



The Regional Municipality of York

**Odour Management and Mitigation
(Condition 9) and Ambient Air
Monitoring and Reporting (Condition 11)
Annual Report (EA File No. 02-04-03)**

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Executive Summary

The Southeast Collector (SEC) Trunk Sewer system conveys municipal wastewater 15 kilometres from the intersection of Ninth Line and Rouge Bank Drive in Markham, Ontario, to the intersection of Finch Avenue and Valley Farm Road in Pickering, Ontario. The operation of the system accommodates future growth in York Region and provides additional capacity for peak and extraneous flows. Furthermore, it increases redundancy to the existing York Durham Sewage System (YDSS) that is co-owned and co-managed by the Regional Municipalities of York and Durham (the Regions).

The system was commissioned on January 27, 2015 and has since been in operation.

The SEC Trunk Sewer Individual Environmental Assessment (IEA) was approved on March 31, 2010 allowing the Regions to proceed with the undertaking subject to 13 Conditions (74 sub-conditions) introduced by the Minister of the Environment's Notice of Approval to Proceed with the Undertaking (Approval).

To address Condition 9 of the Approval, the Odour Management and Mitigation Plan (OMMP) was prepared and submitted to the Ministry of the Environment, Conservation and Parks (MECP) on September 24, 2010. Subsequently, on December 5, 2014, an updated OMMP was provided to include the Operation Manuals for each of the four main components of the odour control system prior to commissioning. On March 24, 2015, the MECP provided comments on the updated OMMP. These comments and outcomes from the annual meeting held on May 19, 2015 including all other subsequent MECP comments have been fully addressed in the Revised Addendum to the updated OMMP dated June, 2016.

To address Condition 11 of the Approval, an Ambient Air Monitoring and Reporting Plan (AAMRP) was submitted to the MECP on September 2010. The objective of the AAMRP is to confirm the operation of the SEC, and its odour control system and meet the designed performance in respect of emissions as set out in the SEC IEA.

The sampling programs for both Conditions 9 and 11 include sampling for odour, hydrogen sulphide (H₂S), ammonia (NH₃), and total reduced sulphur (TRS) compounds at the same sensitive receptors with the same sampling criteria. In addition, the two programs are to follow the same schedule and sampling frequency, and it was agreed at the May 2015 annual meeting with the MECP that the annual reports required under each Condition (9 and 11) are to be consolidated into one Annual Report.

All phases of the sampling program for both Conditions 9 and 11 are now complete. This report is the sixth and final annual report to satisfy Conditions 9.5, 9.6, and 11.5 of

the Approval and it will be posted on the york.ca website as per Conditions 9.7 and 11.7 and covers the period July 2019 to March 2020.

As per Condition 9.3 (e) annual meetings with the MECP Director progressed at the project specific level until 2017 where the decision was made to move the Condition 9 discussion items into the Agenda of regular quarterly liaison meetings between York Region and MECP at the senior management level.

Conditions 9 and 11 sampling programs were conducted concurrently in two phases:

Phase 1:

- a) Pre-Operation - Ambient Monitoring
- b) Start-up of Operations Ambient Air Monitoring and Air Emission Testing

Phase 2: Post Operation Ambient Air Monitoring and Air Emission Testing

The schedules of sampling are shown on the table below.

Phase	Description	Year	Total Number of Sampling Campaigns	Sampling Seasons	Status
1A	Pre-Operation – Ambient Air Monitoring	2012	3	Spring, Summer, Fall	Complete
		2013	3	Winter, Spring, Summer	Complete
1B	Start-up Operations – Ambient Air Monitoring and Air Emissions Testing	One	3	Spring, Summer, Fall (2015)	Complete
2	Post Operation – Ambient Air Monitoring and Air Emissions Testing	One	3	Spring, Summer, Fall (2015)	Complete
		Two	3	Spring, Summer, Fall (2016)	Complete
		Three	2	Early Spring, Summer (2017)	Complete
		Four	1	Summer (2018)	Complete
		Five	1	Summer (2019)	Complete

Odour Management and Mitigation (Conditions 9.5 and 9.6) and Ambient Air Monitoring and Reporting (Condition 11.5)

The sampling program covers the requirements for both Conditions 9 and 11.

Phase 1a, and Phase 1b/Phase 2 Year One:

Conducted between 2012 and 2015 with the results of the campaigns discussed in previous reports.

Phase 2 Year Two:

Conducted in 2016 with the results of the campaigns discussed in previous reports.

Phase 2 Year Three:

Conducted in 2017 with the results of the campaigns discussed in previous reports.

Phase 2 Year Four:

Conducted in 2018 with the results of the campaigns discussed in previous reports.

Phase 2 Year Five:

Conducted in 2019 with the results of the ambient sampling and dispersion modelling based on five-year meteorological data discussed in previous reports.

The results of the dispersion modelling based on daily meteorological data for Summer 2019 showed the following (refer to Table E-1):

- Odour concentrations are 0 OU at all sensitive receptor locations (0% of the internal MECF guidance level of 1 OU).

OCF Technology Performance:

The most recent performance test was completed in September 2019 by the equipment supplier BIOREM Technologies Inc. and the results of the testing, which were discussed in previous reports, showed that the media and the system are in good shape and performing well without issues.

Table E-1: Phase 2 Year Five Emission Summary Table Using Daily Meteorological Data (Summer 2019)

Sampling Season	Contaminant	Chemical Abstract Service Number	OCF Stack Measured Emission Rate	Air Dispersion Model Used*	Modelling Results Maximum Modelled Concentration	Modelling Results Modelled Concentration Location (Sensitive Receptor)	Averaging Period	MECP Limit	Limiting Effect	O.Reg. 419/05 Schedule #	Percentage of MECP Limit (%)
Summer 2019	Odour	N/A	745 OU/s	AERMOD version 16216r	0 OU	R65	10 min	1 OU	Odour	Internal MECP Guidance Level	0
					0 OU	R66	10 min	1 OU	Odour		0
					0 OU	R78	10 min	1 OU	Odour		0
					0 OU	R79	10 min	1 OU	Odour		0
					0 OU	R35	10 min	1 OU	Odour		0
					0 OU	R60	10 min	1 OU	Odour		0

Notes: N/A – Not applicable. There is no Chemical Abstract Service Number for Odour.
 OU – Odour Unit

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1. Introduction

The Southeast Collector (SEC) Trunk Sewer system conveys municipal wastewater 15 kilometres from the intersection of the Ninth Line and Rouge Bank Drive in Markham, Ontario, to the intersection of Finch Avenue and Valley Farm Road in Pickering, Ontario. The operation of the system accommodates the future growth in York Region, and provides additional capacity for peak and extraneous flows. Furthermore, it increases redundancy to the existing York Durham Sewage System (YDSS) that is co-owned and co-managed by the Regional Municipalities of York and Durham (the Regions).

The system is equipped with an odour control system to reduce the creation of odour-containing compounds inside the trunk sewer, limit the corrosion of the sewer headspace/shafts, maintain the trunk sewer headspace under negative pressure, and collect and treat odour emissions before release to the natural environment. The four main components of the odour control system are the Corrosion Control Facility (CCF) at Shaft 13, the Odour Control Facility (OCF) at York-Durham Line, and the Air Handling Facilities (AHF) at Shaft 4 and at Shaft 6/7.

The system was commissioned in December 2014 with Phase 2 commencing on January 27, 2015; it has been in operation for over five years.

1.1 Summary of Condition 9 and 11 Requirements and Updates

The SEC Trunk Sewer Individual Environmental Assessment (IEA) was approved on March 31, 2010 allowing the Regions to proceed with the undertaking, subject to 13 Conditions (74 sub-conditions) under the Minister of the Environment's Notice of Approval to Proceed with the Undertaking (Approval).

To address Condition 9 of the Approval, an Odour Management and Mitigation Plan (OMMP) was prepared and submitted to the Ministry of the Environment, Conservation and Parks (MECP) on September 24, 2010. Subsequently, on December 5, 2014, an updated OMMP was submitted to include the respective Operation Manual for each of the four main components (CCF, OCF, Shaft 4 AHF and Shaft 6/7 AHF) of the odour control system prior to commissioning. On March 24, 2015, the MECP provided comments on the updated OMMP. These comments and outcomes from the annual meeting held on May 19, 2015 including all other subsequent MECP comments have

been fully addressed in the Revised Addendum to the updated OMMP dated June 2016.

In addition, to address Condition 11 of the Approval, an Ambient Air Monitoring and Reporting Plan (AAMRP) was submitted to the MECP in September 2010 with the objective of confirming the operation of the SEC, and its odour control system meet the designed performance in respect of air emissions as set out in the SEC IEA.

The sampling programs for both Conditions 9 and 11 included sampling for odour, hydrogen sulphide (H₂S), ammonia (NH₃), and total reduced sulphur (TRS) compounds at the same sensitive receptors with the same sampling criteria. In addition, the two programs followed the same schedule and sampling frequency. The sampling was conducted at the same six sensitive receptor locations previously identified as part of the Pre-test Plan submitted in 2011.

Condition 9 and 11 sampling programs included the following Phases, which were conducted as per the Schedule shown in Table 1:

Phase 1:

- a) Pre-Operation – Ambient Monitoring
- b) Start-up of Operations Ambient Air Monitoring and Air Emission Testing

Phase 2: Post Operation Ambient Air Monitoring and Air Emission Testing

Both Phase 1 and Phase 2 are now complete.

Table 1: Odour Testing Schedule

Phase	Description	Year	Total Number of Sampling Campaigns	Sampling Seasons	Status
1A	Pre-Operation – Ambient Air Monitoring	2012	3	Spring, Summer, Fall	Complete
		2013	3	Winter, Spring, Summer	Complete
1B	Start-up Operations – Ambient Air Monitoring and Air Emissions Testing	One	3	Spring, Summer, Fall (2015)	Complete
2	Post Operation – Ambient Air Monitoring and Air Emissions Testing	One	3	Spring, Summer, Fall (2015)	Complete
		Two	3	Spring, Summer, Fall (2016)	Complete
		Three	2	Early Spring, Summer (2017)	Complete
		Four	1	Summer (2018)	Complete
		Five	1	Summer (2019)	Complete

1.2 Purpose and Objective

This report is prepared in accordance with Conditions 9.5, 9.6 and 11.5 of the Approval.

Specifically, Conditions 9.5, and 9.6 state:

9.5 *The proponent shall prepare and submit twice annually to the Director, Regional Director and SeCAC (if applicable), Odour Management and Mitigation Monitoring Reports beginning six months following the commencement of operation of the undertaking.*

9.6 *The proponent shall include in each of the Odour Management and Mitigation Monitoring Reports submitted in accordance with Condition 9.5, a report on the performance of the technology used for odour control at the Odour Control Facility.*

Condition 11.5 states:

11.5 *The proponent shall report the results of the ambient air monitoring program to the Regional Director and SeCAC (if applicable) in accordance with the Ambient Air Monitoring and Reporting Plan.*

The structure of the Report is set-up to follow the above conditions. In addition, the Annual Report will be posted on the york.ca website as per Conditions 9.7 and 11.7.

2. Odour Management and Mitigation (Conditions 9.5 and 9.6) and Ambient Air Monitoring and Reporting (Condition 11.5)

2.1 Phase 1b / Phase 2 Year One Sampling

The Phase 1b/Phase 2 Year One Sampling was conducted in Spring, Summer and Fall 2015 and results were provided in the “Odour Management and Mitigation (Condition 9) and Ambient Air Monitoring and Report (Condition 11) Annual Report” submitted on July, 2016 (Second Annual Report).

2.2 Phase 2 Year Two Sampling

The Phase 2 Year Two Sampling was conducted in Spring, Summer and Fall 2016. The results of the Spring 2016 sampling was provided in the “Odour Management and Mitigation (Condition 9) and Ambient Air Monitoring and Report (Condition 11) Annual Report” submitted on July 2016 (Second Annual Report) and the results of the Summer and Fall 2016 sampling were provided in the “Odour Management and Mitigation (Condition 9) and Ambient Air Monitoring and Report (Condition 11) Annual Report” submitted on July 2017 (Third Annual Report).

2.3 Phase 2 Year Three Sampling

The Phase 2 Year Three sampling was conducted in Early Spring and Summer 2017. The results for both the Spring and Summer sampling were provided in the “Odour Management and Mitigation (Condition 9) Semi-Annual Report” dated January 31, 2018.

2.4 Phase 2 Year Four Sampling

The Phase 2 Year Four sampling was conducted in Summer 2018. The results for the Summer sampling were provided in the “Odour Management and Mitigation (Condition 9) Semi-Annual Report” dated January 31, 2019.

2.5 Phase 2 Year Five Sampling

The Phase 2 Year Five sampling was conducted in Summer 2019. The results for the ambient sampling and dispersion modelling based on five-year meteorological data

were provided in the “Odour Management and Mitigation (Condition 9) Semi-Annual Report” dated December 31, 2019.

The daily meteorological data for AERMOD version 16216 for Summer 2019 was requested from the MECP but was not received in time to be included in the December 2019 semi-annual report submission. The requested data for Summer 2019 was received in February 2020 and therefore the dispersion modeling results based on the daily meteorological data has been included in this final annual report.

- The dispersion modelling results based on daily meteorological data for Summer 2019 showed the following:
 - Odour concentration is 0 OU at all sensitive receptor locations (0% of the internal MOECC level of 1 OU)

The details of the inputs to the dispersion modeling results for Summer 2019 were previously reported but have been included here again as a reference for the Summer 2019 dispersion modelling results based on the daily meteorological data.

Table 2 is a MECP template which provides a summary of the sampling results for odour, TRS, and ammonia at the OCF stack during the time that sampling was conducted. The information provided in Table 2 was used as inputs to the dispersion model and represents the highest emissions rates of the sampled concentrations during each sampling event.

The ammonia emission rate is based on the sampled concentration at the OCF stack while the TRS is calculated following the MECP formula as the sum of the sampled emission rates of Hydrogen Sulphide, Methyl Mercaptan, Dimethyl Sulphide and Dimethyl Disulphide. The summary of the calculations is provided in Table 3.

Table 4 provides a summary of the odour sampling results during the day of sampling at each sensitive receptor location. Table 4 was used as input to the dispersion modelling when the daily meteorological data provided by the MECP on each day of sampling was used.

Table 5 is the summary of the dispersion modelling results for odour at each of the sensitive receptor locations using the daily meteorological data for the Summer 2019 sampling.

Table 2: Phase 2 Year Five Summer 2019 Sampling Source Summary Table

Source Description	Sampling Season	OCF Stack Source Data				OCF Stack Emission Data						
		Flow-rate (m ³ /s)	Exit Temp. (°C)	Diameter (m)	Height Above Grade (m)	Contaminant	Chemical Abstract Service Number	Maximum Emission Rate	Averaging Period	Estimating Technique	Data Quality	% of Overall Emissions (%) ¹
OCF Stack	Summer 2019	13.3	22.9	1.05	12	Odour	N/A	745 OU/s	10 min	ST	AA	100
						TRS	N/A	<0.0014 g/s	10 min & 24 hr	ST	AA	100
						Ammonia	7664-41-7	0.001 g/s	24 hr	ST	AA	100

Notes: N/A – “Not applicable”. There is no Chemical Abstract Number for Odour and TRS.
 OU – Odour Unit
 ST – “Source Testing”
 AA – “Above Average”
¹ The OCF Stack is the only emission source and therefore represents 100% of the overall emissions at the OCF.

Table 3: Phase 2 Year Five Summer 2019 OCF Stack Measured Total Reduced Sulphur Compounds and Ammonia Emission Rates

Sampling Season	Maximum Emission Rate (mg/s)				Maximum Emission Rate (g/s)	
	Hydrogen Sulphide	Methyl Mercaptan	Dimethyl Sulphide	Dimethyl Disulphide	TRS	Ammonia
Summer 2019	<0.20	<0.29	<0.37	<0.57	<0.0014	0.001

Table 4: Phase 2 Year Five Summer 2019 Sampling Odour Source Summary Table

Source Description	Sampling Season	Location of Ambient Sampling	OCF Stack Source Data				OCF Stack Emission Data						
			Flow-rate (m ³ /s)	Exit Temp. (°C)	Diameter (m)	Height Above Grade (m)	Contaminant	Chemical Abstract Service Number	Emission Rate (OU/s)	Averaging Period	Estimating Technique	Data Quality	% of Overall Emissions (%) ¹
OCF Stack	Summer 2019	R65	13.9	23.2	1.05	12	Odour	N/A	641	10 min	ST	AA	100
		R66	11.7	22.8	1.05	12	Odour	N/A	273	10 min	ST	AA	100
		R78	14.3	22.2	1.05	12	Odour	N/A	745	10 min	ST	AA	100
		R79	14.7	24.1	1.05	12	Odour	N/A	476	10 min	ST	AA	100
		R35	11.9	22.2	1.05	12	Odour	N/A	347	10 min	ST	AA	100
		R60	12.2	23.0	1.05	12	Odour	N/A	399	10 min	ST	AA	100

Table 5: Phase 2 Year Five Emission Summary Table Using Daily Meteorological Data (Summer 2019)

Sampling Season	Contaminant	Chemical Abstract Service Number	OCF Stack Measured Emission Rate	Air Dispersion Model Used*	Modelling Results Maximum Modelled Concentration	Modelling Results Modelled Concentration Location (Sensitive Receptor)	Averaging Period	MECP Limit	Limiting Effect	O.Reg. 419/05 Schedule #	Percentage of MECP Limit (%)
Summer 2019	Odour	N/A	745 OU/s	AERMOD version 16216r	0 OU	R65	10 min	1 OU	Odour	Internal MECP Guidance Level	0
					0 OU	R66	10 min	1 OU	Odour		0
					0 OU	R78	10 min	1 OU	Odour		0
					0 OU	R79	10 min	1 OU	Odour		0
					0 OU	R35	10 min	1 OU	Odour		0
					0 OU	R60	10 min	1 OU	Odour		0

Notes: N/A – Not applicable. There is no Chemical Abstract Service Number for Odour.
 OU – Odour Unit

2.6 OCF Technology Performance

The most recent performance testing of the odour control facility was conducted on September 5th, 2019 by the equipment supplier BIOREM Technologies Inc. and the results are discussed in previous reports. The results of the testing showed that the media and the system are performing well with no major adjustments required.

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2.7 Statement of Accommodation

Accessible formats or communication supports for this report are available upon request. Please contact Environmental Services Reception Desk at 1-877-464-9675 ext. 73000.