Upper York Sewage Solutions
Environmental Assessment

Odour Baseline Conditions Report

Prepared for:
The Regional Municipality of York

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Executive Summary

This Odour Baseline Conditions study was conducted to identify and describe the existing odour conditions within the UYSS EA study area based on available existing information sources and field investigations.

The UYSS EA study area extends to north to Lake Simcoe, east to Woodbine Avenue, west to Bathurst Street, and south to Green Lane East, where the east/west boundaries constrict to Yonge Street and Leslie Street, respectively, and the southern boundary terminates at St. John's Sideroad and includes the Towns of Aurora (very northern portion of the Town), Newmarket (bounded by Yonge Street and Leslie Street), East Gwillimbury (western half of the Town) and Georgina (extreme southwestern portion of the Town).

The odour baseline conditions were determined using the framework provided in the Minister-approved (as amended) UYSS EA Terms of Reference Odour Work Plan.

Odour sampling was conducted at the Aurora, Bogart, and Newmarket Pumping Stations to assess the existing baseline conditions within the UYSS study area. Odour monitoring was conducted at the Holland Landing Water Pollution Control Plant (Lagoons) and the York Region Waste Management Centre in the Town of Newmarket.

The odour emission rates developed from the odour sampling program were used in odour based dispersion modelling to approximate the baseline odour conditions at the existing wastewater pumping stations. Field observations and a review of available existing data confirmed the baseline conditions as well as the locations of odour sensitive receptors that will be the subject of future analysis.

The existing information sources and field investigations indicated that odour impacts at existing odour sensitive receptors from the existing wastewater infrastructure are environmentally insignificant (i.e., less than one odour unit). The only existing odour sources along the proposed York Durham Sewage System Alternative Routes are the pumping stations.

The field investigations also determined that there are no existing odour sources at any of the short list of alternative Water Reclamation Centre Sites and conveyance infrastructure routes.
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Section 1.0
Introduction

This report documents the existing odour baseline conditions associated with the Upper York Sewage Solutions Environmental Assessment (UYSS EA) study area in accordance with the Odour Work Plan (Appendix A) included in the Minister of the Environment (Minister) approved UYSS EA Terms of Reference (as amended), and the March 13, 2012 letter to the Ministry of the Environment (MOE) titled "Implementation of the Upper York Sewage Solutions Environmental Assessment Terms of Reference Odour Work Plan" (Appendix B).

The approved UYSS EA Terms of Reference proposed the following investigative studies (individual work plans) for the purposes of generating a more detailed description and understanding of the environment and outlining how that generated information would be utilized in the screening, analysis and evaluation of alternatives and assessing the impacts associated with the preferred alternative during the UYSS EA:

- Agricultural
- Archaeological
- Cultural Heritage
- Natural Environment
- Land Use
- Noise and Vibration
- Odour

The approved UYSS EA Terms of Reference also stated that the results from undertaking each of these work plans will be documented in two reports during the EA as follows:

- Baseline Conditions Report
  - Documenting the results of collecting and reviewing available existing information sources and carrying out the proposed field investigations
- Impact Assessment Report
  - Documenting the results of the impact assessment including any additional required field investigations

Upon completion, each report would be made available during the UYSS EA to review agencies, First Nations and Métis organizations, and the public for their information via the project website and upon request and will become either a reference or supporting document to the submitted EA Report. The EA Report will be based on and reflect the information contained in the two reports.
1.1 Report Objectives and Organization

More specifically, the objectives of this report are:

- To identify and describe the existing odour conditions within the UYSS EA study area based on available existing information sources
- To document the results of field investigations carried out to supplement and enhance the available existing sources of information so that additional data is generated to carry out an impact assessment of the short list of Alternative Methods (i.e., the short list of Alternative Water Reclamation Centre Sites and associated conveyance infrastructure routes) and the York Durham Sewage System (YDSS) Modifications Alternative Routes

This report is organized as follows:

- **Section 2.0** describes the final study area associated with the UYSS EA
- **Section 3.0** describes the methodologies used during the baseline conditions study
- **Section 4.0** describes the existing odour sensitive receptors within the UYSS EA study area
- **Section 5.0** provides the description of the existing odour sources within the UYSS EA study area based on available existing information sources
- **Section 6.0** provides the description and results of the field investigations carried out for the short list of alternative Water Reclamation Centre Sites, associated conveyance infrastructure and the YDSS Modifications Alternative Routes
- **Section 7.0** provides a summary of existing odour conditions

Section 2.0

Upper York Sewage Solutions Study Area

A preliminary study area was defined as part of the UYSS EA Terms of Reference for generating a general description of the potentially affected environment with the intent of finalizing it during the UYSS EA. With this in mind, the finalized study area is similar to what was proposed in the approved UYSS EA Terms of Reference with a more substantive change in the south where the boundary was revised northerly reflecting the Preferred Alternative To the Undertaking.

The finalized study area for the UYSS EA extends north to Lake Simcoe, east to Woodbine Avenue, west to Bathurst Street, and south to Green Lane East where the east/west boundaries constrict to Yonge Street and Leslie Street, respectively, and the southern boundary terminates at St. John's Sideroad. The UYSS EA study area includes the Towns of Aurora (very northern portion of the Town), Newmarket (bounded by Yonge Street and Leslie Street), East Gwillimbury (western half of the Town) and Georgina (extreme southwestern portion of the Town). Figure 2.1 shows the boundaries of the UYSS service area and the final UYSS EA study area.
Figure 2.1

Upper York Sewage Solutions Study Area

October 2012
Section 3.0  
Methodology

Using the framework provided in the approved UYSS EA Terms of Reference Odour Work Plan, existing odour conditions within the final UYSS EA study area were identified and described through available existing information sources coupled together with field investigations.

The ambient or existing baseline odour conditions were quantified within a large geographic area in The Regional Municipality of York (York Region) to inform the Site selection process for the proposed Water Reclamation Centre and associated conveyance infrastructure routes as well as the York Durham Sewage System Modifications Route.

3.1  Available Existing Information Collection and Review

The approved UYSS EA Terms of Reference Odour Work Plan included a list of known available existing information sources, which have been collected and reviewed as part of determining existing odour conditions within the final UYSS EA study area. The sources of information utilized for this purpose are grouped according to the definition of the environment provided in the Environmental Assessment Act, namely the social environment as per the approved UYSS EA Terms of Reference.

The social environment encompasses the social conditions that influence the life of humans or a community. For purposes of the UYSS EA, the description of the social environment presents the communities within the final study area in terms of their populations, characteristics, etc.

Existing sources of information were collected and reviewed as follows:

- York Durham Sewage System Long Term Odour Control Strategy
- MOE Records of Complaints (i.e., odour) in the vicinity of the study area
- York Region Records of Complaints (i.e., odour) in the vicinity of the study area
- Environmental Compliance Approval (ECA) documents, previously termed Certificates of Approval (C of A)
- UYSS EA Land Use Baseline Conditions Report

3.2  Field Investigations

The approved UYSS EA Terms of Reference Odour Work Plan proposed a number of field surveys that were to be carried out during the EA to supplement and enhance available existing information sources ensuring that the data are comparable across the final UYSS EA study area and of sufficient detail to carry out an impact assessment on the short list of Alternative Methods (i.e., the short list of alternative Water Reclamation Centre Sites and associated conveyance infrastructure routes) and the YDSS Modifications Alternative Routes (see Section 5.0).
list of proposed field investigations was refined in the March 13, 2012 letter to MOE titled "Implementation of the Upper York Sewage Solutions Environmental Assessment Terms of Reference Odour Work Plan".

The following types of field investigations were carried out:

- Identification of existing and future planned odour sensitive receptors\(^1\) within the final UYSS EA study area based on the Land Use Baseline Conditions Report with confirmation by visual survey
- Identification of existing odour sources within the final UYSS EA study area
- Sampling of selected significant existing odour sources
- Ambient odour monitoring at selected locations

Field investigations of the UYSS EA study area were conducted on October 6, 2011, and May 29, 2012. The purpose of the field investigations was to identify the predominant existing background odour sources and sensitive receptor locations. The following sites were visited on one or both days:

- Aurora Pumping Station
- Newmarket Pumping Station
- Bogart Pumping Station
- Holland Landing Pumping Station
- Holland Landing Water Pollution Control Plant (Lagoons)
- Proposed Alternative Water Reclamation Centre Sites (Site 24, Site 30, Site WH1, Site WH2)

Figure 3.1 indicates the existing sewage servicing within York Region.

### 3.2.1 Identification of Odour Sensitive Receptors

Existing odour sensitive receptors (such as residences, daycares, schools, hospitals, and businesses) within the UYSS EA study area were identified based on a review of the UYSS EA Land Use Baseline Conditions Report and confirmed by a visual survey and review of satellite imagery. The results are discussed in Section 4.0.

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\(^1\) Odour sensitive receptors generally include residences, camping grounds, schools, community centres, day care centres, recreational centres and outdoor public recreational areas. For the purposes of this evaluation, businesses have been included as potential sensitive receptors.
3.2.2 Odour Source Identification

A visual survey of the UYSS EA study area was conducted to review/identify existing potential odour sources. The following facilities in particular were included in this survey:

- Aurora Pumping Station
- Newmarket Pumping Station
- Bogart Pumping Station
- Holland Landing Pumping Station
- Holland Landing Water Pollution Control Plant (Lagoons)

This survey indicated that odour sampling at select pumping stations would prove valuable in determining existing baseline conditions within the UYSS EA study area and along the Alternative Routes as part of the YDSS Modifications to service growth from Aurora and a portion of Newmarket.

It was later identified that odour monitoring at the York Region Waste Management Centre in Newmarket would also be useful to define existing conditions. This facility is not located within the UYSS EA study area; however, it was included because it is directly southeast of the UYSS EA study area boundary.

The odour sampling conducted as a result of this survey helped to define the existing conditions of odour for the three main pumping stations (Newmarket, Aurora, and Bogart) and the Holland Lagoons and York Region Waste Management Centre (via odour monitoring). The Holland Landing Pumping Station was not included in the sampling program because it is very similar to the Bogart Pumping Station in size, and is not located in such near proximity to residential receptors as the Bogart Pumping Station. The results are described in Section 6.0.
3.2.3 Odour Source Sampling at the Existing Pumping Stations

To assess the existing baseline conditions within the UYSS EA study area along the route of the proposed YDSS Modifications Alternative Routes required as part of the YDSS Modifications, an odour sampling program was conducted.

The Newmarket Pumping Station, Aurora Pumping Station, and Bogart Pumping Station will all form part of the YDSS Modifications, regardless of which Alternative Route is chosen. Therefore, odour sampling events were held at the Aurora, Newmarket, and Bogart Pumping Stations with the results provided in the Report, "Determination of Odour, Total Reduced Sulphur and TO-15 Volatile Organic Compounds from the Aurora, Newmarket and Bogart Pumping Station Exhausts" (see Appendix C).

The Aurora Pumping Station uses a chemical scrubber to handle odour emissions from the wet well. The scrubber typically operates from May to November. Both the inlet and the outlet of the scrubber that treats emissions from the wet well for odour, volatile organic compounds and total reduced sulphur compounds and volumetric flow rate were tested.

The Newmarket Pumping Station uses equalization tanks to hold sewage overflow. They are designed to be used in times of high flows or when a pumping station further downstream is shutdown. During regular operation the equalization tanks are empty. When the equalization tanks are in use, a scrubber operates to handle the odour emissions from the equalization tanks when they are being used to store wastewater. The inlet and outlet of the scrubber were tested for odour and volumetric flow rate, during an event when the pumping stations further downstream were shut down.

The Bogart Pumping Station is a small pumping station used to boost wastewater to the main forcemain that connects to the Aurora Pumping Station. The Bogart Pumping Station is not equipped with a scrubber. The odour sample obtained at Bogart Pumping Station was taken from the interior air above the wet well on the second floor below street level (the main access point). The sample was taken directly below the point of the ventilation fan pick-up. The volumetric flow rate of the vent was not measurable as the exhaust was not operating during the sampling, therefore to be conservative the flow rate was assumed to be the fan rating of the sidewall exhaust.

Each source was sampled in accordance with "Draft Ontario Source Testing Code (Version #3), June 2010, Part G: Method ON-6" (Method ON-6) and was sampled in triplicate. The samples were forwarded to CRA's odour laboratory and analyzed for odour Detection Threshold following ASTM E679-04 and EN 13725:2003 within 24 hours after collection.

Method ON-6 requires odour samples to be collected using the pre-dilution technique if any of the following criteria are met:

1. If it is determined that the stack gas temperature may degrade the sample container
2. If the moisture content of the stack gas will result in condensation forming in the sample container
3. If the odour intensity is great enough that it is likely to result in a positive response at
the highest dilution factor of the olfactometer

Prior to the sample collection it was determined that pre-dilution was not required. Odour
samples may be collected undiluted if appropriate according to Method ON-6. The sampling
train consisted of a vacuum lung with two sampling fittings. One of the fittings was attached to a
personnel pump used to evacuate the lung sampler during the odour sampling. The other fitting
was attached by a short length of tubing to a gas sample bag on the inside of the container, and
to tubing used as a sampling line on the outside of the container.

All tubing and fittings used for sampling are made of inert material (Teflon or Stainless Steel).
The sample bags were Nalophan. Bags are conditioned prior to sampling according to the Draft
Method ON-6. Teflon tubing is replaced with new tubing prior to collecting each set of odour
samples.

The sample bag was partially filled with air, purged and then refilled with the test sample.
Following collection, the samples were placed inside a dark-coloured (garbage) bag to prevent
photochemical reactions of the odourous compounds.

Samples were then transported to the CRA Odour Lab within 24 hours of collection where they
were presented to an 8-member panel using an AC'SCENT® Dynamic Dilution Forced-Choice
Triangle Olfactometer to determine the Detection Threshold. One laboratory blank was filled
with carbon filtered air and analyzed.

The Detection Threshold is the point at which statistically 50 percent of the panel can detect the
odour. The Detection Threshold is a dilution factor, and therefore, has no units. For
convenience, the Detection Threshold is expressed in odour units (OU). The odour emission
rate from each sampling location was determined by multiplying the Detection Threshold by the
flow rate at the time of sampling.

CRA's Odour Lab conforms to the European Standard EN13725:2003, as well as the MOE
standard, and ASTM E544-99 standard.

CRA's odour concentration evaluations for detection and recognition thresholds are conducted
in accordance with ASTM Standard Practice E679-04, "Standard Practice for Determination of
Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series Method of
Limits" and EN 13725, "Air Quality - Determination of odor concentration by dynamic
olfactometry". These evaluations are performed using the AC'SCENT® Dynamic Dilution
Forced-Choice Triangle Olfactometer. The AC'SCENT® Dynamic Dilution Forced-Choice
Triangle Olfactometer complies with all aspects of ASTM E679-04 standard as well as the
operational requirements of EN 13725, "Air Quality - Determination of Odour Concentration by
Dynamic Olfactometry".

The odour evaluation panels consist of eight individual assessors that are selected and trained
following the "Guidelines for Selection and Training of Sensory Panel Members" (ASTM Special
Technical Publication – STP 758) and EN 13725. The odour panelists are trained using
40 parts per million n-butanol calibration gas as required in EN 13725. Panelists found to be significantly insensitive or oversensitive are removed from the panel.

Odour sample bags are allowed to equilibrate to laboratory ambient temperature for a period of not less than one hour prior to evaluation with the olfactometer. Samples are consumed during the evaluation. The olfactometer is calibrated prior to each testing session.

As part of the laboratory QA/QC, all samples are retrospectively screened as required by EN 13725:2003. Retrospective Screening is carried out on the basis of parameter ΔD, the ratio between an individual threshold estimate and the geometric mean of all individual threshold estimates in a measurement. Assessors with a ΔD lower than –5.0 or greater than 5.0 are eliminated from the results. The purpose is to exclude panel members that show a deviant response due to health factors or specific hyperosmia or anosmia to the odour.

3.2.4 Ambient Odour Sampling at the Holland Landing Water Pollution Control Plant and Waste Management Centre

Odour monitoring was conducted at the Holland Landing Water Pollution Control Plant (Lagoons) and the York Region Waste Management Centre in the Town of Newmarket.

The Holland Landing Water Pollution Control Plant (Lagoons) is located at 19932 Cedar Street in the Town of East Gwillimbury. The Lagoons are surrounded by the Holland Landing Prairie Provincial Nature Reserve to the north-west, a mature deciduous swamp and mixed forest to the north, a residential subdivision and the East Holland River to the west, and an early successional woodlot with rural residential properties to the south and east. The Holland Landing Water Pollution Control Plant (Lagoons) treats sewage from portions of the Town of East Gwillimbury and discharges treated effluent to the East Holland River.

The York Region Waste Management Centre is located at 100 Garfield Wright Boulevard in the Town of Newmarket and is surrounded by agricultural land to the north and east, and an industrial subdivision to the south and west of the facility as shown in Appendix D. This facility is not located within the UYSS EA study area; however, it was included because it is directly southeast of the UYSS EA study area boundary. The facility has a solid waste transfer station, a food waste transfer station, a process for mixed Blue Box recyclables, and an education centre. The facility has been in operation since July 4, 2005.

Odours are best detected and qualified with the human nose. However, it is difficult to quantify the intensity of an odour with the nose alone. In order to measure odour intensity at the Holland Landing Water Pollution Control Plant (Lagoons) and the York Region Waste Management Centre, the Nasal Ranger field olfactometer was used.

The Nasal Ranger provides a quantitative measure of odour by mixing odourous ambient air with odour free filtered air at selectable dilution ratios, called dilution-to-threshold (D/T) ratios. The D/T ratio is a measure of the number of dilutions needed to make the odourous ambient air non-odourous.
A precision electronic flow meter built into the Nasal Ranger barrel measures the total volume of mixed airflow traveling down the barrel on the way to the nasal mask. The readout display recessed on top of the Nasal Ranger housing shows the user when the inhalation flow rate is within the required 16–20 litres per minute.

The rotational position of the Nasal Ranger D/T dial determines the orifice size and therefore the volume of odourous air that enters through the selected orifice. The principle of field olfactometry calculates the D/T ratio as follows:

\[
\text{D/T} = \frac{\text{Volume Carbon Filtered Air}}{\text{Volume of Odourous Air}}
\]

When using the Nasal Ranger, odours will fall within the D/T range of less than 2-D/T, to greater than 60-D/T.

All monitoring events took place in May 2012 and were conducted using the Nasal Ranger Field Olfactometer. Field data collected during the monitoring events and maps marking the monitoring locations for each event are provided in Appendix D.

Atmospheric conditions for the testing period were recorded prior to taking odour measurements. Wind speed, wind direction, and temperature were noted on the field datasheets provided in Appendix D.

At each measurement location where a definitive odour was detected, the Nasal Ranger was used to obtain the odour dilution ratio. The approximate time of each location measurement was recorded. The Nasal Ranger was first positioned to the BLANK position to zero the operator’s nose. The D/T dial was then turned to the 60-D/T position, and the operator inhaled at a rate of 16-20 L/min. The operator continued the procedure of blanking and turning the dial to lower D/T positions until an odour was detected. The resulting D/T ratio was recorded and the operator continued to the next sampling location. If an odour was not detected, then the D/T ratio was record as "less than 2" (< 2). A flow chart further detailing the testing procedure is provided as Appendix E.

Upon detecting an odour, the smell was described based on an odour classification system provided in Appendix F. The classification system uses codes relating to odour descriptors in order for the operator to qualify the smell. The descriptor code was recorded on the field data sheet. If a smell occurred which was not on the data sheet, then the operator's personal description was noted.

### 3.2.5 Odour Based Dispersion Modelling

Air dispersion modelling was performed using the United States Environmental Protection Agency (USEPA) multi-source dispersion model AERMOD, as prescribed by Ontario Regulation 419/05 (O. Reg. 419/05). AERMOD is an advanced steady-state plume model that has the ability to incorporate building cavity downwash, actual source parameters, emission
rates, terrain and historical meteorological information to predict ground level concentrations at specified locations.

Odour based dispersion modelling was performed using a tiered receptor grid as described by O. Reg. 419/05 and the MOE technical bulletin entitled "Methodology for Modelling Assessments with 10-Minute Average Standards and Guidelines under O. Reg. 419/05", dated April 2008.

A Tier 1 assessment, per the technical bulletin, was performed to determine odour ground level concentrations. A Tier 1 assessment is an air dispersion model constructed as prescribed by O. Reg. 419/05 and using a tiered receptor grid to model for a 1-hour averaging period at ground level. All modelled results are then converted to a 10-minute averaging period. The removal of meteorological anomalies is allowed for determination of the maximum compliance odour value.

**Modelling Executables**

The following United States Environmental Protection Agency (USEPA) executables were used in the assessment:

- AERMOD digital terrain pre-processor (AERMAP), version 11103
- AERMIC air dispersion model (AERMOD), version 11353
- Building Profile Input Program (BPIP), version 04274

**Meteorological Data**

Five years of pre-processed meteorological data (surface and profile files) was obtained from the MOE for Toronto for the years 1996 to 2000. The AERMOD models were run to calculate the maximum 1-hour ground level concentrations for odour. The meteorological conditions which would result in the maximum concentration would typically be stable atmospheric conditions such as an inversion with low wind speed. The maximum hour or averaging period out of 43,800 hours of data would not occur at each grid point simultaneously since the wind can only blow in one direction at a given time.

The MOE provides AERMOD meteorological data sets for three different land uses. Based on the surrounding land use of the proposed Facility, the "crops" data set was selected.

**Averaging Periods and Time-Based Concentration Conversion**

Odour levels are based on 10-minute concentrations of 1 odour unit (OU). An OU for a compound is defined as a threshold where 50 percent of the population would detect, but not identify, the odiferous compound. This definition is normally applied at odour sensitive receptors.

All concentrations at the receptors were modelled. As AERMOD cannot model averaging periods less than 1 hour, the 1-hour averaging period was used with the resulting predicted
concentrations converted to the shorter 10-minute averaging period using the MOE conversion factor of 1.65.

**Digital Elevation Model Data**

Digital elevation model data was obtained from the MOE. The Digital Elevation Model data was used to include effects of terrain in the modelling. The terrain used is from the MOE Digital Elevation Model dataset tile091.

Digital Elevation Model data was preprocessed with AERMAP for use with AERMOD.

**Source Input Parameters**

The odour exhaust vents at each of the pumping stations were modelled as point sources based on their physical description. Source parameters and locations were based on information collected during source testing events in 2011.

A summary of the AERMOD source input parameters are provided in Table 3.1.

**Table 3.1: Summary of AERMOD Source Input Parameters for Pumping Stations**

<table>
<thead>
<tr>
<th>Pumping Station</th>
<th>Description</th>
<th>Orientation</th>
<th>Height (m)</th>
<th>Temperature (K)</th>
<th>Velocity (m/s)</th>
<th>Diameter (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora PS</td>
<td>Scrubber Exhaust Stack</td>
<td>Vertical</td>
<td>7.92</td>
<td>287.15</td>
<td>11.116</td>
<td>0.914</td>
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<tr>
<td>Bogart PS</td>
<td>Exhaust Vent</td>
<td>Horizontal</td>
<td>1.22</td>
<td>273.75</td>
<td>0.708</td>
<td>1.3</td>
</tr>
<tr>
<td>Newmarket PS</td>
<td>Scrubber Exhaust Stack</td>
<td>Vertical</td>
<td>5.1</td>
<td>285.45</td>
<td>13.03</td>
<td>0.648</td>
</tr>
</tbody>
</table>

**Tiered Receptor Grid**

A tiered receptor grid was defined for each pumping station based on a bounding box that encapsulates all the modelled sources at the station. The grid was then tiered starting from the edge of the bounding box with a fine resolution, and progressing to coarser resolutions at further distances. All tiered distances were defined relative to the bounding box. The receptor grid used for each station is described as follows:

- 20 m spacing within 200 m of the edge of the bounding box
- 50 m spacing from 200 to 500 m
- 100 m spacing from 500 to 1,000 m
- 200 m spacing from 1,000 to 2,000 m
- 500 m spacing from 2,000 to 5,000 m

For each of the short list of alternative Water Reclamation Centre Sites, a property line ground level receptor grid with 10 m spacing was used to evaluate the maximum property boundary
concentration. Property lines were estimated using Google Earth and by identifying visible fence lines. No receptors were placed inside the property boundaries of the proposed alternative Water Reclamation Centre Sites.

On-Site Building Data

All on-site buildings for each pumping station were modelled in AERMOD to account for building cavity downwash. Cavity downwash can result in odour being forced to ground level prematurely under certain meteorological conditions, which can result in higher than expected near-field odour levels. Roof heights of on-site buildings were estimated using Google Streetview and Google Earth.

The USEPA Building Profile Input Program (BPIP) was used to calculate downwash effects for each station for use with the AERMOD model.

3.2.6 Description of the Short List of Alternative Methods and York Durham Sewage System Modifications

Short List of Alternative Water Reclamation Centre Sites

As part of the UYSS EA screening process, four alternative Water Reclamation Centre Sites were selected as the short list of Alternative Methods to be carried forward for comparative evaluation (see Appendix G) as follows:

- Site 24 located on the west side of 2nd Concession north of Queensville Sideroad (i.e., 20704 2nd Concession Road, East Gwillimbury)
- Site 30 located on the east side of Leslie Street north of Queensville Sideroad and south of Holborn Road (i.e., 20913 Leslie Street, East Gwillimbury)
- Site WH 1 located north of Queensville Sideroad just south of Holborn Road between 2nd Concession and Leslie Street (i.e., 20908/20854 Leslie Street, East Gwillimbury)
- Site WH 2 located on the east side of 2nd Concession just north of Queensville Sideroad (i.e., 1004 Queensville Sideroad / 20709-20733 2nd Concession, East Gwillimbury)

Conveyance Infrastructure Routes

Following the identification of the short list of alternative Water Reclamation Centre Sites, infrastructure routes for conveying the collected wastewater to the proposed Water Reclamation Centre for treatment and for conveying the treated effluent from the facility to a discharge location in the East Holland River were identified for each of the short-listed alternative Water
Reclamation Centre Sites. **Appendix G** depicts the conveyance infrastructure routes to/from each of the short list of Alternative Water Reclamation Centre Sites.

Detailed information regarding the short list of alternative Water Reclamation Centre Sites and the conveyance infrastructure routes are provided in the "Screening of the Long List of Potential Alternative Water Reclamation Centre Sites and Development of the York Durham Sewage System Modifications (May 2012)".

**York Durham Sewage System (YDSS) Modifications: Alternative Routes**

Modifying the existing YDSS through the Town of Newmarket is also proposed as part of the Preferred Alternative To the Undertaking. To provide additional system reliability during high flow conditions, the existing YDSS would be upgraded to accommodate additional flows from the Towns of Newmarket and Aurora. The proposed modifications provide sufficient capacity for approved growth to 2031 and relief to the existing conveyance system during periods of extreme high flow during wet weather events (snowmelt, rainstorms) or during system maintenance operations at the Newmarket, Bogart Creek, and Aurora Pumping Stations.

As a result, three alternative routes were developed for additional wastewater conveyance from the existing Newmarket and Bogart Creek Pumping Stations to the existing Aurora Pumping Station and existing YDSS (see **Appendix G**). Detailed descriptions of the YDSS Modifications Alternative Routes are provided in the Screening of the Long List of Potential Alternative Water Reclamation Centre Sites and Development of the York Durham Sewage System Modifications (May 2012).

**Section 4.0**

**Description of Existing Odour Sensitive Receptors**

Existing odour sensitive receptors (such as residences, daycares, schools, hospitals, and businesses) have been identified based on a review of the UYSS EA Land Use Baseline Conditions Report.

**Figure 4.0** presents the land use and heritage resource sites surrounding the four short-listed alternative Water Reclamation Centre Sites and the larger UYSS EA study area.

In addition to a general survey of the study area, the following specific locations within the study area were visited:

- Aurora Pumping Station
- Bogart Pumping Station
- Newmarket Pumping Station
- Holland Landing Water Pollution Control Plant (Lagoons)
- Holland Landing Pumping Station
Proposed Alternative Water Reclamation Centre Sites (Site 24, Site 30, Site WH1, Site WH2)

Aurora Pumping Station

The Aurora Pumping Station is located at 242 St. John's Sideroad East, at the northern terminus of Industrial Parkway. Odour sensitive receptors in the surrounding area include residential and greenspace (McKenzie Marsh). St. Andrews Valley Golf Club, a semi-private club, is located east and north of the facility.

There are no schools or churches in the Town of Aurora that are located within the UYSS EA study area. A professional office at the corner of Yonge Street and St. John's Sideroad and the St. Andrews Valley Golf Club are the only businesses in the Town of Aurora that are located within the UYSS EA study area.

Bogart Pumping Station

The Bogart Pumping Station is located in a low lying area in the middle of a residential district, at 242 Hamilton Drive in Newmarket. The Bogart Pumping Station does not have a scrubber or any emission controls. There are residences within 50 m of the property. The facility's wet well exhausts are not normally turned on.
Figure 4.1

Legend

Conceptual Routes
- Alternative A
- Alternative B
- Alternative C

WRC Potential Sites (Short List)
Heritage Resource Sites
Greenbelt Natural Heritage System

Waterbody
River - Intermittent
River - Single Line
Wetland
UYSSolutions Service Area
Lower Tier Municipalities

LandUse
- Active Aggregate
- Commercial
- Estate Residential
- Golf Course
- Industrial
- Institutional
- Intensive Agriculture
- Manicured Open Space
- Natural Heritage Feature
- Non-intensive Agriculture
- Rural Development
- Urban

Existing Approved Holland Landing Lagoon Water Pollution Control Plant

October 2012

Legend

Conceptual Routes
- Alternative A
- Alternative B
- Alternative C

WRC Potential Sites (Short List)
Heritage Resource Sites
Greenbelt Natural Heritage System

Waterbody
River - Intermittent
River - Single Line
Wetland
UYSSolutions Service Area
Lower Tier Municipalities

LandUse
- Active Aggregate
- Commercial
- Estate Residential
- Golf Course
- Industrial
- Institutional
- Intensive Agriculture
- Manicured Open Space
- Natural Heritage Feature
- Non-intensive Agriculture
- Rural Development
- Urban

Existing Approved Holland Landing Lagoon Water Pollution Control Plant

October 2012
Newmarket Pumping Station

The Newmarket Pumping Station is located at 380 Bayview Parkway, at the Bayview Operations Centre. The surrounding land use is residential and greenspace. The Newmarket Pumping Station has one scrubber that operates only when the equalization tanks are in use.

Holland Landing Water Pollution Control Plant Lagoons

The Holland Landing Water Pollution Control Plant (Lagoons) is located at 19932 Cedar Street, East Gwillimbury, Ontario. The Water Pollution Control Plant (Lagoons) is surrounded by the Holland Landing Prairie Provincial Nature Reserve to the north-west, a mature deciduous swamp and mixed forest to the north, a residential subdivision and the East Holland River to the west, and an early successional woodlot with rural residential properties to the south and east. The Holland Landing Water Pollution Control Plant (Lagoons) treats sewage from portions of East Gwillimbury and discharges treated wastewater effluent to the East Holland River. The site includes four wastewater stabilization lagoons.

Holland Landing Pumping Station

The Holland Landing Pumping Station, located on Bradford Street in Holland Landing, is a small Facility (similar in size to the Bogart Pumping Station). The Holland Landing Pumping Station does not have a scrubber or any emission controls. The surrounding land use is greenspace and some residential. The nearest residence is approximately 100 m away from the facility.

Section 5.0
Description of Existing Odour Sources within the UYSS EA Study Area

This Section provides an overview of the existing odour conditions within the UYSS EA study area based on the results of collecting and reviewing available existing information sources. This Section also provides odour monitoring results to quantify existing odour sources in the UYSS EA study area.

5.1 Overview of Existing Odour Conditions within the UYSS EA Study Area

A review of existing information sources, including the MOE's Environmental Compliance Approval database, the York Region environmental complaints database, and the MOE's records of complaints for the UYSS EA study area was conducted. The following is an overview of the findings of this review:
The majority of permitted facilities in the study area have only minor probability of potential off-site odour impacts, which were considered to be environmentally insignificant.

Two existing permitted facilities have potentially odourous sources, but were determined to be environmentally insignificant contributors to the existing baseline conditions due to separation distances.

The York Region's environmental complaints records indicate that the odour related complaints were isolated incidences. There is no evidence of chronic odour problems related to the existing YDSS wastewater infrastructure.

Based on the MOE environmental complaint data available for the UYSS EA study area, it does not appear that the existing YDSS wastewater infrastructure was the cause of the odour complaints on record.

### 5.1.1 Review of Ministry of the Environment Environmental Compliance Approval Database

One-hundred and seventy-seven (177) Environmental Compliance Approvals issued by the MOE, formerly termed Certificates of Approval, were reviewed for the existing commercial and industrial facilities within the study area.

The facilities were reviewed based on the permitted environmental sources that may have associated odour emissions. The location of the potentially odourous facilities was assessed against the locations of the four alternative Water Reclamation Centre Sites and the YDSS Modifications Alternative Routes. They were determined to be environmentally insignificant contributors to the existing baseline conditions at these locations due to separation distances. The rest of the study area was determined to have only facilities with minor probability of potential off-site odour impacts, which were also considered to be environmentally insignificant.

### 5.1.2 Review of York Region Complaint Database

York Region provided a summary of the environmental complaints received dating back to 2004 for the existing wastewater infrastructure in the UYSS EA study area. A copy of the environmental incident form was provided for each complaint on record. These forms are provided in Appendix H. The majority of the complaints were odour related. One complaint pertained to dust.

**Town of Aurora**

Three odour complaints were documented for the Aurora Pumping Station. The first, received on August 30, 2004, was from a resident nearby. The complaint was determined to correlate to

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3 Permitted facility refers to a Facility that has an Environmental Compliance Approval issued by the MOE.
the cleaning of the dumping pad at the pumping station that day. The wind direction was from the northeast, towards the residence in question.

A second report of odour from the same resident was received on October 27, 2004. The wind was again from the northeast, towards the residence. The odour was found to be related to a small spill that occurred during the cleaning of the dumping pad.

The third and final odour complaint on record relating to the Aurora Pumping Station, reported on October 24, 2008, was believed to be related to a manhole cave-in at the pumping station.

Based on a review of these complaints, it seems that odour has not been an ongoing issue at the Aurora Pumping Station in recent years. The facility is equipped with an odour controlling scrubber that operates during May through November to mitigate odour during the warmer months. The complaints received all relate to isolated incidents that were dealt with to prevent future odour issues.

**Town of Georgina**

One odour complaint was documented by York Region for the Town of Georgina, dated August 18, 2006. A resident complained of a wastewater odour in the area. It was believed to be related to proximity of a vent pipe to the residence. The pipe was relocated as a result of the complaint. No further complaints were received.

**Town of Newmarket**

One odour complaint was documented by York Region for the Newmarket area, dated June 15, 2007. A resident on Bosworth Court complained of a sewage odour in the area near Hound Trail Flume. Due to the hot temperatures, H₂S was being produced in the sewer lines and escaping from the collection system. Odours did not persist in the area.

**Bogart Pumping Station**

One odour complaint was documented by York Region for the Bogart Pumping Station. The complaint was received on August 26, 2010 from a nearby resident. The follow-up team did not identify any odour at the facility. The odour was not confirmed as originating from the Bogart Pumping Station. A nearby composting facility was investigated but there was no odour discharge identified at the time of the complaint.

**Holland Landing Water Pollution Control Plant (Lagoons)**

Four odour complaints were documented for the Holland Landing Water Pollution Control Plant (Lagoons), dated September 1, 2004, April 8, 2005, November 14, 2005, and April 8, 2011. The lagoons tend to produce the most odour during spring turnover, when the ice thaws.
5.1.3 Review of Ministry of the Environment Complaint Database

The MOE provided a tabulated summary of the number and type of complaints received within the UYSS EA study area from 2007 to 2011 (see Appendix I). The majority of the complaints received were odour related as summarized below.

Town of Aurora

Six odour complaints were received for the area in the Town of Aurora bounded by St. John’s Sideroad, Wellington Street, Yonge Street, and Industrial Parkway North. No data was available from MOE on the nature/character of the odour complaints, or whether the complaints were related to existing wastewater infrastructure in the area. The Aurora Pumping Station is located directly north of this area. In the absence of more complete data, it is unknown if the odour complaints were related to the Aurora Pumping Station. As mentioned, the Aurora Pumping Station is equipped with an odour controlling scrubber, so it is unlikely.

Town of Newmarket

One-hundred and thirty nine complaints were received for the area in the Town of Newmarket bounded by Mulock Drive, Davis Drive, Bayview Avenue/Prospect Street, and Highway 404. MOE has indicated that the majority of these complaints were related to the same source. MOE also indicated that the character of the odour was described as “dirty diapers, sewage, and garbage”. While MOE cannot identify the source of the odour, it is not likely that these complaints were in relation to existing YDSS infrastructure based on proximity and nature of the odour. While the Bogart Pumping Station is located within these bounds, it is a very small source and there is only one odour complaint on record with York Region regarding the Bogart Pumping Station over the last eight years. A review of facilities in the area with the potential to emit the described odours would indicate that a facility unrelated to the wastewater infrastructure is most likely responsible for the high number of odour complaints.

Twenty-three odour complaints were received from the area in the Town of Newmarket bounded by Mulock Drive, Davis Drive, Yonge Street, and Bayview Avenue/Prospect Street. No data was available from MOE on the nature/character of the odour complaints. There are no pumping stations located within this area of the UYSS EA study area, although the existing YDSS conveyance route does pass through this part of the Town of Newmarket.

The odour complaints described above account for 93 percent of the total odour complaints received for the Town of Newmarket. The remaining complaints are documented in Appendix I.

Town of East Gwillimbury

There were nine odour complaints received by MOE for the area in the Town of East Gwillimbury bounded by Leslie Street, Green Lane, Doane Road, and Woodbine Avenue. There were four odour complaints received for the area bounded by Mount Albert Road, Green
Lane, Yonge Street, and Bayview Avenue. These complaints account for 77 percent of the odour complaints received for the Town of East Gwillimbury. The remaining complaints are documented in Appendix I.

No data was available from MOE on the nature/character of the odour complaints. These areas are well removed from the four alternative Water Reclamation Centre Sites, the Holland Landing Water Pollution Control Plant (Lagoons), and the Holland Landing Pumping Station.

Town of Georgina

MOE had only one odour complaint on record for the Town of Georgina, from the area bounded by Old Homestead Road, Morton Avenue, Metro Road North, and Woodbine Avenue. No data was available on the nature/character of the odour complaint. While MOE could not identify the source of the odour, it is not likely that these complaints were in relation to the existing YDSS infrastructure based on proximity.

5.1.4 Results of Ambient Odour Sampling

Holland Landing Water Pollution Control Plant (Lagoons)

Four monitoring events were conducted between May 3 and May 18, 2012 at the Holland Landing Water Pollution Control Plant (Lagoons). Three out of the four monitoring events (May 10, May 11, and May 18, 2012) were conducted on warm, sunny and humid days as these conditions may be more odourous; and one monitoring event (May 3, 2012) was conducted during cloudy, overcast and wet conditions. Monitoring events took place at varying times of the day; morning, afternoon and evening in case the time of day made a significant difference in odour detection. On May 10 and May 11, 2012, there were moderate winds whereas on May 3 and May 18, 2012, it was calm and there was a light breeze.

In general, odour was detected between 2 and 4 Dilution-to-Threshold (D/T) at the four lagoon locations monitored. An earthy odour was detected and could be further described as grassy, musty, peat-like and swampy. The odour detected was characteristic of wet soil and standing water. At higher wind speeds, a slight sewage smell could be detected briefly. On May 3, 2012, odour was detected at 7 D/T at lagoon location No. 2 (as defined in Appendix D), and could be described as an offensive decay odour. It was found that time of day did not make a significant difference in odour detection.

There is a small residential subdivision to the east of the Holland Landing Water Pollution Control Plant (Lagoons). A review of the complaints history, as described in Section 5.1.2 and Section 5.1.3 indicates that only four odour complaints have been documented for the Holland Landing Water Pollution Control Plant (Lagoons) since 2004. Based on the complaint records and the generally low D/T detections in the vicinity of the lagoons, odour does not appear to be negatively affecting the residential area.
York Region Waste Management Centre

One monitoring event was conducted at the facility on May 18, 2012. It was mainly sunny and winds were calm with a light breeze. Two locations on Garfield Wright Boulevard between Woodbine Avenue and Bales Drive East facing north (towards the facility) were monitored in the early evening. Odour was detected at 15 D/T for both locations and could be characterized as an offensive decay odour; and an offensive sour and stinky garbage odour.

The York Region Waste Management Centre is not located within the UYSS EA study area, but because it is directly southeast of the boundary it was included in the monitoring. Based on the results of the monitoring, potential adverse odour effects from the York Region Waste Management Centre are not expected to extend into the UYSS EA study area.

Section 6.0
Description of the Existing Odour Conditions based on Field Investigations for the Alternative Methods

This Section describes the existing odour conditions associated with the short list of Alternative Methods (i.e., the short list of alternative Water Reclamation Centre Sites and associated conveyance infrastructure) and the YDSS Modifications Alternative Routes.

6.1 Short List of Alternative Water Reclamation Centre Sites and Conveyance Infrastructure Routes

Descriptions of each of the four proposed alternative Water Reclamation Centre Sites, surrounding areas, and potential odour sensitive receptors in the vicinity of the identified suitable areas4 for each Site and adjacent to the conveyance routes are outlined below. Appendix G shows the suitable areas for each Site. All of the Sites are rural in character.

The number of odour sensitive receptors potentially affected will be confirmed following the development of the alternative Water Reclamation Centre facility design layout/footprint for each of the short list Alternative Water Reclamation Centre Sites.

Site WH2

Site WH2 is located on the east side of 2nd Concession just north of Queensville Sideroad (i.e., 1004 Queensville Sideroad/20709-20733 2nd Concession, East Gwillimbury). Site WH2 is located on agricultural land that was not observed to be actively farmed during field investigations. A major hydro corridor crosses Site WH2 in the north-west corner.

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4 The Water Reclamation Centre facility design layout/footprint will be located within the suitable area.
The Site is adjacent to existing residential dwellings along 2nd Concession and future residential land use zones on the south side of Queensville Sideroad. Potential odour sensitive receptors in the vicinity of the suitable area of Site WH2 are along 2nd Concession and Queensville Sideroad and are primarily residential.

Site 24

Site 24 is located on the west side of 2nd Concession, north of Queensville Sideroad (i.e., 20704 2nd Concession, East Gwillimbury). Site 24 is currently actively farmed agricultural land and a major hydro corridor crosses Site 24 in the south east corner.

Potential odour sensitive receptors in the vicinity of the suitable area of Site 24 are located just north of the Site adjacent to 2nd Concession and are residential.

Site WH1

Site WH1 is located north of Queensville Sideroad just south of Holborn Road between 2nd Concession and Leslie Street (i.e., 20908/20854 Leslie Street, East Gwillimbury). The Site is located on agricultural land and not observed to be actively farmed during field investigations. A major hydro corridor crosses Site WH1 from the south-west corner to the north-east.

Potential odour sensitive receptors in the vicinity of the suitable area on the west portion of Site WH1 are similar to those near Site 24. The receptors are residential and located just north and south of the Site along Leslie Street.

The east portion of the Site is immediately adjacent to the Queensville Cemetery located to the south and adjacent residential dwellings along Leslie Street. Potential odour sensitive receptors in the vicinity of the suitable area on the east portion of Site WH1 are residential and located just north and south of the Site along Leslie Street.

Site 30

Site 30 is located on the east side of Leslie Street north of Queensville Sideroad and south of Holborn Road (i.e., 20913 Leslie Street, East Gwillimbury). Site 30 is located on agricultural land but was not observed to be actively farmed during field investigations.

The Site is located on the opposite side the Queensville Cemetery of Leslie Street and adjacent to existing residential dwellings along Leslie Street.

The Highway 404 extension, currently under construction, is adjacent to Site 30 on the east side and the current alignment for the future approved Bradford Bypass is adjacent to Site 30 on the north side.

Potential odour sensitive receptors in the vicinity of the suitable area of Site 30 are similar to the east portion of Site 30 and are residential and located just north and south of the Site along Leslie Street.
6.2 York Durham Sewage System Modifications
Alternative Routes

The following provides a brief description of the area surrounding the YDSS Modifications Alternative Routes and associated odour sources. Section 6.2.4 describes odour emission rates associated with these sources.

6.2.1 Alternative Route A

Alternative Route A is located in an urban area that is a mix of urban, residential, parks and open space, and conservation areas.

The only odour sources along Alternative Route A are the pumping stations that are part of the existing YDSS wastewater infrastructure.

6.2.2 Alternative Route B

Alternative Route B is located in a developed urban area and is routed between a mix of parks and open space areas and urban residential areas. A portion of Alternative Route B follows Prospect Street.

The only odour sources along Alternative Route B are the pumping stations that are part of the existing YDSS wastewater infrastructure (see Section 4.0).

6.2.3 Alternative Route C

Alternative Route C is located in a developed urban area and is routed between a mix of open space (not provincially significant), urban residential land use, and along the existing Bayview Avenue and St. John's Side Road corridor.

The only odour sources along Alternative Route C are the pumping stations that are part of the existing YDSS wastewater infrastructure (see Section 4.0).

6.2.4 Odour Emission Rates at Existing Pumping Stations

As mentioned in Section 3.2.3, odour sampling events were held at the Aurora, Newmarket, and Bogart Pumping Stations with the results provided in the Report, "Determination of Odour, Total Reduced Sulphur and TO-15 Volatile Organic Compounds from the Aurora, Newmarket and Bogart Pumping Station Exhausts" (see Appendix C).
The average odour emission rate calculated for the scrubber outlet at the Aurora Pumping Station, as determined based on the odour source testing data, is 411.2 OU m³/s. Based on the inlet and outlet results, the calculated removal efficiency of odour for the Aurora Pumping Station scrubber is 93 percent.

The average odour emission rate calculated for the scrubber outlet at the Newmarket Pumping Station, as determined based on the odour source testing data, is 116.1 OU m³/s. Based on the inlet and outlet results the calculated removal efficiency of odour for the Newmarket Pumping Station scrubber is 87 percent.

The average odour emission rate calculated for the Bogart Pumping Station sidewall exhaust, as determined based on the odour source testing data, is 14.4 OU m³/s. The Bogart Pumping Station is not equipped with a scrubber.

Based on the results of the odour modelling assessment, and after removal of meteorological outliers, as provided by MOE guidance:

- For the Aurora Pumping Station, the maximum off-site 10-minute odour concentration was predicted at 0.87 OU and is located west of the scrubber exhaust stack along the fence line.
- For the Newmarket Pumping Station, the maximum off-site 10-minute odour concentration was predicted at 0.71 OU and is located west of the scrubber exhaust stack along the west fence line.
- For the Bogart Pumping Station, the maximum off-site 10-minute odour concentration was predicted at 1.70 OU and is located east of the passive exhaust vent along the fence line.

The odour modelling results are considered to be extremely conservative because sampling was conducted during worst-case odour conditions, i.e., when the scrubber is in operation during the summer months (Aurora Pumping Station), during an overflow event (Newmarket Pumping Station) or when the wet well exhaust is turned on (Bogart Pumping Station).

The odour emissions from the Newmarket Pumping Station and the Aurora Pumping Station are considered to be insignificant because they do not exceed 1 OU at the property line.

The 1.7 OU maximum off-site odour concentration obtained for the Bogart Pumping Station was along the fence line. A review of the odour concentrations at the nearest residences yielded the following:

- residence to the northwest of the Bogart Pumping Station sidewall vent, 0.7-0.8 OU (max)
- residence directly south of the Bogart Pumping Station sidewall vent, 0.4-0.5 OU (max)
- residence to the southwest of the Bogart Pumping Station sidewall vent, 0.4-0.9 OU (max)
An odour sample was also taken at the property line of the Bogart Pumping Station. The odour laboratory analysis indicated that this sample had a Detection Threshold of 7 OU. This Detection Threshold is typical of what would be expected of a 'blank' or 'background' sample analyzed in the odour laboratory. Based on this information and the odour concentrations at the residences, as noted above, the odour emissions from the Bogart Pumping Station are not considered significant.

The odour emissions from the Holland Landing Pumping Station are assumed to be similar to the Bogart Pumping Station based on the size of the facility. Therefore, the odour emissions from the Holland Landing Pumping Station are not considered to be significant, as the odour sensitive receptors in the vicinity of the facility are located at a greater separation distance than those near the Bogart Pumping Station. The nearest residence is approximately 100 m away from the facility.

The following odour contour plots have been generated based on the results of the odour dispersion modelling:

- Figure 6.1 - Odour Contours Aurora Pumping Station
- Figure 6.2 - Odour Contours Bogart Pumping Station
- Figure 6.3 - Odour Contours Newmarket Pumping Station
Legend

Odour Contours (OU)

NOTE:
The maximum predicted 10-minute odour concentration after removal of meteorological outliers is 0.87 OU.
Legends

Odour Contours (OU)

NOTE:
The maximum predicted 10-minute odour concentration after removal of meteorological outliers is 1.70 OU.
Legend

- Odour Contours (OU)

NOTE:
The maximum predicted 10-minute odour concentration after removal of meteorological outliers is 0.71 OU.
Section 7.0
Summary

The odour baseline conditions study was conducted to identify and describe the existing odour conditions within the UYSS EA study area. The UYSS EA study area extends north to Lake Simcoe, east to Woodbine Avenue, west to Bathurst Street, and south to Green Lane East where the east/west boundaries constrict to Yonge Street and Leslie Street, respectively, and the southern boundary terminates at St. John's Sideroad. The UYSS EA study area includes the Towns of Aurora (very northern portion of the Town), Newmarket (bounded by Yonge Street and Leslie Street), East Gwillimbury (western half of the Town) and Georgina (extreme southwestern portion of the Town).

The baseline odour conditions for the UYSS EA study area were determined using the framework provided in the approved UYSS EA ToR Odour Work Plan and the March 13, 2012 letter to MOE titled "Implementation of the Upper York Sewage Solutions Environmental Assessment Terms of Reference Odour Work Plan".

Based on the review MOE's Environmental Compliance Approval database, it was determined that the majority of existing permitted facilities in the study area have only minor probability of potential off-site odour impacts, which were considered to be environmentally insignificant. Two potentially odourous facilities were determined to be environmentally insignificant contributors to the existing baseline conditions due to separation distances.

The records of environmental complaints on file with York Region and the Ministry of the Environment were also reviewed. York Region's environmental complaints records indicated that the odour related complaints were isolated incidences. There is no evidence of chronic odour problems related to the existing wastewater infrastructure. Based on MOE Records of Complaints data available for the UYSS EA study area, it does not appear that the existing wastewater infrastructure was the cause of the odour complaints on record.

A visual survey of the UYSS study area was conducted as part of the study to observe existing sources of odour and land use within the study area as well as any odour sensitive receptors. Based on the results of this survey, potential areas of concern around existing wastewater infrastructure were identified and a sampling plan was developed to quantify existing baseline conditions.

Odour sampling was conducted at the Aurora, Bogart, and Newmarket Pumping Stations to assess the existing baseline conditions within the UYSS EA study area. The Holland Landing Pumping Station was not included in the sampling program because it is very similar to the Bogart Pumping Station in size, and is not located as close to residential receptors as the Bogart Pumping Station.

The odour emission rates developed from the odour sampling program for the pumping stations were used in odour based dispersion modelling to approximate the existing baseline odour conditions. The odour based dispersion modelling generated odour contour maps that are representative of the baseline odour conditions for the existing wastewater infrastructure in the
UYSS EA study area. A review of the modelling results indicated that the impacts from the Aurora Pumping Station, Newmarket Pumping Station, and Bogart Pumping Station were not environmentally significant at any nearby odour sensitive receptors.

The odour impacts from the Holland Landing Pumping Station are assumed to be similar to the Bogart Pumping Station based on the size of the facility. Therefore, the odour impacts from the Holland Landing Pumping Station are also not considered to be environmentally significant, as the odour sensitive receptors in the vicinity of the facility are located at a greater separation distance than those near the Bogart Pumping Station.

Odour monitoring was conducted at the Holland Landing Water Pollution Control Plant (Lagoons). Based on the complaint records and the generally low odour concentrations measured in the vicinity of the Holland Landing Water Pollution Control Plant (Lagoons), odour does not appear to be negatively impacting the residential area.

The existing baseline odour conditions for the four alternative Water Reclamation Centre Sites identified as "WH1", "WH2", "Site 24", and "Site 30" were identified. Based on a review of the existing conditions, there are no odour sources of concern at or surrounding these Sites.

The existing baseline odour conditions along the proposed YDSS Modifications Alternative Routes were identified. Based on a review of the existing conditions, there are no odour sources of concern along these routes. The existing pumping stations along the route have been demonstrated to be insignificant sources of odour.

Field observations and a review of available existing data confirmed the baseline conditions as well as the locations of odour sensitive receptors.
Section 8.0
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Section 9.0
Glossary of Terms

<table>
<thead>
<tr>
<th>Glossary of Terms</th>
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<tr>
<td><strong>Anosmia</strong></td>
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<tr>
<td>Lack of sensitivity to olfactory stimuli. Absence of the sense of smell.</td>
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<td><strong>Baseline Conditions</strong></td>
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<tr>
<td>The existing conditions that are the physical, chemical, biological, social, economic, and cultural setting in which the proposed project is to be located and where local impacts (both positive and negative) might be expected to occur.</td>
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<tr>
<td><strong>Category</strong></td>
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<tr>
<td>A broader category, group or element of the environment used for classifying a given set of criteria.</td>
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<tr>
<td><strong>Criteria / Criterion</strong></td>
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<tr>
<td>A set of principles or standards used to compare and judge alternatives. (plural = &quot;criteria&quot;, singular = &quot;criterion&quot;)</td>
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<tr>
<td><strong>Detection Threshold</strong></td>
</tr>
<tr>
<td>The point at which statistically 50 percent of the panel can detect the odour. The Detection Threshold is a dilution factor, and therefore, has no units. For convenience, the Detection Threshold is expressed in odour units (OU).</td>
</tr>
<tr>
<td><strong>Dilution-to-Threshold (D/T) Ratios</strong></td>
</tr>
<tr>
<td>The field olfactometer provides a quantitative measure of odour by mixing odourous ambient air with odour free filtered air at selectable dilution ratios, called dilution-to-threshold (D/T) ratios. The D/T ratio is a measure of the number of dilutions needed to make the odourous ambient air non-odourous.</td>
</tr>
</tbody>
</table>
Glossary of Terms

Environmental Assessment (EA)  
A generic term for a study that assesses the potential environmental effects (positive or negative) of a proposal. Key components of an environmental assessment include consultation with government agencies and the public; consideration and evaluation of alternatives; and the management of potential environmental effects. Conducting an environmental assessment promotes good environmental planning before decisions are made about proceeding with a proposal.

For the purposes of this Terms of Reference, an Environmental Assessment refers to the process and related documentation, including the submission of a Terms of Reference and final Environmental Assessment Report for approval by the Minister of the Environment, in accordance with the requirements of Part II of the EA Act.

Field Olfactometer  
A portable odour detecting and measuring device, which can determine ambient odour “Dilution-to-Threshold” (D/T) values objectively.

Hyperosmia  
An increase in olfactory sense. Having a lower odour threshold.

Individual Environmental Assessment (IEA)  
See Environmental Assessment.

Individual Threshold Estimate  
The detection threshold of one individual assessor calculated from one dilution series.

Minister of the Environment (Minister)  
The Minister of the Environment is responsible under the EA Act for final approval of the ToR and the EA.

Ministry of the Environment (MOE)  
The Ministry of the Environment is responsible for protecting air, land and water to ensure healthy communities, ecological protection, and sustainable development for present and future generations of Ontarians.

Monitoring  
A systematic method for collecting information using standard observations according to a schedule and over a sustained period of time.

Nasal Ranger  
A brand of field olfactometer used for measuring and quantifying odour strength in the ambient air.
## Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Environment</td>
<td>A term that encompasses all living and non-living things occurring naturally on Earth or some region thereof.</td>
</tr>
<tr>
<td>Odour Panel</td>
<td>A group of assessors used to analyze an odourous sample by olfactometry.</td>
</tr>
<tr>
<td>Odour Unit</td>
<td>A threshold where 50 percent of the population would detect, but not identify, an odiferous compound. This definition is normally applied at odour sensitive receptors.</td>
</tr>
<tr>
<td>Olfactometer</td>
<td>A dilution apparatus which mixes odourous air in specific ratios with odour free air for presentation to a panel of assessors.</td>
</tr>
<tr>
<td>Preferred Alternative</td>
<td>The alternative selected as the undertaking for which approval will be sought, based on an approach for identifying a preferred alternative, namely:</td>
</tr>
<tr>
<td></td>
<td>a) Identify a recommended alternative</td>
</tr>
<tr>
<td></td>
<td>b) Consult review agencies and the public on the recommended alternative</td>
</tr>
<tr>
<td></td>
<td>c) Confirm or select the preferred alternative based on the comments received</td>
</tr>
<tr>
<td>Preliminary Study Area</td>
<td>In reference to the UYSS EA, extends north to Lake Simcoe, east to Woodbine Avenue, south to 19th Avenue, and west to Bathurst Street. This preliminary study area is the area within which activities associated with the undertaking will occur and where potential environmental effects will be studied, and it currently includes the UYSS Service Area.</td>
</tr>
<tr>
<td>Pumping/Forcemain Based Sewer System</td>
<td>A sewer system that relies on the use of pumps and pressurized pipes (forcemain) to convey collected wastewater from urban areas to a wastewater treatment facility for disposal.</td>
</tr>
<tr>
<td>Retrospective Screening</td>
<td>A procedure for reviewing olfactometry results where results of assessors that show a deviation from normal due to health or specific hypersensitivity or hyposensitivity are removed from the group test average. Removal of an assessor’s results may be based on the standard deviation or the ratio between their individual threshold estimate and the group (panel) average.</td>
</tr>
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<td><strong>(UYSS) Service Area</strong></td>
<td>Area to be serviced by the undertaking consisting of the growth portions of the Towns of Aurora, Newmarket, and East Gwillimbury, including Holland Landing, Queensville, and Sharon.</td>
</tr>
<tr>
<td><strong>Sensitive Receptor</strong></td>
<td>Odour sensitive receptors generally include residences, camping grounds, schools, community centres, day care centres, recreational centres and outdoor public recreational areas. For the purposes of this evaluation, businesses have been included as potential sensitive receptors.</td>
</tr>
<tr>
<td><strong>Social Environment</strong></td>
<td>Represents the external conditions under which people engage in <em>social</em> activity within their community.</td>
</tr>
<tr>
<td><strong>Triangular Forced Choice</strong></td>
<td>A method of olfactometry testing where the assessor is given two blank (odour free) presentations and one dilute odour sample. The assessor is forced to choose which of the three presentations contains the odour.</td>
</tr>
<tr>
<td><strong>Terms of Reference (ToR)</strong></td>
<td>The first step in an application for approval to proceed with a project or undertaking under the <em>Environmental Assessment Act</em> is the submission of a Terms of Reference (ToR) for the Environmental Assessment (EA). Public and agency consultation is required on the preparation and submission of the ToR to the Ministry of the Environment. Approval is required by the Minister of the Environment. If approved, the ToR provides a framework / work plan for the EA.</td>
</tr>
<tr>
<td><strong>Undertaking</strong></td>
<td>An enterprise, activity, proposal, plan or program in respect of a commercial or business enterprise or activity of a person or persons that has potential environmental effects and is assessed in accordance with the requirements of the <em>Environmental Assessment Act</em>.</td>
</tr>
<tr>
<td><strong>Upper York/upper York</strong></td>
<td>Upper York is defined as the general area of York Region within the Lake Simcoe watershed.</td>
</tr>
<tr>
<td><strong>York Durham Sewage System (YDSS)</strong></td>
<td>A centralized wastewater collection and treatment system for both York and Durham Regions.</td>
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