and Facilities Installed in 2011

This Condition, listed under 9(e) of the former C of A, and under 9(b) (xi) of the current C of A, requires information regarding any site preparation or installation of facilities planned for the next reporting period.

In 2011, the final portion of the final cover system will be installed at the landfill, to close the site. Also, the compost pad and pond are expected to be decommissioned.

3.12 Calculations

This Condition, listed under 9(b) (xii) of the current C of A, requires calculations regarding the volume of waste, daily and intermediate cover, and final cover deposited or placed at the site during the reporting period, and a calculation of the total volume of site capacity used during the reporting period.

Using the survey of November 3, 2010, site volumes were calculated. The remaining air space and expected site life can be found in the following **Table 3.2**.

TABLE 3.2

2010 Landfill Quantities

Description	Quantity (m^3)
Gross remaining air space (including final cap)	69,000
Remaining quantity of final cap to be placed(1)	24,900
Remaining air space for waste and daily cover	44,100
Estimated daily cover volume remaining assuming 4:1 waste/cover ratio	8,800
Air space for waste	35,300

NOTES:
(1) Final landfill cap is constructed of 0.90 m of clayey material, and 0.15 m of topsoil.

3.13 Leachate Quantities

This Condition, listed under 9(f) of the former C of A, and 9(b) (xiii) of the current C of A, requires a summary of the quantity of any leachate or pre-treated leachate removed from the site during each operating week.

In 2010, leachate continued to be hauled to Napanee for treatment. Loads are collected from the site, manifested and then discharged at the dumping facility located at Enviro Park Lane and West Street on the edge of the Town of Napanee. Leachate continues to be extracted at the landfill site at the lowest portions on Phases 2 and 4 and hauled as required for treatment off-site.

In the event that leachate cannot be hauled from the site due to conditions at the receiving plant, etc., leachate or leachate-impacted water will be stored in the leachate-holding lagoon located to the north of the site to contain leachate and to prevent spills. Leachate can be discharged from the lagoon with MOE approval, or, once leachate treatment resumes at the receiving plant, this liquid is then hauled to the sewage treatment plant for treatment and disposal. This is a temporary measure and is outlined in the leachate management plan submitted to the MOE. The water stored in this lagoon is generally only slightly impacted by leachate and is not odorous. In 2010, this pond was dewatered, and allowed to drain freely in future rainfall events. In the event that this contingency is required in the future, the pond could be used again.

WM inspects the site each day for leachate seeps and problem areas in the final cap. If leachate seeps are encountered, they are promptly repaired to avoid any surface water contamination. Generally, leachate seeps are excavated and granular material and dry clay are replaced and packed. When cracks develop in other areas of the final cap and the potential for gas migration is present, the final cap is scarified or re-compacted and additional clay may be placed in the area to prevent gas migration. Through the continuous removal of leachate to the leachate treatment facilities and the extraction of landfill gas through the landfill gas collection and disposal system, the potential for leachate seeps and gas outbreaks are minimized and the potential for any off-site impact is reduced.

Table 3.3, provided on the following page, details the weekly quantity of leachate removed from the Richmond Landfill. The volumes presented in the table were converted from the tonnage determined in the truck at the site scale, and converted using 1 tonne = 1m^3.

TABLE 3.3

2010 Weekly Leachate Quantities

WEEK COMMENCING	TOTAL LEACHATE REMOVED - NAPANEE (m^3)	WEEK COMMENCING	TOTAL LEACHATE REMOVED - NAPANEE (m^3)
1/1/2010	0	7/4/2010	231.17
1/3/2010	280.70	7/11/2010	287.88
1/10/2010	222.13	7/18/2010	288.52
1/17/2010	391.28	7/25/2010	289.54
1/24/2010	396.24	8/1/2010	231.58
1/31/2010	384.76	8/8/2010	286.48
2/7/2010	328.44	8/15/2010	585.29
2/14/2010	338.08	8/22/2010	581.61
2/21/2010	341.99	8/29/2010	577.17
2/28/2010	402.13	9/5/2010	404.96
3/7/2010	338.43	9/12/2010	586.66
3/14/2010	464.80	9/19/2010	529.29
3/21/2010	405.82	9/26/2010	583.79
3/28/2010	214.50	10/3/2010	532.74
4/4/2010	450.89	10/10/2010	472.96
4/11/2010	564.48	10/17/2010	461.62
4/18/2010	527.88	10/24/2010	467.40
4/25/2010	585.44	10/31/2010	280.09
5/2/2010	462.08	11/07/2010	342.55
5/9/2010	289.25	11/14/2010	348.49
5/16/2010	229.80	11/21/2010	465.66
5/23/2010	225.89	11/28/2010	285.35
5/30/2010	463.77	12/5/2010	690.55
6/6/2010	528.99	12/12/2010	410.53
6/13/2010	403.49	12/19/2010	347.77
6/20/2010	407.96	12/26/2010	247.59
6/27/2010	347.03	**TOTAL**	**20,813.49**

3.14 Waste Tonnage Summaries

This Condition, listed under 9(b) of the former C of A, and 9(b) (xiv), requires the weekly, maximum daily, and total annual quantity (tonnes) of waste received at the site. Condition 9(b) of the former C of A also requires a list of all current commercial and industrial users.

Table 3.4 is an updated list of municipalities serviced by this landfill, as follows:

TABLE 3.4

Municipalities Presently Serviced

City of Belleville
Town of Deseronto
City of Quinte West

The Corporation of the County of Prince Edward
(Which used to include)
- Town of Picton
- Town of Sophiasburgh
- Village of Bloomfield
- Township of Athol
- Township of Hallowell
- Village of Wellington
- Township of North Marysburgh

Town of Greater Napanee
Newburgh Ward – of Stone Mills Township

The list of commercial/industrial waste users provided from the present landfill records is contained in **Appendix C.**

Tables 3.5 and **3.6** summarize weekly, monthly and total annual quantity of volumes in metric tonnes for the calendar year 2010. Weigh scale operators recorded the tonnages, as noted on the following pages:

TABLE 3.5

2010 Weekly Tonnage Totals

WEEK COMMENCING	TOTAL WASTE TONNAGE LANDFILLED (TONNES)	TOTAL CONTAMINATED SOIL RECEIVED (TONNES)	WEEK COMMENCING	TOTAL WASTE TONNAGE LANDFILLED (TONNES)	TOTAL CONTAMINATED SOIL RECEIVED (TONNES)
1/1/2010	0	0	7/4/2010	322.37	423.78
1/3/2010	130.79	1.68	7/11/2010	377.74	393.94
1/10/2010	116.97	0	7/18/2010	316.18	509.08
1/17/2010	118.44	0	7/25/2010	400.68	585.78
1/24/2010	102.95	0	8/1/2010	404.46	577.39
1/31/2010	119.97	0	8/8/2010	393.36	203.36
2/7/2010	116.74	0	8/15/2010	416.00	2,294.43
2/14/2010	93.55	0	8/22/2010	423.61	1,197.44
2/21/2010	101.55	0	8/29/2010	367.36	798.82
2/28/2010	119.34	0	9/5/2010	354.92	427.19
3/7/2010	159.93	67.57	9/12/2010	457.26	4,061.20
3/14/2010	115.20	0	9/19/2010	398.11	1,358.77
3/21/2010	116.78	17.35	9/26/2010	458.82	482.52
3/28/2010	197.84	0	10/3/2010	387.18	134.87
4/4/2010	235.86	169.53	10/10/2010	423.90	711.97
4/11/2010	197.52	2,131.08	10/17/2010	370.52	1,334.62
4/18/2010	300.50	1,211.59	10/24/2010	497.93	4,199.61
4/25/2010	270.52	0	10/31/2010	455.05	2,809.74
5/2/2010	328.42	129.76	11/07/2010	384.51	100.04
5/9/2010	350.82	4,068.54	11/14/2010	350.37	39.58
5/16/2010	273.87	2,679.21	11/21/2010	381.15	0
5/23/2010	295.86	352.61	11/28/2010	324.77	0
5/30/2010	342.35	507.35	12/5/2010	286.00	2,000.76
6/6/2010	416.64	633.46	12/12/2010	604.59	598.19
6/13/2010	368.52	406.44	12/19/2010	284.88	995.72
6/20/2010	354.25	542.92	12/26/2010	188.88	0
6/27/2010	235.43	173.16	**TOTAL**	**15,611.21**	**39,331.05**

TABLE 3.6

2010 Monthly Tonnage Totals

MONTH	COMPOST DIVERTED FROM LANDFILL SITE (TONNES)	TOTAL WASTE TONNAGE LANDFILLED (TONNES)	TOTAL CONTAMINATED SOIL RECEIVED (TONNES)
January	1.77	469.15	1.68
February	2.64	431.81	0
March	14.85	696.37	84.92
April	120.41	1,017.12	3,512.2
May	105.98	1,278.96	7,339.81
June	29.62	1,630.74	2,153.64
July	19.04	1,473.43	1,912.58
August	29.12	1,763.31	4,994.9
September	42.52	1,808.31	6,406.22
October	112.47	1,781.81	6,381.07
November	141.33	1,725.29	2,949.36
December	13.82	1,534.91	3,594.67
TOTAL	**633.57**	**15,611.21**	**39,331.05**

NOTE: The site is licensed for 125,000 tonnes/year.
Total tonnage shown does not include recyclable material.

The 2010 waste tonnage landfilled was 15,611.21 tonnes of waste and 39,331.05 tonnes of soil, which was compiled from the monthly summary of wastes received. The licensed tonnage is 125,000 tonnes/year. Tonnages listed include impacted soil that was received at the site for disposal.

The maximum daily tonnage received was on December 15, 2010 and was 243.36 tonnes.

In addition, this year, WM diverted compostable material to the on-site composting program, and electronic waste (e-waste) to off-site recycling centers. Approximately 633.57 tonnes of compostable material was diverted from the landfill site, and 45.72 tonnes of e-waste was diverted. This is not included in the total tonnage received at the landfill site. Additional material was directed through on-site recycling programs at the mini transfer area but the tonnages are not available for plastics, glass and fibres. As well, 81.88 tonnes of recycled tires were diverted from the landfill, along with 28.05 tonnes of recyclable metal.

3.15 Summary of Complaints

Over the years, a few immediate neighbours have occasionally contacted WM regarding odours from the landfill site. The normal decomposition of waste causes odours from the site. WM implemented the

operation of a landfill gas recovery system in 2001 to eliminate the odour source. Perimeter gas wells were drilled in the waste mound, and collection piping withdraws landfill gas from the wells and all leachate manholes to reduce the odour emitted from the landfill site. Landfill gas is flared off in a totally enclosed flare to the south of the landfill footprint. The landfill flare was commissioned in April 2001 and successfully reduces landfill gas odours.

The weather station is located south of the office area. The station monitors wind speed, wind direction, temperature, rainfall, solar radiation and relative humidity. Recorded local weather patterns help in addressing odour complaints.

In 2009, the MOE conducted a 3-week odour survey in June and July, and found no negative impacts on the local air quality. In addition, the MOE used their TAGA (Trace Atmospheric Gas Analyzer) unit to evaluate the local air quality, and concluded that the air quality was similar to any rural air quality in Ontario.

WM also continued with the surface emission survey study in 2010, where a consultant measured surface emissions to identify areas of weak cap. This year, a surface emission survey was performed on October 26, 2010. Four (4) areas were identified above 500ppmv. It was noted in the consultant's report that the flare was down approximately three (3) hours before the survey was performed. The final cover system in the exceedance areas were inspected and repaired as needed. No new wells were installed in 2010, as it is believed that there is sufficient wellfield coverage in place.

WM staff also tour the surrounding area and concession roads regularly to monitor for odour, litter and illegally dumped waste. Observations are recorded and corrective measures taken as required. In addition, when odour complaints are received at the landfill site, WM staff are dispatched to investigate the source of the odour and record the conditions that may have influenced the odour. WM is able to complete this response plan if complaints are received directly by WM. If complaints are delayed or not directed towards WM, the potential odour source cannot be investigated nor can corrective action be taken if the odour was potentially landfill related.

In 2010, there were two (2) odour complaints received by WM, for which the above procedure was used to address the complaints. Please refer to **Appendix D** for the complaint forms. One complaint, relayed from the MOE District Office in Kingston, was received as a result of the flare not operating due to maintenance of the mechanical system. The second odour complaint was also relayed from the MOE District office, but no source was detected at the site once the complaint was received by WM.

In 2010, in compliance with Condition 109 of the amended C of A, WM posted a sign near the front entrance, directing residents with questions, concerns and complaints to contact the WM Help Line when the site is closed, or to contact the Landfill Manager during operating hours. Phone numbers for both contacts are provided on the sign.

3.16 Operational Problems

This Condition, listed under 9(e) of the former C of A, and 9(b) (xvi) of the current C of A, requires a discussion of any operational problems encountered at the site, and corrective action taken.

In 2010, the control valve at the southwest sedimentation pond was inadvertently left in the open position by WM personnel, after completing a MOE approved discharge event. This resulted in approximately 4,134 cubic metres of untested water being discharged from the site. The MOE became aware of the incident, and on January 11, 2011, a Provincial Officer's Order (POO) was issued to the Richmond Landfill, requiring WM to complete several items in regards to improving the frequency of the inspection program on the discharge control system. **Appendix E** contains the Provincial Officer's Order that was received as a result of the MOE inspection, along with the responses from WM.

3.17 Refusal of Waste

This Condition, listed under 9(b) (xvii) of the current C of A, requires a summary of any waste that was refused for disposal at the site, the reasons for refusal, and the carrier who brought the waste to the site.

On August 16, 2010, a refrigerator was refused for disposal at the landfill. The refrigerator was not tagged certifying that Freon had been removed which would allow disposal. The resident left the site with the refrigerator, and WM completed a Waste Discrepancy Form, which can be found in **Appendix F** of the report.

3.18 Leachate Collection System Cleaning and Inspection

This Condition, listed under 9(b) (xviii) of the current C of A, requires a summary of the leachate collection system cleaning and inspection activities.

In 2010, WM regularly inspected the leachate pumps and system each day that hauling of leachate occurred. On April 15th and 16th, 2010, the leachate lines were flushed and cleaned. No blockages or issues were reported from this activity.

3.19 Financial Assurance Summary

This Condition, listed under 9(b) (xix) of the current C of A, requires an update summary of the amount of financial assurance which has been provided to the Director.

Currently, the financial assurance amount of $11,557,385 has been provided to the Director for the Richmond Landfill.

As a condition of the amended C of A, a revised financial assurance plan was submitted to the MOE on June 30, 2010. Upon receiving approval from the MOE, WM will provide the Director with an updated financial assurance amount.

3.20 Monitoring Well Status and Compliance

This Condition, listed under 9(b) (xx), requires a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903.

A report addressing this condition has been prepared by WESA under separate cover to satisfy this requirement.

3.21 Statement of Compliance

This Condition, listed under 9(b) (xxii) of the current C of A, requires a statement of compliance with all conditions of this Certificate of Approval and other relevant Ministry groundwater and surface water requirements.

As a result of the inspections completed in 2010, to the best of our knowledge, GENIVAR certifies that WM has complied with the conditions outlined in the various Certificates of Approval for the site, with respect to site operations. WESA will certify the monitoring portion of this requirement.

3.22 Confirmation of Site Inspection Program

This Condition, listed under 9(b) (xxiii), requires confirmation that the site inspection program as required by this Certificate has been complied with by the Owner.

WM has confirmed to GENIVAR that the site inspection program that is required by the Certificates of Approval, and by the various reports that address the site operations and monitoring, have been complied with.

3.23 Operations, Equipment, or Procedures Changes

This Condition, listed under 9(e) of the former C of A, and 9(b) (xxiv) of the current C of A, requires documentation of any changes in operations, equipment, or procedures employed at the site.

No changes in operations, equipment or procedures were employed at the site, other than those that were outlined in the C of A amendment that was received March 31, 2010.

3.24 Recommendations

This Condition, listed under 9(b) (xxv) of the current C of A, requires recommendations regarding any proposed changes in operations of the site be listed in this report.

GENIVAR does not have any recommendations for changes in the site operations.

4.0 REPORTING REQUIREMENTS – CERTIFICATE OF Approval No. 5268-7E8LJW

4.1 Leachate Management

Leachate haulage from the site to the Napanee (now part of the Town of Greater Napanee) sewage system began in 1996. Leachate is regularly hauled from the landfill by Sutcliffe Sanitation Services Ltd. and discharged directly to the sewage system. Close communication between the town, WM and Sutcliffe Sanitation is maintained to determine if leachate may be accepted for treatment. Sutcliffe Sanitation is the common hauler of sludge from the sewage treatment plant and leachate from the landfill site. Before picking up a load of leachate, Sutcliffe Sanitation confirms with the town that leachate can be hauled on that particular day.

During the winter of 2003/2004, WM constructed a leachate/septage dumping facility within the Town of Napanee. The dumping facility is located at Enviro Park Lane and West Street within the Town of Napanee on municipally owned property. The dumping facility was commissioned in April 2004, after which time all leachate was deposited at the dumping station. Station users are recorded by PIN numbers that uniquely identify each station user and log the quantity of material discharged to the dumping facility. Users are then billed on a user pay basis by the Napanee Utilities. Ownership, operation and maintenance of the facility is the responsibility of the Greater Napanee Utilities. WM has a usage contract, which allows WM to use the facility for a specified period of time as long as Napanee Utilities does not have a restriction on dumping due to treatment characteristics at the sewage treatment plant. The dumping facility contains dumped loads and slowly discharges wastewater into the Napanee sewage system. Napanee Utilities has a C of A for this site.

It is a requirement of the landfill site's C of A that alternative leachate treatment options are available should Napanee be unable to treat leachate. Approval has been given to discharge leachate at Cobourg, however, leachate was not hauled to Cobourg for treatment in 2010. Letters of approval for alternate leachate treatment sites can be found in **Appendix G** of this report.

4.1.1 Leachate Quantities

This Condition, listed under 10(4) (b) of the current C of A, requires a summary of the monthly quantity of leachate disposed off site and corresponding leachate average quality.

Table 4.1 indicates the leachate quantities trucked from the site to the Napanee sewage treatment plant in 2010. The average rate of removal for treatment was 57.02 m^3/day.

TABLE 4.1
2010 Monthly Leachate Quantities

Month	Napanee (m^3)
January	1,290.35
February	1,393.27
March	1,766.60
April	2,187.77
May	1,264.79
June	2,038.85
July	1,151.73
August	1,920.21
September	2,331.91
October	2,049.43
November	1,663.46
December	1,755.12
Total	**20,813.49**

4.1.2 Operational Problems and Corrective Actions

This Condition, listed under 10(4) (c) of the current C of A, requires a description of any operating problems encountered and corrective actions taken.

In 2010, there were no operating problems encountered or corrective actions taken for the leachate management system. No issues from the treatment of the leachate at the sewage treatment plants have arisen.

4.1.3 Maintenance Performed On Structures

This Condition, listed under 10(4) (d) of the current C of A, requires a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Works.

In 2010, regular inspection of the leachate pumps and system took place each day that leachate was hauled from the site. On April 15th and 16th, 2010, the leachate lines were flushed and cleaned. No blockages or issues were reported.

4.1.4 Calibration and Maintenance of Leachate Monitoring Equipment

This Condition, listed under 10(4) (e) of the current C of A, requires a summary of the calibration and maintenance carried out on all leachate monitoring equipment.

In 2010, a high level alarm installed was installed in the north leachate chamber to alert the operator of leachate levels exceeding 0.66 metres, as required by Conditions 86 and 87 of the amended C of A No. 371203 issued March 31, 2010. The high level alarms in the south chamber were replaced.

4.1.5 Summary of Complaints Received

This Condition, listed under 10(4) (f) of the current C of A, requires a summary of any complaints received during the reporting period, and any steps taken to address the complaints.

Two complaints were received in 2010. Both complaints were for odour, which were immediately addressed by WM (following the complaints procedures previously described in **Section 3.15**) at the time the complaints were received. Please refer to **Appendix D** for the complaint logs completed by WM.

4.1.6 Summary of By-Pass, Spill or Abnormal Discharge Events

This Condition, listed under 10(4) (g) of the current C of A, requires a summary of all By-pass, spill, or abnormal discharge events.

There were no leachate events that were a By-pass, spill, or abnormal discharge event.

4.2 Surface Water Management

Surface water quality management is also operated under C of A No. 5268-7E8LJW, which outlines the operation of three (3) sedimentation ponds located on the landfill site property. This section is intended to satisfy the requirements outlined in Condition 10(4) (a), (c), (d), (f) and (g) of the C of A.

4.2.1 Summary of Stormwater Monitoring Data

This Condition, listed under 10(4) (a) of the current C of A, requires a summary and interpretation of all stormwater monitoring data and a comparison to the Provincial Water Quality Objectives (PWQO), including an overview of the success and adequacy of the Works.

WESA has prepared an annual report to satisfy this section of the C of A, under separate cover. The reader is directed to this document for this information.

4.2.2 Operating Problems and Corrective Actions

This Condition, listed under 10(4) (c) of the current C of A, requires a description of any operating problems encountered and corrective actions taken.

In 2010, an unplanned release from the south sedimentation pond occurred due to frost heaving around and along the outlet structure and pipe. The outlet structure was repaired to correct the construction

issues, and improved to ensure no further problems are encountered. A steel sheet pile wall was installed in the outlet berm, to prevent any additional seepage, and the outlet structure and pipe was replaced.

4.2.3 Summary of Maintenance Activities

This Condition, listed under 10(4) (d) of the current C of A, requires a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Works.

The two (2) northerly sedimentation ponds operated in 2010 without any maintenance required on the ponds. The ponds are regularly inspected to ensure their operation meets the C of A, and no remedial work was required in 2010.

In 2008, WMCC applied to the MOE for approval to upgrade the south sedimentation pond, to create a wetland area, and to improve the aesthetics of the front entrance. Approval was received from the MOE, and construction was completed on the south sedimentation pond in March 2009. On April 27, 2009, the southerly berm of the sedimentation pond failed, due to frozen material becoming weak after thawing. The pond was sampled and dewatered, and the material in the berm was removed and replaced with dry clay till material from the on-site borrow area. Work began in mid-July 2009 and was completed in late September 2009. Seeding was completed in 2010.

In January 2010, the outlet control berm on the south pond failed, due to frost heave along the outlet pipe. The existing rip rap and geotextile were removed along with the outlet pipe and control structure. Sheet piles were installed through the centre of the berm along its entire length to ensure no further water would exit the berm. The control structure was relocated to the north toe of the outlet berm, and the outlet pipe was reinstalled through the sheet pile. Additional clay was brought in from an offsite source to bring the berm back to design height, and geotextile and riprap were placed over the clay. Work began in early September 2010, and was completed one week later.

4.2.4 Summary of Complaints Received

In 2010, there were no complaints received regarding the ponds.

4.2.5 Summary of By-Pass, Spill or Abnormal Discharge Events

The stormwater certificate of approval requires toxicity, chemical testing and MOE approval prior to any discharge event. Listed below in the table are the MOE approved discharge events that occurred in 2010. Volumes were calculated based on water level drop in the ponds.

TABLE 4.2

2010 Pond Discharge Volumes

Date of Discharge	Pond Identification	Volume Discharged (m^3)
February 8, 2010	Northwest Pond	2,802 m^3
	Southwest Pond	5,724 m^3
March 24, 2010	Northwest Pond	3,500 m^3
	Northeast Pond	2,600 m^3
	Southwest Pond	13,967 m^3
May 19 to June 10th	Leachate holding lagoon	16,245 m^3
November 23, 2010	Southwest Pond	4,134 m^3

Prior to all discharge events, toxicity testing was completed to ensure the water was safe to discharge.

5.0 General

In 2010, WM completed ongoing maintenance and operation of the landfill site, with additional work completed on the south sedimentation pond outlet structure and berm. Landfill operations progressed smoothly throughout the year and there were no operational impacts on the surrounding area. Active litter control, gas management, leachate treatment and active monitoring of the landfill site resulted in no operational impacts on the surrounding area. Litter control is well managed, and the continued use of the landfill gas collection and flaring system and system maintenance and upgrades has reduced any potential landfill gas odours. WM has been very active in monitoring all aspects of the site, both on and off site, ensuring that no impacts were caused on the surrounding areas.

The tonnage of waste received at the landfill site over the past year was reduced from the annual approved tonnage to allow WM to continue to service their local customers and commitments. Landfill operations have been contained to the upper extents, and south face of the landfill site and within the final contours approved for the landfill site. Grades are controlled to ensure compliance with the final contours.

Leachate extraction and treatment continues at the landfill site, and 20,813.49 m^3 of leachate has been removed during the past year, or approximately 57.02 m^3/day. It is recommended that leachate removal off site continue.

The landfill gas extraction and flaring system successfully collected and flared the landfill gas generated from the landfill site. Continued operation and expansion of this system will be completed in the coming years to ensure that odours are minimized around the landfill site. Additional wells may be installed as landfilling progresses and final cap is constructed at higher elevations.

Neighbours with concerns are always invited to visit the landfill with their concerns, which are addressed by the site manager.

Site operations are progressing smoothly. We conclude the landfill operation is operating in an environmentally sound and orderly manner.

Respectfully submitted:

GENIVAR Inc.

Jeff E. Armstrong, P.Eng.
Designated Consulting Engineer
Director, Solid Waste Management
JEA/bdl