Appendix F-2

Surface Water Existing Conditions Report

DRAFT REPORT

Surface Water Resources Existing Condition Report

Walker South Landfill Phase 2 Environmental Assessment

Submitted to:

Walker Environmental Group

Submitted by:

WSP Canada Inc.

55 King Street, Suite 700, St. Catharines, ON
L2R 3H5 Canada

(905) 687-1771

CA0065457.5367

June 22, 2026

Distribution List

PDF - Walker Environmental Group

PDF - WSP Canada Inc.

Record of Issue

Date Issued	Version	Notes/Comments
8 May 2026	RevA	DRAFT
12 June 2026	RevB	DRAFT
22 June 2026	RevC	DRAFT

Table of Contents

1 INTRODUCTION 1

2 OBJECTIVES 3

3 EXISTING CONDITIONS STUDY DESIGN AND METHODS 3

3.1 Study Areas 3

3.2 Review of Available Information 7

3.3 Field Investigations 9

3.3.1 Manual Flow and Water Level Measurements 9

3.3.2 Continuous Water Level Monitoring 9

3.3.3 Continuous Flow Monitoring 10

3.3.4 Water Quality Sampling 10

4 CHARACTERIZATION OF THE EXISTING ENVIRONMENT 11

4.1 Desktop Assessment 11

4.1.1 Drainage Patterns and Catchment Areas for Surface Water Stations 15

4.1.2 Desktop Flow Volume Estimates 15

4.1.2.1 Water Survey of Canada Station Results 15

4.1.2.2 Seaway Flow Results 19

4.1.3 Desktop Surface Water Quality Results 20

4.1.3.1 Provincial Water Quality Monitoring Network (PWQMN) Results 20

4.1.3.2 Seaway Water Quality Results 23

4.2 Field Investigations 25

4.2.1 Manual Water Level Results 25

4.2.2 Manual Flow Measurement Results 27

4.2.3 Continuous Water Level and Flow Monitoring Results 28

4.2.4 Stage-Discharge Rating Curve 30

4.2.5 Surface Water Quality Results 30

4.2.5.1 Environmental Compliance Approval (ECA) No. A120211 30

4.2.5.1.1 Old Welland Canal Monitoring Results 31

4.2.5.2 Environmental Compliance Approval (ECA) No. 0084-78RKAM 37
4.2.5.2.1 Old Welland Canal Water Quality Results 37
4.2.5.2.2 Ten Mile Creek Water Quality Results 38
4.2.5.3 Permit to Take Water No. 3612-CMTM5V 40
4.2.5.3.1 PTTW Monitoring Program Water Quality Results 41
4.2.5.4 2025 Water Quality Monitoring Results 45
5 CONCLUSIONS 48
6 REFERENCES 51

TABLES

Table 3-1: List of Information Sources Reviewed through Desktop Assessment 7
Table 3-2: Walker Surface Water Monitoring Stations 9
Table 3-3: Monitoring Program - Summary Table 11
Table 4-1: Catchment Areas at Monitoring Locations 15
Table 4-2: Available Long-Term Hydrometric Stations Near the Study Area 16
Table 4-3: Estimated Flood Discharges for Project Watercourse Crossings 16
Table 4-4: Estimated Mean Monthly Flows for Project Watercourse Crossings 18
Table 4-5: Welland Canal Flow Summary Data 19
Table 4-6: Selected Provincial Water Quality Monitoring Network (PWQMN) Stations in the Regional Area 21
Table 4-7: Surface Water Quality Results from PWQMN Stations in Regional Area 21
Table 4-8: Surface Water Quality Results from Seaway Stations in Regional Area 23
Table 4-9: Manual Water Level Measurements (masl) 26
Table 4-10: Manual Flow Measurements (L/s) 27
Table 4-11: Summary Statistics (Maximum, Minimum and Average) of Continuous Water Levels 28
Table 4-12: Summary Statistics (Maximum, Minimum and Average) of Continuous Flows 28
Table 4-13: 2024-2025 Stage-Discharge Rating Curve Equations 30
Table 4-14: Old Welland Canal Monitoring Results 32
Table 4-15: South Quarry Monitoring Results 38
Table 4-16: PTTW Monitoring Program Requirements 40
Table 4-17: Southeast Quarry Monitoring Results 42

FIGURES

Figure 1-1: Site Location Plan 2
Figure 3-1: Local Surface Water Study Area 4
Figure 3-2: Regional Surface Water Study Area 6
Figure 4-1: Walker Drainage System 14
Figure 4-2: Welland Canal Map (InfoNiagara, 2021) 20

APPENDICES

Appendix A
Water Quality Analytes

Appendix B
Environmental Compliance Approval (ECA) No. A120211

Appendix C
Environmental Compliance Approval (ECA) No. 0084-78RKAM

Appendix D
Permit to Take Water No. 3612-CMTM5V

Appendix E
Continuous Water Level and Flow

Appendix F
Stage-Discharge Rating Curves

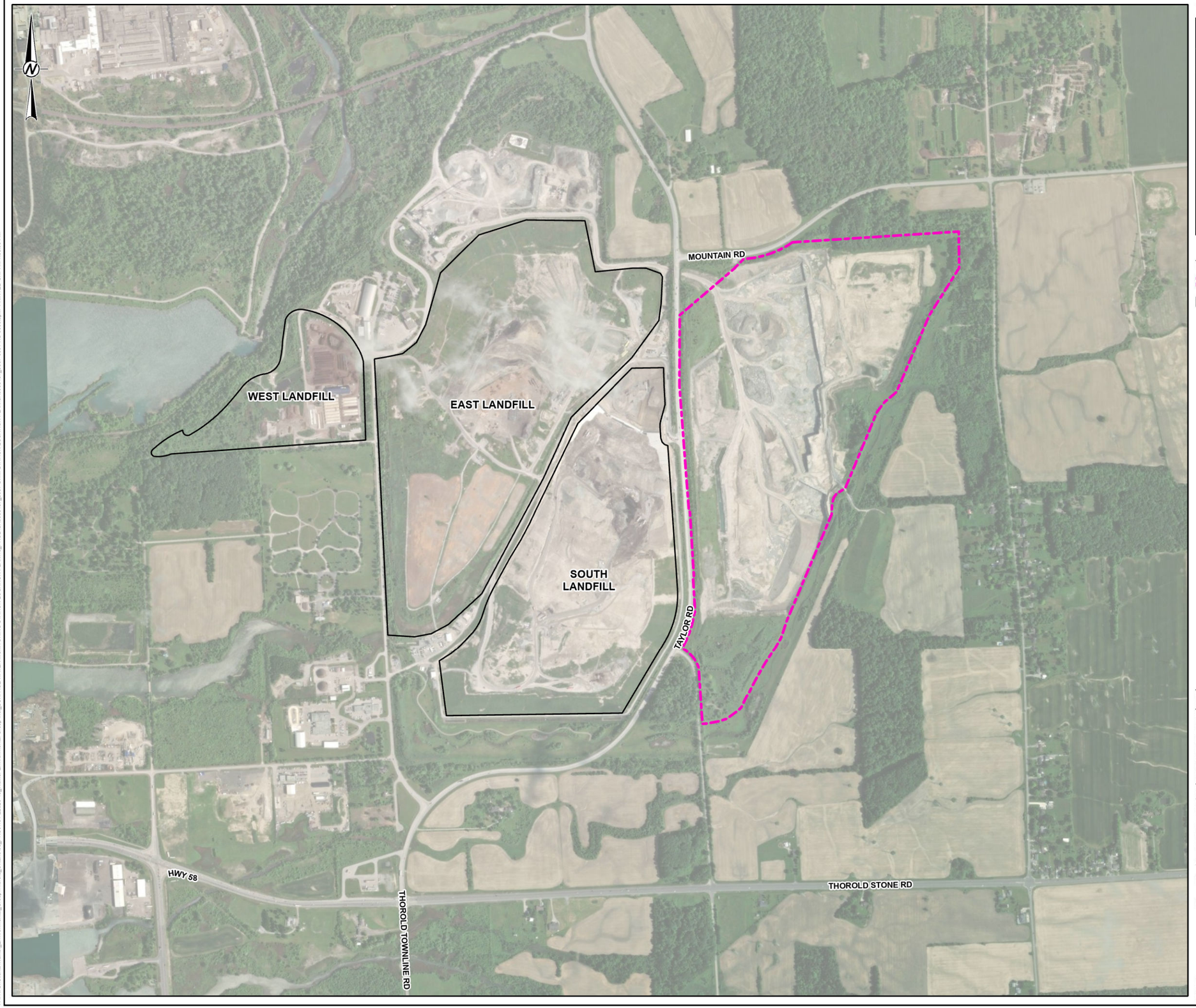
Appendix G
Water Quality Monitoring Results

1 INTRODUCTION

This report provides an overview of the existing surface water conditions within the study areas for the South Landfill Phase 2 Environmental Assessment (EA). The Minister of the Environment, Conservation and Parks (Minister) Approved Terms of Reference (ToR) for the EA included a preliminary description of the existing environmental conditions with a commitment to expand upon this description during the EA.

Walker Environmental Group (Walker) initiated a Comprehensive EA under the Ontario EA Act seeking approval to expand the capacity of its existing South Landfill located at the Walker Resource Management Campus (Campus) in Niagara Falls, as seen on **Figure 1-1.** The South Landfill is an essential component of Walker's Campus since it began operating in 2009 under Environmental Compliance Approval (ECA) No. 0084-78RKAM, as amended, and provides safe, reliable, and affordable disposal capacity for solid, non-hazardous waste from residential and industrial, commercial, and institutional (IC&I) sources to its customer base within the City of Niagara Falls, the Regional Municipality of Niagara, and the Province of Ontario. The South Landfill's total approved disposal capacity is 17.7 million cubic metres (m^3) and is expected to reach maximum capacity by 2029 to 2031.

The proposed Phase 2 of the South Landfill would extend its approved capacity by approximately 18 to 20 million m^3 over a 20-year period, ensuring Walker can continue to provide essential waste disposal services to its existing customer base. Walker is proposing to locate the additional disposal capacity (Phase 2) to the east of the existing South Landfill within the area currently occupied by Walker's Southeast Quarry. The proposal would maintain the existing landfill service area, as well as the annual volume of solid, non-hazardous waste from the sources currently accepted.



KEY MAP

SCALE: 1:500,000

LEGEND

- SITE STUDY AREA (SSA)
- WALKER RESOUCE MANAGEMENT CAMPUS (EAST, SOUTH AND WEST LANDFILLS)

DRAFT

0 150 300 600

1:12,500 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO 2. IMAGERY CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP, GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
WALKER ENVIRONMENTAL GROUP

PROJECT
SURFACE WATER RESOURCES EXISTING CONDITIONS REPORT
SOUTH LANDFILL PHASE 2 ENVIRONMENTAL ASSESSMENT,
NIAGARA FALLS, ONTARIO

TITLE
SITE LOCATION

CONSULTANT

wsp

YYYY-MM-DD	2026-05-07
DESIGNED	----
PREPARED	JM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0065457.5367	0001	A	1-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\Walker_Environmental_Group\Thorold_Ontario\99_PRO\131-22836-19_Walker Environmental Group Inc._SURFACE WATER MONITORING STATION LOCATION PLAN\CA0065457_5367-0001-HS-0000.aprx PRINTED ON: AT: 1:58:06 PM

2 OBJECTIVES

The principal objective of the surface water investigations is to characterize the flow regime and water quality of key surface water features within and adjacent to the Site, including Six Mile Creek, Ten Mile Creek and the Welland Canal, to determine the physical/chemical baseline conditions.

The EA Act requires that proponents describe the environment that may potentially be affected or may reasonably be expected to be affected, directly or indirectly, by the Alternative Methods of Carrying Out the Undertaking (Alternative Methods) proposed as part of an EA. The description of the existing environmental conditions will provide the baseline for the assessment of potential effects for the proposed undertaking, which will be conducted during the EA. This report focuses on characterizing the existing conditions within the study areas for the South Landfill Phase 2 EA for surface water resources.

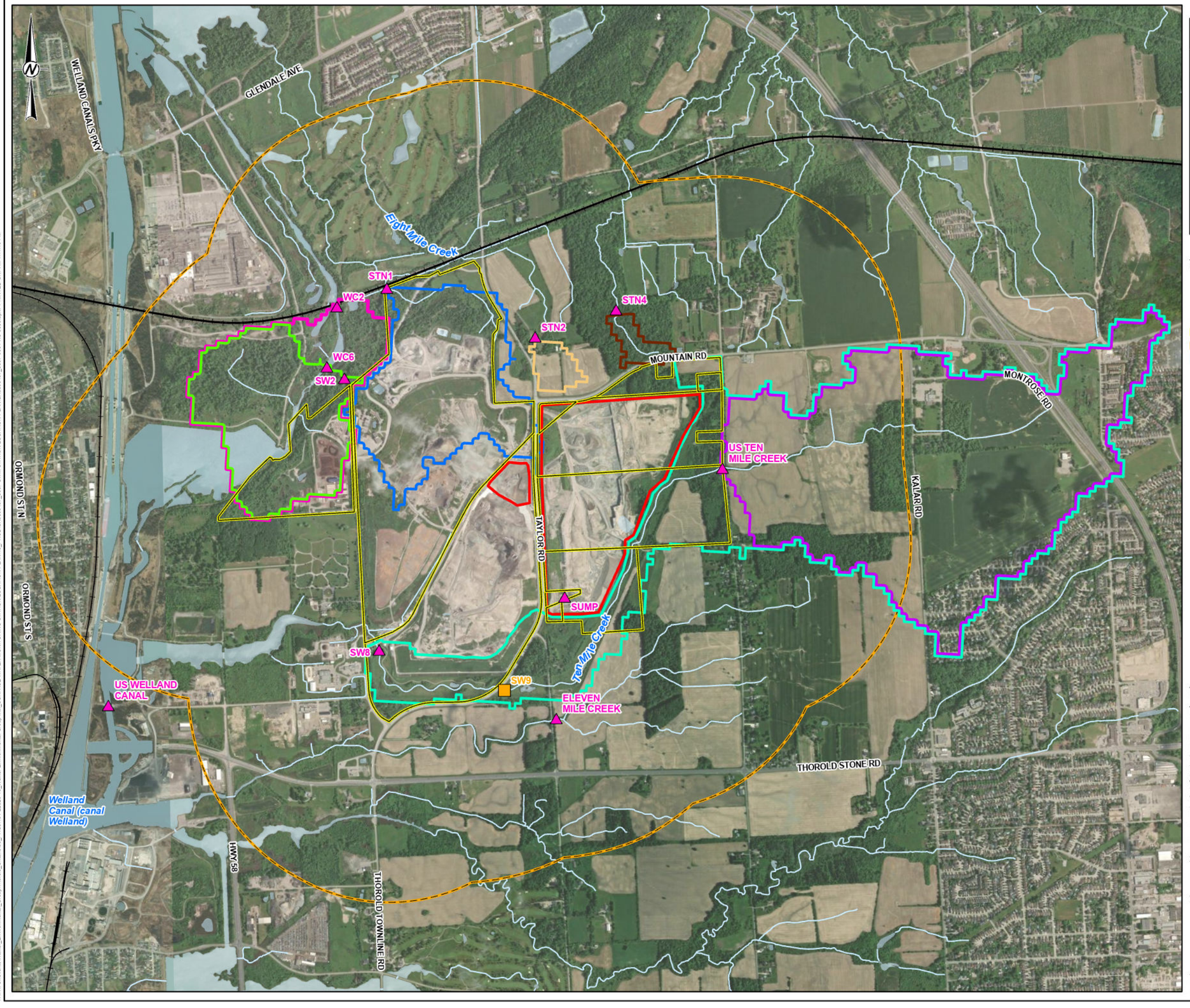
3 EXISTING CONDITIONS STUDY DESIGN AND METHODS

Characterization of the surface water existing environment was completed by undertaking a desktop review of the large available dataset from historical monitoring completed for existing Walker ECAs and Permit to Take Water (PTTW) programs, supplemented by project specific field investigations. The desktop review includes a review of available existing information, including aerial imagery and Light Detection and Ranging (LiDAR) where available, to determine surface water features adjacent to the Site. Field investigations consist of ground-based surveys at select surface water receptor locations, as seen on **Figure 3-1.** The methods used to characterize the surface water existing environment are described in the following sections. Baseline data were compiled for surface water features where potential direct effects of the Project at the immediate local scale (i.e., the area of direct disturbance) occur, and where the receiving waterbodies or watercourses are most likely to be directly affected by Project infrastructure and activities (i.e., potential stormwater discharge locations or for construction dewatering activities).

3.1 Study Areas

From a surface water perspective, the characterization of existing conditions within the following study areas are appropriate to this EA:

- Site Study Area (SSA), encompassing lands (81.30 ha) owned and operated by Walker that include the current Southeast Quarry extraction limit, and encompasses the proposed limit of fill and buffer area, which aligns with the proposed Waste Disposal Site Limit Boundary, as shown on **Figure 1-1.** The SSA is fully located within the Ten Mile Creek watershed;
- Local Study Area (LSA), including all lands within a 1.2 km radius of the Walker Campus boundaries, as shown on **Figure 3-1**. The surface water existing conditions LSA was designed to capture the local effects of the Project on the surface water environment that may extend beyond the SSA with the understanding that the spatial extent of this LSA is intended to account for the local area where effects of the Project are likely to be measurable; and



KEY MAP

SCALE: 1:500,000

LEGEND

- SURFACE WATER MONITORING LOCATIONS
- WALKER SURFACE WATER MONITORING STATION
- RAILWAY
- WATERCOURSE
- SITE BOUNDARY
- LOCAL STUDY AREA
- WATERBODY

WATERSHEDS

- STN1 WATERSHED
- STN2 WATERSHED
- STN4 WATERSHED
- SW2 WATERSHED
- SW8 WATERSHED
- US TEN MILE CREEK WATERSHED
- WC2 WATERSHED
- WC6 WATERSHED

DRAFT

0 250 500 1,000

1:21,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO 2. IMAGERY CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
WALKER ENVIRONMENTAL GROUP

PROJECT
SURFACE WATER RESOURCES EXISTING CONDITIONS REPORT
SOUTH LANDFILL PHASE 2 ENVIRONMENTAL ASSESSMENT,
NIAGARA FALLS, ONTARIO

TITLE
LOCAL SURFACE WATER STUDY AREA

CONSULTANT

wsp

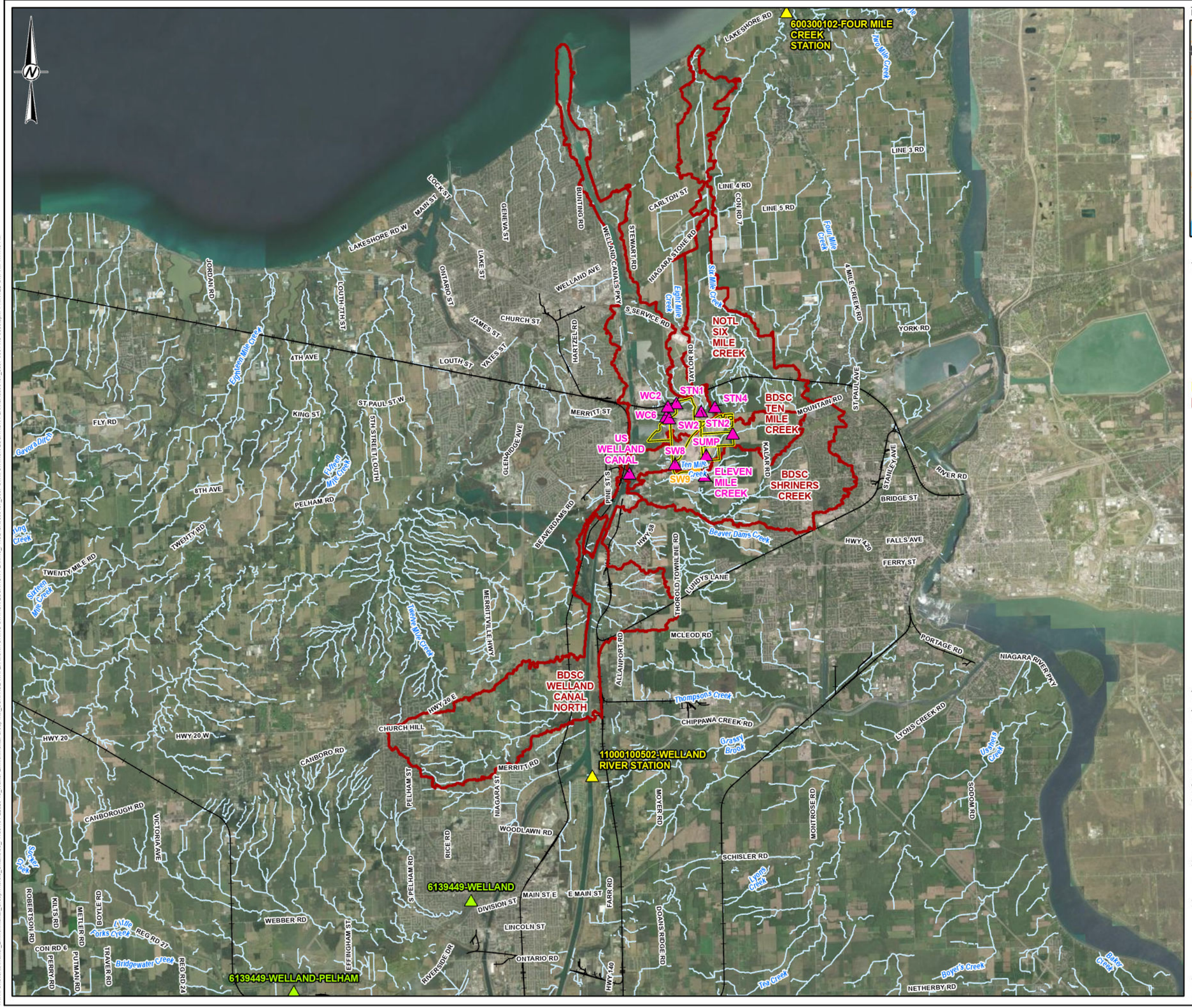
YYYY-MM-DD	2026-06-12
DESIGNED	----
PREPARED	JJ/JM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0065457.5367	0001	A	3-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: S:\Clients\Walker Environmental_Group\Thorold_Ontario\99_PRO\131-22826-19_Walker Environmental Group Inc._SURFACE WATER MONITORING STATION LOCATION PLAN\ap_PRO\CA0065457_5367 SWM STATION LOCATION PLANCA0065457_5367-0001-HS-0000.aprx, PRINTED ON: AT: 1:11:13 PM

- Regional Study Area (RSA), including the watershed areas (as defined on a subwatershed scale in accordance with Niagara Peninsula Conservation Authority (NPCA) designation) of each waterbody that is crossed by the Project footprint, as shown on **Figure 3-2.** A review and analysis of Water Survey of Canada (WSC) hydrometric information and NPCA watershed datasets was conducted to characterize the drainage patterns and catchments within and adjacent to the Site. The surface water RSA appears to fall within four NPCA subwatershed systems, these include two within the Beaver Dam Schiner's Creek (BDSC) watershed, including the Welland Canal North subswatershed to the west and Shriners Creek subwatershed to the south. Two subwatersheds are within the Niagara-on-the-Lake (NOTL) watershed, which includes the Ten Mile Creek within the centre of the site, and the Six Mile Creek to the east. These subwatershed areas fall within two Ministry of Natural Resources (MNR) designated quaternary watersheds, with Welland Canal North, Shriners Creek and Ten Mile Creek subwatersheds found within the Welland Canal quaternary watershed boundary and the Six Mile Creek subwatershed found within the West Lake Ontario Shoreline quaternary watershed. The NPCA subwatershed classed areas included within the RSA are intended to provide a large enough area to assess potential cumulative and regional effects on surface water and fish and fish habitat environments.



KEY MAP

SCALE: 1:2,000,000

LEGEND

- SURFACE WATER MONITORING LOCATIONS
- ENVIRONMENT OF CANADA CLIMATE STATIONS
- PROVINCIAL WATER QUALITY MONITORING NETWORK STATIONS
- WALKER SURFACE WATER MONITORING STATION
- RAILWAY
- WATERCOURSE
- SITE BOUNDARY
- REGIONAL STUDY AREA

DRAFT

0 1,250 2,500 5,000

1:125,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO 2. IMAGERY CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
WALKER ENVIRONMENTAL GROUP

PROJECT
SURFACE WATER RESOURCES EXISTING CONDITIONS REPORT
SOUTH LANDFILL PHASE 2 ENVIRONMENTAL ASSESSMENT,
NIAGARA FALLS, ONTARIO

TITLE
REGIONAL SURFACE WATER STUDY AREA

CONSULTANT

wsp

YYYY-MM-DD	2026-06-12
DESIGNED	----
PREPARED	JJ/JM/BA
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
CA0065457.5367	0001	A	3-2

3.2 Review of Available Information

A desktop review of available information was conducted to document existing conditions and identify surface water features that may be present in the study areas. The investigation of existing conditions included a background information search and literature review to gather data and provide context for the evaluation of surface waters in the study areas. **Table 3-1** presents the list of information sources reviewed.

Table 3-1: List of Information Sources Reviewed through Desktop Assessment

Information Source	Record
▪ Applicable Provincial Plans (Niagara Escarpment Plan (Ministry of Natural Resources (MNR), 2017)) ▪ Applicable Municipal Official Plans (Niagara Region (2024), City of Niagara Falls (2024) and schedules	▪ Designated surface water features and areas (i.e., watershed planning and land use)
▪ Conservation Authority and Public Data - Niagara Peninsula Conservation Authority (NPCA)	▪ 1 m contour layer for the Niagara Region (City of Niagara Falls, 2019) ▪ Regulated Areas mapping (Niagara Peninsula Conservation Authority, 2019) ▪ Watershed reports (various) ▪ Watershed planning maps (various) ▪ Watercourse and waterbody features map hydrography (Niagara Peninsula Conservation Authority, 2022a) ▪ Shoreline Areas (Niagara Peninsula Conservation Authority, 2022b) ▪ Water Quality reports and datasets (various) ▪ Niagara Watershed Plan (Niagara Region, 2020)
▪ Land Information Ontario (LIO) (Ministry of Natural Resources (MNR), 2024a), (2024b), and (2024c)	▪ Active Aggregate Pits and Quarries ▪ Areas of Natural and Scientific Interest (ANSI) ▪ Aquatic Resource Area (ARA) water line/polygon and point segment ▪ Crown Land Use Policy Atlas (CLUPA) ▪ Conservation Reserves (CLUPA, GapTool) ▪ Ontario Hydro Network (OHN) Waterbodies/Watercourses ▪ Ontario Watershed Boundaries (OWB), including Quaternary Watersheds ▪ Ontario Watershed Information Tool ▪ Recreation and tourism, (canoe routes and portages etc.)
▪ Ontario Watershed Information Tool (OWIT) developed by the MNR (2019)	▪ Watershed area
▪ Water Survey of Canada (WSC) and Ontario Ministry of Environment, Conservation and Parks (MECP) (2019)	▪ Archived hydrometric data
▪ MECP Provincial (Stream) Water Quality Monitoring Network (PWQMN) (Ministry of Environment, Conservation and Parks, 2023)	▪ Archived water quality data
▪ Existing aerial photography (Google, 2024) and topographic maps (Esri, 2009)	▪ Land cover and access ▪ Contours (1m) and elevations ▪ Air photos
▪ Walker Environmental Group site data	▪ Air photos

Information Source	Record
	■ Facility layout, drainage maps and figures ■ Proposed on-site stormwater management concept designs for vertical expansion alternatives ■ Existing leachate management system ■ Annual Monitoring Reports ■ Interviews and discussions with MECP staff, Conservation Authorities, and Environment Canada ■ Surface Water Existing Conditions Reports ■ Terrestrial and Aquatic Environment Existing Conditions Reports

A review and analysis of WSC hydrometric information and NPCA watershed mapping data was conducted to characterize the drainage patterns and catchments for locations in the watershed areas intersected by the SSA. The data were used to generate catchment characteristics for several creeks and associated tributaries, including the Welland Canal, at several selected monitoring locations.

A stream monitoring network was established on Ten Mile Creek, the Welland Canal and Old Welland Canal and associated tributaries. The network includes ten (10) surface water monitoring locations, shown on **Figure 3-1,** which includes:

- two (2) stations on Ten Mile Creek - upstream and downstream of the Site (Ten Mile Creek Watershed);
- one (1) station on the Welland Canal - upstream of Ten Mile Creek;
- two (2) stations on the Old Welland Canal - upstream (WC6) and downstream (WC2) of the existing quarry drainage works;
- two (2) stations at springs located to the north of the Site (STN 2 and STN4) (outside of Ten Mile Creek Watershed);
- one (1) station on a tributary to the Old Welland Canal located to the northwest of the Site (STN1); and
- two (2) stations along the existing quarry drainage works, consisting of one (1) station at the current quarry sump and one (1) station immediately downstream of the Walker Collection Chamber (SW2), which discharges to the Old Welland Canal.

Historical data are available at several of these stations because they have been included in previous Walker monitoring studies and the type of hydrometric data collection varies between stations based on access, worker safety and data needs. However, manual water level (staff gauges) and flow measurements are conducted at four of the stations including: the two (2) stations on Ten Mile Creek (upstream [new] and downstream of the site [SW8]); and two (2) that contribute to the Welland Canal with one at a tributary to the Old Welland Canal located to the northwest of the site (STN1) and one at a discharge outlet of the Site works (SW2). Electronically recorded water levels and flow measurements were retrieved on a monthly basis from December 2024 to March 2026. Pressure transducers were deployed at each of the four stations to develop a water level record of each station at 30-minute intervals. A data logging barometric pressure transducer (barologger) was also installed at the site to provide atmospheric pressure compensation for the water level transducer data.

The historical flow records from WSC and the water quality monitoring data from MECP (i.e., PWQMN datasets) were also evaluated to characterize existing streamflow and water quality conditions.

3.3 Field Investigations

Field investigations of surface water conditions were completed between December 2024 and March 2026 to obtain site-specific information at the surface water receptor locations. The results of these field investigations were used to further augment the characterization of existing water quantity and quality conditions for the Project detailed below.

3.3.1 Manual Flow and Water Level Measurements

Manual flow measurements were obtained monthly during the December 2024 to March 2026 surface water program in order to verify and refine stage-discharge rating curve relationships.

The spot flow measurements were completed using the velocity-area method. Representative channel cross-sections were established and marked at each surface water flow monitoring station. A tape measure was extended the length of each cross-section during the measurement event. Streamflow velocities and corresponding water depths were collected at various intervals along the cross-section: 0.10 m to 0.20 m spacing of watercourses. Current velocities were recorded with a HACH Electromagnetic Flow Meter Model FH950 (EM Flow Meter) at 60% of the total water depth (for water depths less than 0.75 m) or at both 20% and 80% of the depth and then averaged (for water depths greater than 0.75 m). Velocity and depth measurements were obtained by wading channels at all the flow monitoring stations.

A staff gauge was installed at each surface water monitoring station. The staff gauge was attached to a steel T-post which was set in the channel bed. Water level measurements were read from the staff gauge in conjunction with the spot flow measurements. The monitoring station elevations were surveyed relative to mean sea level using a GPS surveyor. Water levels were recorded in meters above sea level.

3.3.2 Continuous Water Level Monitoring

Continuous water level monitoring was undertaken at the stations presented in **Table 3-2** below and on **Figure 3-1** to assess seasonal streamflow regimes in the watercourses adjacent to the Site.

Table 3-2: Walker Surface Water Monitoring Stations

NPCA Subwatershed Area	Station ID	General Description	Continuous Water Level/Flow Instrumentation[1]	Period of Record
BDSC TEN MILE CREEK	US Ten Mile Creek	Upstream section of Ten Mile Creek	DIVER Logger	December 2024 – March 2026
BDSC TEN MILE CREEK	SW8	Downstream Section of Ten Mile Creek	DIVER Logger	December 2024 – November 2025
BDSC WELLAND CANAL NORTH	STN1	Tributary of the Welland Canal North	DIVER Logger	December 2024 – March 2026
BDSC WELLAND CANAL NORTH	SW2	Site Stormwater Discharge to the Old Welland Canal	DIVER Logger	December 2024 – March 2026

[1] DIVER Logger installed/maintained by WSP and represents a non-vented pressure transducer that was compensated for atmospheric pressure using a DIVER Barologger.

The continuous water level records at US Ten Mile Creek, SW8, STN1 and SW2 were obtained/developed using continuous water level data with 30-minute intervals.

3.3.3 Continuous Flow Monitoring

To obtain continuous flow data, the spot measurements of water level and flow were used to develop stage-discharge rating curves for each flow monitoring station. The rating curves for stations US Ten Mile Creek, SW8, STN1 and SW2 were developed by correlating the water level and the corresponding discharge in a power function.

Fully developed rating curves are typically one or a series of curves of the form $Q = a*(Y - Y_o)^b$, where Q is the stream flow rate in litres per second, a and b are a fitted coefficient and exponent, respectively, Y is the water depth in metres and Y_o is an estimated water depth where zero flow rate occurs (e.g., the bottom of the channel or standing water in the channel due to downstream control).

To estimate the rating curve parameters, an optimization technique was applied with appropriate bounds on rating curve parameters. Minimization of sum-of-square-of-error between the measured manual flows and calculated flows was used as an objective function.

Continuous water level and flow records have been obtained from a station operated by Water Survey of Canada as summarized in **Section 4.1.2**.

3.3.4 Water Quality Sampling

Water quality sampling was conducted at each of the flow monitoring stations (i.e., US Ten Mile Creek, SW8, STN1 and SW2) as well as additional stations STN2, STN4, WC2, WC6, US Welland Canal and the Quarry Sump, as shown on **Figure 3-1**. The water quality samples collected at the ten (10) stream monitoring network stations were completed on a quarterly basis starting in April 2025 to evaluate seasonal fluctuations in the surface water quality. Note that, based on the MECP comments received dated May 13, 2025, additional water quality monitoring at Eight Mile Creek and Eleven Mile Creek was investigated. Eleven Mile Creek appeared to be an intermittent stream, and a sample was collected during the March 25, 2026 field visit. Eight Mile Creek was not found connected to site drainage and no water quality sample was collected.

In addition to the collection of water quality samples, field teams also collected generic in-situ water quality measurements during each quarterly sampling round. In-situ measurement parameters included:

- Conductivity;
- Dissolved Oxygen;
- Dissolved Oxygen Saturation;
- pH;
- Temperature; and
- Total Dissolved Solids (TDS).

Collected water quality samples were analysed by an accredited laboratory for the parameters listed in the attached Table A-1 and Table A-2 in **Appendix A** to establish a record of baseline conditions. The parameters listed in Table A-1 were selected based on general parameters of concern within the study area, as well as the leachate characteristics provided in Table 1 of Ontario Regulation 232/98. The parameters listed in Table A-2 were selected based on the leachate quality criteria (Schedule 4) of Ontario Regulation 347. The parameters listed in Table A-1 were sampled and analysed during each quarterly sampling round, while the parameters listed

in Table A-2 were analysed only once due to the high cost and effort of analysis. **Table 3-3** below provides details about monitoring program for the site. The surface water monitoring stations are shown on **Figure 3-1.**

Table 3-3: Monitoring Program - Summary Table

Proposed Surface Water Monitoring Program			
Station	**Water Level (WL)**	**Flow (Q)**	**Water Quality (WQ)[a]**
STN1	Yes	Yes	Yes
STN2	Yes	-	Yes
STN4	Yes	-	Yes
SW2	Yes	Yes	Yes
SW8	Yes	Yes	Yes
Sump	-	-	Yes
US Ten Mile Creek (New Station)	Yes	Yes	Yes
US Welland Canal (New Station)	-	-	Yes
WC2	-	-	Yes
WC6	-	-	Yes
Eleven Mile Creek	-	-	Yes[b]

Note(s):

a) a attached Table 3 for a comparison of existing water quality monitoring analytes to new water quality monitoring program at each station.

b) The monitoring station was established in response to MECP comments dated May 13, 2025. Sampling at the station was conducted during the field visit on March 25, 2026 only.

Several previous water quality monitoring programs for projects related to the Campus have already been completed or are still in progress. Findings of several programs relating to surface water receptors being studied for this program can be found in **Section 4.2.5** below.

4 CHARACTERIZATION OF THE EXISTING ENVIRONMENT

4.1 Desktop Assessment

The desktop assessment consisted of the development of a surface water feature list and a review of available existing information. A preliminary list of applicable information sources including federal and provincial guidance was reviewed in development of this approach.

The SSA is located above and adjacent to the Niagara Escarpment, southeast of St. Catharines and east of the Welland Canal (canal) in the Ten Mile Creek catchment area which is part of the Welland Canal catchment area. Prior to construction of the Welland Canal and Decew Falls generating station, the LSA likely drained westward and contributed to the Twelve Mile Creek Watershed. Under existing conditions, drainage from the LSA contributes to the canal, either directly or via tributaries of the canal and Ten Mile Creek, and ultimately flows north to Lake Ontario.

Ten Mile Creek drains a catchment area east of the Southeast Quarry (i.e., the proposed location of the South Landfill Phase 2) to the Welland Canal. Historically, Ten Mile Creek was diverted south and west around the Southeast Quarry and the former South Quarry, and back to its original confluence with the Welland Canal. The

catchment area is predominantly rural and agricultural with an area of approximately 5.3 km^2. Other land uses in the Ten Mile Creek catchment include urban development.

The Old Welland Canal flows northwards adjacent to the escarpment face along the northwest side of the Closed West Landfill and East Quarry Operations Area. The Old Welland Canal connects two surge basins on the canal, located west and northwest of the existing Walker landfill operations. Flow in the Old Welland Canal is regulated by the St. Lawrence Seaway Authority via a drop structure adjacent to the Closed West Landfill.

A number of water seepage areas and spring fed ponds are present north of the SSA, on the upper bench of the Niagara Escarpment. These areas feed intermittent tributaries of the Six Mile Creek and the Old Welland Canal catchment areas.

Drainage at the Campus is managed such that any surface water which has potential to contact waste materials is isolated and directed to the leachate collection system (LCS), prior to pre-treatment and discharge to the Municipal Sanitary Sewer under existing agreements with Town of Niagara-on-the-Lake and Niagara Region. Non-contact runoff within the Campus is collected in the Southeast Quarry sump, East Quarry storm water management structure, and in a series of storm water management ponds around the South and East Landfills. These ponds are operated with the discharge valve normally closed and are batched discharged if they meet their applicable discharge criteria. If the accumulated runoff in the storm water management ponds does not meet discharge criteria, the water can be pumped to the LCS as a contingency.

During the extraction phase in the former East Quarry (now East Landfill), a trench was constructed along the north-south axis of the former East Quarry floor to provide gravity drainage of water away from the operations. Prior to constructing the landfill, a solid drainage pipe (1200mm solid pipe) was installed in the trench to facilitate drainage of surface water from the South and Southeast Quarries, underneath the East Landfill, to the Old Welland Canal. A perforated groundwater collection pipe was installed parallel to the 1200mm solid pipe to collect groundwater seepage accumulating under the landfill liner system. Collectively, these drainage pipes are known as the Walker Drainage System (WDS). **Figure 4-1** shows layout of on-site stormwater management ponds, perforated ground water collection pipe, and 1200 mm solid pipe.

To facilitate quarry dewatering and following a period of retention to settle suspended solids, water from the Southeast Quarry sump is conveyed via gravity out of the quarry, west under Taylor Road and into the 1200mm solid pipe, from where it flows west around the south end of the South Landfill, then north under the East Landfill and discharges to the Old Welland Canal.

Accumulated stormwater runoff from the East Quarry Operations Area (aggregate processing and stockpiling area north of the East Landfill) is retained behind the storm water management structure at the northeast edge of the area. The structure, which utilizes a clay berm and valve to control non-contact surface water, operates with the discharge valve operated in the normally closed position. The accumulated runoff settles and typically infiltrates through voids in the underlying fractured bedrock. If required, and the surface water quality results are in compliance with the prescribed effluent limits, the accumulated runoff is batch discharged to a roadside ditch along Thorold Townline Road, which ultimately flows to the Old Welland Canal.

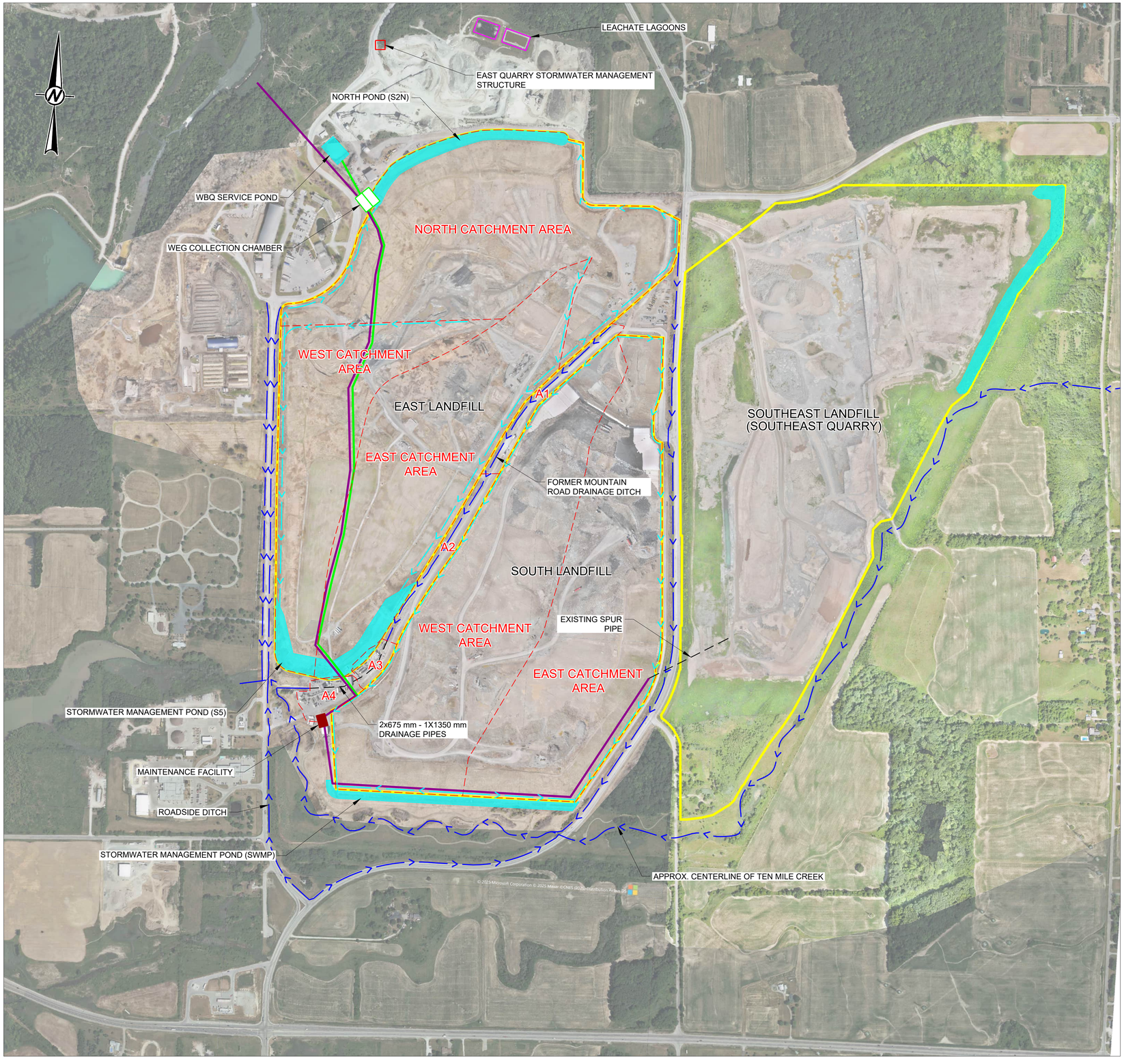
Non-contact runoff from the South Landfill flows to the South Landfill SWMP. The SWMP, constructed in 2016, is batch discharged into the 1200mm solid pipe, from where it flows north under the East Landfill and to the Old Welland Canal.

Non-contact runoff from the capped southern and northern parts of the East Landfill flow to Pond S5 and the North Pond (S2N), respectively. Pond S5, constructed in 1995, is batch discharged to Ten Mile Creek at Thorold

Townline Road, from where it flows west to the Welland Canal. The North Pond, constructed in 1992, is batch discharged to the WBQ Service Pond, which is used as a water source for quarry operations and dust suppression.

Stormwater accumulated in the South Landfill SWMP and the East Landfill Pond S5 and North Pond (S2N) have not had to be diverted to the leachate collection system (LCS) due to contact water reaching the ponds. It is noted, however, that an unplanned discharge of non-contact water from the South Landfill SWMP occurred in October 2021. Water was observed exiting the pond to the 1200mm solid pipe due to a damaged discharge valve. Field parameter measurements were immediately taken as required by the ECA for pond discharge. All field parameters complied with their discharge limits except dissolved oxygen (DO), which was slightly below the lower discharge limit, even in the confirmation testing. As such, the pond was pumped to the LCS to stop the discharge and to facilitate inspection and repair of the damaged SWMP discharge valve. Approximately 525 m^3 of non-contact water discharged from the pond to the 1200mm solid pipe, and approximately 3,000 m^3 of non-contact water was pumped from the pond to the LCS. The MECP was notified of the unplanned discharge.

As operations at the Campus have changed and grown over time, storm water management works have been added, modified, or removed. During quarry operations at the Campus, dewatering sumps in the quarry floor have consistently directed storm water to the 1200mm solid pipe or its precursor trench in the East Quarry floor and ultimately to the Old Welland Canal. During development of the East and South Landfills, operations were consistently managed such that any surface water which had potential to contact waste materials was isolated and directed to the LCS, while any non-contact water was directed through on-site ditching and/or temporary piping to the 1200mm solid pipe. Once portions of the East and South Landfill reached final elevation with the final cap material in place, storm water from those areas was directed to the relevant storm water ponds and managed as described previously. Even though storm water management works have been added, modified, or removed at the Campus over time, the operations have consistently maintained separation between contact and non-contact storm water.



LEGEND

- LANDFILL BOUNDARY
- CATCHMENT AREA BOUNDARY
- LANDFILL SURFACE WATER DRAINAGE DITCH SHOWING FLOW DIRECTION
- EXTERIOR SURFACE WATER DRAINAGE DITCH SHOWING FLOW DIRECTION
- STORMWATER MANAGEMENT POND
- GROUNDWATER COLLECTION SYSTEM (GWCS)
- WALKER ENVIRONMENTAL GROUP INC. (WEG) DRAINAGE SYSTEM (1200 mm Ø PIPE)

NOTE(S)

1. PROJECTION: UTM NAD83-17N (CSRS 2010).
2. ELEVATIONS ARE GEODETIC (masl). DATUM IS BASED ON NRCAN HT2.0 (CGVD2013).

REFERENCE(S)

1. IMAGERY: © 2025 MICROSOFT CORPORATION © MAXAR © CNES (2025) DISTRIBUTION AIRBUS DS.
2. BASE PLAN FEATURES FROM OPEN DATA, CITY OF NIAGARA FALLS.
3. EXISTING GROUND IS BASED ON UAV SURVEY DATED JUNE 12, 2025 BY WALKER.

NOT FOR CONSTRUCTION

DRAFT

0 200 400

1:5,000 METRES

CLIENT
WALKER ENVIRONMENTAL GROUP

PROJECT
SURFACE WATER RESOURCES EXISTING CONDITIONS REPORT
SOUTH LANDFILL PHASE 2 ENVIRONMENTAL ASSESSMENT
NIAGARA FALLS, ONTARIO

TITLE
EXISTING WALKER DRAINAGE SYSTEM

CONSULTANT

YYYY-MM-DD	2026-05-06
DESIGNED	-
PREPARED	SJL
REVIEWED	MS
APPROVED	DM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0065457.5367	0003	A	4-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

0 25 mm

4.1.1 Drainage Patterns and Catchment Areas for Surface Water Stations

The catchment boundaries for the various watercourse stations along the Site surface water receptors are presented on **Figure 3-2.** The catchments were delineated based on available topography and contour data from NPCA and MECP. The catchment areas are listed in **Table 4-1** and, where applicable, include all upstream sub-catchments (e.g., catchment area at SW8 includes catchment area at US Ten Mile Creek station). The SSA represents approximately 25% of the Ten Mile Creek subwatershed area at SW8.

Table 4-1: Catchment Areas at Monitoring Locations

Subwatershed Area	Station ID	General Description	Catchment Area (km^2)
BDSC TEN MILE CREEK	US TEN MILE CREEK	Upstream Station on Ten Mile Creek, East of Walker Quarry	2.4
	SW8	Downstream Station on Ten Mile Creek, West of Walker Quarry	3.3
	US WELLAND CANAL	Downstream Station on Ten Mile Creek West of Walker Quarry, Confluence with Welland Canal	4.3
BDSC WELLAND CANAL NORTH	STN1	Tributary of Welland Canal North 1, located North of Walker Quarry	0.8
	STN2	Tributary of Welland Canal North 2, located North of Walker Quarry	<0.1
	SW2	Site Groundwater and Stormwater Discharge to the Old Welland Canal	0.8[(a)]
	SUMP	Stormwater runoff collected by the Southeast Quarry	<0.1
	WC2	Downstream of Site Groundwater and Stormwater Discharge, in the Old Welland Canal	0.9[(b)]
	WC6	Upstream of Site Groundwater and Stormwater Discharge, in the Old Welland Canal	0.7[(b)]
NOTL SIX MILE CREEK	STN4	Tributary of Six Mile Creek, located North of Walker Quarry	<0.1

Note(s):

a) Approximate drainage area of Campus consisting of discharge from Site works. Discharge includes contributions from both groundwater and surface water sources.

b) Reliable estimates of drainage area contributing to the Old Welland Canal, and in turn discharge rates, were not possible due to discharge being controlled by the Welland Canal system. Drainage areas are based on the estimated overland flow area contributing to the receptor point and does not consider the drainage contributing within the Welland Canal itself.

4.1.2 Desktop Flow Volume Estimates

4.1.2.1 Water Survey of Canada Station Results

Estimated flood discharges and mean monthly flows at the watercourse crossings were derived based on a regional analysis using data from a nearby WSC station (i.e., Station 02HA030, named Four Mile Creek near Virgil).

Flows at the watercourse crossing locations were pro-rated to the target catchment based on contributing drainage area, using the formula:

$$Q_2 = Q_1 \times (A_2 / A_1)^{C}$$

Where Q_2 is the target flow, Q_1 is the reference flow, A_2 and A_1 are the target catchment area and reference catchment area, respectively, and C is a coefficient (equal to 1 in the case of mean flows and approximated as 0.75 in the case of peak [return period] flows) (Ontario Ministry of Transportation (MTO), 1997). The hydrometric station used for the regional analysis is summarized in **Table 4-2**, while the estimated 2-year, 100-year and mean monthly discharges at the watercourse crossings are shown in **Table 4-3** and **Table 4-4**. Annual instantaneous peak flow at Four Mile Creek near Virgil (Station 02HA030) were analysed to obtain peak flows for 2- and 100-year flood events. Flood flow analysis was completed using RMC-BestFit software developed collaboratively by the U.S. Army Corps of Engineers' Risk Management Center and Engineer Research and Development Center's Coastal and Hydraulics Laboratory. Years with incomplete or missing flow data were excluded and the remaining data were analysed as a single record and fitted to Log-Pearson Type III distribution. In general, surface water flows and water levels at the watercourses interacting with the Project are largely controlled by snowmelt and rainfall generated runoff patterns. The spring and fall hydrographs are typically characterized by moderate to high flows in response to the annual snowmelt event in April-May and fall rains in October-November, while hydrographs during the summer and winter months are marked by mostly low flows or dry channel conditions augmented by the occasional rainfall generated runoff peak.

Table 4-2: Available Long-Term Hydrometric Stations Near the Study Area

Station ID #	Name	Latitude/ Longitude	Approx. Distance from Project footprint [km]	Drainage Area [km2]	Period of Record	2-Year Discharge(a) [m³/s]	100-Year Discharge(a) [m³/s]
02HA030	Four Mile Creek near Virgil	43° 11' 44" N 79° 06' 48" W	7.5	13.5	2005-2025	6.76[(a)]	10.65[(a)]

Source: Hydrometric station data were obtained from the Environment Canada Water Survey of Canada Historical Hydrometric Data database (Government of Canada 2024).

Notes:

a) Peak flows (2-, and 100-year flows) are based on the annual instantaneous peak flow and fitted to Log-Pearson Type III distribution.

Table 4-3: Estimated Flood Discharges for Project Watercourse Crossings

Crossing ID	Estimated Drainage Area	Name of Watercourse or Drainage Feature	Prorated WSC Station	2-Year Discharge(b)	100-Year Discharge(b)
	(km2)	-	(ID #)	(m³/s)	(m³/s)
US TEN MILE CREEK	2.4	Ten Mile Creek	02HA030	1.85	2.92
SW8	3.3	Ten Mile Creek	02HA030	2.35	3.7
US WELLAND CANAL [(a)]	4.3	Welland Canal	02HA030	2.87	4.52
STN1	0.8	Tributary of the Welland Canal North 2	02HA030	0.81	1.28
STN2	<0.1	Tributary of the Welland Canal North 1	02HA030	0.17	0.27
STN4	<0.1	Tributary of Six Mile Creek	02HA030	0.17	0.27

Crossing ID	Estimated Drainage Area	Name of Watercourse or Drainage Feature	Prorated WSC Station	2-Year Discharge(b)	100-Year Discharge(b)
	(km2)	-	(ID #)	(m^3/s)	(m^3/s)
SW2	0.8	Site Groundwater and Stormwater Discharge to the Old Welland Canal	02HA030	0.81	1.28
WC2 [(a)]	0.9	Old Welland Canal	02HA030	0.89	1.40
WC6 [(a)]	0.7	Old Welland Canal	02HA030	0.73	1.16

Note(s):

a) Reliable estimates of drainage area, and in turn discharge rates, were not possible due to discharge being controlled by the Welland Canal system. Drainage areas are based on the estimated overland flow area contributing to the receptor point and do not consider the drainage contributing within the Welland Canal itself.

b) Prorated flows were determined using the calculated 2-year and 100-year discharge values from WSC station 02HA030 (Four Mile Creek near Virgil).

Table 4-4: Estimated Mean Monthly Flows for Project Watercourse Crossings

Crossing ID	Prorated WSC Station	Mean Monthly Flows (m^3/s) (a)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
US TEN MILE CREEK	02HA030	0.04	0.05	0.06	0.05	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.04
SW8	02HA030	0.06	0.06	0.08	0.07	0.04	0.03	0.03	0.03	0.02	0.03	0.03	0.06
US WELLAND CANAL	02HA030	0.08	0.08	0.10	0.09	0.05	0.04	0.04	0.03	0.03	0.04	0.04	0.07
STN1	02HA030	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01
STN2	02HA030	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
STN4	02HA030	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
WC2	02HA030	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
WC6	02HA030	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01

Note(s):

a) Mean monthly flows at crossing locations were prorated based on data from WSC station 02HA030 (Four Mile Creek near Virgil).

4.1.2.2 Seaway Flow Results

Data retrieved from the St. Lawrence Seaway Management Corp. (SLSMC) was reviewed to determine flows entering and exiting the Welland Canal, as well as flows at Lock #7. Lock #7 is located on the main Welland Canal, west of the Campus and downstream of the confluence with 10 Mile Creek (Ministry of Natural Resources, 2019). Site drainage exits the SSA westward via the 1200 mm pipe to SW2 on the Old Welland Canal. There are three main water diversions at or near Lock #7. At Lock #7 itself, water is needed to pass vessels, the Power House and Supply Weir Second Canal. Additionally, Weir #7 diverts water around Lock #7 to a pond downstream. However, this pond feeds Weir #6 and the Flight Locks (Locks #6, #5 and #4) downstream. **Table 4-5** below details the average annual flows entering and exiting the Welland Canal, as well as the average annual flow that is diverted at Lock #7. **Figure 4-2** below shows the arrangement of the lock system within the Welland Canal.

Table 4-5: Welland Canal Flow Summary Data

Year	Average Monthly Flow (m3/s)		
	Entering the Canal (from Lake Erie)	Water Diversions at Lock #7	Flow Exiting Canal (into Lake Ontario)
2021	236.3	27.6	210.6
2022(a)	235.4	25.9	200.7
2023	206.4	27.3	178.5
2024(b)	143.0	23.3	124.4

Note(s):

a) Seaway records for April 2022 were unavailable.

b) Completed Seaway records for 2024 only include data from January to October.

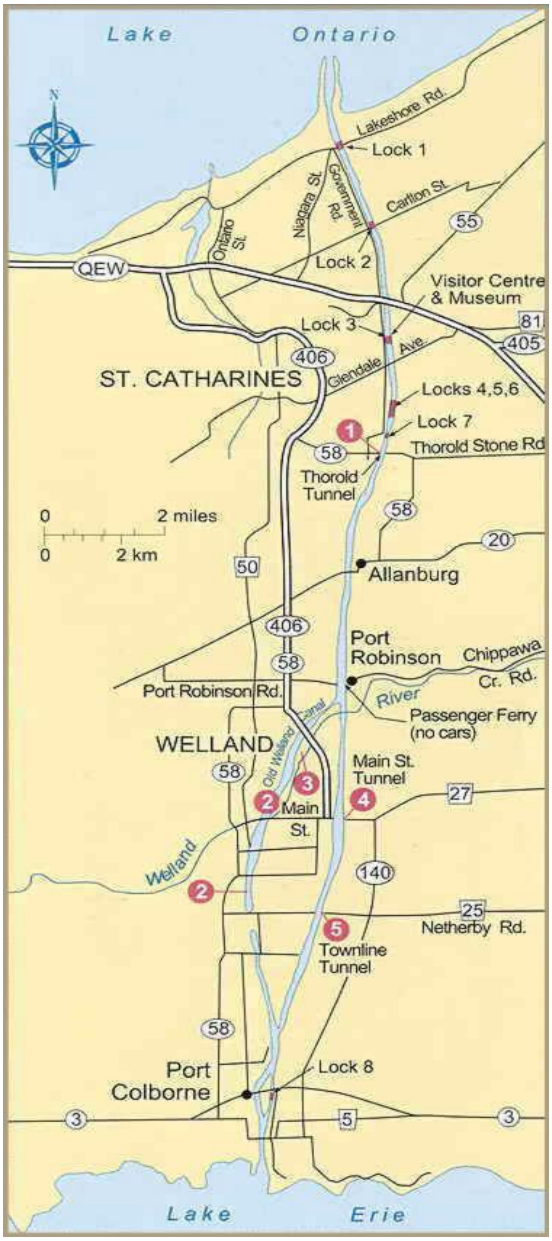


Figure 4-2: Welland Canal Map (InfoNiagara, 2021)

4.1.3 Desktop Surface Water Quality Results

4.1.3.1 Provincial Water Quality Monitoring Network (PWQMN) Results

Historical water quality results from Provincial Water Quality Monitoring Network (PWQMN) stations within the RSA Study Area were used to estimate typical surface water quality conditions in the regional area (Ministry of Environment, Conservation and Parks, 2023). Two PWQMN stations near the study area were investigated, including one station from the NOTL Four Mile Creek subwatershed (Station 06000300102) and one station from the LWR Welland River subwatershed (Station 11000100502), noting that each monitoring station was active at the time of reporting. Details for each PWQMN station are presented in **Table 4-6,** while a summary of the historical water quality monitoring data is presented in **Table 4-7**.

Table 4-6: Selected Provincial Water Quality Monitoring Network (PWQMN) Stations in the Regional Area

Station ID	Station Name	Latitude °N	Longitude °W	Available Water Quality Record	General Location	NPCA Subwatershed Area
06000300102	Four Mile Creek	43°15'12"	79°7'33"	2003-2021	Lakeshore Rd, Niagara Reg Rd 87	NOTL Four Mile Creek
11000100502	Welland River	43°1'43"	79°12'40"	2003-2021	River St, At New Siphon, Port Robinson	LWR Welland River

Table 4-7: Surface Water Quality Results from PWQMN Stations in Regional Area

Parameter	Units	Guideline Value	Four Mile Creek (Station ID 06000300102)		Welland River (Station ID 11000100502)	
			Median Value (a)	% meeting guideline	Median Value (a)	% meeting guideline
Temperature	°C	N/A[b]	14.6	N/A[b]	15.4	N/A[b]
pH	n/a[k]	6.5-8.5[c][d]	8.2	95%	8.2	99%
Alkalinity	mg/L ($CaCO_3$)	30-500[d][e]	169	100%	98	100%
Conductivity	µS/cm	N/A[b]	821	N/A[b]	358	N/A[b]
Chloride	mg/L	250[f]	83.2	99%	23.4	100%
Phosphorus	mg/L	0.01-0.03[c]	0.200	2%	0.06	13%
Nitrate[h]	mg/L as N	10[g][h]	1	98%	0.6	100%
Nitrite[h]	mg/L as N	1[g][h]	0.024	100%	0.029	100%
Total suspended solids	mg/L	25[i]	17.1	64%	8.7	83%
Turbidity	NTU	5[f][j]	18.2	8%	10.5	26%
Total dissolved solids	mg/L	500[f]	-	-	-	-
Dissolved Oxygen	mg/L	>4[k][l]	10.3	98%	10.6	99%
Total Aluminum	µg/L	75[c][m][n]	238	8%	177	14%
Total Cadmium	µg/L	0.5[g][o][p]	0.53	59%	0.64	57%
Total Copper	µg/L	5[c][q]	3.1	80%	1.83	100%
Total Iron	µg/L	300[c][f][r]	333	43%	227	66%
Total Lead	µg/L	1-5[c][s][t]	2.81	87%	2.41	92%

Notes:

a) Corresponds to median value of collected samples for select PWQMN location. Concentrations below detection limit were reported negative in the data and therefore were excluded from median estimate.

b) Not applicable. No guideline value available for select parameter.

c) Ontario Ministry of the Environment, 1994. Water Management, Policies, Guidelines. Provincial Water Quality Objectives of the Ministry of Environment and Energy. ISBN 0-7778-8473-9 rev. Queen's Printer for Ontario, 1994.

d) Operational Guideline detailed in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE 2003).

e) Water Management, Policies, Guidelines. Provincial Water Quality Objectives of the Ministry of Environment and Energy (MOE 1994) states that alkalinity should not be decreased by more than 25% of the natural concentration.

f) Aesthetic objective detailed in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE 2003).

g) Maximum Acceptable Concentration (MAC) detailed in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE 2003).

h) Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).

i) Based on CCME 1999 - Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life where the maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period) under clear flow conditions and maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L under high flow conditions.

j) Based on CCME 1999 - Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life indicating a maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 2 NTUs from background levels for a longer-term exposure (e.g., 30-d period).

k) Based on Ontario Ministry of the Environment (1994) Water Management, Policies, Guidelines. Provincial Water Quality Objectives for dissolved oxygen where the concentration limit should be between 4-8 mg/L should not be less than 47-63% of saturation value.

l) Based on CCME 1999 - Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life, the concentration limit of dissolved oxygen should be between 5.5-9.5 mg/L. That said, the value is variable. Guidelines should be referred to for more information.

m) Operational Guideline detailed in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE 2003) states limit for aluminum at 0.1 mg/L.

n) CCME 1999 - Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life indicates an aluminum limit of 0.005 mg/L if pH <6.5 and 0.1 mg/L if pH ≥ 6.5.

o) The PWQO criterion for total cadmium is dependent on the hardness. Median hardness at the stations were above 100 mg/L as CaCO3 and therefore the cadmium criterion was set at 0.0005 mg/L.

p) CCME 1999 - Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life indicates a cadmium long term limit between 0.00014mg/L to 0.00037mg/L. Limit is based on equation detailed in Guidelines for correcting cadmium limit to measured hardness.

q) The PWQO criterion for total copper is dependent on the hardness. Hardness was measured between 85 mg/L and 408 mg/L for PWQMN stations. Therefore, the copper criterion was set at 5 µg/L.

r) Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life (CCME 1999). Long term iron limit is 300 µg/L.

s) Maximum Acceptable Concentration (MAC) detailed in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE 2003) for lead is 10 µg/L.

t) CCME 1999 - Canadian Water Quality Guideline, Water Quality (Freshwater) for the Protection of Aquatic Life indicates a lead limit between 0.001-0.007 mg/L based on hardness. Limit is based on equation detailed in Guidelines for correcting lead limit to measured hardness.

n/a = not applicable; N/A = not available; µS/cm = microsiemens per centimetre; NTU = Nephelometric Turbidity Units.

Based on the available water quality results identified in the desktop study of the NOTL Four Mile Creek subwatershed (i.e., Bowmanville Creek PWQMN stations 06000300102) the watercourse included neutral pH that ranged from 7.61 to 8.71, alkalinity that varied from 76.6 to 249 mg/L (as calcium carbonate [$CaCO_3$]), hardness that ranged from 88 to 408 mg/L, and dissolved oxygen levels that varied between 3.3 and 22.9 mg/L. Turbidity conditions were observed to range from 3.05 to 492 NTU with a calculated median of 18 NTU, while suspended solids concentrations varied from 3.1 to 380 mg/L with a median of 17 mg/L. Phosphorous concentrations were greater than the Interim PWQO criterion of 0.02 mg/L in 98% of surface water samples, with a median of 0.20 mg/L. Approximately 41% of the total cadmium samples were greater than the Interim PWQO criterion of 0.5 µg/L. Total copper concentrations were greater than the Interim PWQO criterion of 5 µg/L in 20% of surface water samples, with a median of 3.1 mg/L. Total iron concentrations were greater than the PWQO criterion of 300 µg/L in 57% of surface water samples, with a median of 333 µg/L. Total lead concentrations were greater than the Interim PWQO criterion of 5 µg/L in 13% surface water samples, with a median of 2.81 µg/L.

With reference to the available water quality results identified in the desktop study of the LWR Welland River subwatershed (i.e., Welland River station 11000100502), the watercourse included neutral pH values that ranged from 6.39 to 8.52, alkalinity that varied from 57 to 154 mg/L, hardness that ranged from 85 to 280 mg/L, and dissolved oxygen levels that varied between 1.0 mg/L and 20.0 mg/L. Turbidity conditions ranged from 1 to 190 NTU, with a calculated median of 10.5 NTU. In comparison, suspended solids concentrations varied from 2.5 to 203 mg/L, with a median of 8.7 mg/L. Phosphorous concentrations were greater than the Interim PWQO criterion

of 0.02 mg/L in 87% of surface water samples, with a median of 0.06 mg/L. Approximately 43% of the total cadmium samples were greater than the Interim PWQO criterion of 0.5 µg/L., with a median of 0.64 µg/L. Total copper concentrations were below the Interim PWQO criterion of 5 µg/L in all surface water samples with a median of 1.83 µg/L. Total iron concentrations were greater than the PWQO criterion of 300 µg/L in 34% of surface water samples, with a median of 227. µg/L. Total lead concentrations were greater than the Interim PWQO criterion of 5 µg/L in 8% surface water samples, with a median of 2.41 µg/L.

4.1.3.2 Seaway Water Quality Results

Data provided by the St. Lawrence Seaway Management Corp. (SLSMC) were reviewed to identify general water quality at several sections of the Welland Canal, including Locks #8, #7, and #2. The arrangement of the lock system can be seen on **Figure 4-2.** This water quality investigation was completed by SLSMC as part of a pre-engineering study to address potential gate corrosion along the lock system. Surface water samples were collected from Locks #2, #7 and #8 in the Niagara Improvement Area region. In-situ water measurements (pH, temperature, conductivity, dissolved oxygen and oxidation-reduction potential) were also collected from the targeted locks, using a calibrated YSI 556 water probe, rented from Pine Environmental Services. Field work was completed between August 4 and August 12, 2020, by SLSMC. The surface water samples collected from Locks #2, #7 and #8 were analyzed by Agat Laboratories from Mississauga, Ontario.

Table 4-8 presents the general chemistry surface water results, including the in-situ field measurements, and metals results for each lock. It should be noted that the surface water quality varies during the year, especially following the spring freshet, where chloride, calcium and total dissolved solids concentrations, amongst others, are often elevated.

Table 4-8: Surface Water Quality Results from Seaway Stations in Regional Area

Sample Date			April 12, 2020			Notes
Parameter	Unit	PWQO	Lock #8	Lock #7	Lock #2	
General Chemistry						
Temperature (Field)	^{O}C	-	24.7	25.4	25.4	5 m depth
			24.7	25.4	25.4	10 m depth
Dissolved Oxygen (Field)	mg/L	-	8.0	8.9	9.3	Field - 5 m depth
			7.9	8.5	9.1	10 m depth
Oxidation Reduction Potential (Field)	mV	-	32	26	25	5 m depth
			34	32	35	10 m depth
Electrical Conductivity (Field)	µS/cm	-	283	296	285	5 m depth
			283	296	284	10 m depth
pH (Field)	-	6.5 - 8.5	8	8.3	8.3	5 m depth
			7.6	7.8	7.8	10 m depth
Electrical conductivity	µS/cm	-	248	258	255	-
pH	-	6.5 - 8.5	7.97	7.83	7.71	-
Langelier Index	-	-	0.194	0.0645	-0.0475	-
Hardness (as CaCO3)	mg/L	-	114	117	118	-
Total Dissolved Solids	mg/L	-	154	162	164	-
Alkalinity (as CaCO3)	mg/L	-	99	99	100	-

Sample Date			April 12, 2020			Notes
Parameter	Unit	PWQO	Lock #8	Lock #7	Lock #2	
m - Alkalinity (as CaCO3)	mg/L	-	99	99	100	-
p - Alkalinity (as CaCO3)	mg/L	-	<5	<5	<5	-
Bicarbonate (as CaCO3)	mg/L	-	99	99	100	-
Carbonate (as CaCO3)	mg/L	-	<5	<5	<5	-
Hydroxide (as CaCO3)	mg/L	-	<5	<5	<5	-
Fluoride	mg/L	-	<0.05	<0.05	<0.05	-
Chloride	mg/L	-	18.2	21.6	19.3	-
Nitrate as N	mg/L	-	0.11	0.17	0.13	-
Nitrite as N	mg/L	-	<0.05	<0.05	<0.05	-
Bromide	mg/L	-	<0.05	<0.05	<0.05	-
Sulphate	mg/L	-	22.4	25.2	25.1	-
Ortho Phosphate as P	mg/L	-	<0.10	<0.10	<0.10	-
Reactive Silica	mg/L	-	0.68	0.78	0.98	-
Silica (Si)	mg/L	-	NA	NA	NA	-
Ammonia as N	mg/L	-	<0.02	<0.02	<0.02	-
Phosphorus	mg/L	0.03	<0.02	0.03	0.020	-
Total Organic Carbon	mg/L	-	2.3	2.2	2.1	-
Turbidity	NTU	-	2.8	3.8	6.6	-
Calcium	mg/L	-	30.93	31.63	32.12	-
Potassium	mg/L	-	1.64	1.78	1.98	-
Sodium	mg/L	-	9.85	12.44	11.81	-
Cation Sum	meq/L	-	2.76	2.93	2.93	-
Anion Sum	meq/L	-	2.97	3.13	3.08	-
Metals						
Aluminum (Al)	mg/L	0.075 mg/L for pH > 6.5 to 9.0	0.103	0.123	0.248	-
Antimony (Sb)	mg/L	0.02	<0.003	<0.003	<0.003	-
Arsenic (As)	mg/L	0.01	<0.003	<0.003	<0.003	-
Barium (Ba)	mg/L	-	0.019	0.020	0.021	-
Beryllium (Be)	mg/L	1.1 for Hardness > 75 mg/L	<0.001	<0.001	<0.001	-
Boron (Bo)	mg/L	0.2	0.023	0.026	0.029	-
Cadmium (Cd)	mg/L	0.0002	<0.001	<0.001	<0.001	-
Chromium (Cr)	mg/L	-	<0.003	<0.003	<0.003	-
Chromium VI (Cr VI)	mg/L	0.001	NA	NA	NA	-
Cobalt (Co)	mg/L	0.0009	<0.001	<0.001	<0.001	-
Copper(Cu)	mg/L	0.005	<0.003	<0.003	<0.003	-
Iron (Fe)	mg/L	0.3	0.091	0.110	0.206	-
Lead (Pb)	mg/L	0.005	<0.001	<0.001	<0.001	-
Magnesium (Mg)	mg/L	-	9.02	9.28	9.22	-

Sample Date			April 12, 2020			Notes
Parameter	Unit	PWQO	Lock #8	Lock #7	Lock #2	
Manganese (Mn)	mg/L	-	0.005	0.005	0.006	-
Mercury (Hg)	mg/L	-	<0.0001	<0.0001	<0.0001	-
Molybdenum (Mo)	mg/L	0.04	<0.002	<0.002	<0.002	-
Nickel (Ni)	mg/L	0.025	<0.003	<0.003	<0.003	-
Selenium (Se)	mg/L	0.1	<0.004	<0.004	<0.004	-
Silver (Ag)	mg/L	0.1	<0.002	<0.002	<0.002	-
Strontium (Sr)	mg/L	-	0.170	0.181	0.186	-
Thallium (TI)	mg/L	0.0003	<0.006	<0.006	<0.006	-
Tin (Sn)	mg/L	-	<0.002	<0.002	<0.002	-
Titanium (Ti)	mg/L	-	<0.002	<0.002	0.002	-
Tungsten (W)	mg/L	0.03	<0.010	<0.010	<0.010	-
Uranium (U)	mg/L	0.005	<0.002	<0.002	<0.002	-
Vanadium (V)	mg/L	0.006	<0.002	<0.002	<0.002	-
Zinc (Zn)	mg/L	0.03	<0.005	<0.005	<0.005	-
Zirconium (Zr)	mg/L	0.004	<0.004	<0.004	<0.004	-

4.2 Field Investigations

Field investigations to determine surface water conditions for the South Landfill Phase 2 Environmental Assessment were initiated in December 2024 and completed in March 2026 after obtaining site-specific information at the surface water receptor locations, seen on **Figure 3-1**. Staff gauges to measure water levels were installed in December 2024 (i.e., STN1, SW2 and SW8) and January 2025 (i.e., US Ten Mile Creek) and investigated monthly to determine estimated water levels and flows (recorded by a flow meter). Water quality results at all 10 stations (i.e., STN1, STN2, STN4, SW2, SW8, Sump, US Ten Mile Creek, US Welland Canal, WC2 and WC6, noted in **Section 3.3.4**) were collected quarterly starting in April 2025. The results of these field investigations are used to further augment the characterization of existing water quantity and quality conditions for the Project, in addition to the desktop results detailed above. That said, environmental studies are currently being completed at select areas of the Walker Campus under separate ongoing monitoring programs. These monitoring programs are being completed as part of existing ECAs and PTTWs, which include studies completed at several surface water stations as part of the new South Landfill Phase 2 Environmental Assessment. Two stations as part of the new South Landfill Phase 2 Environmental Assessment monitoring program have not been assessed in previous studies (i.e., US Ten Mile Creek and US Welland Canal as seen on **Figure 3-1**) and the new field program reported herein includes additional water quality analytes that have not been assessed previously. A full list of analytes scheduled to be collected at the surface water monitoring locations can be found in **Appendix A** (with Table A-1 including quarterly sampling analytes and Table A-2 including annual sampling analytes).

4.2.1 Manual Water Level Results

The manual water level measurement results are summarized in **Table 4-9**.

Table 4-9: Manual Water Level Measurements (masl)

Date	Water Level (masl)					
	US Ten Mile Creek	STN 1	STN2	STN4	SW2	SW8
2024-11-29	-	136.64	-	-	153.98	174.41
2025-01-07	180.23	-	-	-	-	-
2025-01-24	180.26	136.64	Dry, no flow	Dry, no flow	153.96	174.48
2025-02-11	180.31	136.61	-	-	153.96	174.41
2025-03-27	180.24	136.64	Dry, no flow	Dry, no flow	153.98	174.37
2025-04-15	180.27	136.66	Dry, no flow	Dry, no flow	153.99	174.40
2025-05-28	180.23	136.65	-	-	153.99	174.37
2025-06-17	180.15	Stagnant, no flow	Dry, no flow	Dry, no flow	153.96	174.22
2025-07-21	180.17	136.57	-	-	153.94	174.15
2025-08-11	180.17	136.36	-	-	153.95	174.12
2025-09-30	180.17	136.48	Dry, no flow	Dry, no flow	154.01	174.02
2025-10-16	180.18	136.59	-	-	154.05	174.16
2025-11-21	180.23	136.62	-	-	154.04	174.34
2025-12-11	-	-	Dry, no flow	Dry, no flow	154.05	-
2026-01-29	-	-	-	-	-	-
2026-02-20	-	-	-	-	-	-
2026-03-25	180.28	136.73	Dry, no flow	Dry, no flow	154.02	-
Maximum	180.31	136.73	-	-	154.05	174.48
Minimum	180.15	136.36	-	-	153.94	174.02
Mean	180.22	136.60	-	-	153.99	174.29

Note:

"-" indicates measurement/value not available; frozen conditions prevented staff gauge measurements at select stations during December 2025 to February 2026.

The results of the manual water level measurements are as follows:

- During the monitoring period (2024-2026), manual water levels were measured at six stations to characterize seasonal fluctuations and support continuous monitoring efforts. Water levels showed seasonal variation, with higher levels generally observed during winter through spring months (January-May) and lower levels during summer and fall months (June-October).
- Due to dry or frozen conditions, manual water levels could not be measured at select stations during some field visits. Specifically, STN2 and STN4 experienced dry conditions during majority of the monitoring period. Frozen conditions prevented measurements at US Ten Mile Creek, STN1, and SW8 during December 2025 to February 2026.
- At US Ten Mile Creek, water levels ranged from 180.15 masl to 180.31 masl, with peak water level observed in February 2025 and lowest water level in June 2025.

- At STN1, water levels ranged from 136.36 masl to 136.73 masl, with peak water level observed in March 2026 and lowest levels in August 2025.
- At SW2, water levels ranged from 153.94 masl to 154.05 masl, demonstrating relatively stable conditions with minimal seasonal variation throughout the monitoring period.
- At SW8, water levels ranged from 174.02 masl to 174.48 masl, with peak water level in January 2025 and lowest water level during summer and fall months (July-October 2025).

4.2.2 Manual Flow Measurement Results

The manual flow measurement results are summarized in **Table 4-10**.

Table 4-10: Manual Flow Measurements (L/s)

Date	Flow rate (L/s)			
	US Ten Mile Creek	STN 1	SW2	SW8
2024-11-29	10.6	Stagnant, no flow	9.3	6.7
2025-01-07	0.02	-	-	-
2025-01-24	1.2	Stagnant, no flow	4.9	Stagnant, no flow
2025-02-11	0.1	1.1	4.2	Stagnant, no flow
2025-03-27	0.4	3.3	16.4	5.5
2025-04-15	1.9	Stagnant, no flow	24.9	2.9
2025-05-28	0.1	2.0	21.1	6.1
2025-06-17	0.1	Stagnant, no flow	8.1	3.6
2025-07-21	Stagnant, no flow	Stagnant, no flow	3.2	Stagnant, no flow
2025-08-11	Stagnant, no flow	Stagnant, no flow	5.5	Stagnant, no flow
2025-09-30	Stagnant, no flow	Stagnant, no flow	1.9	Stagnant, no flow
2025-10-16	Stagnant, no flow	Stagnant, no flow	12.2	Stagnant, no flow
2025-11-21	0.3	Stagnant, no flow	7.9	3.0
2025-12-11	0.7	Stagnant, no flow	10.3	3.4
2026-01-29	0.1	Stagnant, no flow	5.8	Stagnant, no flow
2026-02-20	331.7	Stagnant, no flow	162.6	Stagnant, no flow
2026-03-25	8.6	Stagnant, no flow	35.5	29.9
Maximum	331.7	3.4	162.6	29.9
Minimum	0.02	1.1	1.9	2.9
Mean	27.4	2.2	20.9	8.2

Note:
"-" indicates measurement/value not available

The results of manual flow measurements are as follows:

- During monitoring period, manual flows varied seasonally across stations, with elevated flows generally observed during February and spring months (March-May) and reduced, stagnant or no flows during summer and fall months (July-October), with the exception of SW2 where flows were observed during all field visits.

Note that the flows measured during February 2026 were observed significantly higher than the other flow measurement events.

- Due to stagnant conditions (pooled water with no flow), manual flows could not be measured at three stations during summer and fall months. Specifically, STN1 experienced stagnant conditions during November 2024, January 2025, April 2025, and June 2025 through March 2026. US Ten Mile Creek showed stagnant, no-flow conditions from July 2025 through October 2025 and SW8 showed stagnant, no-flow conditions during January 2025, February 2025, July 2025 through October 2025, January 2026, and February 2026.
- At US Ten Mile Creek, flows ranged from 0.02 L/s to 331.7 L/s, with peak flow observed in February 2026.
- At STN1, flow ranged from 1.1 L/s to 3.4 L/s when flowing, with extended periods of stagnant conditions throughout most of the monitoring period.
- At SW2, flows ranged from 1.9 L/s to 162.6 L/s, showing the highest variability among all stations. Peak flow was measured in February 2026 (162.6 L/s), with elevated flows also observed in April 2025 and May 2025.
- At SW8, flows ranging from 2.9 L/s to 29.9 L/s when flowing, with the highest flow observed in March 2026.

The manual flow readings are based on a specific point in time; hence, it is difficult to account for hydrological lag times between stations because of storage and/or time of concentration effects. The continuous flow monitoring results provide a more comprehensive evaluation of the characteristics of flow regime for the broader investigation period. However, where applicable, the manual flow rates are referenced to support observations and inferences related to water quality trends.

4.2.3 Continuous Water Level and Flow Monitoring Results

Water level and flow hydrographs were generated for all continuous flow monitoring stations (**Section 3.3.3**). Water level and flow hydrographs at continuous flow monitoring stations are presented in **Appendix E** on Figure E-1 through Figure E-4. These figures are supplemented by daily total precipitation and daily mean temperature records from the Environment of Canada climate station (WELLAND-PELHAM, ID: 6139449). To generate the flow hydrographs using the continuous water level records, stage-discharge rating curves were developed using manual flow measurements. Summary statistics (Maximum, Minimum and Average) of continuous water levels and flows are presented in **Table 4-11** and **Table 4-12**, respectively.

Table 4-11: Summary Statistics (Maximum, Minimum and Average) of Continuous Water Levels

Statistical Parameter	Surface Water Level (masl)			
	Ten Mile Creek	STN1	SW2	SW8
Maximum	180.78	137.27	154.55	175.39
Minimum	180.09	136.28	153.72	174.00
Average	180.26	136.64	154.01	174.34

Table 4-12: Summary Statistics (Maximum, Minimum and Average) of Continuous Flows

Statistical Parameter	Flow Rate (L/s)			
	Ten Mile Creek	STN1	SW2	SW8
Maximum	52	49	392	583

Statistical Parameter	Flow Rate (L/s)			
	Ten Mile Creek	STN1	SW2	SW8
Minimum	0	0	0	0
Average	2	3	22	13

The results of continuous water level and flow monitoring are as follows:

- Water level records reported herein were collected from December 2024 to March 2026 for all four stations (US Ten Mile Creek, STN1, SW2, and SW8).
- Water level fluctuations at the monitoring stations ranged from 0.69 m to 1.39 m. The lowest and highest water level fluctuations were recorded at Ten Mile Creek and SW8, respectively.
- Water levels were generally observed to increase from February 2025, peaking in March-May 2025, followed by a gradual decrease through the summer and fall months (June to November 2025), then peaking again in February-March 2026. This pattern corresponds with spring snowmelt and rainfall events, followed by reduced precipitation during summer months.
- During monitoring period, flows and/or water level hydrographs at the monitoring stations were generally in correlation with precipitation events generating low to moderate flows, particularly during the spring period (March-May 2025), noting that the response to precipitation events at SW2 was milder than the other stations.
- Flow hydrographs generated using stage-discharge rating curves showed that peak flows ranged from 49 L/s (estimated at STN1) to 583 L/s (estimated at SW8), noting that peak flows were influenced by spring snowmelt and rainfall events. It should be noted that the measured flows fall within the low flow range; therefore, the predicted flows derived from stage-rating curves in this range have greater confidence than those associated with high flows.
- At US Ten Mile Creek, water levels ranged from 180.09 masl to 180.78 masl, with peak water levels observed in March 2026. Manual flow could not be measured during extended periods (July-October 2025) due to stagnant/pooled/dry water conditions as noted in the hydrograph.
- Water level record at US Ten Mile Creek showed sudden spikes at regular interval. Walker confirmed with the Region of Niagara that these spikes are related to hydrant flushing along Garner Road to Ten Mile Creek.
- At STN1, water levels ranged from 136.28 masl to 137.14 masl, with flows ranging from 0 L/s to 49 L/s. Peak flows occurred in March and April 2025, with extended low-flow or stagnant conditions throughout most of the monitoring period.
- At SW2, water levels ranged from 153.72 masl to 154.55 masl, with flows ranging from 0 L/s to 392 L/s. The station exhibited relatively stable water levels during November 2025 to April 2025 and August to December 2025, with a notable drop in water levels during May to June. Peak flow (392 L/s) occurred in February 2026 at the onset of the spring freshet period. A sudden increase and drop in water levels observed in end-July and mid-June, respectively, may be attributed to beaver activity and/or the accumulation and subsequent removal of vegetation or tree debris affecting water flow.

- Minor water level fluctuations were also recorded at SW2. Considering that SW2 receives both groundwater and stormwater from the Southeast Quarry, the undeveloped South Landfill floor, and roadside ditches along Taylor Road, these variations may be attributed to inputs from these sources.
- At SW8, water levels ranged from 174.00 masl to 175.39 masl, showing the highest water level fluctuations among all stations. Flows ranged from 0 L/s to 583 L/s, with the second highest peak flow recorded among all stations. The logger was submerged in stagnant/pooled water with no flow during mostly dry conditions from June to October 2025, as noted in the hydrograph.
- Most monitoring stations exhibited a gradual response to precipitation events, with flows showing moderate peaks during the spring period. All stations showed minimal to zero flow during the summer months (July-October 2025), corresponding with reduced precipitation and dry conditions. This pattern is consistent with the manual flow measurements showing stagnant or no-flow conditions during the same period.

4.2.4 Stage-Discharge Rating Curve

Stage-discharge rating curves for continuous flow monitoring stations are presented in **Table 4-13** and Figure F-1 through Figure F-2 in **Appendix F.**

Table 4-13: 2024-2025 Stage-Discharge Rating Curve Equations

Station ID	Stage Discharge Rating Curve Equation	Rating Curve Offset, Y_o (masl)
Ten Mile Creek	$Q = 0.15 (Y – 180.08)^{3.00}$	180.08
STN1	$Q = 0.08 (Y – 136.27)^{3.50}$	136.27
SW2	$Q = 0.65 (Y – 153.7)^{3.00}$	153.70
SW8	$Q = 0.15 (Y – 173.95)^{3.75}$	173.95

Note that the measured flows were observed within the low flow range and therefore the predicted flows using stage-rating curves withing low flow range are presented with higher confidence compared to high flows.

4.2.5 Surface Water Quality Results

Historical water quality results that have been completed as part of ongoing monitoring programs for separate studies are presented in **Sections 4.2.5.1** to **4.2.5.3** and water quality monitoring results at all 10 stations (i.e., STN1, STN2, STN4, SW2, SW8, Sump, US Ten Mile Creek, US Welland Canal, WC2 and WC6, noted in **Section 3.3.4**) collected in 2025 are presented in **Section 4.2.5.4**.

4.2.5.1 Environmental Compliance Approval (ECA) No. A120211

Environmental monitoring programs are currently being completed for Walker's solid non-hazardous waste disposal facility (East Landfill) located in the former Walker Aggregates Inc. (WAI) - East Quarry. This disposal facility is located in lots 11, 30, 31, 49, 50 and 66, former Township of Stamford, City of Niagara Falls, Regional Municipality of Niagara, and is known as the East Landfill Site (see **Figure 1-1**). An annual report is required under the MECP Environmental Compliance Approval (ECA) No. A120211 for the East Landfill site. A copy of ECA No. A120211 can be found in **Appendix B**.

Annual reports, prepared by Urban & Environmental Management Inc. (UEM) in collaboration with WSP Canada Inc. (hydrogeological and hydrological) with input provided by Walker and its contractors, have been completed

previously and include water quality results for several stations included as part of the South Landfill Phase 2 Environmental Assessment program. Samples are obtained and analysed for general chemical, trace metals, and field parameters quarterly each year. Volatile organic parameters listed in North Pond ECA are also collected several times a year.

The current monitoring program for the East Landfill requires quarterly surface water quality monitoring at stations SW2, WC2, and WC6. As shown on **Figure 3-1,** SW2 is located at the site property boundary with discharge leaving the Collection Chamber through the 1,200 mm solid concrete drainage pipe prior to discharge to the Old Welland Canal. Stations WC6 and WC2 are located within the Old Welland Canal upstream and downstream, respectively, of the discharge from SW2. The water which discharges at SW2 consists of groundwater and stormwater which collects from: (i) the Southeast Quarry, (ii) the undeveloped South Landfill floor, and (iii) from roadside ditches along Taylor Road.

4.2.5.1.1 Old Welland Canal Monitoring Results

Historical chemical results for stations SW2, WC2 and WC6 are presented below in **Table 4-14**. The historic chemical results detail the median and 90th percentile values for parameter collected since 1998.

Table 4-14: Old Welland Canal Monitoring Results

Parameter		PWQO / *CWQG*	Old Welland Canal Monitoring Locations					
			SW2		WC2		WC6	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
Field	pH (SU)	6.5-8.5 *(6.5-9.5)*	7.9	8.2	8.3	8.6	8.4	8.7
	Conductivity (µS/cm)	-	3400	5234	390.5	725.5	321	421.8
	Temperature (ºC)	-	13.2	20.01	10.7	21.96	10.8	22.3
	DO (mg/L)	(a)	10.25	13	11.25	14.66	11.4	14.4
General Parameters	pH (SU)	6.5-8.5 *(6.5-9.5)*	7.97	8.12	8.14	8.278	8.17	8.312
	Conductivity (µS/cm)	-	3600	5634	374	580.6	310	364.6
	TDS (mg/L)	-	2645	4508	231	375.2	196	225.4
	TSS (mg/L)	-	12	68.5	8	21.3	5	10
	Hardness (mg/L)	-	1220	1894	148	202	127	140
Major Ions (mg/L)	Chloride	*120 (f)*	550	1136	30	62.8	22	31.35
	Sulphate	*429 (g)*	1000	1416	42.5	94.6	27	32.5
	Alkalinity	(b)	170	230.4	99	110	98	106.4
	Calcium	-	350	500.4	40	58.8	35	38
	Magnesium	-	100	150	11	15.84	9.2	10
	Sodium	-	320	574.8	19	35.8	14	21
	Potassium	-	23	35.2	2	3	1.7	2
Nutrients and Organic Indicators (mg/L)	Nitrate	*3.0 (h)*	1.44	2.98	0.245	0.547	0.21	0.43
	Nitrite	*0.06 (i)*	0.05	0.101	0.0085	0.05	0.005	0.05
	T K N	-	0.61	1.2	0.22	0.37	0.22	0.374
	Ammonia	-	0.25	0.799	0.025	0.098	0.025	0.0708

Parameter		PWQO / *CWQG*	Old Welland Canal Monitoring Locations					
			SW2		WC2		WC6	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
	Un-ionized Ammonia	0.02 (c)	0.005	0.017	0.001025	0.004	0.001	0.004
	Organic Nitrogen	-	0.31	0.716	0.17	0.31	0.17	0.31
	Total Phosphorous	0.03 (d)	0.02	0.1052	0.02	0.05	0.016	0.040
	D O C	-	3	6.5	2.6	3.45	2.5	3.3
	T O C	-	2.7	4.23	2.6	3.2	2.6	3.3
	C O D	-	13	34.3	6	11	6	11
	Phenols	0.001	<0.001	-	<0.001	-	<0.001	-
Total Metals (mg/L)	Aluminum	0.015-0.075 *(o)*	0.005	0.01	0.01	0.05	0.006	0.041
	Antimony	0.2	<0.005	0.01	<0.005	-	<0.005	-
	Arsenic	0.1	0.0025	0.011	0.001	0.0050	0.001	0.005
	Barium	-	0.03	0.05	0.022	0.028	0.021	0.026
	Boron	0.2 *1.5 (j)*	0.85	1.305	0.041	0.1	0.026	0.046
	Cadmium	0.0002 *(k)*	<0.0001	-	<0.0001	-	<0.0001	-
	Chromium	0.0089	<0.005	0.0073	<0.005	-	<0.005	-
	Copper	0.005	0.0025	0.0052	0.0014	0.0030	0.0012	0.003
	Iron	0.3	0.3	1.32	0.20	0.65	0.13	0.36
	Lead	0.025	0.0005	0.005	0.0005	0.0025	0.0005	0.0025
	Manganese	*(m)*	0.04	0.12	0.00975	0.021	0.0053	0.012
	Mercury	0.0002	<0.00005	-	<0.00005	-	<0.00005	-
	Nickel	0.0025 *(p)*	<0.025	-	<0.025	-	<0.025	-
	Selenium	0.1	0.003	0.05	<0.002	0.025	<0.002	0.0045
	Silver	0.0001	<0.0001	-	<0.0001	-	<0.0001	-
	Zinc	0.03	0.0066	0.05	0.005	0.01	0.005	0.01

Parameter		PWQO / *CWQG*	Old Welland Canal Monitoring Locations					
			SW2		WC2		WC6	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
		(n)						
	Strontium	-	-	-	-	-	-	-
	Titanium	-	-	-	-	-	-	-
	Vanadium	0.006	-	-	-	-	-	-
Halogenated Volatiles (µg/L)	1,1,1<Trichloroethane	(10)	<0.4	-	<0.4	-	<0.4	-
	1,1,2,2<Tetrachloroethane	(70)	<0.5	-	<0.43	-	<0.43	-
	1,1,2<Trichloroethane	(800)	<0.4	-	<0.3	-	<0.3	-
	1,1<Dichloroethane	(200)	<0.4	-	<0.4	-	<0.28	-
	1,1<Dichloroethene	(40)	<0.5	-	<0.28	-	<0.28	-
	1,2<Dibromoethane (Ethylene Dibromide)	(5)	<0.4	-	<0.2	-	<0.2	-
	1,2<Dichlorobenzene	2.5	<0.4	-	<0.4	-	<0.4	-
	1,2<Dichloroethane	(100)	<0.4	-	<0.2	-	<0.2	-
	1,2<Dichloropropane	(0.7)	<0.5	-	<0.36	-	<0.36	-
	1,3<Dichlorobenzene	2.5	<0.4	-	<0.4	-	<0.4	-
	1,4<Dichlorobenzene	4	<0.4	-	<0.3	-	<0.23	-
	Bromodichloromethane	(200)	<0.3	-	<0.3	-	<0.3	-
	Bromoform	(60)	<0.4	-	<0.4	-	<0.4	-
	Bromomethane (Methyl Bromide)	(0.9)	<0.5	-	<0.5	-	<0.5	-
	Carbon tetrachloride	-	<0.3	-	<0.2	-	<0.2	-
	Chlorobenzene (Monochlorobenzene)	15	<0.2	-	<0.2	-	<0.2	-

Parameter		PWQO / *CWQG*	Old Welland Canal Monitoring Locations					
			SW2		WC2		WC6	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
	Vinyl Chloride (Chloroethylene)	(600)	<0.2	-	<0.2	-	<0.2	-
	Chloroform (Trichloromethane)	-	<0.5	-	<0.215	-	<0.215	-
	Chloromethane (Methyl Chloride)	(700)	<1	-	<1	-	<1	-
Halogenated Volatiles (µg/L)	cis<1,2<Dichloroethene	(200)	<0.4	-	<0.4	-	<0.4	-
	cis<1,3<Dichloropropene	-	<0.2	-	<0.2	-	<0.2	-
	Dibromochloromethane	(40)	<0.3	-	<0.3	-	<0.3	-
	Methylene Chloride (Dichloromethane)	(100)	<2	-	<1	-	<1	-
	Tetrachloroethene	(50)	<0.3	-	<0.2	-	<0.2	-
	trans<1,2<Dichloroethene	(200)	<0.4	-	<0.4	-	<0.4	-
	trans<1,3<Dichloropropene	(7)	<0.2	-	<0.2	-	<0.2	-
	Trichloroethene	(20)	<0.3	-	<0.3	-	<0.3	-
	Trichlorofluoromethane (CFC<11)	-	<0.5	-	<0.5	-	<0.5	-
Non<Halogenated Volatiles (µg/L)	Benzene	(100)	<0.2	-	<0.2	-	<0.2	-
	Ethylbenzene	(8)	<0.4	-	<0.4	-	<0.4	-
	Styrene	(4)	<0.45	-	<0.4	-	<0.4	-
	Toluene	(0.8)	<0.4	-	<0.38	-	<0.36	-
	o<Xylene	(40)	<0.4	-	<0.4	-	<0.3	-

Parameter		PWQO / *CWQG*	Old Welland Canal Monitoring Locations					
			SW2		WC2		WC6	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
	m&p<Xylene	(32)	<0.5	-	<0.5	-	<0.5	-
	Xylenes (Total)	-	<0.4	-	<0.4	-	<0.4	-
Water Soluble Volatiles (µg/L)	Acrolein	(0.03)	<10	-	<7.9	-	<7.9	-
	Acrylonitrile	-	<5	-	<3	-	<3	-

Note(s):

PWQO - Provincial Water Quality Objectives (revised 1999), Numbers in brackets are interim PWQO currently under development.

CWQG - Canadian Water Quality Guidelines values are noted in italics.

Values under detection limit were adjusted to half values of detection limit for analytical purpose. The 90th percentile was not calculated for certain parameters, as their values were below the detection limit.

PWQO Notes:

a) Dissolved oxygen is temperature dependent: value should not be less than the range of 7 mg/L (25 °C) to 4 mg/L (0 °C) for warm water biota.

b) Alkalinity should not decrease by more than 25% of the natural concentration: calculated on an event specific basis from background station SW1 when sampled.

c) Un-ionized ammonia value calculated value using the fraction (f) of NH3 from: f = 1 ÷ (10pKa-pH+1), where: 'pKa = 0.09018 + 2729.92 ÷ T; T = ambient water temperature in Kelvin (K); K = °C + 273.16; Field pH and temperature values and laboratory total ammonia results are used in the equation

d) Total phosphorus does not have a firm objective: excessive plant growth in rivers and streams should be eliminated at a concentration below 0.03 mg/L

e) m-xylene interim PWQO is 2 µg/L; p-xylene interim PWQO is 30 µg/L

CWQG Notes:

f) CWQG for chloride - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2011).

g) British Columbia Water Quality Guideline for sulphate depends on hardness (BC WQG, 2013). For hardness greater than 250 mg/L, a site specific sulphate guideline may need to be developed.

h) CWQG for nitrate-nitrogen - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2012).

i) CWQG for nitrite-nitrogen - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 1987).

j) CWQG for boron - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2009).

k) CWQG for cadmium depends on hardness. For hardness values between 17 to 280 mg/L, the CWQG is calculated using the equation: CWQG (µg/L) = 10{0.83(log[hardness]) – 2.46 } (CWQG, 2014).

m) CWQG for manganese is calculated using the MS Excel calculator provided in Appendix B of CWQG (2019).

n) CWQG for zinc is calculated using the equation: CWQG = exp(0.947[ln(hardness mg/L)] - 0.815[pH] + 0.398[ln(DOC mg/L)] + 4.625) and is valid between hardness 23.4 and 399 mg CaCO3/L, pH 6.5 and 8.13 and DOC 0.3 to 22.9 mg/L. (CWQG, 2018).o) CWQG for aluminium depends on pH. CWQG= 0.005mg/L if pH<6.5 and CWQG=0.1 if pH>6.5 (CWQG, 2019).

p) CWQG for nickel depends on hardness. For hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L; For hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = [exp{0.76[ln(hardness)]+1.06}]/1000; For hardness >180 mg/L, the CWQG is 0.150 mg/L; For hardness is unknown, the CWQG is 0.025 mg/L (CWQG, 2019).

A trend analysis for the surface water results was completed for the last 5 years of data as the operational configuration of the Southeast Quarry and South Landfill changes from year to year (UEM, 2025). A summary of observations from a trend analyses for the surface water results at SW2, WC2 and WC6 is provided below:

- At upstream station WC6, concentrations are “stable” or have “no trend” at the 95% confidence factor, except for sulphate and total phosphorus which have “decreased” and DOC which has “increased” over the past 5 years;
- At downstream station WC2, concentrations are “stable” or have “no trend” at the 95% confidence factor, except for concentrations of total phosphorus which have “decreased” and DOC which have “increased” over the past 5 years; and,
- Concentrations at SW2 are “stable” or have “no trend” at the 95% confidence factor, except for nitrate concentrations which have “increased”.
- Detailed analysis of the water quality results and trends can be found in the annual monitoring reports completed as part of Environmental Compliance Approval (ECA) No. A120211.

4.2.5.2 Environmental Compliance Approval (ECA) No. 0084-78RKAM

Walker also operates a solid non-hazardous waste disposal facility in the previously mined out Walker Aggregates Inc. (WAI) – South Quarry. This disposal facility is located in lots 31, 49, 50 and 66, former Township of Stamford, City of Niagara Falls, Regional Municipality of Niagara, and is known as the South Landfill Site (**Figure 1-1**). Annual reports are completed each year under the MECP Environmental Compliance Approval (ECA) No. 0084-78RKAM for the South Landfill Site. A copy of ECA No. 0084-78RKAM can be found in **Appendix C**.

The purpose of the surface water monitoring program is to identify potential leachate impairment of surface water at the monitoring network locations. Surface water quality is assessed using the Provincial Water Quality Objectives (PWQO) (Ministry of Environment, Conservation and Parks, 2023). Where background concentrations exceed the PWQO, the aim is to prevent further deterioration of surface water quality by landfill operations.

The surface water monitoring network includes results for SW9 (also included in the new South Landfill Phase 2 surface water monitoring program), located along Ten Mile Creek. Water quality results are also collected for station SW2 (included in ECA No. A120211 and presented in **Section 4.2.5.1**), located near the outlet of the 1,200 mm solid concrete drainage pipe Collection Chamber; WC6 and WC2 (both included in ECA No. A120211 presented above) located upstream and downstream of the Collection Chamber outlet along the Old Welland Canal.

Surface water runoff from the undeveloped areas of the South Landfill is collected in on-site ditching and conveyed to the southwest where it is directed to the 1,200 mm solid concrete drainage pipe via the approved spur line, with an outlet at SW2.

In April 2016, construction of a SWMP along the southern edge of the South Landfill was completed and the SWMP became operational. Surface water that collects in the SWMP is discharged to the 1,200 mm solid concrete drainage pipe as well.

4.2.5.2.1 Old Welland Canal Water Quality Results

In accordance with Schedule C of the South Landfill ECA, quarterly surface water samples were obtained near the outlet of the 1,200 mm solid concrete drainage pipe (SW2), upstream of the discharge point on the Old Welland Canal (WC6) and downstream of the discharge point on the Old Welland Canal (WC2), as shown in

Figure 3-1. The historic surface water quality results for stations SW2, WC2 and WC6 can be found in the previously presented **Section 4.2.5.1** in **Table 4-14**.

4.2.5.2.2 Ten Mile Creek Water Quality Results

Ten Mile Creek is located south of the South Landfill and is physically separated from the landfill by a perimeter berm. The SWMP is designed such that the pond discharges to the 1,200 mm solid concrete drainage pipe during both normal discharge and overflow conditions. Per the ECA, discharge from the SWMP pond is done in a batch arrangement, following water quality testing. Although storm water is not discharged to Ten Mile Creek, Schedule C of the South Landfill ECA requires quarterly monitoring in Ten Mile Creek (SW9). Water quality samples are obtained on a quarterly basis from 2009 to 2023. The Ten Mile Creek historical surface water quality results are presented in **Table 4-15**.

Table 4-15: South Quarry Monitoring Results

Parameter		PWQO / CWQG	South Quarry Monitoring Locations	
			SW9	
			Median	90th percentile
Field	pH (SU)	6.5-8.5 *(6.5-9.5)*	7.9	8.3
	Conductivity (µS/cm)	-	889	2430
	Temperature (ºC)	-	10.6	21.55
	DO (mg/L)	(a)	9.825	13.415
General Parameters	pH (SU)	6.5-8.5 *(6.5-9.5)*	7.99	8.19
	Conductivity (µS/cm)	-	854.5	2550
	TDS (mg/L)	-	535	1455
	TSS (mg/L)	-	17.5	40
	Hardness (mg/L)	-	200	469.6
Major Ions (mg/L)	Chloride	*120 (f)*	140	515
	Sulphate	*429 (g)*	57.5	198.5
	Alkalinity	(b)	130	290
	Calcium	-	54	131.5
	Magnesium	-	15	42
	Sodium	-	84	331.5
	Potassium	-	4.6	7.65
Nutrients and Organic Indicators (mg/L)	Nitrate	*3.0 (h)*	0.29	1.195
	Nitrite	*0.06 (i)*	0.029	0.05
	T K N	-	0.675	1.4
	Ammonia	-	0.04	0.225
	Un-ionized Ammonia	0.02 (c)	0.001	0.005
	Organic Nitrogen	-	0.62	1.276
	Total Phosphorous	0.03 (d)	0.16	0.315
	D O C	-	11.5	16.7
	T O C	-	33.5	49
	C O D	-	1	3
	Phenols	0.001	0.0005	0.00075

Parameter		PWQO / CWQG	South Quarry Monitoring Locations	
			SW9	
			Median	90th percentile
Total Metals (mg/L)	Aluminum	0.015-0.075 *(o)*	0.0185	0.544
	Antimony	0.2	<0.0005	0.005
	Arsenic	0.1	0.00245	0.025
	Barium	-	0.041	0.067
	Boron	0.2 *1.5 (j)*	0.04	0.0607
	Cadmium	0.0002 *(k)*	<0.0001	0.005
	Chromium	0.0089	<0.005	0.025
	Copper	0.005	0.0048	0.00752
	Iron	0.3	1.125	4.7
	Lead	0.025	0.00076	0.005
	Manganese	*(m)*	0.05	0.2
	Mercury	0.0002	0.000035	0.00005
	Nickel	0.0025 *(p)*	-	-
	Selenium	0.1	<0.002	0.025
	Silver	0.0001	<0.0001	0.005
	Zinc	0.03 *(n)*	0.008	0.025
	Strontium	-	-	-
	Titanium	-	-	-
	Vanadium	0.006	-	-

Note(s):

PWQO - Provincial Water Quality Objectives (revised 1999), Numbers in brackets are interim PWQO currently under development.

CWQG - Canadian Water Quality Guidelines values are noted in italics.

Values under detection limit were adjusted to half values of detection limit for analytical purpose. The 90th percentile was not calculated for certain parameters, as their values were below the detection limit.

PWQO Notes:

a) Dissolved oxygen is temperature dependent: value should not be less than the range of 7 mg/L (25 °C) to 4 mg/L (0 °C) for warm water biota.

b) Alkalinity should not decrease by more than 25% of the natural concentration: calculated on an event specific basis from background station SW1 when sampled.

c) Un-ionized ammonia value calculated value using the fraction (f) of NH3 from: f = 1 ÷ (10pKa-pH+1), where: 'pKa = 0.09018 + 2729.92 ÷ T; T = ambient water temperature in Kelvin (K); K = °C + 273.16; Field pH and temperature values and laboratory total ammonia results are used in the equation

d) Total phosphorus does not have a firm objective: excessive plant growth in rivers and streams should be eliminated at a concentration below 0.03 mg/L

e) m-xylene interim PWQO is 2 µg/L; p-xylene interim PWQO is 30 µg/L

CWQG Notes:

f) CWQG for chloride - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2011).

g) British Columbia Water Quality Guideline for sulphate depends on hardness (BC WQG, 2013). For hardness greater than 250 mg/L, a site specific sulphate guideline may need to be developed.

h) CWQG for nitrate-nitrogen - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2012).

i) CWQG for nitrite-nitrogen - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 1987).

j) CWQG for boron - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2009).

k) CWQG for cadmium depends on hardness. For hardness values between 17 to 280 mg/L, the CWQG is calculated using the equation: CWQG (µg/L) = 10{0.83(log[hardness]) – 2.46 } (CWQG, 2014).

m) CWQG for manganese is calculated using the MS Excel calculator provided in Appendix B of CWQG (2019).

n) CWQG for zinc is calculated using the equation: CWQG = exp(0.947[ln(hardness mg/L)] - 0.815[pH] + 0.398[ln(DOC mg/L)] + 4.625) and is valid between hardness 23.4 and 399 mg CaCO3/L, pH 6.5 and 8.13 and DOC 0.3 to 22.9 mg/L. (CWQG, 2018).

o) CWQG for aluminium depends on pH. CWQG= 0.005mg/L if pH<6.5 and CWQG=0.1 if pH>6.5 (CWQG, 2019).

p) CWQG for nickel depends on hardness. For hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L; For hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = [exp{0.76[ln(hardness)]+1.06}]/1000; For hardness >180 mg/L, the CWQG is 0.150 mg/L; For hardness is unknown, the CWQG is 0.025 mg/L (CWQG, 2019).

A Mann-Kendall trend analyses was completed for the surface water results at SW9 and indicate that the parameter concentrations are generally “stable” or have “no trend” at the 95% confidence factor. The exceptions are the chloride, sulphate and sodium concentrations which are decreasing at SW9. These trends are not interpreted to be related to the landfill. It is noted that the December concentrations of total chromium, iron, lead and zinc at SW9 are elevated above the recent historical range; these results may be anomalous as a result of high dilution factors (UEM, 2025).

4.2.5.3 Permit to Take Water No. 3612-CMTM5V

Walker also operates the Southeast Quarry, which occupies part of Lots 29, 32, 48, 49, 50, 51, and 66 in the City of Niagara Falls. The location of the Southeast Quarry is the proposed footprint of the South Landfill Phase 2 Expansion and is shown in the Site Location, **Figure 1-1.**

Aggregate extraction in the Southeast Quarry commenced in early 2007 under Ministry of Natural Resources (MNR) License No. 11175. Prior to April 2008, aggregate extraction took place in the former South Quarry (currently the South Landfill), under License No. 8336, which was surrendered on April 1, 2008. The monitoring program requirements for quarry dewatering activities have been established in the PTTW since December 2006. PTTW No. 3612-CMTM5V, issued on January 9, 2023, currently authorizes dewatering activities on the site. A copy of PTTW No. 3612-CMTM5V can be found in **Appendix D**.

Discharge of stormwater run-off collected from a 3.3-hectare catchment area at the site, located within the aggregate stockpile area in the East Quarry Operations Area, is allowed by means of Environmental Compliance Approval for Industrial Sewage Works (ECA [Sewage] No. 7557-86WG42), dated September 17, 2010.

Springs, spring-fed ponds, and headwater streams in the Six Mile Creek watershed and a catchment area discharging to the Old Welland Canal (referred to as the Old Welland Canal watershed) are monitored as part of the PTTW Monitoring Program. Site plans prepared historically for the quarry monitoring program identified that the Six Mile Creek watershed and the Old Welland Canal watershed, but not the Eight Mile Creek watershed, could potentially be affected by changes in water quality or quantity in the identified springs and spring-fed ponds.

The required monitoring locations under the PTTW are outlined in **Table 4-16.** The locations of the specified monitoring stations are shown on **Figure 3-1.**

Table 4-16: PTTW Monitoring Program Requirements

Monitoring Location	GPS Coordinates	Water Quality (twice / year)
STN1	0648523N 4777789E	X
STN2 / SP2	0649321N 4777531E	X

Monitoring Location	GPS Coordinates	Water Quality (twice / year)
STN4 / SP5	0649782N 4777702E	X

Piezometers were installed within the general seepage area to measure water levels; however, determination of actual discharge volumes is challenging since flow is very limited and/or may stop during summer months. Furthermore, it is not possible to measure vertical gradients because the exact location of the seeps and springs is not visible.

The piezometers installed in the seepage areas at STN1, STN2 and STN4 consist of 32 mm (1.25”) diameter steel riser pipes with stainless steel screened drive points completed to a depth of approximately 2 m below ground surface. As shown on **Figure 3-1,** stations STN1 and STN2 are situated within the Old Welland Canal watershed, while station STN4 is situated within the Six Mile Creek watershed. Stations STN2 and STN4 were monitored as required by PTTW No. 3612-CMTM5V.

Surface water quality sampling is conducted semi-annually at stations STN1, STN2, and STN4, as required by the PTTW. Surface water quality sampling is also conducted quarterly at station STN1 in conjunction with South Landfill surface water station SW8 on Ten Mile Creek, as required by ECA (Sewage) No. 7557-86WG42.

4.2.5.3.1 PTTW Monitoring Program Water Quality Results

Surface water quality at each sampling location included in the PTTW monitoring program is tabulated below in **Table 4-17**. Semi-annual surface water sampling events are completed at stations STN1, STN2 and STN4 from 2006 to 2023. Quarterly samples are also obtained at station STN1 as required by ECA (Sewage) No. 7557-86WG42.

Table 4-17: Southeast Quarry Monitoring Results

Parameter		PWQO / CWQG	Southeast Quarry					
			STN1		STN2		STN4	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
Field	pH (SU)	6.5-8.5 *(6.5-9.5)*	8	8.3	7.5	7.66	7.75	7.91
	Conductivity (µS/cm)	-	1350	2340	2260	2432	629	747.9
	Temperature (ºC)	-	12.4	18.16	9.8	14.14	10	13.45
	DO (mg/L)	(a)	9.77	12.94	8.35	8.51	6.01	9.244
General Parameters	pH (SU)	6.5-8.5 *(6.5-9.5)*	8.12	8.235	7.85	8.102	7.97	8.094
	Conductivity (µS/cm)	-	1500	2165	2330	2506	638	762
	TDS (mg/L)	-	939	1469	1400	1562	378.5	488.3
	TSS (mg/L)	-	11.5	118.8	10	75.4	16	78
	Hardness (mg/L)	-						
Major Ions (mg/L)	Chloride	*120 (f)*	146	422.9	442	575.6	29	47.8
	Sulphate	*429 (g)*	220	391.1	172	285	41	61.4
	Alkalinity	(b)	350	390.4	310	380	260	298.4
	Calcium	-	159.5	220.9	131.5	173.4	74	82.8
	Magnesium	-	52.25	66.2	36	44.1	29	34
	Sodium	-	100	230.5	294	326	25	35.4
	Potassium	-	5	8.1	5	9.4	1.7	2
Nutrients and Organic Indicators (mg/L)	Nitrate	*3.0 (h)*	0.05	0.288	2.26	5.394	0.32	0.762
	Nitrite	*0.06 (i)*	<0.01	-	-	-	-	-
	T K N	-	0.33	0.54	0.43	0.894	0.23	0.522
	Ammonia	-	0.04	0.122	0.025	0.068	0.025	0.083
	Un-ionized Ammonia	0.02 (c)	0.001	0.003	0.0005	0.0005	0.0005	0.0005
	Organic Nitrogen	-	-	-	-	-	-	-

Parameter		PWQO / CWQG	Southeast Quarry					
			STN1		STN2		STN4	
			Median	90th Percentile	Median	90th Percentile	Median	90th Percentile
	Total Phosphorous	0.03 (d)	0.031	0.089	0.096	0.322	0.044	0.11
	D O C	-	-	-	-	-	-	-
	T O C	-	-	-	-	-	-	-
	C O D	-	-	-	-	-	-	-
	Phenols	0.001	-	-	-	-	-	-
Total Metals (mg/L)	Aluminum	0.015-0.075 *(o)*	0.005	0.005	0.005	0.015	0.005	0.134
	Antimony	0.2	<0.0005	0.00074	<0.0005	0.005	<0.0005	0.005
	Arsenic	0.1	0.002	0.005	<0.001	0.025	<0.001	-
	Barium	-	-	-	-	-	-	-
	Boron	0.2 *1.5 (j)*	-	-	-	-	-	-
	Cadmium	0.0002 *(k)*	<0.0001	-	<0.0001	0.005	<0.0001	-
	Chromium	0.0089	0.00275	0.0073	0.004	0.025	0.0025	0.0044
	Copper	0.005	-	-	-	-	-	-
	Iron	0.3	0.605	1.366	0.11	2.26	0.19	1.24
	Lead	0.025	<0.001	0.004	<0.001	0.005	<0.001	0.00236
	Manganese	*(m)*	0.345	0.546	0.025	0.406	0.04	0.168
	Mercury	0.0002	<0.0001	-	<0.0001	-	<0.0001	-
	Nickel	0.0025 *(p)*	<0.005	-	<0.005	-	<0.005	-
	Selenium	0.1	<0.002	0.005	<0.0015	0.025	<0.001	-
	Silver	0.0001	<0.0001	-	<0.0001	0.005	<0.0001	-
	Zinc	0.03 *(n)*	<0.01	-	<0.01	0.034	<0.01	0.0194
	Strontium	-	0.987	1.458	0.596	0.93	0.32	0.4132
	Titanium	-	<0.01	0.029	<0.01	-	<0.01	-
	Vanadium	0.006	0.002	0.006	0.002	0.025	0.002	0.004

Note(s):

PWQO - Provincial Water Quality Objectives (revised 1999), Numbers in brackets are interim PWQO currently under development.

CWQG - Canadian Water Quality Guidelines values are noted in italics.

Values under detection limit were adjusted to half values of detection limit for analytical purpose. The 90th percentile was not calculated for certain parameters, as their values were below the detection limit.

PWQO Notes:

a) Dissolved oxygen is temperature dependent: value should not be less than the range of 7 mg/L (25 °C) to 4 mg/L (0 °C) for warm water biota.

b) Alkalinity should not decrease by more than 25% of the natural concentration: calculated on an event specific basis from background station SW1 when sampled.

c) Un-ionized ammonia value calculated value using the fraction (f) of NH3 from: f = 1 ÷ (10pKa-pH+1), where: 'pKa = 0.09018 + 2729.92 ÷ T; T = ambient water temperature in Kelvin (K); K = °C + 273.16; Field pH and temperature values and laboratory total ammonia results are used in the equation

d) Total phosphorus does not have a firm objective: excessive plant growth in rivers and streams should be eliminated at a concentration below 0.03 mg/L

e) m-xylene interim PWQO is 2 µg/L; p-xylene interim PWQO is 30 µg/L

CWQG Notes:

f) CWQG for chloride - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2011).

g) British Columbia Water Quality Guideline for sulphate depends on hardness (BC WQG, 2013). For hardness greater than 250 mg/L, a site specific sulphate guideline may need to be developed.

h) CWQG for nitrate-nitrogen - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2012).

i) CWQG for nitrite-nitrogen - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 1987).

j) CWQG for boron - Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, Long Term Concentration (CWQG, 2009).

k) CWQG for cadmium depends on hardness. For hardness values between 17 to 280 mg/L, the CWQG is calculated using the equation: CWQG (µg/L) = 10{0.83(log[hardness]) – 2.46 } (CWQG, 2014).

m) CWQG for manganese is calculated using the MS Excel calculator provided in Appendix B of CWQG (2019).

n) CWQG for zinc is calculated using the equation: CWQG = exp(0.947[ln(hardness mg/L)] - 0.815[pH] + 0.398[ln(DOC mg/L)] + 4.625) and is valid between hardness 23.4 and 399 mg CaCO3/L, pH 6.5 and 8.13 and DOC 0.3 to 22.9 mg/L. (CWQG, 2018).

o) CWQG for aluminium depends on pH. CWQG= 0.005mg/L if pH<6.5 and CWQG=0.1 if pH>6.5 (CWQG, 2019).

p) CWQG for nickel depends on hardness. For hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L; For hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = [exp{0.76[ln(hardness)]+1.06}]/1000; For hardness >180 mg/L, the CWQG is 0.150 mg/L; For hardness is unknown, the CWQG is 0.025 mg/L (CWQG, 2019).

Historical surface water quality data indicate that concentrations of total phosphorus and iron are typically elevated above the PWQO, both upstream and downstream of the Quarry, and are inferred to have naturally elevated background concentrations in the study area. The dissolved oxygen concentrations at STN1 have not previously exceeded the PWQO. Continued monitoring of dissolved oxygen at STN1 was completed and presented in **Section 4.2.5.4**. Historically, the ground surface at STN2 and STN4 has generally been dry during dry weather conditions (GLL, 2006a), particularly STN2. Surface water samples obtained from station STN1 represent stream water quality. The chemical signature for the STN1 samples suggests that water at this station is a mixture of precipitation/surface water run-off and bedrock groundwater, as historically observed.

4.2.5.4 2025 Water Quality Monitoring Results

Field and laboratory water quality monitoring was conducted at ten (10) stream monitoring network stations (STN1, STN2, STN4, SW2, SW8, Sump, US Ten Mile Creek, US Welland Canal, WC2 and WC6) on a quarterly basis during 2025 to evaluate seasonal fluctuations in surface water quality. Samples were collected on April 15, June 17, September 30/October 2, and December 11, 2025. Note that an additional station at Eleven Mile Creek was sampled once on March 25, 2026 per MECP request. Field parameters were compared to Provincial Water Quality Objectives (PWQO) and Canadian Council of Ministers of the Environment (CCME) short-term and long-term guidelines, whereas laboratory analytical results were compared to their respective regulatory guidelines (PWQO, CCME guidelines, Environmental Protection Act (Ontario Regulation 232/98 and Ontario Regulation 347)) to evaluate the occurrence of exceedances. The results of field measurements and laboratory analysis are presented in Tables G-1 and G-2 in **Appendix G.**

Field Results

In general, field parameters at most stations were within PWQO and CCME guidelines, where applicable, throughout the monitoring period. Water temperature showed expected seasonal variations, ranging from near 0°C in December 2025 to over 23°C in June 2025. Dissolved oxygen ranged from 0.80 mg/L to 14.63 mg/L across all sampling rounds. Specific conductivity varied considerably across stations, ranging from approximately 260 µS/cm to over 5000 µS/cm, with SW2 consistently exhibiting the highest values. Turbidity averaged at 11.6 NTU, except for an elevated value at SW8 (98.76 NTU) in June 2025.

Exceedances of PWQO guidelines were observed for pH and dissolved oxygen at few stations during the monitoring period. pH exceedances above the PWQO upper range (6.5-8.5) were observed at three watercourse stations (WC2, WC6, and US Welland Canal) during multiple sampling events, however the pH values did not exceed CCME guidelines (6.5-9). Dissolved oxygen results below the temperature dependant PWQO minimum range of (5.0 mg/L-8.0 mg/L) were observed at US Ten Mile Creek in June 2025 (4.32 mg/L), STN1 in September 2025 (0.80 mg/L), and SW8 in June (5.25 mg/L). During field visits, samples at some stations could not be collected due to dry, frozen, or stagnant water conditions. Summary of lab results at each monitoring station is as follows:

- At US Ten Mile Creek, a dissolved oxygen (4.32 mg/L in June 2025) was observed below the PWQO minimum of 5.0 mg/L. During September 2025 sampling event, pooled/stagnant water conditions prevented sampling. No other field parameters exceeded guidelines.
- At STN2 and STN4, no exceedances were observed. Both stations experienced dry conditions during June, September, and December 2025 sampling events.
- At Sump, no exceedances were observed. December 2025 sampling could not be completed due to frozen conditions.

- At STN1, a dissolved oxygen (0.80 mg/L in September 2025) was observed below the PWQO minimum of 5.0 mg/L. No other field parameters exceeded guidelines.
- At SW2, no exceedances were observed, although this station consistently exhibited the highest specific conductivity values.
- At WC2, pH exceeded PWQO upper limit of 8.5 during three sampling events: April 2025 (8.77), September 2025 (8.69), and December 2025 (8.54).
- At WC6, pH exceeded PWQO upper limit of 8.5 during all four sampling events and ranged from 8.74 to 8.83.
- At SW8, dissolved oxygen (5.25 mg/L in June 2025) was observed below the PWQO minimum threshold in June 2025. During September sampling event, pooled/stagnant water conditions prevented sampling.
- At US Welland Canal, pH exceeded PWQO upper limit of 8.5 during two sampling events: June 2025 (8.65) and December 2025 (8.58).

In summary, field pH exceeded PWQO guidelines at three watercourse stations, with values ranging from 8.54 to 8.83, slightly above the PWQO upper threshold of 8.5, but remained with CCME guidelines. Note, while the field pH showed exceedances, lab pH was observed to be within PWQO range (see lab results below for details). Dissolved oxygen exceedances were observed at two stations (Ten Mile Creek and STN1), likely related to stagnant water conditions.

Lab Results

Water quality samples were collected at all 11 stations and sent to laboratory for analysis. All parameters were tested quarterly (April 15, June 17, September 30/October 2, and December 11, 2025), except for the analytes under Ontario Regulation 347 Schedule 4, which were analysed only during the September 30/October 2 sampling round due to high cost and effort of analysis. Note that the Eleven Mile Creek station was sampled once on March 25, 2026. Summary of lab water quality results and exceedances is provided in subsections below.

General Parameters

Lab pH values ranged from 7.71 to 8.39 with an average of 8.07, which were within PWQO and CCME guidelines. Note, while the lab measured pH at WC2, WC6, SW8 were within PWQO guidelines, field measures pH at these stations was observed to exceed PWQO upper limit (see field results above for details). Alkalinity (as $CaCO_3$) ranged from 87 mg/L to 440 mg/L and averaged 175 mg/L. Total dissolved solids (TDS) ranged from 135 mg/L to 2,990 mg/L with an average of 869 mg/L, noting that the value of 2,990 mg/L was observed at SW2 in December 2025. Hardness ($CaCO_3$) ranged from 110 mg/L to 1,700 mg/L with an average of 477 mg/L, noting that the values of 110 mg/L and 1,700 mg/L were observed at Eleven Mile Creek and SW2, respectively. Dissolved organic carbon (DOC) ranged from 1.4 mg/L to 13 mg/L with an average of 4.1 mg/L. Total organic carbon (TOC) ranged from 1.4 mg/L to 15 mg/L with an average of 4.4 mg/L. Lab conductivity ranged from 290 µS/cm to 5,000 µS/cm with an average of 1,478 µS/cm. Lab turbidity measurements ranged from 0.5 NTU to 77 NTU with an average of 8.1 NTU.

Anions and Nutrients

Nitrate concentrations ranged from <0.01 mg/L to 2.81 mg/L, all below the CCME guidelines. Nitrite concentrations ranged from <0.01 mg/L to 2.25 mg/L, with one exceedance of the CCME long-term guideline

(0.197 mg/L) observed at SW2 in the October 2025 sampling event (2.25 mg/L). Total ammonia-N concentrations ranged from <0.05 mg/L to 2.1 mg/L.

Total ammonia-N exceedances of CCME long-term guidelines were observed at six stations during the June 2025 and October 2025 sampling events. Exceedances in June 2025 were recorded at Ten Mile Creek (1.1 mg/L), sump (0.46 mg/L), SW2 (0.96 mg/L), WC2 (0.68 mg/L), WC6 (2.1 mg/L), US Welland Canal (0.51 mg/L), and one exceedance in October 2025 at SW2 (0.74 mg/L).

Total un-ionized ammonia exceedances of both PWQO (0.02 mg/L) and CCME (0.019 mg/L) guidelines were observed at seven stations during the June 2025 sampling event only. Exceedances were recorded at Ten Mile Creek (0.073 mg/L), Sump (0.052 mg/L), STN1 (0.057 mg/L), SW2 (0.044 mg/L), WC2 (0.078 mg/L), WC6 (0.044 mg/L), and US Welland Canal (0.084 mg/L). Total un-ionized ammonia concentrations during all other sampling rounds were below guidelines.

Total phosphorus exceeded the PWQO guidelines (0.020 mg/L) at all stations at least one throughout the monitoring period, except at Sump. Exceedances ranged from 0.023 mg/L to 0.12 mg/L, with US Ten Mile Creek, STN1, and SW8 exceeding during all sampling events. Additional exceedances were observed at STN4, STN2, SW2, WC2, WC6, and US Welland Canal during sampling events, primarily, in April and December 2025. At Eleven Mile Creek, total phosphorus (0.092 mg/L) exceeded the PWQO guideline during the March 2026 sampling event. Total phosphorus concentrations exceeded CCME long-term limits at all stations at least once except at Sump. Overall, phosphorous concentrations ranged 0.004-0.12 mg/L that corresponds to tropic states ranging from ultra-oligotrophic to hyper-eutropic conditions.

Metals

In general, metal concentrations were below PWQO and CCME guidelines, except concentrations of aluminium boron, copper, and iron at few stations that were observed elevated. Specific details are as follows:

- Aluminum exceeded both the PWQO (75 µg/L) and CCME (100 µg/L) long term guidelines at Eleven Mile Creek in March 2026 (2,300 µg/L)
- Boron exceeded the PWQO guideline (200 µg/L) at Sump and SW2 throughout the monitoring period, with concentrations ranging from 430 µg/L to 880 µg/L at Sump and 650 µg/L to 1,300 µg/L at SW2.
- Copper exceeded both the PWQO (5 µg/L) and CCME (4 µg/L) long term guidelines at US Ten Mile Creek in December 2025 (6.9 µg/L).
- Iron exceeded both the PWQO and CCME guidelines (300 µg/L) at US Ten Mile Creek, STN1, SW2, SW8, and Eleven Mile Creek stations. Exceedances were observed at US Ten Mile Creek (all samples), STN1 (June 2025), SW2 (June, October, and December 2025), SW8 (April and June 2025), and Eleven Mile Creek (March 2026).

Organic Compounds, Pesticides, and Other Parameters

Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides and herbicides, organochlorinated pesticides, and dioxins and furans were analysed during the September 30/October 2 sampling event only. Concentrations of these parameters were below PWQO, CCME, and Ontario Regulation 232/98 and Ontario Regulation 347 guidelines. No exceedances were observed for any leachate characteristics under Ontario Regulation 232/98 or Schedule 4 parameters under Ontario Regulation 347.

Samples were also tested for polyaromatic hydrocarbons (PAHs), surrogate recovery parameters, petroleum hydrocarbon. The values of PAHs were below the detection limit, and the total oil and grease ranged from <0.5 to 5.5 mg/L.

Microbiological Parameters

Samples were tested for background, fecal coliform, total coliform, and Escherichia coli (E-coli) at the monitoring stations throughout the quarterly sampling events. Background parameter ranged from 10 CFU/100mL to 46,000 CFU/100mL. Fecal coliform concentrations ranged from 0 CFU/100mL to 16,000 CFU/100mL, with the highest concentrations observed during the September/October sampling event at WC2, SW2, Sump, and WC6. Total coliform concentrations ranged from 12 CFU/100mL to 490 CFU/100mL when quantifiable. E-coli ranged from 0 CFU/100mL to 50 CFU/100mL, when quantifiable, and did not exceed PWQO guideline (i.e., 100 E. coli per 100 mL). Six stations exhibited NDOGT (no data due to overgrowth; total coliforms and/or E. coli detected) for total coliforms and e-coli for at least once sample. NDOGT results were most frequently observed during June and December 2025 sampling events.

In summary, most water quality parameters were observed below relevant water quality guidelines during the monitoring period. Exceedances were limited to a few parameters at select stations, including total ammonia-N (6 stations), total un-ionized ammonia (7 stations), iron (5 stations), boron (2 stations), and single exceedances of aluminum, copper, and nitrite. The exception was total phosphorus, which exhibited exceedances at 10 stations across multiple sampling events. All organic compounds, pesticides, and Ontario Regulation 232/98 and 347 leachate, and microbiological parameters were below applicable guidelines.

5 CONCLUSIONS

The Existing Conditions Report for Surface Water Resources for the Walker South Landfill Phase 2 Environmental Assessment provides an analysis of the current surface water conditions within the study areas. The following detailed conclusions summarize the key findings and implications of the report.

Drainage Patterns and Catchment Areas

The study areas encompass multiple subwatersheds, each with distinct drainage characteristics that influence surface water flow and quality. The delineation of catchment areas based on topography and contour data from the NPCA and the MECP was crucial in understanding the spatial extent of potential project impacts. Surface water stations for the Walker South Landfill Phase 2 Environmental Assessment program were selected based on drainage pattern information in relation to site works. Note that, in response to MECP comments received May 13, 2025, the watersheds of Eight Mile Creek and Eleven Mile Creek were delineated and were not found to be connected to site drainage.

Desktop Surface Water Flow and Quality

The surface water study is focused on characterizing the flow regimes of key surface water features on or near the site works, including Six Mile Creek, Ten Mile Creek, and the Welland Canal. The flow data, obtained through both desktop review and manual monitoring, revealed seasonal variations and established baseline conditions.

Historical water quality data from desktop resources indicated that most parameters generally meet provincial guidelines. However, certain parameters, such as aluminum, phosphorus and iron, were found to exceed these guidelines, suggesting naturally elevated background concentrations or potential anthropogenic influences.

Historical Water Quality and Flow Results

Previously completed annual reports for existing monitoring program align with the requirements of various ECAs, ensuring that the monitoring programs meet regulatory standards. The historical data from these reports provided a valuable reference for assessing current conditions. The PTTW monitoring program for the Southeast Quarry included semi-annual and quarterly water quality sampling, which contributed to the overall understanding of surface water conditions in the study areas.

- Old Welland Canal: Historical monitoring results for the Old Welland Canal indicated stable or decreasing concentrations of most parameters, with some exceptions such as manganese and nitrate, which showed increasing trends.
- Ten Mile Creek: The water quality results for Ten Mile Creek revealed stable or no trends for most parameters, with an increasing trend for copper. The elevated concentrations of certain metals in December suggest potential anomalies.
- Southeast Quarry: The historical data for the Southeast Quarry indicated naturally elevated concentrations of phosphorus and iron, with stable or no trends for most other parameters. The dissolved oxygen levels at certain historical stations were within acceptable limits.

Field Investigations

Monthly manual flow and water level measurements were completed at four surface water monitoring stations throughout the monitoring period from December 2024 to March 2026 to develop stage-discharge rating curves. Flow hydrographs were developed using stage-discharge rating curves and continuous water level records at surface water monitoring stations. Quarterly water quality sampling was conducted at eleven stations, including in-situ field measurements and comprehensive laboratory analyses for several parameters including general chemistry, nutrients, metals, organic compounds, pesticides, and microbiological parameters. Key findings of the surface water field investigations are as follows:

Flow and water level monitoring showed that:

- Manual flows varied seasonally across stations: flows were generally higher in spring (March–May) and lower, stagnant or absent in summer and fall (July–October), except at SW2, which had flow during all visits. Flows measured during February 2026 were observed significantly higher than the other flow measurement events.
- Manual flows at monitoring stations were generally low and ranged from 0.02 L/s (at US Ten Mile Creek) to 336.67 L/s (at US Ten Mile Creek).
- Water levels exhibited an overall increase beginning in February 2025, reaching a peak between March and May 2025. This was followed by a gradual decline throughout the summer and autumn months (June to November 2025), with another peak observed in February to March 2026. These fluctuations align with seasonal patterns, including spring snowmelt and rainfall events, as well as decreased precipitation during the summer.
- Water levels and flow hydrographs at the monitoring stations generally corresponded with precipitation events that caused low to moderate flows and showed increase during spring.

Water quality monitoring showed that:

- Most water quality parameters remained within guidelines during the monitoring period. Exceedances were limited to a few parameters at select stations and included total ammonia-N (6 stations), un-ionized ammonia (7), iron (5), boron (2), aluminum, copper and nitrite (one each). Total phosphorus exceeded limits at 10 stations in several events. All organic compounds, pesticides, regulated leachate, and microbiological results met applicable guidelines.

The baseline data and insights provided in this report will serve as a reference for the Environmental Assessment application process, guiding the development of effective management strategies to protect and enhance surface water resources in the project area.

6 REFERENCES

City of Niagara Falls. (2019, January 16). Niagara Falls 2018 1m Contours [dataset]. Retrieved from https://open.niagarafalls.ca/datasets/niagarafalls::niagara-falls-2018-1m-contours/about

City of Niagara Falls. (2024). *OFFICIAL PLAN – CITY OF NIAGARA FALLS.* Retrieved from https://niagarafalls.ca/city-hall/planning/official-plan-current-document.aspx

Esri. (2009, December 12). "World Imagery" [basemap]. Scale Not Given. Retrieved from https://www.arcgis.com/home/item.html?id=10df2279f9684e4a9f6a7f08febac2a9. (Jan 29, 2025)

Google. (2024). Google Earth Satellite Imagery. Retrieved from https://earth.google.com/web/

InfoNiagara. (2021). *Welland Canal.* Retrieved from http://www.infoniagara.com/attractions/welland_canal/

Ministry of Environment, Conservation and Parks. (2019). *Water Survey of Canada (WSC) and Ministry of Environment, Conservation and Parks (MECP)*.

Ministry of Environment, Conservation and Parks. (2023). Provincial (Stream) Water Quality Monitoring Network (PWQMN). Retrieved November 11, 2024, from https://data.ontario.ca/en/dataset/provincial-stream-water-quality-monitoring-network

Ministry of Natural Resources (MNR). (2017). *Niagara Escarpment Plan.* Queen's Printer for Ontario. Retrieved from https://escarpment.org/wp-content/uploads/2024/11/niagara-escarpment-plan-oct-2024-consolidation.pdf

Ministry of Natural Resources (MNR). (2024a). *Aquatic Resource Area (ARA).* King's Printer for Ontario. Retrieved from Land Information Ontario (LIO).

Ministry of Natural Resources. (2019). *Ontario Watershed Information Tool (OWIT). Updated 2024*. Retrieved from https://www.ontario.ca/page/ontario-watershed-information-tool-owit

Ministry of Natural Resources. (2024b). *Crown Land Use Policy Atlus.* King's Printer for Ontario.

Ministry of Natural Resources. (2024c). *Ontario Hydrographic Network (OHN).* King's Printer for Ontario.

Niagara Peninsula Conservation Authority. (2019, August 28). Generic Regulations Approximated Regulation Lands.

Niagara Peninsula Conservation Authority. (2022a, October 5). Contemporary Mapping of Watercourses NPCA. Retrieved from https://gis-npca-camaps.opendata.arcgis.com/maps/camaps::contemporary-mapping-of-watercourses-npca/about

Niagara Peninsula Conservation Authority. (2022b, October 12). Contemporary Mapping of Watercourses Shoreline. Retrieved from https://gis-npca-camaps.opendata.arcgis.com/datasets/camaps::contemporary-mapping-of-watercourses-shoreline/about

Niagara Region. (2020, October). Niagara Watershed Plan - Watershed Planning Equivalency Document. Retrieved from https://www.niagararegion.ca/projects/rural-and-natural-systems/pdf/niagara-watershed-plan-discussion-paper.pdf

Niagara Region. (2024). *Niagara Official Plan - May 2024 Consolidation.* Retrieved from https://www.niagararegion.ca/official-plan/pdf/2022-niagara-official-plan.pdf

UEM. (2025). *2024 Annual Monitoring Report - South Landfill Site.*

Signature Page

WSP Canada Inc.

DRAFT

Maya Ali
Water Resources Specialist

DRAFT

Mohsin Siddique, PhD, PEng
Senior Water Resources Engineer

DRAFT

Douglas Kerr, PEng
Senior Principal Engineer

DRAFT

Dan Mohr, P.Eng.
Senior Principal Engineer

MA/MS/DK/DM/ld/al

APPENDIX A

Water Quality Analytes

Analyte
1,4 Di-chlorobenzene
Alkalinity
Aluminum (dissolved) (Clay Free)
Ammonia
Antimony
Arsenic
Barium
Benzene
Beryllium
Boron
Cadmium
Calcium
Chemical Oxygen Demand (COD)
Dissolved Chloride
Chromium
Chloride
Cobalt
Conductivity (field and lab)
Copper
Dissolved Organic Carbon (DOC)
Dissolved Oxygen (DO) (Field and Laboratory)
Field Temperature
Hardness (as CaCO3)
Iron
Lead
Magnesium
Manganese
Mercury
Methylene Chloride(Dichloromethane)
Molybdenum
Nickel
Nitrate
Nitrite
Organic Nitrogen
pH (Field and Laboratory)
Potassium
Selenium
Silver
Sodium
Strontium
Sulphate
Suspended Solids
Temperature (Field)
Titanium
Toluene
Total Biological Oxygen Demand (BOD5)
Total Dissolved Soilds (TDS) (Field and Laboratory)
Total Kjeldahl Nitrogen (TKN)
Total Organic Carbon (TOC)
Total Phenols (4-AAP Method)
Total Phosphorus
Total Suspended Solids (TSS)
Un-ionized Ammonia (calc.)
Vanadium
Vinyl Chloride
Zinc
Oil and Grease
Phosphate
Salinity
Silicon
Thallium
Tin
Tungsten
Uranium
Zirconium
Turbidity (Field)
Total Coliforms/Fecal Coliforms/E. Coli
PAH

Note(s):
1) Regulation 232 Table 1 (*in italics*)
2) Niagara Region - Stormwater Management Guideline

Analytes of Regulation 347 Schedule 4
Aldicarb
Aldrin + Dieldrin
Arsenic
Atrazine + N-dealkylated metabolites (Weedex)
Azinphos-methyl
Barium
Bendiocarb
Benzene
Benzo(a)pyrene
Boron
Bromoxynil
Cadmium
Carbaryl/Sevin/1-Naphthyl-N methyl carbamate
Carbofuran
Carbon tetrachloride (Tetrachloromethane)
Chlordane
Chlorobenzene (Monochlorobenzene)
Chloroform
Chlorpyrifos
Chromium
Cresol (Mixture - total of all isomers, when isomers cannot be differentiated)
m-Cresol
o-Cresol
p-Cresol
Cyanazine
Cyanide
2,4-D / (2,4-dichlorophenoxy)acetic acid
2,4-DCP (2,4-Dichlorophenol)
DDT (total isomers)
Diazinon/Phosphordithioic acid, o,o-diethyl o-(2-isopropyl 6-methyl-4-pyrimidinyl) ester
Dicamba
1,2-Dichlorobenzene (o-Dichlorobenzene)
1,4-Dichlorobenzene (p-Dichlorobenzene)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (Vinylidene chloride)
Dichloromethane (also see - methylene chloride)
Diclofop-methyl
Dimethoate
2,4-Dinitrotoluene
Dinoseb
Dioxin & Furan
Diquat
Diuron
Endrin
Fluoride
Glyphosate
Heptachlor + Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Lead
Lindane
Malathion
Mercury

Analytes of Regulation 347 Schedule 4
Methoxychlor/1,1,1-Trichloro-2,2-bis(p-methoxyphenyl) ethane
Methyl ethyl ketone / Ethyl methyl ketone
Methyl Parathion
Methylene chloride / Dichloromethane
Metolachlor
Metribuzin
NDMA
Nitrate + Nitrite (as Nitrogen)
Nitrilotriacetic acid (NTA)
Nitrobenzene
Paraquat
Parathion
PCBs
Pentachlorophenol
Phorate
Picloram
Pyridine
Selenium
Silver
Simazine
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
2,4,5-TP/ Silvex/ 2-(2,4,5-Trichlorophenoxy)propionic acid
Temephos
Terbufos
Tetrachloroethylene
2,3,4,6-Tetrachlorophenol /(2,3,4,6-TeCP)
Toxaphene
Triallate
Trichloroethylene
2,4,5-Trichlorophenol (2,4,5-TCP)
2,4,6-Trichlorophenol (2,4,6-TCP)
Trifluralin
Uranium
Vinyl chloride
Extra Analytes
BTEX
VOCs
Polynuclear Aromatic Hydrocarbons (PAHs)

APPENDIX B

Environmental Compliance Approval (ECA) No. A120211

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A120211
Issue Date: July 22, 2022

Walker Environmental Group Inc.
2800 Thorold Townline Rd
Niagara Falls, Ontario
L0S 1A0

Site Location: 2800 Thorold Townline Road
Niagara Falls City, Regional Municipality of Niagara
L0S 1A0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of a 69.8 hectare waste disposal site landfill located within a total site area of 119 hectares

For the purpose of this environmental compliance approval, the following definitions apply:

"Act" and **"EPA"** means the Environmental Protection Act, R.S.O. 1990, C.E-19 as amended;

"Adverse Effect" is as defined in the Environmental Protection Act, R.S.O. 1990, as amended.

"**Contaminating Lifespan"or "CLS"** refers to the period of time, after closure until the Site finally produces contaminants at concentrations below levels which have unacceptable health or environmental effects;

"Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the EPA;

"District Manager" refers to the District Manager in the MECP's Niagara District Office;

"District Office" refers to the MECP Niagara District Office;

"**EMP**" refers to the Environmental Monitoring Plan;

"**Environmental Compliance Approval" or "ECA"** means this entire provisional Environmental Compliance Approval document, issued in accordance with Section 20.2 of the EPA, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A";

"Major Works" are those works that have an engineering component.

"MECP" or "**Ministry**" refers to the Ontario Ministry of the Environment, Conservation and Parks;

"Operator" has the same meaning as "Operator" as defined in s.25 of the EPA;

"Owner" means Walker Environmental Group Inc. and its successors and assigns;

"O. Reg. 101/94" means Ontario Regulation 101/94 as amended from time to time;

"**PA**" means the Pesticides Act, R.S.O. 1990, c. P-11, as amended from time to time;

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the OWRA or Section 5 of the EPA or Section 17 of PA;

"Regional Director" refers to the Director of the Ministry of the Environment's West Central Regional Office;

"Regulation 232/98" or "O. Reg. 232/98"means Ontario Regulation 232/98 (New Landfill Standards) made under the EPA, as amended from time to time;

"Regulation 347" or "Reg. 347 means Regulation 347, R.R.O. 1990, made under the EPA, as amended from time to time;

"**Site**" means the Walker Environmental Group Inc. East Landfill Site including the landfilling area and the buffer lands as approved by this ECA; and

"**STSF**" means the Soil Temporary Storage Facility.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1.0 TERMS AND CONDITIONS

General

1.1 The requirements specified in this ECA are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Approval in no way abrogates the

Applicant's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

1.2 The Owner shall ensure that all communications/correspondence made pursuant to this ECA includes reference to the ECA approval number A120211.

1.3 The obligations imposed by the terms and conditions of this ECA are obligations of due diligence.

Compliance

1.4 The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of the ECA and the conditions herein and shall take all reasonable measures to ensure the person complies with the same.

1.5 Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this ECA.

In Accordance

1.6 Except as otherwise provided for in this ECA, the Site shall be operated and maintained in accordance with the application for Environmental Compliance Approval for a Waste Disposal Site, and the supporting documentation listed in Schedule "A".

Other Legal Obligations

1.7 The issuance of, and compliance with, this ECA does not:

(a) relieve any person of any obligation to comply with any provision of the EPA or any other applicable statute, regulation or other legal requirement; or
(b) limit in any way the authority of the Ministry to require certain steps be taken or to request that any further information related to compliance with this ECA be provided to the Ministry ;

unless a provision of this ECA specifically refers to the other requirement or authority and clearly states that the other requirement or authority is to be replaced or limited by this ECA .

Adverse Effect

1.8 The Owner or Operator remain responsible for any contravention of any other condition of this ECA or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect or impairment of air and/or water quality.

Furnish Information

1.9 Any information requested by the Director or a Provincial Officer concerning the Site and its operation under this ECA including but not limited to any records required to be kept by this ECA shall be provided in a timely manner.

1.10 The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this ECA or under any statute, regulation or subordinate legal instrument, in relation to the information, shall not be construed as:

i. an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any condition of this ECA or any statute, regulation or other subordinate legal requirement; or
ii.. acceptance by the Ministry of the information's completeness or accuracy.

1.11 Any information related to this ECA and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

Interpretation

1.12 Where there is a conflict between a provision of any document, including the application, referred to in this ECA, and the conditions of this ECA, the conditions in this ECA shall take precedence.

1.13 Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the Ministry approved the amendment in writing**.**

1.14 Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

1.15 The conditions of this ECA are severable. If any condition of this ECA, or the application of any condition of this ECA to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this ECA shall not be affected thereby.

Certificate of Requirement

1.16 Pursuant to Section 197 of the EPA, no person having an interest in the Site shall deal with the Site in any way without first giving a copy of this ECA to each person acquiring an interest in the Site as a result of the dealing.

1.17 In the event any additional land is acquired for the Site, then two (2) copies of a completed Certificate of Requirement, containing a registerable description of the additional lands for the

Site, shall be submitted to the Director for the Director's signature within sixty (60) calendar days of any amendment to this ECA that incorporates the land into the ECA.

1.18 In the event any additional land is acquired for the Site, then the Certificate of Requirement shall be registered in the appropriate land registry office on title to the Site and a duplicate registered copy shall be submitted to the Director within ten (10) calendar days of receiving the Certificate of Requirement signed by the Director.

No Transfer or Encumbrance

1.19 No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance and is satisfied with the arrangements made to ensure that all conditions of this ECA will be carried out and that sufficient financial assurance is deposited with the Ministry to ensure that these conditions will be carried out.

Change of Owner

1.20 The Owner shall notify the Director, in writing, and forward a copy of the notification to the District Manager, within 30 days of the occurrence of any changes in the following information:

i. the ownership of the Site ;
ii. the Operator of the Site ;
iii. the address of the Owner or Operator ;
iv. the partners, where the Owner or Operator is or at any time becomes a partnership and a copy of the most recent declaration filed under the Business Names Act , R. S. O. 1990, c. B.17, shall be included in the notification;
v. the name of the corporation where the Owner or Operator is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the Corporations Information Act , R. S. O. 1990, c. C.39, shall be included in the notification.

1.21 In the event of any change in the ownership of the Site, other than a change to a successor municipality, the Owner shall notify in writing the succeeding owner of the existence of this ECA, and a copy of such notice shall be forward to the Director and District Manager.

Inspections

1.22 No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the EPA or the PA, of any place to which this ECA relates, and without limiting the foregoing:

i. to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this ECA are kept;
ii. to have access to, inspect, and copy any records required to be kept by the conditions of this ECA ;

iii. to inspect the Site, related equipment and appurtenances;
iv. to inspect the practices, procedures, or operations required by the conditions of this ECA; and
v. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this ECA or the EPA or the PA.

2.0 FINANCIAL ASSURANCE

2.1 The Owner shall ensure that an updated Financial Assurance, as defined in Section 131 of the Act, in an amount of no less than **fifteen million two hundred seventy-seven thousand and one hundred sixty dollars (CAD$15,277,160.00)** is submitted to the Ministry. This Financial Assurance shall be in a form acceptable to the Director and shall provide sufficient funds for the closure, post-closure monitoring, maintenance, and contingency plans for the Site.

2.2 (1) The total Financial Assurance includes a contingency fund of $4,200,000.00 for leachate and landfill gas collection and treatment contingencies, as well as other contingency measures in accordance with the MECP Financial Assurance Guideline and Item 81 of Schedule "A".

(2) The total contingency fund of $4,200,000.00 applies to the East Landfill only, and will not increase over time.

(3) If the contingency measures specified in Condition 2.2 (1) are constructed in the future, the Owner may apply to the Director to reduce the associated contingency amount.

(4) If part of or the entire landfill gas management system is decommissioned due to insufficient gas generation at the Site, the Owner may apply to the Director to reduce the associated contingency amount.

2.3 An additional Financial Assurance of $500,000.00 shall be submitted to the Director prior to the commencement of operation of the Soil Temporary Storage Facility.

2.4 Commencing on June 30, 2023 and at intervals of three (3) years thereafter, the Owner shall submit to the Director, a re-evaluation of the amount of Financial Assurance to implement, at a minimum, the actions required under Condition 2.1 and the details of the contingency amount outlined in Condition 2.2. The re-evaluation shall be prepared in accordance with Ontario Regulation 232/98 and shall include:

i. updates of the discount, interest and inflation rates associated with the requirements for financial assurance in this ECA including justifications and sources of the proposed rates;
ii. an assessment based on any new information relating to the environmental conditions of the Site; and
iii. the costs of additional site maintenance, monitoring and/or implementation of contingency plans required by the Director upon review of the closure plan and annual reports.

The Financial Assurance must be submitted to the Director within twenty (20) days of written acceptance of the re-evaluation by the Director.

2.5 The amount of Financial Assurance excluding the contingency amount described in Condition 2.2 is subject to review at any time by the Director and may be amended at his/her discretion. If any Financial Assurance is scheduled to expire or notice is received, indicating Financial Assurance will not be renewed, and satisfactory methods have not been made to replace the Financial assurance at least sixty (60) days before the Financial Assurance terminates, the Financial Assurance shall forthwith be replaced by cash.

3.0 PUBLIC LIAISON COMMITTEE

3.1 The Owner shall use its best efforts to maintain the Walker Public Liaison Committee (PLC) for the Site. The PLC shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the undertaking. In addition, the purpose of the PLC will be to provide community review of the development, operation (current and proposed) and ongoing monitoring, closure and post-closure care related to the Site. The PLC will also be provided the opportunity to review and comment on any subsequent applications for approval under the EPA.

3.2. The Owner shall provide the following to the PLC for review and recommendations:

i. update of landfilling operations at the site
ii. the Annual Report required by Condition No. 14.3
iii. proposed changes to the ECA for the Site; and
iv. complaints and complaint response procedures
v. closure plans

3.3. The Owner shall review annually in consultation with the members of the PLC the need for the committee, and the committee may be suspended upon consent of the Regional Director should there be insufficient interest among the public members.

3.4. The Owner shall not construe any recommendations provided by the PLC as supervisory or regulatory to the operation of the Site or as an approval of operations of the Site.

4.0 CONSTRUCTION, INSTALLATION and PLANNING

Major Works

4.1 For the purposes of this ECA the following are Major Works:

a. gas management system;
b. leachate collection system;
c. stormwater management system; and

d. final cover

4.2 A final detailed design shall be prepared for each Major Work to be constructed at the Site consistent with the conceptual design and amendments of the Site as presented in the Supporting Documentation in Schedule "A".

4.3 The final detailed design of each Major Work shall include the following:

a. design drawings and specifications;
b. a detailed quality assurance / quality control (QA/QC) program for construction of the major work, including necessary precautions to avoid disturbance to the underlying soils; and
c. details on the monitoring, maintenance, repair and replacement of the engineered components of the major work, if any.

4.4 Any design optimization or modification that is inconsistent with the conceptual design shall be clearly identified, along with an explanation of the reasons for the change.

4.5 (1) At least two (2) months before the anticipated construction of each respective construction phase of the leachate collection system, the Owner shall submit to the Director for approval with copies to the District Manager, a final detailed design report and drawings for the Major Work,including quality assurance/quality control procedures for the works.

(2) At least (3) months prior to the proposed commencement of the construction of other Major Works (exluding the leachate collection system and the final cover), the Owner shall submit to the Director for approval, with copies to the District Manager, final detailed design report and drawings of the Major Work(s) , including quality assurance/quality control procedures for the works.

4.6 Each major work shall be constructed in accordance with the approved final detailed design and the QA/QC procedures shall be implemented as proposed by the Owner. Any significant variances from the conceptual design for the Site shall be subject to approval by the Director.

4.7 As-built drawings for all Major Works shall be retained on Site and made available to Ministry staff for inspection.

Pre-Landfilling Requirements

4.8 Prior to any landfilling taking place in any cell of the Site, a Site development report for that cell shall be prepared by an independent consulting engineering firm and submitted for the approval of the Director. This Site development report shall include the following:

a) An inspection report prepared by a Professional Engineer and/or Geoscientist present during the construction of the following items:

i) liners;
ii) lysimeters;
iii) surface water and leachate collection ponds;
iv) monitoring wells installed during the issuance of this certificate;
v) leachate collection systems; and
vi) aggregate layer.

b) An interpretation of the data developed by Part (a) of this condition identifying any discrepancies between the proposed design and actual construction and the potential impact of these discrepancies, if any, on the environment. Steps to be taken to alleviate any potentially adverse impacts of these discrepancies should be included.

5.0 GENERAL OPERATIONS

Proper Operation

5.1. Except as otherwise provided by these conditions, this Site shall be designed, developed, used, maintained and operated in accordance the supporting documentation, listed in the attached Schedule "A".

Service Area

5.2 (a) The Site is approved to receive industrial, commercial and institutional wastes, including asbestos wastes, from the Province of Ontario.

(b) The Site is approved to receive municipal waste from the Regional Municipality of Niagara only.

Site Footprint

5.3 The final footprint of 69.8 hectares for landfilling and the final contours with a maximum top elevation of waste of 193.5 meters above sea level are approved as per Item Nos. 42 and 43 of Schedule "A".

Annual and Daily Capacity

5.4 a. The maximum annual rate of fill for the Site is 627,750 tonnes.

b. The maximum daily rate of fill for the site is 5,000 tonnes.

Incoming Waste

5.5 The Owner shall monitor the weight of Waste received for disposal by the use of weigh scales.

Where the weigh scales are temporarily out of operation for maintenance or repair, estimates of Waste volumes and density shall be used to estimate the weight of Waste received for disposal.

Hours of Operation

5.6 (1) Waste shall only be accepted at the Site during the following time periods:

i. 7:00 am to 7:00 pm - Monday to Friday (except statutory holidays); and
ii. 7:00 am to 1:00 pm - Saturday.

(2) On Saturdays that are most proximal to a Statutory holiday, hours of waste receipt may be extended to 4:00 pm to receive waste only from curbside pick-up within the Region of Niagara.

(3) On-Site equipment used for daily site preparation and closing activities shall only be used during the following time periods:

i. 6:00 am to 9:00 pm - Monday to Friday (except statutory holidays); and
ii. 6:00 am to 3:00 pm - Saturday.

(4) On Saturdays that are most proximal to a statutory holiday, hours of on-site equipment use may be extended to 6:00 pm to manage waste only from curbside pick-up within the Region of Niagara.

(5) The operating hours may be extended to accommodate seasonal or unusual quantities of waste with the prior written approval concurrence of the District Manager

Security and Supervision

5.7 (1) No Waste shall be accepted, landfilled or removed from the Site unless trained personnel is present and supervises the operation;

(2) The Owner shall ensure that all supervisors of the Site have been adequately trained with respect to the following:

i. terms, conditions and operating requirements of this ECA and the O & D Report;
ii. the operation and management of the Site, including emergency procedures;
iii. relevant waste management regulations and legislation;
iv. environmental concerns related to the Waste being handled at the Site;
v. the procedures contained in the O & D Report ; and
vi. occupational health and safety concerns pertaining to the Waste being handled at the Site;

(3) The Site is deemed to be closed when a Site supervisor is not present at the Site and the Site entrance and exit gates will be locked or otherwise secured against access by unauthorized persons.

5.8 (1) To assist the Site operating personnel, the Owner shall ensure that an Operations Manual describing the day-to-day operation of the Site is kept on Site at all times and updated as necessary;

(2) This manual shall include but not be limited to, the day-to-day construction, operations and maintenance and the responsibilities for the following: leachate collection system, landfill gas collection system, surface water management system, daily, interim and final cover, side slope clay liner, all aspects of the leachate, groundwater, surface water and gas monitoring programs, equipment inspection and maintenance, materials management control and placement, odour, dust, noise and litter control and acceptable waste management program;

(3) A copy of the manual shall be provided to the District Manager within three (3) months of the issuance of this ECA; and

(4) A copy of any revisions to the manual shall be provided to the District Manager prior to the effective date of revisions.

5.9 The Owner shall ensure that a sign which complies with local by-laws is present at the main entrance and the exit from the Site, and which is legible from a distance not less than 25 metres and on which is displayed in prominent letters the following information:

i. the name of the Site;
ii. the ECA number under which the Site is operated;
iii. the name of the operator;
iv. the normal hours of operation;
v. a telephone number to which complaints may be directed; and
vi. a 24-hour emergency telephone number.

Burning of Waste

5.10 No Waste shall be burned or incinerated at the Site.

Scavenging

5.11 The Owner shall ensure no scavenaging at the Site occurs.

Noise Impacts

5.12 (1) The Owner shall operate the Site within the noise level limits prescribed in the Noise Guidelines for Landfill Sites; and

(2) The Owner shall take all steps that are reasonably necessary to limit the noise impact from the truck traffic, along the haul route on-Site.

Dust Impacts

5.13 The Owner shall, during the normal operations, including truck traffic, limit dust impacts and in any event shall take all necessary steps as are reasonably necessary to limit dust impacts from the Site.

Litter Management

5.14 The Owner shall take all reasonable steps to operate and maintain the Site such that litter does not create a nuisance

Nuisances

5.15 The Owner shall take all reasonable steps to operate and maintain the Site such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

6.0 SITE OPERATIONS

Odour Impacts and Daily Cover

6.1 Cover material shall be applied as follows:

a. Daily Cover - At the end of each working day, the entire working face shall be covered with a minimum thickness of 150 mm of soil material or other material approved as identified under Reg. 232/98 or any other alternative daily cover material approved by this ECA.

b. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm material cover material (which restricts infiltration to less than 150 mm/year). This materials may consist of soil, contaminated soils, foundry sands, slag, aggregate grindings, aggregrate production by-products (limited to shale, ground stone and crushed concrete) manufactured cover materials, or, an approved thickness of alternative cover material approved by this ECA; and

c. Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 mm thick layer of final soil cover and 150 mm of topsoil shall be placed as described in Item (3) in Schedule “A”. Fill areas shall be progressively completed and rehabilitated as landfill development has reached final contours.

6.2 Alternative materials not approved by this ECA may be used as daily and interim cover material, subject to an approval by the Director via an amendment to the ECA.

Leachate Lagoons

6.3 The leachate treatment lagoons at the Site shall operated in accordance with Item Nos. 28, 29, and 30 of Schedule "A".

Soil Temporary Storage Facility

6.4 The STSF shall be constructed, established and operated in accordance with this ECA and all its conditions, scheduled items and supporting information including, but not limited to, the following sub-conditions specific to the operation of the STSF:

Construction and Establishment

6.5 (1) The STSF shall be constructed in accordance with Items 67 through 69 of Schedule "A" including a geotextile barrier as detailed in Item 70 of Schedule "A".

Waste Types

(2) The STSF shall not receive waste for storage and transfer other than solid, non-hazardous waste limited to the following materials hereafter referred to as "STSF Waste":

i. Non-hazardous contaminated soil;
ii. Spill clean-up residue;
iii. Industrial process waste that is soil-like including foundry sand, slag, emission control dusts and treatment residues;
iv. Sediment from dredging; and
v. Construction and demolition waste limited to concrete, brick and asphalt.

Storage and Receiving Limits

(3) The STSF shall be limited to a 25,000 square metre area located within the footprint of the landfilling area and shall never exceed an elevation of 205.5 mASL.

(4) The STSF shall not receive any waste for processing.

(5) Notwithstanding condition 63.3, the STSF shall not exceed a total capacity of 250,000 cubic metres or 450,000 tonnes, whichever comes first.

(6) The STSF shall not receive more than an annual average maximum of 1,000 tonnes per day of STSF Waste with an absolute daily maximum of 5,000 tonnes.

(7) The STSF shall not ship off-site for disposal more than an annual average maximum of 1,000

tonnes per day of STSF Waste with an absolute daily maximum of 5,000 tonnes.

(8) STSF Waste received at the STSF shall count towards the fill rate detailed in Condition 5.5 (b) of this ECA.

Storage Time

(9) The Owner shall keep a running total of the amount of STSF Waste received at, stored at and removed from the STSF, in tonnes, and ensure that an equal amount of STSF Waste is removed from the STSF to maintain a consistent two (2) year turnaround time for waste storage on-site.

Particulate Matter and VOC Monitoring Plan

(10) The Owner shall conduct the air quality monitoring for particulate and volatile organic compounds around the STSF in accordance with Items 71 through 72 in Schedule "A".

7.0 MAJOR WORKS APPROVALS

Cell Construction

7.1 Approval is granted for the development of Cells 1A, 2A, 2, 3, 4, 5, 6, 7, 8A, 8B, 9A, 9B, 10A, 10B, 11, 12ABC, 13, 14, 15A and 15B. all in accordance with Item Nos. 7, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, and 62 of Schedule "A".

Gas Utilization Pad

7.2 (1) Approval is hereby granted for the construction for the landfill gas utilization building pad expansion in accordance with Items 50 through 58 in Schedule "A".

(2) a. Approval is hereby granted for the construction of Phase 2 gas plant expansion in accordance with Items 63 through 66 in Schedule "A".

b. Prior to operating the Phase 2 expansion of the gas plant, the Owner shall submit to the District Manager in writing when the operation of the expansion of the plant shall commence.

c. Within one year of the completion of the construction for Phase 2 gas plant expansion, the Owner shall submit to the District Manager, a final contour plan and report detailing the works undertaken. The as-built plan shall show finished contours for the entire gas plant, access roads, surface water controls, pipelines, and other pertinent information.

d. Approval under Section 9 of the EPA shall be obtained for the new purge flare prior to installation.

e. Approval shall be obtained from the Director for any future expansion of the IGRS Gas Plant's Site Limits, or any modifications to the gas utilization plant that would impact its capacity to destroy landfill gas prior to implementation.

(3) Approval is hereby granted for the construction of the Renewable Natural Gas facility in accordance with Item 84 in Schedule "A".

Stormwater Management System

7.3 Approval is hereby granted to change the location of the North Pond and to changes to the overflow of South Pond as approved under the Ontario Water Resources Act and Items 59, 60 and 61 in Schedule "A".

Gas Collection System

7.4 a. A system for the collection of gases within the landfill may be constructed and operated in accordance with the Item Nos. 31, 44, 45, and 46 of Schedule "A".

b. As-built drawings and specifications for the completed landfill gas collection system shall be submitted to the District Manager within 30 days of the works becoming operational.

c. This condition does not provide approval for the flare component of the works, which is subject to approval under Section 9 of the EPA.

d. The landfill gas collection system works may only be constructed once all necessary permits are obtained under the Niagara Escarpment Planning and Development Act, R.S.O. 1990.

8.0 TRAINING

Employees and Training

8.1 A training plan for all employees that operate any aspect of the site shall be developed and implemented by the Operator. Only trained employees shall operate any aspect of the Site or carry out any activity required under this ECA. For the purpose of this ECA "trained" means knowledgeable either through instruction or practice in:

i. the relevant waste management legislation including EPA, Reg. 347, regulations and guidelines;
ii. major environmental and occupational health and safety concerns pertaining to the waste to be handled;
iii. the proper handling of wastes;
iv the management procedures including the use and operation of equipment for the

processes and wastes to be handled;
v the emergency response procedures;
vi the specific written procedures for the control of nuisance conditions;
vii the terms, conditions and operating requirements of this ECA and,
viii proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

9.0 RECORDS

Daily Inspections and Log Book

9.1 An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation to ensure that the site is being operated in compliance with this Certificate. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed.

9.2 A record of the inspections shall kept in a daily log book or a dedicated electronic file that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

9.3 A record shall be kept in the daily log book of all the following:

i. the type, time of arrival, hauler name, and quantity (tonnes) of all waste including approved cover material received at the Site;
ii. all complaints from the public received by the Owner and an indication of the action taken by the Owner in response;
iii. results of any tests done to determine the acceptability of waste at the Site;
iv. a list of the refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known;
v. calculation of the total quantity (by weight) of waste received at the Site for each day; and
vi. a record of litter collection activities and Site inspections.

Monthly Records

9.4 Monthly site inspection records in the form of a written log or a dedicated electronic file shall include the following:

i. a summary of wastes received and refused for disposal at the Site;

ii. the area of the Site in which waste disposal operations are taking place;
iii. a calculation of the total quantity (tonnes) of waste received at the Site during each operating day and each operating week;
iv. the amount of any leachate removed, or treated and discharged from the Site;
v. a record of litter collection activities and the application of any dust suppressants;
vi. a record of the daily inspections;
vii. a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service;
viii. type and amount of daily, intermediate and final cover used;
ix. maintenance and repairs performed on equipment employed at the Site;
x. complaints received and actions taken to resolve them;
xi. emergency situations and actions taken to resolve them; and
xii. any other information required by the District Manager.

Site Inspections

9.5 During site operations, the Owner shall inspect the site monthly for the following items but not limited to these items:

i. General settlement areas or depressions on the waste mound;
ii. Shear and tension cracks on the waste mound;
iii. Condition of surface water drainage works;
iv. Erosion and sedimentation in surface water drainage system;
v. Presence of any ponded water on the waste mound;
vi. Adequacy of cover material;
vii Condition of groundwater monitoring wells and gas wells;
viii. Presence of insects, vermin, rodents and scavenging animals on or adjacent to the waste mound;
ix. Condition of fence surrounding the Site; and,
x. General site appearance.

9.6 The Owner shall inspect the waste mound and surrounding areas weekly for presence of leachate seeps. Any leachate seeps that are discovered shall be repaired within 48 hours of notice by the Owner.

Record Retention

9.7 Except as authorized in writing by the Director, all records required by this ECA shall be retained at the Site for a minimum of two (2) years from their date of creation.

9.8 The Owner shall retain all documentation listed in Schedule “A” for as long as this ECA is valid.

9.9 All monthly summary reports are to be kept at the Site until they are included in the Annual Report.

9.10 The Owner shall retain employee training records as long as the employee is working at the Site.

9.11 The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

10.0 EMERGENCY SITUATIONS

10.1 In the event of a fire or discharge of a contaminant to the environment (i.e. incident), Site staff shall contact the MECP Spills Action Centre (1-800-268-6060) and the District Office of the MECP.

10.2 The Owner shall submit to the District Manager a written report within 3 days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

10.3 All wastes resulting from an emergency situation shall be managed and disposed of in accordance with Reg. 347.

10.4 The Owner shall ensure that any updates to the Emergency Response Manual for the Site are submitted to the District Manager within one month of being issued. The Emergency Response Manual should indicate the responsibility of each of the stakeholders with respect to handling possible emergency situations.

10.5 The Emergency Response Manual shall be reviewed and updated on a regular basis and be provided to the District Manager.

10.6 The Owner shall ensure that adequate fire fighting and contingency spill clean up equipment is available and that emergency response personnel are familiar with its use and location.

10.7 All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the Site; and
(b) be adequately maintained and kept in good repair.

10.8. The Owner shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

11.0 PUBLIC COMPLAINTS PROCEDURE

11.1 If at any time, the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:

(a) The Owner shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

(b) The Owner, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and

(c) The Owner shall complete a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents. A copy of the report shall be retained on-Site.

11.2 The Owner shall post at the Site entrance the phone number of a suitable, local contact to receive complaints or questions related to the Site. All complaints and the Owner's actions taken to remedy the complaints must be summarized in the Annual Report.

12.0 MONITORING

Well Operation and Maintenance

12.1 The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

12.2 In areas where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and they shall be properly re-secured.

12.3 All groundwater monitoring wells whether included in the monitoring program or not shall be assessed, repaired, replaced or decommissioned as required. Any well being decommissioned shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903.

12.4 The Owner shall repair or replace any monitoring well included in the monitoring program which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

12.5 Any monitoring well included in the monitoring program that is no longer required as part of the groundwater monitoring program may be decommissioned provided its removal from the monitoring program has been approved by the Director. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Program

12.6 The Site monitoring program shall include the following components:

a) Water monitoring program shall be conducted as outlined in Section 7. 2 of the Proposed Monitoring Program and Tables 7 & 8 of the East Quarry Landfill Site 1999-2000 Annual Report, Item 47 of Schedule "A"**;** and

b) The water monitoring program identified above in Condition 12.6 a) is modified to reduce the sampling frequency at LI1 from quarterly to 3 times per year and reduce the sampling frequency at well location 18-1 from annually to every 4 years, as outlined in Item 83 of Schedule "A".

(c) The following changes to the monitoring program are hereby approved:
i. remove monitoring well MM4-1 from the monitoring program;
ii. remove manhole MHC2 from the monitoring program and replace with MHC2a.

12.7 (1) For any changes to the monitoring program, the Owner shall in a cover letter request the acceptance of the changes by the District Manager.

(2) Within fourteen (14) days of receiving the writing correspondence from the District Manager confirming that the District Manager is in agreement with the proposed changes to the monitoring program, the Owner shall forward a letter identifying the proposed changes and a copy of the correspondences from the District Manager, to the Director requesting the ECA be amended to approve the proposed changes prior to implementation.

Compliance

12.8 The Site shall be operated in such a way to ensure compliance with the MECP's Guideline B-7 Reasonable Use Concept at monitoring points along the property line that have the potential to be impacted by leachate from the Site.

13.0 CONTINGENCY PLANS

13.1 In the event of a confirmed exceedance of a site-specific trigger level for groundwater or surface water impacts due to leachate , the Owner shall complete the following:

i. immediately notify the District Manager; and
ii. an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the Owner in accordance with the approved trigger mechanisms and associated contingency plans described in

Schedule "A" .

13.2 If monitoring results, investigative activities and implementation criteria indicate the need to implement contingency measures, the Owner shall ensure that the following steps are taken:

a. The District Manager shall be notified by the Owner as soon as possible of the need to implement contingency measures and the proposed contingency measures that need to be implemented;

b. If engineered systems/components or changes to the approved landfill design are required then the Owner shall prepare and submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures to the Director for approval; and

c. For contingency plan that have an engineered system/component or involve changes to the approved landfill design, the contingency measures shall be implemented by the Owner upon approval by the Director.

14.0 REPORTING

Annual Report

14.1 By **April 30th** of each year, an annual report on the use, operation and monitoring of the Site during the previous calendar year shall be submitted to the Regional Director. The report shall include:

(1) the results and an interpretive analysis of the results of all groundwater, surface water, landfill gas, leachate collection system monitoring, and leachate monitoring, including the following:

i. the adequacy of the monitoring programs and recommendations for any modifications to programs as appropriate;
ii. the extent to which the monitoring results indicate compliance with the conditions of this ECA, PWQO, ODWO, the Reasonable Use Guideline and any other relevant statutes and guidelines;
iii. the trend of the monitoring results with respect to future compliance with the conditions of this ECA, PWQO, ODWO, the Reasonable Use Guideline and any other relevant statutes and guidelines; and
iv. the current or expected future need to implement contingency plans and/or additional mitigation measures to ensure compliance with the Conditions of this ECA, PWQO, ODWO, the Reasonable Use Guideline and any other relevant statutes and guidelines;

(2) summary of Site inspections;

(3) Site plans showing:

i. existing contours of the Site;

ii. areas of landfilling operation during the reporting period and areas of intended operation during the next reporting period;
iii. areas of excavation during the reporting period;
iv. the progress of final and interim cover application;
v. previously existing Site works, including stockpiling, works installed during the reporting period, and works planned for installation during the next reporting period and the progress of seeding on final and interim cover;
vi. Areas and quantities where dewatered sewage biosolids are used as daily, intermediate and final cover; and
vii. Areas currently being used for operations detailed in section 16.0.

(4) a summary of the quantity of any leachate removed, or treated and discharged, from the Site, during each month;

(5) the type and quantity (by weight) of all Waste, alternative daily cover, interim cover and final cover disposed or applied during the reporting period.

(6) calculation of the total volume of the Site capacity used during the reporting period;

(7) a calculation of the remaining capacity of the Site and an estimate of the remaining Site life;

(8) a summary of the monthly, maximum daily and annual tonnage of Waste received at the Site;

(9) a monthly summary of the quantity of waste shingles and woodwaste received and stored on Site for processing as part of the operations detailed in section 16.0 of this ECA;

(10) calculations and analysis to confirm that sufficient capacity remains in the South Landfill to dispose of all material approved under Section 16.0 of this ECA for the propose of ensuring adequate Financial Assurance.

(11) a summary of the public complaints received by the Owner and the responses made by the Owner including the actions taken to resolve these complaints;

(12) other measures, undertaken by the Owner, to reduce or prevent off-Site impacts and to ensure compliance with the Ministry's requirements;

(13) extent and timing of the contingency measures described in the conditions 10.1 and 10.2 above, that may be needed to be implemented;

(14) report on the decommissioning of wells, that have been decommissioned in the reporting year;

(15) a brief description of the changes to the operational procedures and the resultant changes to the impact management plans;

(16) a discussion of the operation and performance of the Major Works at the Site, any operational

problems encountered at the Site and the remedial measures taken to alleviate the impacts from those problems, including the control of dust, odour and noise.

15.0 SITE CLOSURE

15.1 At least two (2) years prior to the anticipated date of closure of this Site, the Owner shall submit to the Director for approval, with copies to the District Manager, a detailed Site closure plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring and end use. The plan shall include the following:

a. a plan showing Site appearance after closure;
b. a description of the proposed end use of the Site;
c. a descriptions of the procedures for closure of the Site, including:

i. advance notification of the public of the landfill closure;
ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
iii. completion, inspection and maintenance of the final cover and landscaping;
iv. Site security;
v. removal of unnecessary landfill-related structures, buildings and facilities; and
vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater and surface water ; and
vii. a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;

d. descriptions of the procedures for post-closure care of the Site, including:

i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater and surface water;
ii. record keeping and reporting; and
iii. complaint contact and response procedures;

e. an assessment of the adequacy of and need to implement the contingency plans for leachate; and

f. an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date.

15.2. The Site shall be closed in accordance with the closure plan as approved by the Director.

16.0 INTERIM AND END USES

16.1 The Owner is approved for the following interim and end uses of the Site, to be operated in

accordance with Items (78) through (82) of Schedule "A" and the conditions of this ECA:

(1) Agriculture limited to the production of crops for use as biomass materials as a renewable energy source, high carbon content for use in compost production, and standard crop production for cattle and livestock feed supplement. The crops produced shall not be used for human consumption;

(2) Soil blending and production;

(3) Storage, grinding and transfer of woodwaste, as defined in Reg. 347, for use as ground cover, as mulch, or for combustion at approved woodwaste combustion sites in accordance with sections 3(2) and 8(6) of Reg. 347**;**

(4) Storage, grinding and transfer of Alternative Low Carbon Fuels and waste wood to be processed into Alternative Low Carbon Fuels, to be used for combustion at approved Alternative Low Carbon Fuel Facilities in accordance with Ontario Regulation 79/15, as amended from time to time;

(5) Storage, grinding and transfer of asphalt shingling in accordance with section 3(19) of Reg. 347;

(6) Storage of finished products and product blends.

16.2 Prior to the commencement of any operation listed in condition 16.1, Financial Assurance must be provided to the Ministry in accordance with condition 2.4 of this ECA.

16.3 Prior to the commencement of any operation listed in condition 16.1, the Owner shall develop and retain at the Site, a Standard Operating Procedure for each interim use that is readily available at the request of a Provincial Officer.

16.4 Storage of waste materials associated with the operations in condition 16.1 is limited to the following:

(1) 27,000 cubic metres of woodwaste related to the operation approved under condition 16.1(3);
(2) 27,000 cubic metres of waste wood and Alternative Low Carbon Fuels related to the operation approved under condition 16.1(4); and
(3) 5,000 cubic metres of asphalt shingles related to the operation approved under condition 16.1(5).

16.5 Should the Owner require additional temporary storage greater than the amount approved in condition 16.4, the Owner shall notify the District Manager, in writing, of the following:

(1) Time required for additional storage;
(2) Amount of additional storage required per waste type;

(3) Confirmation that the requested storage amount is within the maximum theoretical storage capacity, as calculated in Item (82) of Schedule "A".

16.6 Should the Owner require additional storage greater than the amount approved in condition 16.4 on a permanent basis, the Owner shall submit an application to the Ministry for approval and adjust the amount of Financial Assurance required to correspond with the proposed storage capacity.

SCHEDULE "A"

This Schedule "A" forms part of Provisional Certificate of Approval No. A 120211. The waste disposal site (landfilling) approved under this Provisional Certificate of Approval is to be developed and operated in accordance with the following plans and specifications:

1. The application for a Provisional Certificate of Approval for a Waste Disposal Site (landfill) dated July 28, 1981 and the attachment entitled, "Major Industries Using Walker Brothers Quarries Landfill Site".

2. The report and attachments entitled "Landfill Extension Report", Walker Brothers Quarries Limited, Niagara Falls, Ontario, dated April, 1981 and prepared by Proctor and Redfern Limited.

3. The report and attachments entitled, "Hydrogeological Study Report, Proposed Sanitary Landfill Site (East Quarry)", dated April, 1981 and prepared by Gartner Lee Associates Ltd.

4. The letter report to Mr. P.S. Isles from Mr. R. Tait, Proctor and Redfern Limited dated April 21, 1982 and including figures 1, 2, 3 and 4.

5. The drawing entitled, "Proposed Sanitary Landfill Site, Landfill Sequence Plan", A-79431-G4 Revision 2, dated April, 1981 and prepared by Proctor and Redfern Ltd.

6. The letter to Mr. P.S. Isles from Mr. R. Tait, Proctor and Redfern Ltd. Dated May 20, 1982 and including sketches 1 and 2 and chart 1.

7. The following drawings prepared by Proctor and Redfern Ltd. for Walker Brothers Quarries Ltd.:

    a) "Operational Plan – Cell 1, Steps 1& 2", No. B-79431-P1, Revision 1, dated April, 1982.
    b) "Operational Plan – Cell 1, Steps 3 & 4", No. B-79431-P1, Revision 1, dated April, 1982
    c) "Construction Grades for Leachate Collection Ponds and Stormwater Drainage Ponds", No, B-79431-P3, April, 1982.
    d) "Details of Leachate and Groundwater Collection System and Construction Grades for cell 1", No. B-79431-L1, April, 1981. (The details of the leachate collection system shown in sketched 1 and 2 in the letter to Mr. P.S. Isles from

Mr. R. Tait, Proctor and Redfern Ltd., dated May 20, 1982 shall be taken as the approved design.)

e) "Final landform", No. B-79431-G6, March 1981, Revision: Proposed Perimeter Storm Ditches have been redirected to the Storm Pond in the North.

8. The letter to Mr. P.S. Isles from. Mr. F.R. Berrill dated May 19, 1982 including the accompanying chart on cell completion vs. 5 year period after closure cost.

9. The letter to Mr. P.S. Isles from Mr. R. Tait, Proctor & Redfern Ltd. dated June 18, 1982.

10. The report and associated drawings entitled "Walker Brothers Quarries Limited, Site Development Report, Niagara Falls, Ontario" dated October 1982 by Proctor and Redfern Limited.

11. The application for a Provisional Certificate of Approval for a Waste Disposal Site (Landfill) for notification of changes in the use operation of the site dated January 13, 1984 and the attachment entitled, "Application to Amend Provisional Certificate of Approval (Waste Disposal Site) No. A 120211" by Proctor and Redfern Ltd. dated June, 1983.

12. The Proctor and Redfern Drawings and specifications of Cell 2 dated August 21, 1984.

13. The letter from Mr. R. Tait, Project Manager of Proctor and Redfern concerning the completion of Cell 2 construction and confirming that Cell 2 has been constructed in accordance with the Proctor and Redfern specifications dated August 21, 1984.

14. The letter from C.E. McIntyre, Director, MOE Environmental Approvals and Project Engineering Branch to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated November 22, 1984 approving the construction of cell 2.

15. The Proctor and Redfern drawings and specifications of Cells 1A and 2A dated June 1986.

16. The letter from Mr. R. Tait of Proctor and Redfern Group concerning the completion of Cells 1A and 2A and confirming that Cells 1A and 2A have been constructed in accordance with the drawings and specification prepared by Proctor and Redfern and dated June 1986.

17. The letter from T.D. Armstrong, Assistant Director, MOE Environmental Approvals and Land Use Planning Branch to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated December 8, 1986 approving the construction of Cells 1A and 2A.

18. The drawings and specifications of Cell 3 submitted to the MOE Welland District Office on June 2, 1988.

19. The letter from Mr. R. Tait of Proctor and Redfern Group concerning the completion of Cell 3 and confirming that Cell 3 has been constructed in accordance with the Proctor and Redfern specifications dated June 1988.

20. The letters from McGlone and Associates Limited of St. Catharines, Ontario dated September 1986, October 1986, October 22, 1986, and December 3, 1986 confirming that the clay pad has been installed in accordance with Gartner Lee Associate Specifications.

21. The letter from T.D. Armstrong, Assistant Director, MOE Approvals Branch to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated October 18, 1988 approving the construction of Cell 3.

22. The Application for a Waste Disposal Site (Landfilling) dated August 28, 1987 and the report entitled "Walker Brothers Quarries Ltd., Application to Amend Provisional Certificate of Approval (Waste Disposal Site) No. A 120211, East Quarry Solid Waste Disposal Site, Niagara Falls, Ontario" dated August 1987 by Proctor and Redfern Limited.

23. The letter report from Mr. R. Tait of Proctor and Redfern dated January 7, 1992 concerning the completion of Cells 5 and 6 and confirming that Cells 5 and 6 have been constructed in accordance with the plans, specifications and testing for these cells.

24. The letter from W. Ng, Director, MOE Approvals Branch to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated December 17, 1992 approving the construction of Cells 5 and 6.

25. The document entitled "Niagara Waste Systems Limited, East Quarry Landfill Site Construction of Cell 7, Niagara Falls, Ontario, Provisional Certificate of Approval No. A120211" prepared by Proctor and Redfern Limited dated September 1995.

26. The letter dated August 23, 1995 from Messrs. R. Tait and S. Hager of Proctor and Redfern Limited concerning the completion of Cell 7 and confirming that Cell 7 has been constructed in accordance with the Proctor and Redfern specifications dated September 1995.

27. The letter from A. Dominski, Director, Section 39, Environmental Protection Act to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated January 3, 1996 approving the construction of Cell 7.

28. The Application for Approval of a Waste Disposal Site, dated June 27, 1996, signed by Norris Walker, President for the relocation of the leachate treatment lagoons.

29. The report entitled "East Quarry Landfill Site, Relocation of Leachate Treatment Lagoons, Design Brief", dated June 1996, prepared by Proctor and Redfern Limited.

30. The letter dated August 8, 1996 from A. Braithwaite, Niagara Waste Systems Limited, to Jamie Connelly, Ministry of the Environment and Energy; including drawings of the leachate treatment lagoons.

31. The Application for Certificate of Approval (air), Permanent Landfill Gas Flare Operation,

Niagara Waste Systems Limited East Quarry Landfill" prepared by Comcor Environmental, September 10, 1996.

32. The document entitled "Niagara Waste Systems Limited, East Quarry Landfill Site Construction of Cell 8A, Niagara Falls, Ontario, Provisional Certificate of Approval No. A120211" prepared by Proctor and Redfern Limited dated January 1997.

33. The letter dated January 16, 1997 from Messrs. R. Tait and S. Hager of Proctor and Redfern Limited concerning the completion of Cell 8A and confirming that Cell 8A has been constructed in accordance with the Proctor and Redfern specifications dated January 1997.

34. The letter from A. Dominski, Director, Section 39, Environmental Protection Act to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated April 16, 1997 approving the construction of cell 8A.

35. The document entitled "Niagara Waste Systems Limited, East Quarry Landfill Site Construction of Cell 8B, Niagara Falls, Ontario, Provisional Certificate of Approval No. A120211" prepared by Proctor and Redfern Limited dated November 1997.

36. The letter dated November 12, 1997 from Messrs. R. Tait and S. Hager of Proctor and Redfern Limited concerning the completion of Cell 8B and confirming that Cell 8B has been constructed in accordance with the Proctor and Redfern specifications dated November 1997.

37. The letter from A. Dominski, Director, Section 39, Environmental Protection Act to Mr. N.W. Walker, President, Niagara Waste Systems Ltd. dated January 27, 1998 approving the construction of cell 8B.

38. The Site development report entitled "Niagara Waste Systems Limited, East Quarry Landfill Site, Construction of Cell 9A, Niagara Falls, Ontario, Provisional Certificate of Approval No. 120211", prepared by Earth Tech (Canada) Inc., dated October 25, 1999.

39. The Covering Letter dated October 25, 1999, from Messrs. R. Tait and S. Hager of Earth Tech (Canada) Inc. to Mr. Michael Williams, Director, Approvals Branch, the Ministry of the Environment, RE: Niagara Waste Systems Limited – East Quarry Landfill Site, Construction of Cell 9A, Niagara Falls, Ontario, Provisional Certificate of Approval No. 120211.

40. The document entitled "Niagara Waste Systems limited, East Quarry Landfill Site, Construction of Cell 9B, Niagara Falls, Ontario" by Earth Tech Canada Inc. dated October 31, 2000.

41. The document entitled "Niagara Waste Systems Limited, East Quarry Landfill Site, Construction of Cell 10A, Niagara Falls, Ontario" by Earth Tech Canada Inc. dated November 22, 2000.

42. Map 3 entitled "Niagara Waste Systems Limited, East Quarry Landfill Site, Approved Waste Disposal Area" prepared by Earth Tech, revised and faxed to the Ministry of the Environmental

on April 14, 2000 showing the final footprint and top elevation of 193.5 meters above sea level.

43. The letter dated April 27, 2000 to Alison Braithwaite, Niagara Waste Systems Limited from A. Dominski, Supervisor Waste, MOE Environmental Assessment and Approvals Branch, Re: Niagara Waste Systems Landfill Provisional Certificate of Approval A120211, 1998-1999 Annual Report.

44. The Application for a Provisional Certificate of Approval for a Waste Disposal Site dated June 19, 2001 and signed by Alison Braithwaite, Director of Environmental Compliance, Niagara Waste Systems Limited to amend the Certificate to incorporate the gas collection system and complete a certificate rationalization.

45. The document entitled "Niagara Waste Systems Limited, Application to Amend Certificate of Approval A 120211, Gas Collection System and Certificate Rationalization" dated June 2001.

46. The document entitled "Emission Summary and Dispersion Modelling Report, Niagara Waste Systems Limited, East Quarry Landfill" dated December 15, 2000 by GRS Comcor Environmental Limited.

47. The document entitled "Niagara Waste Systems Limited, East Quarry Landfill Site 1999 - 2000 Annual Report" dated December 2000 by Earth Tech (Canada) Inc.

48. Letter and supporting information for an emergency approval dated November 26, 2004 from Alison Braithwaite, Director, Environmental Performance, Niagara Waste Systems Ltd., to I. Parrott, MOE.

49. Fax dated November 29, 2004 from Alison Braithwaite, Director, Environmental Performance, Niagara Waste Systems Ltd., to A. Mobberley, MOE. re: remaining annual tonnage cap calculations

50. Application for a Provisional Certificate of Approval for a Waste Disposal Site and supporting documentation submitted by Niagara Waste Systems Limited requesting an amendment to approve and incorporate the expansion of the landfill gas utilization building and the installation of a generator for renewable energy. The application was signed by Alison Braithwaite, Director, Environmental Performance, Niagara Waste Systems Ltd. dated July 7, 2007. The supporting documentation included the following:

    i. Niagara Waste Limited Corporation Papers;
    ii. Drawing of Generator Area;
    iii. Sketch of generator/GGUI location; and
    iv. Copy of Walker Bros. Quarries Neighbourhood PLC Meeting Minutes (Tuesday May 1, 2007).

51. Letter dated July 20, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems from Mr. Dale Gable, Ministry of the Environment requesting additional information on the location of the system, thickness of concrete and impacts to landfill cover, underground utilities and any special features of the pad.

52. Letter dated August 2, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Limited providing additional detail on UTM coordinates for pad location, comments on Utilities and information on pad construction.

53. Email dated August 3, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Limited providing additional detail on concrete pad thickness.

54. Cover Letter dated December 5, 2007 addressed to Mr. Tesfaye Gebrezghi, Supervisor Waste, Environmental Assessment and Approvals Branch, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems requesting amendment to the Provisional Certificate of Approval to permit the expansion of landfill gas utilization building. Included with the letter was the following:

    i. Application for a Provisional Certificate of Approval for a Waste Disposal Site signed by Tim McVicar, Manager, Landfill and Transfer, Niagara Waste Systems dated December 7, 2007.

55. Memorandum dated January 24, 2008 addressed to D. Gable, Ministry of the Environment from D. Fry, Integrated Gas Recovery Services providing additional information on proposed expansion.

56. Letter dated January 28, 2008 addressed to Mr. Darren Fry, Integrated Gas Recovery Services from Mr. Dale Gable, Ministry of the Environment requesting additional information on proposed additional surface water control features and air approval requirements.

57. Letter dated January 29, 2008 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Darren Fry, Integrated Gas Recovery Services providing additional information on additional surface water control features.

58. Email dated February 12, 2008 to Dale Gable, Ministry of the Environment from Darren Fry, Integrated Gas Recovery Services indicating the usage for the equipment to be installed in the expansion for the gas recovery building.

59. The application for a Provincial Certificate of Approval for a Waste Disposal Site dated June 25, 2008 and supporting documentation submitted by Niagara Waste Systems Limited requesting an amendment to the Certificate to change the location of the North Pond and change to the outlet of the South Pond.

60. Letter dated September 25, 2008, to Dale Gable, Ministry of the Environment, from Bradley Cassidy, Walker Industries.

61. Memorandum dated September 25, 2008, from Edward San, Gartner Lee Limited, to Alison Braithwaite, Niagara Waste System Limited, Re: North Pond Relocation, east Landfill - Slope Stability.

62. Report entitled "Cell 15B Construction Report, Niagara Waste Systems Limited East Quarry Landfill Site, Niagara Falls, Ontario" Dated September 2008 prepared by Gartner Lee Limited.

63. Supporting document entitled "Phase 2 of NWSL/IGRS Gas Plant Expansion" submitted by Niagara Waste System Limited.

64. Letter dated June 2, 2009 addressed to Rick Li, Ministry of the Environment from Brad Cassidy, Niagara Waste Systems Limited providing additional information to the application submitted on March 3, 2009.

65. Drawing No. GP-001 entitled "Niagara Waste System Limited Integrated Gas Recovery Services Phase 2 Grading Concept for Gas Plant Expansion Area" dated July 27, 2009 prepared by AECOM.

66. Letter dated July 28, 2009 addressed to Rick Li, Ministry of the Environment from Brad Cassidy, Niagara Waste System Limited providing response to the review comments from the Ministry.

67. Application for a Certificate of Approval for a Waste Disposal Site dated August 20, 2010, signed by Alison Braithwaite, Director of Environmental Performance, Niagara Waste Systems Limited, including all attached supporting information

68. Document entitled "Niagara Waste Systems Limited, East Landfill Transfer Station, Design and Operations Report" dated August 17, 2010 including all attached drawings and appendices.

69. Letter dated October 12, 2011 to David Lee, Senior Review Engineer, Ministry of the Environment from Scott Hurley, Environmental Specialist, Niagara Waste Systems Limited, Re: Additional Documents/Requests.

70. Letter dated November 11, 2011 to David Lee, Senior Review Engineer, Ministry of the Environment from Scott Hurley, Environmental Specialist, Niagara Waste Systems Limited, Re: design specifications, geotextile barrier and Financial Assurance.

71. Email dated March 8, 2012 addressed to Mr. Tes Gebrezghi, Ministry of the Environment from Mr. Scott Hurley, Walker Industries submitting a air quality monitoring program for the STSF. The email included the attachment:

    i. Document dated March 8, 2012 entitled "Particulate and Volatile Compound Monitoring Plan NWSL East Landfill Soil Temporary Storage Facility" prepared by Walker Industries.

72. Work Plan dated December 4, 2012 and entitled "Ambient Air Quality Monitoring Program" prepared for Niagara Waste Systems Limited by RWDI Air Inc.

77. Environmental Compliance Approval Application received May 13, 2014 signed by Tim McVicar, General Manager - Operations, Walker Environmental Group Inc.

78. Document entitled "Walker Environmental Group Inc. (WEG): East landfill Site ECA No. A120211, Application for Interim Uses, ECA Amendment Application Supporting Documentation" dated May 5, 2014 and prepared by Walker Environmental Group including all attached appendices, drawings, figures and information.

79. Document entitled "Walker Environmental Group Inc. (WEG): East landfill Site ECA No. A120211, Application for Interim Uses, ECA Amendment Application Supporting Documentation" updated August 18, 2015 and prepared by Walker Environmental Group including all attached appendices, drawings, figures and information.

80. E-mail dated August 24, 2015 from David Lee, P. Eng., Senior Review Engineer, Environmental Approvals Branch, Ministry of the Environmental and Climate Change to Lesley Clarke, Team Lead Environmental Performance, WEG and Tim McVicar, WEG.

81. Letter dated January 5, 2016 from Lesley Clarke, Team Lead Environmental Performance, WEG to David Lee, P. Eng., Senior Review Engineer, Environmental Approvals Branch, Ministry of the Environmental and Climate Change including all attached supporting information.

82. Letter dated April 12, 2016 from Lesley Clarke, Team Lead Environmental Performance, WEG to David Lee, P. Eng., Senior Review Engineer, Environmental Approvals Branch, Ministry of the Environmental and Climate Change including all attached supporting information.

83. Letter dated January 10, 2018 to Ms. Clarke, Walker Environmental Group from Kim Groombridge, District Manager, Niagara District Office, Ministry of the Environment and Climate Change.

84. Environmental Compliance Approval Application dated March 10, 2022 signed by Shawn Jordan, Walker Environmental Group Inc., and the supporting documentation for approval of the Renewable Natural Gas facility located at the Gas Utilization Plant.

The reasons for the imposition of these terms and conditions are as follows:

1. *The reason for Condition 1.1, 1.2, 1.3, 1.4 and 1.5 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

2. *The reason for Conditions 1.6, 1.7, 1.8, 1.12, 1.13, 1.14 and 1.15 is to clarify the legal rights and responsibilities of the Owner under this ECA.*

3. *Conditions 1.9, 1.10 and 1.11 are included to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site, which are approved under this ECA.*

4. *Conditions 1.16, 1.17 and 1.18 are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*

5. *The reasons for Condition 1.19 are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be*

made only on the basis that it will not endanger compliance with this ECA.

6. *The reasons for Condition 1.20 and 1.21 are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*

7. *The reason for Condition 1.22 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this ECA. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*

8. *The reasons for Conditions 2.1 to 2.5 inclusive are to ensure that sufficient funds are available to the Ministry to close the landfill, and to carry out all expected post-closure care activities and any contingencies. Failure to include requirements for financial assurance would not be in the public interest and may result in a hazard or nuisance to the natural environment or any person.*

9. *Conditions 3.1 to 3.4 inclusive are necessary in order to establish a forum for the exchange of information and public dialogue on activities to be carried out at the landfill site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*

10. *he reason for Conditions 4.1 to 4.6 is to ensure that the Site is designed, constructed and operated in an environmentally acceptable manner, based on the conceptual design and operations for the Site.*

11. *The reason for Condition 4.7 is to ensure the availability of as-built drawings for inspection and information purposes.*

12. *The reason for Condition 4.8 is to ensure that a site development report be prepared prior to any landfilling taking place in any cell at the site to ensure that the construction of site works is consistent with the plans and specifications approved by this Certificate and the basis upon which the Director made the decision to issue this Certificate. Site operations and development reports are required to ensure the on-going construction and operation of the landfill and site works is consistent with the plans and specifications approved by this Certificate and the basis upon which the Director made the decision to issue this Certificate. Sit operations and works that are not constructed and developed in accordance with these plans may result in contaminant emissions to the environment and a hazard to the health and safety of any person. It is important that these works are inspected by a Professional Engineer and/or Geoscientist because of their complexity.*

13. *The reason for Condition 5.1, are included in order to ensure that waste disposal operations at the site is undertaken in accordance with applicable Ministry of the Environment regulations and guidelines. Compliance with these regulations and guidelines will ensure that the site*

does not cause and adverse effect on the environment.

14. *The reason for Condition 5.2 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*

15. *The reason for Conditions 5.3 and 5.4 are to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.*

16. *The reason for Condition 5.5 is to ensure the Owner is maintains accurate records of incoming waste to the Site.*

17. *The reasons for Condition 5.6 is to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.*

18. *The reason for Condition 5.7 is to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*

19. *The reason for Condition 5.8 is to ensure the Owner keeps the Operations Manual up to date and addresses all the operations on the Site.*

20. *The reason for Conditions 5.9 inclusive is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this ECA.*

21. *The reasons for Condition 5.10 are the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.*

22. *The reason for Condition 5.12 are to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.*

23. *The reasons for Conditions 5.13, 5.14 and 5.15 are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.*

24. *The reason for Condition 6.1 and 6.2 are to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end*

use planned for the site.

25. *The reason for Condition 6.3 is to ensure that the relocation of the leachate treatment lagoons does not cause a nuisance or a threat to the health and safety of any person.*

26. *The reasons for Conditions 6.4 and 6.5 are to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

27. *The reason for Conditions 7.1, 7.2, 7.3, and 7.4 are to approve the major works based on the submitted information. This is to ensure the protection of the environment and public health.*

28. *The reason for Condition 8.1 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.*

29. *The reasons for Conditions 9.1, 9.2 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10 and 9.11 are to provide for the proper assessment of effectiveness and efficiency of Site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this ECA, the EPA and its regulations.*

30. *The reasons for Conditions 10.1, 10.2, 10.3, 10.4, 10.5, 10.6 10.7 and 10.8 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.*

31. *The reason for Condition 11.1 and 11.2 is to ensure their is a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*

32. *The reasons for Condition 12.1, 12.2, 12.3, 12.4 and 12.5 are to ensure protection of the natural environment and the integrity of the groundwater monitoring network.*

33. *The reason for Condition 12.6 is to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*

34. *The reason for Condition 12.7 is to establish a procedure for the Owner to amend the EMP.*

35. *The reason for Condition 12.8 is to ensure the Owner is aware of their responsibility for ensuring compliance with groundwater standards.*

36. *The reason for Conditions 13.1 and 13.2 is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. .*

37. *The reasons for Condition 14.1 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*

38. *The reason for Condition 15.1 and 15.2 is to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.*

39. *The reasons for the Conditions in Section 16.0 are to approve the interim and end uses for the Site and to ensure that any operations associated with those uses are undertaken in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A120211 issued on July 24, 2020

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me and the Ontario Land Tribunal within 15 days after receipt of this notice, require a hearing by the Tribunal. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar* Ontario Land Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5 OLT.Registrar@ontario.ca	and	The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act* Ministry of the Environment, Conservation and Parks 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.oltt.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 22nd day of July, 2022

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

RL/

c: District Manager, MECP Niagara
Brad Bergeron, A.Sc.T., d.E.T. | Senior Project Manager / Principal
, RWDI Air Inc.

APPENDIX C

Environmental Compliance Approval (ECA) No. 0084-78RKAM

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 0084-78RKAM
Issue Date: March 23, 2023

Walker Environmental Group Inc.
2800 Thorold Townline Rd
Niagara Falls, Ontario
L0S 1A0

Site Location: Walker South Landfill
3081 Taylor Rd
Niagara Falls City, Regional Municipality of Niagara

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of a 53.9 hectare waste disposal site within a total site area of 85.68 hectares having a maximum capacity of 17.7 million cubic meters, being known as the South Landfill Site,

to be used for the landfilling of the following types of waste:

Solid Non Hazardous Waste which includes Asbestos.

For the purpose of this environmental compliance approval, the following definitions apply:

"***Adverse Effect*** " means the same as the definition in the EPA.

"Anniversary Date" means the date on which waste is first received at the *Site* ;

"Approval" or ***"ECA"*** means this entire Environmental Compliance Approval, issued in accordance with section 20.3 of the *EPA* , and includes any schedules to it, the application and the supporting documentation listed in schedule "A;

"***Director*** " means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the Act as a Director for the purposes of Part II.1 and Part V of the Act.;

"***District Manager*** " means the District Manager of the local district office of the *Ministry* in which the

Site is geographically located;

"*Engineer* " means holder of a professional engineering licence, a temporary licence, a provisional licence, a limited licence or a certificate of authorization, as the case requires.

"***EPA*** " or ***"Act"*** means *Environmental Protection Act* , R.S.O. 1990, c. E. 19, as amended;

*"**Ministry**"* or *"**MECP**"* means the Ontario Ministry of the Environment, Conservation and Parks;

"***Operator*** " means any person, other than the Owner's employees, authorized by the Owner as having the charge, management or control of any aspect of the site its successors or assigns;

"***Owner*** " means any person that is responsible for the establishment or operation of the site being approved by this *Approval* , and includes the Niagara Waste Systems**,** its successors and assignees;

"OWRA" means the Ontario Water Resource Act, R.S.O 1990, Chapter O.40, as amended;

"*PA* " means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended from time to time:

"***PLC*** " means the Public Liaison Committee;

"***Provincial Officer*** " means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the *OWRA* or section 5 of the *EPA* or section 17 of *PA* .

"***Regional Director*** " means the Regional Director of the local Regional Office of the *Ministry* in which the Site is located.

"***Regulation 232*** " or "***Reg. 232*** " means Ontario Regulation 232/98 (New Landfill Standards) made under the *EPA* , as amended from time to time;

"***Regulation 347*** " or "***Reg. 347*** " means Regulation 347, R.R.O. 1990, made under the *EPA* , as amended from time to time;

"Regulation 419" or "Reg. 419" means Ontario Regulation 419, R.R.O.2005, made under the EPA, as amended from time to time;

"***Site*** " means the entire South Landfill Site, including the buffer lands located at Parts of lots 31, 49, 50 and 66 in the (Former Township of Stamford) City of Niagara Falls in the Regional Municipality of Niagara, approved by this *ECA* .

"Trained personnel" means knowledgeable in the following through instruction and/or practice:

i. relevant waste management legislation, regulations and guidelines;
ii. major environmental concerns pertaining to the waste to be handled;
iii. occupational health and safety concerns pertaining to the processes and wastes to be

handled;

iv. management procedures including the use and operation of equipment for the processes and wastes to be handled;

v. emergency response procedures;

vii. specific written procedures for the control of nuisance conditions;

viii. Specific written procedures for refusal of unacceptable waste loads;

ix. the requirements of this *ECA* .

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

General

1. This Approval revokes all previously issued Environmental Compliance Approval issued under Part V, EPA, for this Site. The approval given herein, including the Terms and Conditions set out, replaces all previously issued approvals and related Terms and Conditions under Part V, EPA for this Site.

2. The Owner and Operator shall ensure compliance with all the conditions of this Approval and shall ensure that persons authorized to carry out work on or operate any aspect of the Site is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

3. Except as otherwise provided for in this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the application for this Approval, dated November 21, 2006, and the supporting documentation listed in Schedule "A"

4. (1) If there is a conflict between a provision of any document listed in Schedule "A" and a provision of any term or condition in this Approval of Approval, the provision in the term or condition shall apply.

   (2) If there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall apply.

5. The conditions of this Approval are severable. If any condition of this Approval, or the application of any condition of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

6. The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

i. an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; or
ii. acceptance by the Ministry of the information completeness or accuracy.

Adverse Effect

7. (1) The Owner and Operator shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the Site,including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(2) The Owner shall ensure the Site is in compliance with Ontario Regulation 419/05.

8. Despite an Owner, Operator or any other person fulfilling any obligations imposed by this Approval the person remains responsible for any contravention of any other condition of this Approval or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

Inspection

9. The Owner and Operator shall take all reasonable steps to have trained personnel inspect the Site for any situation which may cause an adverse effect and to ensure that the Site is being operated in accordance with this Approval.

Certificate of Requirement

10. Pursuant to Section 197 of the EPA, no person having an interest in the Site shall deal with the Site in any way without first giving a copy of this Approval to each person acquiring an interest in the Site as a result of the dealing.

11. In the event any additional lands are acquired and added to the Site, the Owner shall:

(i) Within 60 days of the date of the land acquisition, submit to the Director for their review, two copies of a completed Certificate of Requirement and a registerable description of the new land; and

(ii) Within 10 calendar days of receiving the Certificate of Requirement authorized by the Director, register the Certificate of Requirement in the appropriate Land Registry Office on title to the Property and submit to the Director the duplicate registered copy immediately following registration.

Transferral or Encumbrance of Site

12. No portion of this Site shall be transferred or encumbered prior to or after closing of the Site unless the Director is notified in advance and sufficient financial assurance is deposited with the Ministry to ensure that these conditions will be carried out. In the event of any change in Ownership of the works, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Notification

13. The Owner shall notify the Director, in writing, and forward a copy of the notification to the District Manager, within 30 days of the occurrence of any changes in the following information:

    i. the ownership of the Site;
    ii. the Operator of the Site;
    iii. the address of the Owner or Operator;
    iv. the partners, where the Owner or Operator is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act,* R.S.O. 1990, c. B.l7, shall be included in the notification;

Inspection by Provincial Officer

14. No person shall hinder or obstruct any and all inspection authorized by the EPA, the OWRA and the PA of any place to which this Approval of Approval relates, and without restricting the generality of the foregoing, to

    i. enter upon, at reasonable times, the premises or the location where the records required by the conditions of this Approval are kept;
    ii. have access to, inspect, and copy, at reasonable times, any records required to be kept by the conditions of this Approval;
    iii. inspect , at reasonable times, the Site and related equipment and appurtenances;
    iv. to inspect, at reasonable times, the practices, procedures, or operations required by the conditions of this Approval; and
    v. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Approval, the EPA, the OWRA or the PA.

Information and Records Retention

15. Any information requested by the Ministryor by a Provincial Officer, concerning the Site and its operation under this Approval, including but not limited to any records required to be kept by this Approval shall be provided to the Ministry, upon request**,** in a timely manner.

16. The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

a. an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; or

b. acceptance by the Ministry of the information completeness or accuracy.

17. The Owner shall retain records required by this Approval for a minimum of two (2) years except as otherwise authorized in writing by the Director.

18. The Owner shall maintain copies of documents listed in Schedule "A" of this Approval and make them available for inspection by a Provincial Officer upon request.

Financial Assurance

19. (1) The Owner shall ensure Financial Assurance, as defined in Section 131 of the Act, for the amount as identified in Schedule "E" of this ECA is submit to the Director by April 30 of each year. This Financial Assurance shall be in a form acceptable to the Director and shall provide sufficient funds for the closure, contingency, post-closure monitoring, operation and maintenance of the Site.

(2) Cumulative amounts of the financial assurance following the end of the 5-year period identified in Schedule "E" shall be re-calculated based on the financial assurance re-evaluation report required under Condition No. 20.

20. (1) By no later than **April 30, 2028**, and every five years thereafter, the Owner shall submit a Financial Assurance Re-Evaluation Report to the Director for approval, with copies to the District Manager. The re-evaluation report shall include:

i. updates of the discount, interest and inflation rates associated with the requirements for financial assurance in this Approval including justifications and sources of the proposed rates; and

ii. a report prepared by a qualified professional engineer which updates the cost estimates on which the amounts associated with the requirements for financial assurance in this Approval are based. The report shall take into consideration the:

(1) actual amounts of waste landfilled;
(2) projected rate of fill;
(3) progressive capping of completed fill areas;
(4) leachate generation rates;
(5) landfill gas generation rates;
(6) contaminating life span of the Site with respect to groundwater, surface water and landfill gas;
(7) any measures that have been carried out or need to be carried out to prevent and ameliorate any adverse effect that relates to the site;

and

(8) annual inspection, maintenance, and monitoring costs, including costs for leachate treatment and disposal and landfill gas use or discharge.

iii Updates on required Contingency Costs for the Site.

(2) In the event a updated sewer-use discharge agreement is not reached between the Owner and the upper or lower tier Municipal Government to address all leachate volumes generated at the Owner's Site, the Owner shall include all costs for the handling, transport and disposal of leachate at the site in the financial assurance calculations.

21. If any financial assurance is scheduled to expire or notice is received, indicating financial assurance will not be renewed, and satisfactory methods have not been made to replace the financial assurance at least 60 days before the financial assurance terminates, the financial assurance shall forthwith be replaced by cash.

Public Liaison Committee

22. Upon issuance of the Approval, the Owner shall incorporate into the existing Walker Public Liaison Committee the dissemination of information, review and exchange of information and monitoring results relevant to the operation of the Site.

23. The Owner shall provide the following to the PLC for review and recommendations:

i. update of landfilling operations at the site
ii. the Annual Report required by Condition No. (88)
iii. proposed changes to the Environmental Compliance Approval for the Site; and
iv. complaints and complaint response procedures
v. closure plans

24. The Owner shall review annually in consultation with the members of the PLC the need for the committee, and the committee may be suspended upon consent of the Regional Director should there be insufficient interest among the public members.

25. The Owner shall not construe any recommendations provided by the PLC as supervisory or regulatory to the operation of the Site or as an approval of operations of the site.

Construction, Installation and Planning

Major Works

26. For the purposes of this Approval, major works includes, but are not limited to the following:

i. Liner system;
ii. Leachate management system;
iii. Groundwater management system;
iv. Stormwater management system
v. Gas management system

27. A final detailed design shall be prepared for each Major Work to be constructed at the Site consistent with the conceptual design of the Site as presented in the Supporting Documentation Items (3), (7) and (9) in Schedule "A".

28. The final detailed design of each Major Work shall include the following:

i. design drawings and specifications;
ii. a detailed quality assurance / quality control (QA/QC) program for construction of the major work, including necessary precautions to avoid disturbance to the underlying soils; and
iii. details on the monitoring, maintenance, repair and replacement of the engineered components of the major work, if any.

29. Any design optimization or modification that is inconsistent with the conceptual design shall be clearly identified, along with an explanation of the reasons for the change.

30. The final detailed design of each Major Work shall be submitted to the Director for approval, with two (2) copies to the District Manager.

31. (1) No construction of a Major Work shall commence prior to the Director approving, in writing, the final detailed design of that Major Work. Each major work shall be constructed in accordance with the approved final detailed design and the QA/QC procedures shall be implemented as approved by the Director.

(2) Stage 1 Liner and Leachate Collection System is hereby approved as follows:

(i) Approval is granted for the detailed design for Stage 1 Liner and Leachate Collection System, all in accordance with the documentation listed as Items 26 through 30 in Schedule "A"; and

(ii) Revisions to the detailed design for Stage 1 Liner and Leachate Collection System in accordance with Items 26.(4), (7), (8), (10), (11), (13), (17), (18), (20), (21) and 42 in Schedule "A" are hereby approved.

(3) The Stage 2 Liner and Leachate Collection System is hereby approved, all in accordance with the documentation listed as Items 59 through 62 in Schedule "A".

(4) The detailed design of the stormwater management pond is hereby approved, all in accordance with the documentation listed as Items 63 and 64 in Schedule "A".

(5) Pursuant to Condition 30 of the ECA, the detailed design for Stage 3 liner and leachate collection system included in Items 73 and 74 in Schedule "A" is hereby approved.

(6) The detailed design for Stage 4 liner and leachate collection system is hereby approved, all in accordance with Item 78 of Schedule "A".

32. (1) Prior to accepting waste, the Owner shall submit in writing to the District Manager a letter indicating that the major works (as applied for under Condition 30) have been constructed as per approved detailed designs and request permission to commence landfilling in that Stage/Phase.

(2) Landfilling in an approved Stage/Phase shall not commence until the Owner has received confirmation from the District Manager for the request in Condition No. 32(1) and the Financial Assurance required and approved by the Director as identified in Condition No. (19) has been received by the Director.

(3) Within one hundred and twenty (120) days of receiving confirmation from the District Manager (as identified in Condition No. 32(2), the Owner shall submit to the Director and District Manager, a written Construction Report documenting:

i. all construction activities for the Stage/Phase;
ii. QA/QC activities;
iii. Site conditions; and,
iv. all details of the construction of the approved stage.

are in accordance with the approved design plans and specifications.

33. As-built drawings for all Major Works shall be retained on site and made available to Ministrystaff for inspection.

Subsequent Stages

34. At least six months prior to the anticipated initiation or completion of landfilling in each Stage/Phase of the Site, a final detailed design for all applicable major works for the subsequent stage/phase shall be submitted to the Director for approval in accordance with the Condition No. (27).

35. (1) Prior to accepting waste in each subsequent Phase/Stage, the Owner shall submit in writing to the District Manager a letter indicating that the major works (as applied for under Condition 34) have been constructed as per approved detailed designs and request permission to commence landfilling in that Stage/Phase.

(2) Landfilling in an approved Stage/Phase shall not commence until the Owner has received confirmation from the District Manager for the request in Condition No. 35(1).

(3) Within one hundred and twenty days of receiving confirmation from the District Manager (as identified in Condition No. 35(2), the Owner shall submit to the Director and District Manager, a written Construction Reportdocumenting:

i. all construction activities for the Stage/Phase;
ii. QA/QC activities;
iii. Site conditions; and,
iv. all details of the construction of the approved stage;

are in accordance with the approved design plans and specifications.

Geomembrane

36. The geomembrane shall be protected against puncturing and load-induced damage at all times, including during installation. During installation, care shall also be taken to:

a. remove wrinkles in the geomembrane;
b. minimize stress concentration;
c. ensure high quality seams;
d. minimize differential settlement;
e. minimize exposure to ultraviolet light;
f. prevent damage due to sliding;
g. prevent damage due to installation in cold conditions; and
h. prevent damage due to rodents.

37. To ensure that the geosynthetic products specified in the design have been supplied and installed in accordance with the design drawings and specifications, a qualified inspector(s) shall be on the Site during construction to sample, test and confirm installation in accordance with the recommendations of the manufacturers, design drawings and specifications, and QA/QC procedures.

Blast Monitoring for Liner Performance

38. (1) The Owner shall ensure that no blasting operations in the Southeast Quarry causes damage to the liner system.

(2) If Walker Aggregates Inc. is extracting rock in the Southeast Quarry directly along Taylor Road adjacent to where liner is to be constructed in Stage 2 of landfilling, then the Owner shall prepare a monitoring plan to ensure the ground vibration generated from the blast will not affect the performance of the liner system. The Owner shall submit the plan to the Director for approval, with copies to the District Manager. The Director must approve the plan before the liner construction can proceed.

<u>Operation</u>

Proper Operation

39. (1) The Site shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the EPA, Regulation 347, Regulation 232, and the requirements of this Approval. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

(2) Any changes to the Design and Operations Report shall be submitted to the Director for approval prior to their implementation.

Scavenging

40. The Owner shall ensure no scavenaging at the Site occurs.

Burning Waste Prohibited

41. Burning of waste at the Site is prohibited.

Waste Type

42. Only solid non-hazardous waste (including asbestos) shall be accepted at the Site.

Capacity

43. (1) The total capacity of the Site is **17,700,000** cubic metres; and

(2). The total capacity as identified in Condition No. 43(1) does not include the composite liner, leachate collection system or the final cover.

Daily and Annual Waste Limit

44. (1) No more than **10,000 tonnes** of waste per day shall be accepted at the Site.

(2) The maximum rate at which the Site can receive waste is **1,100,000 tonnes** of waste per year consisting of the following breakdown:

i. **850,000 tonnes** of solid non-hazardous waste; and
ii. **250,000 tonnes** of solid non-hazardous waste that meets the description of waste permitted for use as daily/interim cover as provided in Section 5.9 of Item No. 3 in Schedule "A" for use as daily and interim cover.

(3) The maximum amount identified in Condition No. 44(2) includes an allowance of up to **100,000 tonnes** per year dedicated exclusively to the Region of Niagara. It also includes approved wastes that are used as cover.

Service Area

45. Only waste that is generated within the **Province of Ontario** shall be accepted at the Site.

Design and Operations Report

46. The Design and Operations Report shall be:

    i. retained at the Site;
    ii. kept up to date through periodic revisions; and
    iii. be available for inspection by Ministry staff.

Cover

47. The Owner shall ensure that a thickness of at least 4.0 m of waste (the upper 2.0 m shall be compacted waste) and cover material exists over the area of the leachate collection layer where the biosolids are to be landfilled prior to landfilling the biosolids.

48. Cover material shall be applied as follows:

    a. Daily Cover - At the end of each working day, the entire working face shall be covered with a minimum thickness of 150 mm of soil material or other material approved under Reg. 232/98 or any other alternative daily cover material approved by this Approval.

    b. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm material cover material (which restricts infiltration to less than 150 mm/year). This materials may consist of soil, contaminated soils, foundry sands, slag, aggregate grindings, aggregrate production by-products (limited to shale, ground stone and crushed concrete) manufactured cover materials, or, an approved thickness of alternative cover material approved by this Approval; and

    c. Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 mm thick layer of final soil cover and 150 mm of topsoil shall be placed as described in Item (3) in Schedule "A". Fill areas shall be progressively completed and rehabilitated as landfill development has reached final contours.

49. Alternative materials not approved by this Approval may be used as daily and interim cover material, subject to an approval by the Director via an amendment to the Approval.

Waste Placement

50. No waste shall be landfilled outside of the **limit of fill area** as shown in Item (3) in Schedule "A" attached to this Approval. No waste shall be landfilled in the buffer area.

51. Final slopes above grade at the time of Siteclosure within the waste fill area shall be within the range of 4H:1V (25%) and 20H:1V (5%).

52. The maximum height of the waste shall be 212.50 mASL.

Spills

53. All spills shall be forthwith reported to the Ministry's Spills Action Centre (SAC) and shall be recorded in a log as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences

Buffer

54. A minimum buffer area width of thirty (30) metres shall be maintained between the perimeter of the approved fill area and the property line

Landfill Staging

55. Waste Landfilling Operations shall proceed in the various stages in the following order:

    i. Stage 1;
    ii. Stage 2;
    iii. Stage 3; and
    iv. Stage 4.

Impacted Surface Water

56. The Owner shall ensure that any surface water contaminated with leachate within the active limit of landfilling area shall be directed to the leachate collection/treatment system, recirculated back into the landfill, or removed off-site for disposal at an approved facility.

Hours of Operation

57. Waste shall only be accepted at the Site during the following time periods:

    i. 7:00 am to 7:00 pm - Monday to Friday (except statutory holidays); and
    ii. 7:00 am to 1:00 pm - Saturday.

58. On Saturdays that are most proximal to a Statutory holiday, hours of waste receipt may be extended to 4:00pm to receive waste only from curbside pick-up within the Region of Niagara.

59. On-site equipment used for daily site preparation and closing activities shall only be used during

the following time periods:

i. 6:00 am to 9:00 pm - Monday to Friday (except statutory holidays);
ii. 6:00 am to 3:00 pm - Saturday; and
iii. 24 hours a day and on Sundays during emergency events such as large snow events, large melt events, extreme rain events, and fire emergencies.

60. On Saturdays that are most proximal to a statutory holiday, hours of on-site equipment use may be extended to 6:00 pm to manage waste only from curbside pick-up within the Region of Niagara.

61. The operating hours may be extended to accommodate seasonal or unusual quantities of waste with the prior written approval concurrence of the District Manager

Site Access

62. (1) The Owner shall only permit access to and exit from the Site for the transportation of waste via the main entrance/exit at **3081 Taylor Road, Niagara Falls, Ontario**.

(2) Prior to the completion of construction of the main entrance on Taylor Road, the East Landfill entrance on Thorold Townline Road may be used as temporary access to the Site for the transportation of waste in accordance with Items 36, 37 and 39 in Schedule "A".

63. The Owner shall provide and maintain access roads and on-site roads so that vehicles hauling waste to and on the Site may travel readily on any operating day.

Site Security

64. During non-operating hours, the Owner shall lock the site entrance and exit gates to secure against access by unauthorized persons.

Signage

65. The Owner shall install and maintain a sign which complies with local by-laws at the main entrance/exit to the Site on which is legibly displayed the following information:

i. the name of the Site and Owner;
ii. the number of the Approval;
iii. the name of the Operator;
iv. the normal hours of operation;
v. the allowable and prohibited waste types;
vi. a telephone number to which complaints may be directed;
vii. a twenty-four (24) hour emergency telephone number (if different from above); and
viii. a warning against dumping outside the Site.

66. The Owner shall install and maintain signs on the site that control speed and direct vehicles to the working face.

Nuisances

67. The Owner shall take all reasonable steps to operate and maintain the Site such that the vermin, vectors, dust, litter, odour, noise and traffic do not create an adverse effect.

Cleaning Leachate Collection System

68. (1) For each Stage/Phase, the leachate collection system piping in that Stage/Phase of the landfill shall be inspected annually for the first five years after waste placement overtop of each pipe and then as often as inspections indicate to be necessary .

(2) The Owner shall conduct and document visual inspections of the leachate collection system (as a component of Condition No. 77) on a monthly basis to assist in determining the need for more frequent cleaning and/or maintenance.

(3) The leachate collection system shall be cleaned on a frequency as per Reg. 232/98.

Employees and Training

69. A specific training plan for each employee whom is part of any landfill operation at the Site shall be developed and implemented by the Operator. Only trained personnel shall operate any aspect of the Site or carry out any activity required under this Approval. Documentation of training and personnel whom have taken the training shall be maintained and kept at Niagara Waste Systems Ltd.'s main office at 2800 Thorold Townline Road.

Environmental Inspector

70. The Owner shall permit an Environmental Inspector (which includes other appropriate technical expert(s)) employed by the Ministry to inspect the Site, during hours of waste disposal operations on such terms and conditions, after consultation with the Owner, as deemed appropriate by the District Manager and, for greater certainty:

i. the Owner shall provide the Environmental Inspector with adequate office facilities, including a telephone, and a computer, for use when at the South Landfill, and appropriate arrangements for on-site transportation;
ii. the Owner shall, on a semi-annual basis, reimburse Ministry for the reasonable costs of the Environmental Inspector and associated expenses.

71. Implementation of Condition No. 70 shall be required of the Owner in accordance with the following conditions:

a.. The Owner shall undertake an air space survey of the bottom and top waste

contours to determine the estimated air space used for waste disposal in the prior six months. The air space survey shall include daily cover material and shall take into account settlement. The first air space survey shall be undertaken six months after waste is first received at the Site. The Owner shall undertake further air space surveys semi-annually in January and June after the completion of the first air space survey.

b. Wastes which the Owner has been ordered to dispose of at the Site by any ministry, department or agency of the federal or Provincial Crown shall be excluded from the air space calculations.

c. Each Air Space Survey shall be conducted by an Ontario Land Surveyor or other qualified consultant and such air space survey shall be confirmed by the District Manager. The Owner shall keep a copy of each air space survey on-site and make them available to MECP personnel.

d. Based on the annual rate of waste received at the Site reflected by the most recent air space survey, the Owner shall provide the funding equivalent for an Environmental Inspector being on-site for the following number of days per week as shown in the Table below:

Funding Equivalent to Number of Days Per Week the Environmental Inspector may inspect the Site	Annual Rate Waste Received at the Site in Cubic Meters
1	0 up to 500,000
2	500,000 up to 650,000
3	650,000 up to 800,000
4	800,000 up to 950,000
5	950,000 or more

e. Notwithstanding Condition No. 71(d), the requirement for an Environmental Inspector shall not commence until the annual rate of fill at the Site is equal to of greater than 350,000 cubic meters.

f.. Nothwithstanding Condition No. 71(d) and 69(e), upon the commencement of the construction of the Site, the District Manager may require funds for an Environmental Inspector to be on-site up to one day per week.

72. Nothwithstanding Condition No. 71, the Environmental Inspector may in consultation with the Owner, be increased , reduced, suspended or terminated on such terms and conditions as deemed appropriate by the District Manager and, for greater certainty, the District Manager may require an Environmental Inspector to be on-site for up to five days per week in cases of apparent significant non-complinace with this Approval until such non-compliance is resolved.

73. If the Environmental Inspector is terminated, the District Manager may required the Owner to develop a "Transparency and Accountability Plan" which sets a framework for public access to environmental performance reporting relating to the Site and alternative performance measures program.

74. The Owner shall include as part of the annual reporting for the Site an assessment of the effectiveness of the Compliance, Transparency and Accountability program implemented at the Site and make recommendations for changes in funding, frequency or application of the program.

MONITORING, RECORDING NOTIFICATION

First Receipt of Waste

75. Within one week of the Anniversary Date, the Owner shall notify the District Manager in writing of the date on which the Site first received waste

Daily Inspections and Record Keeping

76. (1) The Owner shall conduct a visual inspection of the Site each day to ensure that: the Site is secure; that the operation of the Site is not causing any adverse effects on the environment.

(2) Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed**.**

77. The Owner shall keep a record of the inspections in a daily log book or electronically that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. The recommendations for remedial action; and
v. the date, time and description of actions taken.

78. The Owner shall keep daily records (when landfill is operating or landfill activity is on-going) that includes but are not limited to the following landfill related operations:

a. the type, date and time of arrival, hauler, and quantity (tonnes) of all waste and cover material received at the Site;
b. the Stage of the Site in which waste disposal operations are taking place;
c. the date of refusals of waste shipments at the Site, the reason for the refusal, and the origin of the waste, if known;
d. a calculation of the total quantity (tonnes) of waste received at the Site during each operating day and each operating month;

e. the amount of any leachate removed, or treated and discharged from the Site (on a monthly basis);
f. a record of litter collection activities and the application of any dust suppressants;
g. a record of the daily inspections; and
h. a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.

Complaints Procedure

79. If at any time, the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:

a. The Owner shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause(s) (related to the Site) of the complaint and forward a reply to the complainant; and

c. The Owner shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

Leachate Management

80. The leachate contingency plan listed as Items 40 and 41 in Schedule "A" that sets out how the leachate will be treated at the Site in the event the long-term sewer use discharge agreement between the Owner and the applicable upper or lower tier municipal government is terminated is hereby approved.

Landfill Gas Monitoring

81. (1) The Ownershall ensure all existing structures and future structures (with the exception of the non-building components of the landfill gas collection system) to be built shall be situated and constructed in a manner which minimizes the potential for explosive hazards due to landfill gas.

(2) The Owner shall install and maintain methane detection and alarm equipment, with active venting or an effective passive venting system to relieve any possible landfill gas accumulation in all enclosed buildings on the Site which at times are occupied by people.

(3) The Owner shall conduct routine monitoring for explosive methane gas levels in all buildings on the Site, especially enclosed structures which at times are occupied by people.

82. The design of the Site and any plans, specifications and descriptions for the control of landfill gas must ensure that the subsurface migration of landfill gas meets the limits of Section (14) of Reg. 232.

Environmental Monitoring Program

83. (1) Monitoring programs for groundwater, surface water, leachate, landfill gas and air quality monitoring shall be carried out in accordance with Schedules "B", "C", and "D", respectively and Items (3) through (23) in Schedule "A".

(2) The frequency of the landfill air quality sampling program shall be conducted as per Items (22) and (23) in Schedule "A".

(3) i. At least fourteen (14) days prior to conducting the first air quality sampling event, the Owner shall notify the District Manager in writing of the proposed date for the sampling event and to request the ministry co-ordinate their staff and equipment to collect duplicate samples during the sampling event.

ii. In conjuction with Condition No. 83 (3)(i), the Owner shall permit ministry staff to be on-site to collect duplicate samples during the first sampling air quality sampling.

(4) In the event, the air quality data collected in Condition No. 83(1) exceeds the predicted modelled contaminant levels at the locations monitored, the Owner shall re-run and submit the results of the predictive air model used during the Environmental Assessment submission(or any other air modelling program acceptable to the ministry) utilizing the collected ambient air monitoring to the District Manager as a component of the Annual Report as requried by Condition No. (88). As a component of the discussion, the Owner shall provide details on the steps to be taken to ensure the site will continue to meet compliance requirements for air quality.

84. (1) The Owner may request to make changes to the monitoring program(s) to the District Manager in accordance with the recommendations of the annual report as described in Condition No. (88). The Owner shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.

(2) Within fourteen (14) days of receiving the written correspondence from the District Office confirming that the District Office is in agreement with the proposed changes to the environmental monitoring program(s) identified in Condition No. (83), the Owner shall forward a letter identifying the proposed changes and a copy of the correspondences

from the District Manager and all other correspondences and responses related to Condition No. (88), to the Director requesting the Approval be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.

(3) In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the Owner shall follow current ministry procedures for seeking approval for amending the Approval.

85. In the event of a confirmed exceedance of a site-specific trigger level for groundwater or surface water impacts due to leachate , the Owner shall complete the following:

i. immediately notify the District Manager; and
ii. an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the Owner in accordance with the approved trigger mechanisms and associated contingency plans described in the Design and Operations Report listed as Item (3) in Schedule "A" or as to be approved by Condition No. (86).

86. If monitoring results indicate that the Site has had an impact on background groundwater concentrations, the Owner shall follow the procedure outlined in Item 43 of Schedule "A" to model contaminant attenuation, and develop trigger mechanisms and contingency plan. The report on contaminant modelling, trigger mechanisms and contingency plan shall be submit to the Director for approval, with copies to the District Manager, within ninety (90) days of confirmation of the impact.

87. If monitoring results, investigative activities and implementation criteria indicate the need to implement contingency measures, the Owner shall ensure that the following steps are taken:

a. The District Manager shall be notified by the Owner as soon as possible of the need to implement contingency measures and the proposed contingency measures that need to be implemented;

b. If engineered systems/components or changes to the approved landfill design are required then the Owner shall prepare and submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures to the Director for approval; and

c. For contingency plan that have an engineered system/component or involve changes to the approved landfill design, the contingency measures shall be implemented by the Owner upon approval by the Director.

Annual Report

88. A written report on the development, operation and monitoring of the Site, shall be completed annually (the Annual Report). The Annual Report shall be submitted to the District Manager

and the PLC by no later than April 30 of each year. The Annual Report shall include but not be limited to the following:

a. the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
b. an assessment of the operation and performance of all engineered facilities, any updated drawings for facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
c. site plans showing the existing contours of the Site; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; previously existing site facilities; facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
d. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
e. a calculation of the remaining capacity of the Site and an estimate of the remaining Site life;
f. a summary of the quantity of any leachate or pre-treated leachate removed from the Site or leachate treated and discharged from the Site on a monthly basis;
h. a summary of the monthly, maximum daily and total annual quantity (tonnes) of waste received at the Site.
i. a summary of any complaints received and the responses made;
j. a discussion of any operational problems encountered at the Site and corrective action taken;
k. an update summary of the amount of financial assurance which has been provided to the Director;
l. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
m. a discussion on the sampling results of the ambient air monitoring along the perimeter of the landfill site,a discussion on a comparison between the predicted air quality and actual air quality results and a discussion on whether there is a need for additional mitigation measures to address potential landfill air quality;
n. an assessment of the need to develop and implement contingency plans for control of groundwater, leachate, surface water and landfill gas;
o. any other information with respect to the Site which the Regional Director may require from time to time; and
p. a discussion on the site's compliance with the Conditions in this Approval.

Closure Plan

89. At least 2 years prior to the anticipated date of closure of this Site, the Owner shall submit to the

Director for approval, with copies to the District Manager and the PLC, a detailed site closure plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring, and end use, based on Section 7 in Item 3 in Schedule "A" attached to this Approval. The plan shall include the following:

a. a plan showing Site appearance after closure;
b. a description of the proposed end use of the Site;
c. a descriptions of the procedures for closure of the Site, including:

    i. advance notification of the public of the landfill closure;
    ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
    iii. completion, inspection and maintenance of the final cover and landscaping;
    iv. site security;
    v. removal of unnecessary landfill-related structures, buildings and facilities; and
    vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    vii. a schedule indicating the time-period for implementing sub-conditions i) to vi) above.

d. descriptions of the procedures for post-closure care of the Site, including:

    i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
    ii. record keeping and reporting; and
    iii. complaint contact and response procedures;

e. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas;
f. an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date; and
g. an update of the cost estimates for financial assurance and the amount which has been provided to the Director to date.

90. The Site shall be closed in accordance with the closure plan as approved by the Director.

91. (1) Approval is hereby granted for the construction of temporary berm, temporary leachate pump chamber, and temporary forcemain in Stage 1 of the Site in accordance with Items 32 through 35 in Schedule "A".

(2) Prior to completion of Stage 1 Liner and Leachate Collection System, the Owner shall notify the

District Manager in writing when the permanent leachate pump chamber shall be in operation and the temporary leachate pump chamber and forcemain be decommissioned.

(3) The Design and Operations Report listed as Item 3 in Schedule "A" is hereby amended in accordance with Item 38 in Schedule "A".

Landfill Gas Management System

92. (1) Stage 1 of the landfill gas management system shall be constructed and operated in accordance with the detailed design listed as Items 44 and 46 through 50 in Schedule "A" of this Approval.

(2) Stage 2 of the landfill gas management system shall be constructed and operated in accordance with the detailed design listed as Items 69 and 70 in Schedule "A" of this Approval.

(3) The landfill gas management system shall be constructed and the gas extraction wells shall at least be installed in completed areas where final contours are reached or in interim completed areas that are inactive for over six months, provided such installation is technically feasible.

(4) Within one hundred and twenty (120) days of commissioning of each stages of the gas management system, the Owner/Operator shall submit to the District Manager a construction report detailing the construction activities and any design changes made to the landfill gas system during construction.

(5) The Owner/Operator shall ensure an Operation and Maintenance Manual (Manual) for the gas management system is submitted to the Director, with copies to the District Manager. The Manual shall provide, but not be limited to, details on inspection and maintenance schedules, documentation procedures, shut-down procedures, Ministry contact procedures, flare operations, and maintenance.

(6) Stage 3 of the landfill gas management system shall be constructed and operated in accordance with the detailed design listed as Items 75 and 76 in Schedule "A" of this Approval.

(7) Stage 4 of the landfill gas management system shall be constructed and operated in accordance with the detailed design listed as Items 80 and 81 in Schedule "A" of this Approval.

93. (1) Following commissioning of the Stage 1 landfill gas management system, at least once a year, the Owner shall conduct an evaluation of the effectiveness of the landfill gas collection system and submit to the District Manager. This shall include an assessment of the system design and operational parameters, adequacy of the extraction wells spacing for maximum landfill gas collection coverage; details on the management of the system to satisfy the design parameters and a description of rationale for adjustments to optimize system operation; effectiveness of the condensate management system; and any possible improvements that can be implemented to maximize the landfill gas recovery, etc.

(2) Should there be an indication of inadequate system performance based on regular monitoring

results or the system effectiveness evaluation required in sub-condition (1), the Owner shall forthwith prepare a detailed plan for improvement of the gas collection system and submit to the Director for approval.

94. Any gas extraction well that needs to be replaced due to damage or the well is deemed to be not functioning properly, the Owner/Operator shall replace the gas extraction well within a reasonable time frame of identifying the need for replacement. Any such changes to the gas extraction system shall be documented in the annual report.

95. The annual report submitted to the District Manager shall include an assessment of the operation of the landfill gas collection system, including but not limited to the following:

a) total volume of landfill gases collected during the reporting year expressed in cubic metres and adjusted to standard 25^{0}C, 101.3 kPa;
b) percentage of methane contained in the collected gases expressed as an average value of the total volume of gases collected over the reporting period;
c) a description of any significant maintenance or operational problems encountered and the actions taken for remediation;
d) any changes to the gas collection system implemented over the reporting period including any extensions of the collection system, installation of new extraction wells, replacement wells, and any other extraction wells that have been mothballed or decommissioned;
e) any other changes to the gas collection system implemented over the reporting period;
f) any updates to the inspection and maintenance plan as a result of changes made to the gas collection system during the reporting period; and
g) any updates to the Operation and Maintenance Manual.

Capacity for the East Landfill Soil Temporary Storage Facility

96 The Owner shall ensure that 250,000 cubic metres of volumetric capacity is left available at the Site for the duration of the lifespan of the East Landfill's Soil Temporary Storage Facility (Environmental Compliance Approval no. A120211).

Schedule "A"

This Schedule forms part of this Environmental Compliance Approval"

1. Application for a Provisional Certificate of Approval for a Waste Disposal Site submitted by Niagara Waste Systems Limited requesting approval for a waste disposal site (South Landfill). The application was signed by John Fisher, Vice President and General Manager Niagara Waste Systems dated November 21, 2006.

2. Letter and supporting documentation (EA Decision) dated November 15, 2006 addressed to Mr. John Fisher, Walker Industries from the Honourable Laurel Broten, Minister of the Environment providing the Notice of Approval to proceed with the proposed undertaking as required under the EAA.

3. Report entitled "Proposed Walker South Landfill - Design and Operations Report" prepared by Gartner Lee Limited dated September 2006.

4. Letter dated December 8, 2006 addressed to Mr. John Fisher, Walker Environmental Services from Mr. Dale Gable, Ministry of the Environment providing comments on Financial Assurance.

5. Letter dated January 31, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing groundwater and surface water technical support comments.

6. Letter dated February 6, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Ltd. providing comments and updated calculating for financial assurance.

7. Letter dated February 8, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing comments on the Design and Operations Plan.

8. Letter dated February 12, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems providing responses to the groundwater and surface water comments.

9. Letter dated February 20, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Ltd. providing a response to comments on the Design and Operations Plan.

10. Letter dated March 2, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing comments on the Gas Collection System.

11. Letter dated March 8, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd.

from Mr. Dale Gable, Ministry of the Environment providing District Office comments on the application.

12. Letter dated March 8, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Ltd. providing a response to comments on the gas collection system and financial assurance.

13. Letter dated March 29, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing comments on leachate discharge to the sanitary sewer.

14. Letter dated March 29, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Ltd. providing a response to the District Office comments.

15. Letter dated April 25, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing a response from the Ministry's TSS on NWS responses to groundwater and surface water comments.

16. Letter dated May 8, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems Ltd.providing a response to the April 25, 2007 letter.

17. Letter dated May 22, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing comments on groundwater and surface water trigger mechanisms and leachate discharge to the sanitary sewer.

18. Email dated September 26, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems providing a contingency plan should NWS not meet Regulation 419.

19. Letter dated September 27, 2007 addressed to Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems providing comments on sewer use bylaws, financial assurance and air quality monitoring.

20. Report dated September 27, 2007 entitled "Ambient Air Quality Monitoring Program - Niagara Waste Systems Limited" prepared for Niagara Waste Systems Limited by RWDI Air Inc.

21. Letter dated October 11, 2007 addressed to Ms. Alison Braithwaite, Niagara Waste Systems Ltd. from Mr. Dale Gable, Ministry of the Environment providing comments on the ambient air quality monitoring program.

22. Letter dated October 25, 2007 addressed to Mr. Alison Braithwaite, Niagara Waste Systems Ltd. from Brad Bergeron, RWDI Air Inc. providing a response to the comments on the ambient air quality monitoring program.

23. Email of November 20, 2007 addressed to Mr. Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems providing information on landfill gas air qualify monitoring frequency.

24. Letter dated January 22, 2008 addressed to Dale Gable, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems providing updated financial assurance calculations.

25. Email of January 29, 2008 addressed to Mr. Tes Gebrezghi, Ministry of the Environment from Ms. Alison Braithwaite, Niagara Waste Systems providing a Schedule of Payments table of the combined Financial Assurance Costs for closure, post-closure and contingency costs on a yearly basis until closure. This email included the table as follows:

    i. Table Attachment entitled "FA South by year.doc" prepared on January 29, 2008

26. Detailed Design Drawings for Stage 1 Base Liner and Leachate Collection System, South Landfill Site:
    (1) Drawing No. LF-001 "Existing Conditions and Facility Layout" dated February 10, 2009, prepared by AECOM.

    (2) Drawing No. LF-002 "Grading Plan - Attenuation Layer" dated February 10, 2009, prepared by AECOM.

    (3) Drawing No. LF-003 "Grading Plan - Secondary Leachate Collection System Layer" dated March 26, 2009, prepared by AECOM.

    (4) Drawing No. LF-004 "Piping Layout - Secondary Leachate Collection System Layout" Revision F dated June 8, 2010, prepared by AECOM;

    (5) Drawing No. LF-005 "Grading Plan - Top of Primary Clay Liner" dated February 10, 2009, prepared by AECOM.

    (6) Drawing No. LF-006 "Piping Layout - Primary Leachate Collection System Layout" dated March 26, 2009, prepared by AECOM.

    (7) Drawing No. LF-007 "Typical Details - Liner System for Landfill Base and Side Slopes / Temporary Berm (Cross Sections 'A' and 'B')" Revision F dated June 8, 2010, prepared by AECOM;

    (8) Drawing No. LF-008 "Typical Sections - Temporary Berm Connection Detail / Interim Temporary Berm and Anchor Trench" Revision F dated June 8, 2010, prepared by AECOM;

    (9) Drawing No. LF-009 "Typical Sections - Cross Sections 'D' and 'E' " dated April 3, 2009, prepared by AECOM.

    (10) Drawing No. LF-010 "Typical Details - Details of Base Liner at Toe of Slope Along West and South Side Slopes" Revision F dated June 8, 2010, prepared by AECOM;

(11) Drawing No. LF-011 "Typical Details - Details of Base Liner at Toe of Slope Along East Side Slope / Cross Section 'F' / Detail '24' " Revision F dated June 8, 2010, prepared by AECOM;

(12) Drawing No. LF-012 "Typical Details - Sections and Details for Primary and Secondary Leachate Pump Chambers" dated March 26, 2009, prepared by AECOM.

(13) Drawing No. LF-013 "Typical Details - Primary and Secondary Leachate Pump Chambers / Bedrock Excavation at Top and Toe of Side Slope" Revision F dated June 8, 2010, prepared by AECOM;

(14) Drawing No. LF-014 "Primary Leachate Collection System Cleanout Structures on Base Liner" dated February 10, 2009, prepared by AECOM.

(15) Drawing No. LF-015 "Primary Leachate Collection System Cleanout Structures on Base Liner" dated February 10, 2009, prepared by AECOM.

(16) Drawing No. LF-016 "Temporary Leachate Chamber and Forcemain Plan" Revision C dated July 27, 2009 prepared by AECOM.

(17) Drawing No. LF-017 "Typical Details - Alternative Temporary Berm (Sections 'A' and 'B')" Revision F dated June 8, 2010 prepared by AECOM;

(18) Drawing No. LF-018 "Typical Details - Alternative Temporary Berm with Increased Height (Section 'J')" Revision F dated June 8, 2010 prepared by AECOM;

(19) Drawing No. LF-019 "Temporary Pump Chamber" Revision B dated July 15, 2009 prepared by AECOM.

(20) Drawing No. LF-020 "Typical Details - Hybrid Temporary Berms" Revision F dated June 8, 2010 prepared by AECOM; and

(21) Drawing No. LF-021 "Typical Details - Typical Cleanout Chamber Detail" Revision F dated June 8, 2010 prepared by AECOM.

27. Report entitled "Detailed Design for Stage 1 Liner and Leachate Collection System, South Landfill" dated February 2009, prepared by AECOM.

28. Letter dated March 25, 2009 addressed to Alison Braithwaite, Niagara Waste Systems Limited from Rick Li, Ministry of the Environment providing review comments on detailed design drawings and specifications.

29. Letter dated March 31, 2009 addressed to Rick Li, Ministry of the Environment from Edward San, AECOM providing response to the Ministry's March 25, 2009 letter.

30. Letter dated April 3, 2009 addressed to Rick Li, Ministry of the Environment from Edward San, AECOM providing information on the buffer zone and associated facilities.

31. Letter dated January 5, 2009, from Bradley Cassidy, Environmental Coordinator, Niagara Waste Systems Limited to Brad Ross, Ministry of the Environment providing notification of a change in location of the *Site* entrance/exit.

32. Letter dated July 17, 2009 addressed to Greg Washuta, Ministry of the Environment from Edward San, AECOM Canada Ltd. regarding the revisions to temporary works in the detailed design of Stage 1 Liner and Leachate Collection System.

33. Letter dated July 23, 2009 addressed to Edward San, AECOM from Rick Li, Ministry of the Environment providing comments on the submitted design for temporary works.

34. Letter dated July 27, 2009 addressed to Rick Li, Ministry of the Environment from Edward San, AECOM providing response to the Ministry's July 23, 2009 letter.

35. Updated Specification for Section 3 "Temporary Berm" prepared by AECOM dated July 2009.

36. Letter dated September 23, 2009 addressed to Brad Cassidy, Niagara Waste Systems Limited from Rick Li, Ministry of the Environment providing comments on the temporary use of the East Landfill entrance for access to the South Landfill.

37. Letter dated September 30, 2009 addressed to Rick Li, Ministry of the Environment from Brad Cassidy, Niagara Waste Systems Limited providing response to the Ministry's September 23, 2009 letter.

38. Letter dated September 28, 2009 addressed to Rick Li, Ministry of the Environment from Brad Cassidy, Niagara Waste Systems Limited, regarding the application to amend the Provinsional Certificate of Approval No.0084-78RKAM for the South Landfill pursuant to Condition 91(3) of this Approval and the supporting documentations.

39. Letter dated October 7, 2009 addressed to Rick Li, Ministry of the Environment from Brad Cassidy, Niagara Waste Systems Limited providing response to the Ministry's comments with regard to the storm water management and the traffic assessment.

40. Letter dated December 19, 2008 addressed to Brad Ross, Ministry of the Environment from Bradley Cassidy, Niagara Waste Systems Limited and the attachment regarding the Niagara Waste Systems South Landfill Leachate Contingency Plan.

41. Letter dated February 5, 2010 addressed to Rick Li, Ministry of the Environment from Alison Braithwaite, Niagara Waste Systems Limited and the attached Site Plan regarding the updated Niagara Waste Systems Limited South Landfill Leachate Contingency Plan.

42. Application for a Provisional Certificate of Approval for a Waste Disposal Site regarding modification

to the detailed design for Stage 1 liner and leachate collection system signed by Alison Braithwaite of Niagara Waste System Limited dated June 11, 2010.

43. Letter report dated August 17, 2009 regarding Niagara Waste Systems Limited - South Landfill (SLF) C of A #0084-78RKAM Reasonable Use Contingency Plan prepared AECOM.

44. Report entitled "Stage 1 Major Works Detailed Design Landfill Gas Management, Walker South Landfill Certificate of Approval 0084-78RKAM" dated May 27, 2011 prepared by Comcor Environmental Limited.

45. Letter dated August 3, 2011 addressed to Rick Li, Ministry of the Environment from Scott Hurley, Niagara Waste Systems Limited RE: Certificate of Approval ("CofA") #0084-78RKAM Condition 30 Niagara Waste System Limited South Landfill.

46. Letter dated August 12, 2011 addressed to Scott Hurley, Niagara Waste Systems Limited from Rick Li, Ministry of the Environment providing review comments on the Stage 1 Landfill Gas Management System.

47. Letter dated August 26, 2011 addressed to Rick Li, Ministry of the Environment from Scott Hurley, Niagara Waste Systems Limited providing a response to MOE's August 12, 2011 letter.

48. Letter dated October 6, 2011 addressed to Rick Li, Ministry of the Environment from Scott Hurley, Niagara Waste Systems Limited regarding Stage 1 Phase 2 detailed design and installation details for the cleanout lateral.

49. Letter dated August 26, 2011 addressed to Rick Li, Ministry of the Environment from Shannan P. McGarr, Comcor Environmental Limited regarding radius of influence for gas extraction wells.

50. Detailed design drawing set for the South Landfill Landfill Gas Collection System Stage 1 Construction prepared by Comcor Environmental Limited dated October 4, 2011 that includes the following:
    (1) G101 Existing Site Area Plan
    (2) G102 Phase 1 - Proposed System Layout
    (3) G103 Phase 2 - Proposed System Layout
    (4) G111 Phase 1- Plan and Profile 700ϕ Header Sta 0+000 - 0+475.58
    (5) G112 Phase 1- Plan and Profile 150ϕ Cleanout Lateral
    (6) G113 Phase 2- Plan and Profile 700ϕ Header Sta 0+475.58 - 1+050
    (7) G114 Phase 2- Plan and Profile 700ϕ Header Sta 1+050 - 1+466.22
    (8) G161 Trench Details
    (9) G162 Sections
    (10) G163 Systems Details
    (11) G164 Systems Details

51 Letter dated November 11, 2011 to David Lee, Senior Review Engineer, Ministry of the Environment from Scott Hurley, Environmental Specialist, Niagara Waste Systems Limited.

52 Letter dated January 16, 2012 to Mr. Scott hurley, Environmental Co-ordinator, Niagara Waste Systems Limited from Mr. Rich Vickers, District Manager, Niagara District Office, Minsitry of the Environment. Re: Proposed Changes to the South Landfill Monitoring Program CofA #0084-76RKAM.

53. Report entitled "2011 Financial Assurance Recalculation Report, South Landfill" dated April 2011 prepared by AECOM.

54. Letter dated February 7, 2012 addressed to Scott Hurley, Niagara Waste Systems Limited from Rick Li, Ministry of the Environment providing comments on the Financial Assurance Recalculation.

55. Letter dated February 13, 2012 addressed to Scott Hurley, Niagara Waste Systems Limited from Rick Li, Ministry of the Environment providing additional comments on the Financial Assurance Recalculation.

56. Letter dated February 29, 2012 addressed to Rick Li, Ministry of the Environment from Scott Hurley, Niagara Waste Systems Limited providing a response to MOE comments on the Financial Assurance Recalculation (Items 54 and 55).

57. Letter dated March 8, 2012 addressed to Scott Hurley, Niagara Waste Systems Limited from Rick Li, Ministry of the Environment regarding the Financial Assurance Recalculation.

58. Letter dated April 5, 2012 addressed to Rick Li, Ministry of the Environment from Scott Hurley, Niagara Waste Systems Limited providing revised Financial Assurance Recalculation, and includes the following attachments:

    1) **Table R1:** Revised Annual Post-Closure Care Cost Estimate Excluding Gas Control System (Annual Cost Revised with Updated Leachate Disposal Unit Rate)
    2). **Table R2:** Final Closure Report Cost
    3). **Table B6B:** Revised Post-Closure Care Cost for Landfill Excluding Gas Control System
    4) **Table B8B:** Total Post-Closure Care Cost for Gas Control System
    5) **Table 8B:** Updated Financial Assurance Amount (Revised April 2012)

59. Detailed Drawing Set entitled "Niagara Waste Systems - Stage 2 Base Liner and Leachate Collection System" prepared for Niagara Waste Systems by AECOM (Project No. 60194116) issued November 30, 2012. The set included the following drawings:

    i. Drawing No. ST-2-LF-000 - Cover Sheet
    ii. Drawing No. ST-2-LF-001 "Existing Conditions and Facility Layout" dated November 30, 2012;
    iii. Drawing No. ST-2-LF-002 "Grading Plan - Attenuation Layer" dated November 30, 2012;
    iv. Drawing No. ST-2-LF-003 "Secondary Leachate Collection System Layer" dated November 30, 2012;
    v. Drawing No. ST-2-LF-004 "Existing Conditions and Facility Layout" dated November 30, 2012;

vi. Drawing No. ST-2-LF-005 "Grading Plan - Top of Primary Clay Liner" dated November 30, 2012;
vii. Drawing No. ST-2-LF-006 "Piping Layout - Primary Leachate Collection System Layout" dated November 30, 2012;
viii. Drawing No. ST-2-LF-007 "Typical Details - Sections Through Base Liner System" dated November 30, 2012;
ix. Drawing No. ST-2-LF-008 "Typical Details - Temporary Berm Section "A" and Details" dated November 30, 2012;
x. Drawing No. ST-2-LF-009 "Typical Details - Temporary Berm Section "B" and "C", Interim Berm Detail" dated November 30, 2012;
xi. Drawing No. ST-2-LF-010 "Typical Details - Section "D" and Base Liner Treatment at Toe of Side Slope" dated November 30, 2012;
xii. Drawing No. ST-2-LF-011 "Typical Details - Anchor Trench, Cleanout chambers and Bedrock Excavation Details" dated November 30, 2012;
xiii. Drawing No. ST-2-LF-012 "Typical Sections - Sections "E" and "F" " dated November 30, 2012;
xiv. Drawing No. ST-2-LF-013 "Typical Details - Leachate Collection System Cleanout Structures - Plan Views" dated November 30, 2012;
xv. Drawing No. ST-2-LF-014 "Typical Details - Leachate Collection System Cleanout Structures - Plan Views" dated November 30, 2012; and
xvi. Drawing No. ST-2-LF-015 "Typical Details - Leachate Collection System Cleanout Structures - Sections/Details" dated November 30, 2012.

60. Report entitled "Niagara Waste Systems Limited - Detailed Design for Stage 2 Liner and Leachate Collection System, South Landfill" prepared by AECOM (Project No. 60194116) dated November 2012.

61. Letter dated May 24, 2013 addressed to Mr. Scott Hurley, Walker Environmental Group Inc. from Mr. Dale Gable, Ministry of the Environment providing comments on the Stage 2 detailed design drawings.

62. Letter dated May 30, 2013 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Tim McVicar, Walker Environmental Group Inc. providing clarification on the detailed design drawings for Stage 2.

63. Letter dated July 3, 2013 addressed to Mr. Tesfaye Gebrezghi, Ministry of the Environment from Mr. Scott Hurley, Walker Environmental Group Inc. submitting the design report and design drawings for the surface water control facility for the Site.

64. Design Report entitled "Walker Environmental Group Inc. - Stormwater Management Design Report for the South Landfill in the City of Niagara Falls, Ontario" prepared by AECOM dated April 2013. The design report included the detailed drawing set entitled "Walker Environmental Group Inc. - South Landfill Site - Stormwater Management Pond" prepared for Walker Environmental Group Inc. by AECOM (Project No. 60194116 The set included the following drawings:

i. Drawing No. SWM-1 entitled "Plan and Profile" dated April 17, 2013;

ii. Drawing No. SWM-2 entitled "Cross Sections "A", "B", "C' and "D"" dated April 17, 2013;
iii. Drawing No. SWM-3 entitled "Cross Sections "E", "F", "G" and "H"" dated April 17, 2013;
iv. Drawing No. SWM-4 entitled "Control Flow Structures Hickenbottom Drain - DICB #2, #3, and #4 (Types 1 and 2)" dated April 17, 2013;
v. Drawing No. SWM-5 entitled "Ditches Inlet Details DICB #1 and #5 (Type #3), Culverts #1 and #2" dated April 17, 2013;
vi. Drawing No. SWM-6 entitled "Ditch Inlet Details DICB #1 and #5 (Type 3), Culverts #1 and #2" dated April 17, 2013;
vii. Drawing No. SWM-7 entitled "Typical Section Along South Side of Landfill" dated April 17, 2013;
viii. Drawing No. R01 entitled "Niagara Waste Systems Limited- South Landfill Site - Stormwater Management Pond - Retaining Walls West Headwall at Culvert #1" dated March 28, 2013; and
ix. Drawing No. R02 entitled "Niagara Waste Systems Limited- South Landfill Site - Stormwater Management Pond - Retaining Walls East Headwall at Culvert #2" dated March 28, 2013.

65. Environmental Compliance Approval application dated July 18, 2013 and signed by Mr. Tim McVicar, General Manager requesting amendment to increase the annual rate of fill at the Site.

66. Report dated July 15, 2013 entitled "Walker Environmental Group Inc. - South Landfill Environmental Screening Report for Daily Cover Fill Rate Increase Modification".

67. Letter dated October 9, 2013 addressed to Mr. Tim McVicar, Walker Environmental Group Inc. from Mr. Dale Gable, Ministry of the Environment requesting additional information on traffic patterns, type of cover material and financial assurance.

68. Letter dated October 17, 2013 addresses to Mr. Dale Gable, Ministry of the Environment from Mr. Tim McVicar, Walker Environmental Group Inc. providing additional information on traffic patterns, clarification on cover material and public notification.

69. Letter dated November 5, 2014 addressed to the Director, EAB from Tim McVicar, Walker Environmental Group Inc. submitting an application requesting an emergency amendment to the ECA. The supporting documentation included:

i. Environmental Compliance Approval Application signed by Tim McVicar, WEGI dated November 5, 2014.

70. Figure 1 Revision B entitled "South Landfill Waste Storage - Plan View" prepared by Walker Environmental Group Inc and dated November 20, 2014.

71. Report entitled "Stage 2 Major Works Detailed Design Landfill Gas Management, Walker South Landfill" dated December 15, 2014 prepared by Comcor Environmental Limited.

72. Letter dated December 24, 2015 to Rick Li, Ministry of the Environment and Climate Change from Lesley Clarke, Walker Environmental Group Inc. providing a response to the Ministry's review comments on the detailed design for Stage 2 Landfill Gas Management System.

73. Letter dated August 19, 2015 addressed to Dale Gable, Ministry of the Environment and Climate Change from Lesley Clarke, Walker Environmental Group Inc. regarding Walker Environmental Group - South Landfill Major Works Approval - Stage 3 Liner and Leachate Collection System. The following attachments are included:

    (1) Detailed design drawing set for Stage 3 Base Liner and Leachate Collection System Walker South Landfill, Niagara Falls, Ontario Revision C dated May 30, 2016 prepared by Golder Associates

    (2) Specification for Stage 3 Liner and Leachate Collection System, South Landfill Walker Environmental Group Inc. dated August 2015 prepared by Golder.

74. Letter dated March 24, 2016 addressed to Rick Li, Ministry of the Environment and Climate Change from Lesley Clarke, Walker Environmental Group Inc. providing a response to the ministry's comments on the detailed design for Stage 3 liner and leachate collection system.

75 Application to Amend Environmental Compliance Approval 0084-78RKAM, signed by Tim Murphy, Walker Environmental Group, dated October 14, 2016.

76. Document entitled "Stage 3 Major Works Detailed Design Landfill Gas Management", prepared by Comcor Environmental Limited, dated September 26, 2016.

77. Letter dated January 10, 2018 to Ms. Clarke, Walker Environmental Group from Kim Groombridge, District Manager, Niagara District Office, Ministry of the Environment and Climate Change.

78. Document entitled "ECA No. 0084-78RJKAM - Stage 4 Detailed Design, Walker South Landfill", prpared by Golder Associates Ltd., dated July 20, 2018.

79. Document entitled "2019 Financial Assurance Re-evaluation Report South Landfill", ECA No. 0084-78RKA, prepared by Golder Associates Ltd. on behalf of Walker Environmental Group, dated April 2019.

80. Environmental Compliance Approval application signed by Kerry Meikle, Walker Environmental Group dated September 9, 2020, and the supporting documentation and technical requirements including document entitled "Stage 4 Major Works Detailed Design landfill Gas Management, Walker South Landfill" prepared by Comcor Environmental Limited, dated August 24, 2020, and the drawing set for "Landfill Gas Collection System - Stage 4" dated June 15, 2020.

81. Letter dated May 7, 2021 addressed to Rick Li, Ministry of the Environment, Conservation and Parks from Diana Pepall, Comcor Environmental Limited regarding response to MECP's comments on the detailed design for Stage 4 Landfill Gas Collection Wellfield.

Schedule "B"

This Schedule forms part of this Environmental Compliance Approval. It describes the groundwater monitoring program referred to in Condition No. (83).

B.1 MONITORING PROGRAM OBJECTIVES

The overall goal of the groundwater monitoring program is to detect and assess the effects of the landfill on local water resources. The following objectives have been identified to achieve this goal:

a) to monitor groundwater quality in the shallow weathered zone, the intermediate depth in the overburden, and the bedrock aquifer;

b) to identify and characterize movement of leachate-related contaminants in the overburden and bedrock at the site boundary;

c) to evaluate the effectiveness of the engineered landfill; and

d) to determine the need for implementation of the contingency plan.

B.2 MONITORING PLAN

The groundwater monitoring plan shall be carried out by the Owner to address the stated objectives and will include:

B.2.1 Measurement of Water Levels

Groundwater levels shall be measured in the groundwater monitors listed in Table B1 fours times per year.

B.2.2 Collection of Groundwater Samples and Frequency

Collection of groundwater samples from the following monitors:

Table B1 - Sampling Location, Sampling Periods and Parameter List

Monitoring Well	Mar	Jun	Sept	Dec
Upgradient Groundwater				
17-1	B4D	A4D	B4D	D
17-2	B4D	A4D	B4D	D
17-3	B4D	A4D	B4D	D
19-1	D	A4D(sr)	D	D
19-2	B4D	A4D	B4D	D
19-3	B4D	A4D	B4D	D
40-1	A4D*	D	D	D
40-2	B4D	A4D	B4D	D
46-1	D	A4D(sr)	D	D
46-2	B4D	A4D	B4D	D
46-3	B4D	A4D	B4D	D
47-1R	D	A4D(sr)	D	D
47-2R	B4D	A4D	B4D	D
47-3R	B4D	A4D	B4D	D
53-1	B4D	A4D	B4D	D
53-2	B4D	A4D	B4D	D
53-4	D	A4D(sr)	D	D
Downgradient Groundwater				
MHC2	B2D	A2D	B2D	A2D
MHC2g	B2D	A2D	B2D	A2D
73-1	B4D	A4D	B4D	D
18-1	D	A4D(sr4)	D	D
18-2	B4D	A4D	B4D	D
18-3	B4D	A4D	B4D	D
16-1	B4D	A4D	B4D	D
16-3	B4D	A4D	B4D	D
39-1	A4D*	D	D	D
26-1	A4D*	D	D	D
67-1	A4D*	D	D	D

Notes:
(1) D - Field depth measurement
(2) (sr) - sampled at reduced frequency, every 2-4 years, in conjunction with the East Landfill monitoring schedule, because well is very slow to recover following a sampling event.
(3) * - Sampled annually to coincide with East to Northeast gradient due to annual drainage to canal.
(4) A2, A3, A4, B2, B3, B4 are parameter lists
(5) Irondequiot groundwater samples are to be collected in February instead of March to ensure sampling conditions are obtained under a west to northwest flow direction
(6) (sr4) - sampled at reduced frequency to every 4 years.

B.2.3 Sampling Parameter Lists

Sampling Parameters for A2

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Nitrite	Sulphate	Field Dissolved Oxygen
Chemical Oxygen Demand	Field Temperature	Ammonia
Total Kjeldahl Nitrogen	Total Phosphorus	Arsenic
Barium	Boron	Cadmium
Chromium	Copper	Iron
Lead	Mercury	Zinc
Total Phenols	Biochemical Oxygen Demand	Suspended Solids

Sampling Parameters for B2

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Nitrite	Sulphate	Total Phenols
Chemical Oxygen Demand	Field Temperature	Ammonia
Total Kjeldahl Nitrogen	Total Phosphorus	Iron
Total Suspended Solids	Biochemical Oxygen Demand	Suspended Solids

Sampling Parameters for A4

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Nitrite	Sulphate	Dissolved Organic Carbon
Chemical Oxygen Demand	Ammonia	Total Kjeldahl Nitrogen
Total Phosphorus	Arsenic	Barium
Boron	Calcium	Cadmium
Chromium	Copper	Iron
Lead	Magnesium	Manganese
Mercury	Potassium	Sodium
Zinc	Total Phenols	Benzene
Toluene	Vinyl Chloride	Dichloromethane
1,4-Chlorobenzene		

Sampling Parameters for B4

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Sulphate	Dissolved Organic Carbon	Chemical Oxygen Demand
Ammonia	Barium	Boron
Calcium	Iron	Magnesium
Sodium		

B.3 MONITORING SYSTEM MAINTENANCE

During each monitoring event, the monitoring network shall be visually inspected. Changes in the physical condition of each well will be noted and necessary repairs undertaken. Monitoring wells that are shown to be damaged beyond repair or whose integrity is in doubt will be decommissioned in accordance with current regulations and standard procedures and replaced, if necessary.

B.4 GROUNDWATER TRIGGER MECHANISM

B.4.1 Groundwater Trigger Objective

The objective of the groundwater trigger mechanism is to identify when implementation of the contingency plan (to be submitted for approval by Condition No. 86) is required in order to prevent leachate-impacted groundwater from causing an adverse effect on local water resources.

B.4.2 Trigger Locations

The following monitoring wells shall be used as the trigger monitoring wells locations

73-1, 16-1, 16-3, 18-1, 18-2, 18-3, 26-1, 39-1, 67-1, MHC2 and MHC2g.

B.4.3 Trigger Parameters

The trigger parameters are those listed in Sampling Parameters A4.

Schedule "C"

This Schedule "C" forms part of this Environmental Compliance Approval. It describes the surface water monitoring program referred to in Condition No. (83).

C.1 OBJECTIVES

a) The primary goal of the Surface Water Monitoring Program is to monitor for any landfill-related impairment of surface water above Provincial Water Quality Objectives (PWQOs). Where the concentration of a specific parameter already exceeds the PWQO in background surface waters, the aim is to allow no further deterioration of surface water quality.

b) The secondary goal of the Surface Water Monitoring Program is to verify that the engineered components of the surface water management and leachate collection systems are performing as designed.

C.2 MONITORING PLAN

Surface water monitoring will be conducted to address the stated objectives, through:

a) monitoring the quality of water from the surface water management features to determine whether or not it is acceptable for discharge to the natural environment;

b) visual inspections for evidence of leachate impacts; and

c) monitoring the quality of the Old Welland Canal and Ten Mile Creek upstream and downstream of the landfill.

The water quality at these monitoring locations will determine the need to implement the contingency plan.

C.2.1 Surface Water Monitoring Stations, Schedule and Analyses

C.2.2 Collection of Surface Water Samples and Frequency

Collection of surface water samples from the following locations:

Table C1 - Sampling Location, Sampling Periods and Parameter List

Monitoring Well	Location	Mar	Jun	Sept	Dec
All South Landfill Stormwater Management Ponds ***					
SW2		B2F	A2F	B2F	A2F
WC2		B2	A2	B2	A2
WC6		B2	A2	B2	A2
SW8		B2	A2	B2	A2
SW9**		B2	A2	B2	A2
NWS-A****		B2	B2	B2	B2
NWS -B****		B2	B2	B2	B2

Notes: (1) ** - New Monitoring location.
(2) *** Sampling and monitoring will be conducted in accordance with the ECA for waste water.
(3) **** - a minimum of one sample from the NWS-A and NWS-B shall be collected during SWMP discharge events 14 days in duration or less. A minimum of one sample every two weeks from the SWMP, NWS-A and NWS-B shall be collected during SWMP discharge events greater than 14 days in duration.
(4) A2, A3, A4, B2, B3, B4 are parameter lists

C.2.3 Sampling Parameter Lists

Sampling Parameters for A2

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Nitrite	Sulphate	Field Dissolved Oxygen
Chemical Oxygen Demand	Field Temperature	Ammonia
Total Kjeldahl Nitrogen	Total Phosphorus	Arsenic
Barium	Boron	Cadmium
Chromium	Copper	Iron
Lead	Mercury	Zinc
Total Phenols	Biochemical Oxygen Demand	Suspended Solids

Sampling Parameters for B2

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Nitrite	Sulphate	Total Phenols
Chemical Oxygen Demand	Field Temperature	Ammonia
Total Kjeldahl Nitrogen	Total Phosphorus	Iron
Total Suspended Solids	Biochemical Oxygen Demand	Suspended Solids

C.3 TRIGGER MECHANISMS

C.3.1

The Owner shall follow the trigger mechanism requirements for the Stormwater Management Ponds as detailed under ECA for waste water.

C.3.2 Trigger for Contingency

If concentrations at WC2 exceed applicable regulatory standards (i.e., PQWOs) and the 75th percentile of upstream concentrations at WC6 on two consecutive discharge events and attributed to stormwater discharge from the South Landfill. Should trigger exceedences not be attributable to operations at the South Landfill, Condition 25 of Environmental Compliance Approval No. A120211 shall be undertaken, as well as an assessment of the Southeast Quarry discharge(s) with regards to trigger exceedances.

Schedule "D"

This Schedule forms part of this Environmental Compliance Approval. It describes the leachate monitoring program referred to in Condition No. (83).

D.1 MONITORING PROGRAM OBJECTIVES

The objectives of the leachate monitoring program are to monitor the leachate water quality with respect to compliance with the Region's Sewer Use By-law on an ongoing basis.

D.2 MONITORING PLAN

The groundwater monitoring plan shall be carried out by the Owner to address the stated objectives and will include:

D.2.1 Frequency

Leachate samples from the Leachate Collection System shall be collected three times per year in March (B3) , June (A3) and September (B3).

D.2.2 Sampling Parameter Lists

Sampling Parameters for A3

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Nitrite	Sulphate	Dissolved Organic Carbon
Chemical Oxygen Demand	Ammonia	Total Kjeldahl Nitrogen
Total Phosphorus	Arsenic	Barium
Boron	Calcium	Cadmium
Chromium	Copper	Iron
Lead	Magnesium	Manganese
Mercury	Potassium	Sodium
Zinc	Total Phenols	Benzene
Toluene	Vinyl Chloride	Dichloromethane
1,4-Chlorobenzene	Suspended Solids	Biochemical Oxygen Demand

Sampling Parameters for B3

pH	Conductivity (field and lab)	Total Dissolved Solids
Alkalinity	Chloride	Nitrate
Sulphate	Dissolved Organic Carbon	Chemical Oxygen Demand
Ammonia	Barium	Boron
Calcium	Iron	Magnesium
Sodium	Suspended Solids	Biochemical Oxygen Demand

Schedule "E"

This Schedule forms part of this Environmental Compliance Approval. It describes the financial assurance payments referred to in Condition No. (19).

Payment Date	Cumulative Amount
Current FA Requirement	
By April 30, 2023	$35,695,093
By April 30, 2024	$38,698,864
By April 30, 2025	$41,702,635
By April 30, 2026	$44,706,416
By April 30, 2027	$47,710,188
By April 30, 2028	$50,713,959

The reasons for the imposition of these terms and conditions are as follows:

1. *The reason for Conditions (1), (2), (4), (5), (6), (7), (8), (9), (15), (16), (17), (18), and (46) is to clarify the legal rights and responsibilities of the Owner under this Environmental Compliance Approval.*

2. *The reason for Conditions (3) and (39) is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*

3. *The reason for Conditions (10) and (11) are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*

4. *The reasons for Condition (12) are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Environmental Compliance Approval.*

5. *The reason for Condition (13) is to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*

6. *The reason for Condition (14) is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*

7. *The reasons for Conditions (19), (20) and (21) are to ensure that sufficient funds are available to the Ministry to close the landfill, and to carry out all expected post-closure care activities and any contingencies. Failure to include requirements for financial assurance would not be in the public interest and may result in a hazard or nuisance to the natural environment or any person.*

8. *The reason for Conditions (22), (23), (24) and (25) is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*

9. *The reason for Conditions (26), (27), (28), (29), (30), (31) and (32) is to ensure that the Site is designed, constructed and operated in an environmentally acceptable manner, based on the conceptual design and operations for the Site. Condition (29) has been specifically included to allow for optimization of design for subsequent stages based on operating experience and monitoring results and to ensure that any necessary remedial action is undertaken before landfilling may proceed in the next stage.*

10. *The reason for Condition (33) is to ensure the availability of as-built drawings for inspection and information purposes.*

11. *The reason for Condition (34) and (35) is to confirm that Site conditions are as expected and the Site has been prepared and constructed in accordance with the approved design.*

12. *The reason for Condition (36) is to ensure the Owner keeps the geomembrane in good conditions during installation.*

13. *The reason for Condition (37) is to ensure the geomembrane is supplied and installed as per the design specifications.*

14. *The reasons for Condition (38) is to ensure the liner is not damaged by adjacent quarry blasting operations and that a plan is in place to monitor should blasting and liner construction be adjacent to each other. This is to ensure the long - term health and safety of the public and the environment.*

15. *The reasons for Conditions (40), (67) and (68) is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and that the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.*

16. *The reason for Condition (41) is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.*

17. The reasons for Conditions (42), (43), (44) and (45) is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

18. The reasons for Condition (47) are to minimize the potential for clogging of the drainage layer and to minimize temperature effects on the leachate collection system. Failure to maintain the specified minimum thickness of waste and cover material may result in a decrease in the service life of the drainage layer.

19. The reason for Condition (48) is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

20. The reason for Condition (49) is to specify the approval requirements for use of alternative cover material at the Site.

21. The reason for Conditions (50), (51), (52) and (54) is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.

22. The reason for Condition (53) is to ensure the owner calls the Spills Action Centre in the event of a spill.

23. The reason for Condition (55) is to identified the landfill staging as per the submitted information by the Owner.

24. The reasons for Condition (56) is to ensure surface water on is managed in an acceptable manner at the site. This is to ensure the long-term health and safety of the public and the environment.

25. The reasons for Conditions (57), (58), (59), (60), (65) and (66) are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

26. The reasons for Conditions (61) are to specify the normal hours of operation for the landfill Site and provide a mechanism for amendment of the hours of operation.

27. The reasons for Conditions (62), (63) and (64) are to specify site access to/from the Site

and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

28. *The reason for Condition (65) and (66) is to ensure the Owner has a sign at the entrance of the site to ensure the public are fully aware of important information and restrictions related to Site operations under this Approval.*

29. *The reasons for Condition (68) are to minimize the potential for clogging of leachate collection pipes and to ensure effective operation of the leachate collection system components for as long as they are required. Failure to clean out these components on a regular basis may result in a decrease in their service lives. Regular cleaning of the leachate collection pipes is especially important during stages of landfilling when the level of both organic and inorganic constituents in the leachate is high and, consequently, the potential for clogging due to encrustation is greatest. As the landfill reaches the more stable methane producing stage, pipe cleaning may be required less frequently.*

30. *The reason for Condition (69) is to ensure an established plan is in place to for all employees pertaining to the site operation.*

31. *The reasons for Conditions (70), (71), (72), (73), and (74) are to ensure that there is a person, reporting directly to the Ministry, with associated costs reimbursed by the Owner, who is responsible for inspecting the Site, based on the requirements in this Approval to ensure that the Site is operated in an environmentally acceptable manner.*

32. *The reason for Condition (75) is to ensure that the Ministry is notified of the date on which the Site opens for receipt of waste.*

33. *The reasons for Conditions (76), (77), (78) and (79) are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Approval, the EPA and its regulations.*

34. *The reason for Condition (80) is to ensure the Owner has a contingency plan to address leachate management should the Owner no longer be permitted to discharge leachate into the sanitary sewer.*

35. *The reasons for Conditions (81) and (82) is to ensure landfill gas at the site is monitored and any landfill gas management systems meet current standards. This is to ensure the long-term health and safety of the public and the environment.*

36. *The reasons for Condition (83) is to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*

37. *The reasons for Condition (84) is to ensure any changes to the environmental monitoring plan are recognized in the Approval.*

38. *The reasons for Condition No. (85), (86) and (87) is to ensure the Owner has an established set of procedures and plans to address groundwater and surface water compliance exceedances. This is to ensure the health and safety of the public and the environment.*

39. *The reasons for Conditions (88) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report and compliance report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*

40. *The reasons for Conditions (89) and (90) are to ensure that final closure of the Site is completed in accordance with ministry requirements, an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.*

41. *The reasons for Condition 91 is to approve the construction of temporary facilities in Stage 1 and acknowledge revisions to the Design and Operations Report.*

42. *The reason for Condition 92 is to approve the detailed design of Stage 1 landfill gas management system submitted under Condition 30 of this Approval, and to ensure the construction activities are documented and the system operation and maintenance manual is prepared following construction.*

43. *The reason for Condition 93 is to ensure the gas collection system is operated as designed and any deficiency is identified and improvement measures be implemented promptly.*

44. *The reason for Condition 94 is to ensure damaged or non-functioning gas wells be replaced promptly.*

45. *The reason for Condition 95 is to specify the information regarding the gas management system to be included in the annual report and to ensure compliance with the Ministry's requirement on annual operations.*

46. *The reason for Condition 96 is To ensure that adequate capacity is left available at the Site as a means of a contingency measure for the East Landfill's Soil Temporary Storage Facility.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 0084-78RKAM issued on May 22, 2021

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon

me and the Ontario Land Tribunal within 15 days after receipt of this notice, require a hearing by the Tribunal. Section 142 of the *Environmental Protection Act* provides that the notice requiring the hearing ("the Notice") shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the *Environmental Protection Act,* a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

Registrar*
Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5
OLT.Registrar@ontario.ca

and

The Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.oltt.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the *Environmental Protection Act.*

DATED AT TORONTO this 23rd day of March, 2023

Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

RL/
c: District Manager, MECP Niagara
Rushan Galagoda, Walker Environmental Group Inc.

APPENDIX D

Permit to Take Water No. 3612-CMTM5V

AMENDED PERMIT TO TAKE WATER
Ground Water
NUMBER 3612-CMTM5V

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

Walker Aggregates Inc.
Post Office Box 100
Thorold, Ontario, L2V 3Y8
Canada

For the water taking from: Four excavated ponds and NWS Drainage System

Located at: Lot 30, Concession N/A, Geographic Township of Stamford
Niagara Falls, Regional Municipality of Niagara

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment, Conservation and Parks.

(d) "District Office" means the Niagara District Office.

(e) "Permit" means this Permit to Take Water No. 3612-CMTM5V including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means Walker Aggregates Inc..

(g) "OWRA " means the *Ontario Water Resources Act,* R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated May 24, 2022 and signed by Kerry Meikle, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person without the Director's written consent.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change.

2. General Conditions and Interpretation

2.1 Inspections
The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act,* S. O. 2002.

2.2 Other Approvals
The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act*, and the *Environmental Protection Act*, and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **August 31, 2032**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Four excavated ponds and NWS Drainage System	Pond Quarry	Pits and Quarries	Dewatering	10,000	24	14,400,000	365	17 648530 4777190
						Total Taking:	14,400,000		

3.3 The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized for the purposes specified in Table A.

3.4 Notwithstanding Condition 3.3, the Permit Holder is not restricted on the rate or amount of water takings within the quarry floor for use in the quarry floor for dust suppression, vehicle washing, aggregate washing and for internal drainage management, provided that the water is used or re-circulated within the quarry floor.

4. Monitoring

4.1 Under section 9 of O. Reg. 387/04, and as authorized by subsection 34(6) of the *Ontario Water Resources Act* , the Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit, or as otherwise accepted by the Director. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31st in every year, the records required by this condition to the ministry's Water Taking Reporting System.

4.2 The Permit Holder shall implement the Monitoring, Trigger, and Mitigation Plan in accordance with **Item 1** and **Item 2 of Schedule A**.

4.3 The Permit Holder shall collect surface water quality samples at established monitoring stations STN1, STN2 and STN4 in accordance with **Item 1** of **Schedule A** and **Item 3** (Figure 1) in **Schedule A**. Samples shall be analyzed for the parameters identified in **Item 1** (Table C) in **Schedule A**. Samples shall be collected semi-annually, in accordance with the methods outlined in **Item 3** of **Schedule A**.

4.4 The Permit Holder shall implement the residential water well monitoring program in accordance with **Item 1** (Table A) in **Schedule A**.

4.5 The Permit Holder shall submit to the Director, an annual monitoring report, prepared by a licensed Professional Geoscientist, or Professional Engineer, specializing in hydrogeology which includes and interprets all monitoring data collected as condition of this report. The report shall also document all interference complaints along with any mitigative measures that were taken. This report shall be submitted to the Director on or before April 30 of each year and include the monitoring data for the 12-month period ending December 31 of the previous year.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, as amended, provides that the Notice requiring the hearing shall state:

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

a. The name of the appellant;
b. The address of the appellant;
c. The Permit to Take Water number;
d. The date of the Permit to Take Water;
e. The name of the Director;
f. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
*Registrar**
Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5
OLT.Registrar@ontario.ca

AND

The Director, Section 34.1,
Ministry of the Environment, Conservation and Parks
Floor 1, 135 St Clair Ave W
Toronto, ON
M4V 1P5

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at	by Fax at	by e-mail at
(416) 212-6349	(416) 326-5370	www.ert.gov.on.ca
Toll Free 1(866) 448-2248	Toll Free 1(844) 213-3474	

This Permit cancels and replaces Permit Number 6547-CHLN5P, issued on 2022/08/31.

Dated at Toronto this 9th day of January, 2023.

Gregory Meek
Director, Section 34.1
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule "A" forms part of Permit To Take Water 3612-CMTM5V, dated January 9, 2023.

1. Letter Report, *Subject: Walker Brothers Quarry – Consolidated Monitoring, Trigger and Mitigation Plan PTTW No. 6547-CHLN5P Walker Aggregates Inc* ., prepared by WSP Canada Inc., signed by Kevin Fitzpatrick, P.Eng. and Craig Leger, C.E.T., dated December 23, 2022.

2. Letter Report, *Subject: Updated Trigger and Mitigation Plan and Administrative Amendment Southeast Quarry, Walker Aggregates Inc . Permit to Take Water 6547-CHLN5P* , prepared by WSP Canada Inc., signed by Kevin Fitzpatrick, P.Eng. and Craig Leger, C.E.T., dated October 26, 2022.

3. Report, *Walker Aggregates Inc., 2021 Walker Brothers Quarry Aggregate License, Environmental Compliance Approval for Industrial Sewage Works and Permit to Take Water Annual Monitoring Report,* prepared by Urban & Environmental Management Inc., signed by Greg Taras, RPP, dated March 29, 2022.

4. Report, *2012 Walker Brothers Quarry Permit to Take Water – Mitigation Plan* , prepared by AECOM, dated November 2012, Reference AECOM 60241889.

5. Report, *2009 Walker Brothers Quarry Aggregate Licence and Permit to Take Water Monitoring Report,* prepared by AECOM, dated March 2010, Reference AECOM 60145460.

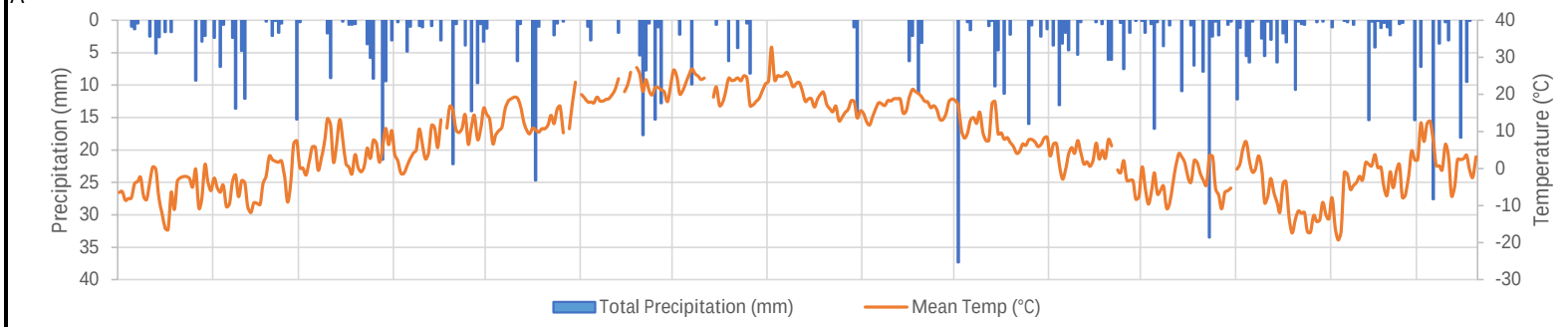
6. Report, *Supporting Documentation for Permit to Take Water No. 4750-8CDJ3J Renewal Application* , prepared by AECOM, dated May 2012.

APPENDIX E

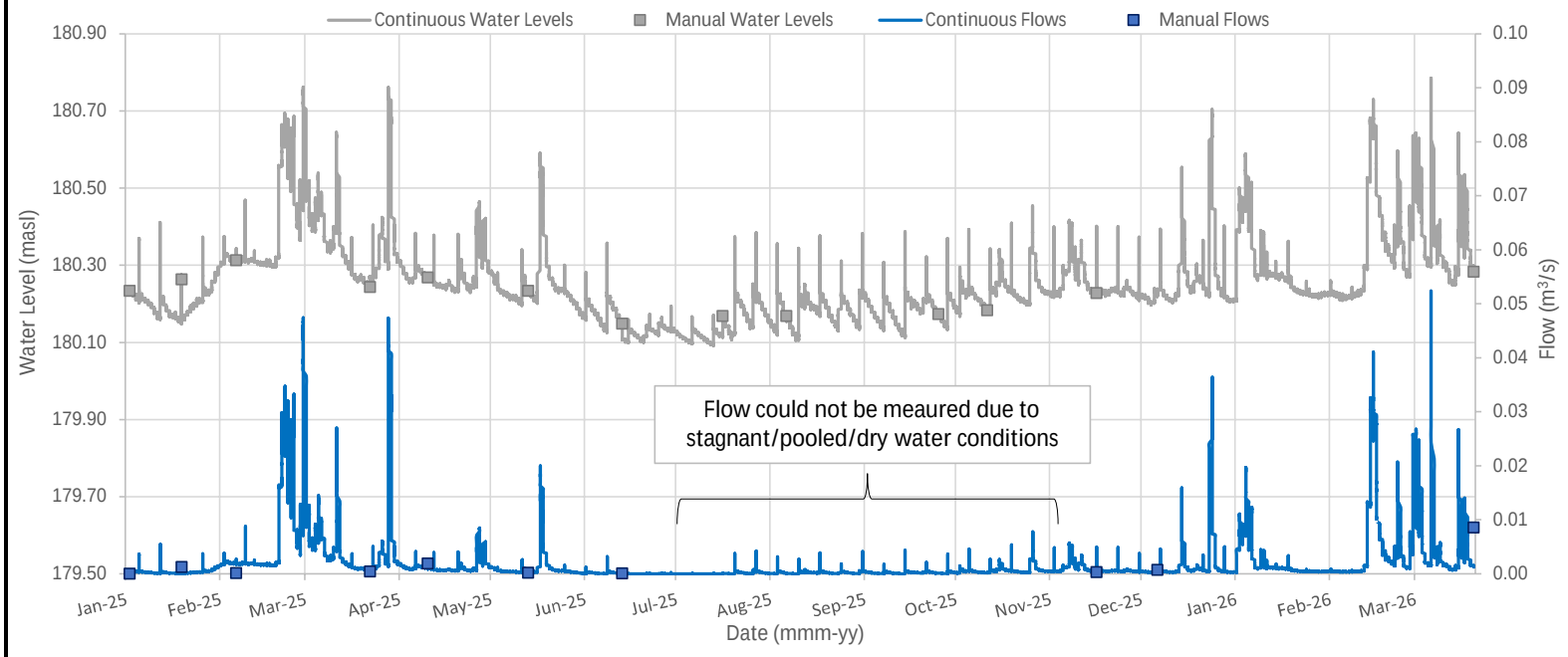
Continuous Water Level and Flow

2025-2026 Continuous Water Levels at US Ten Mile Creek	FIGURE E-1

A



B



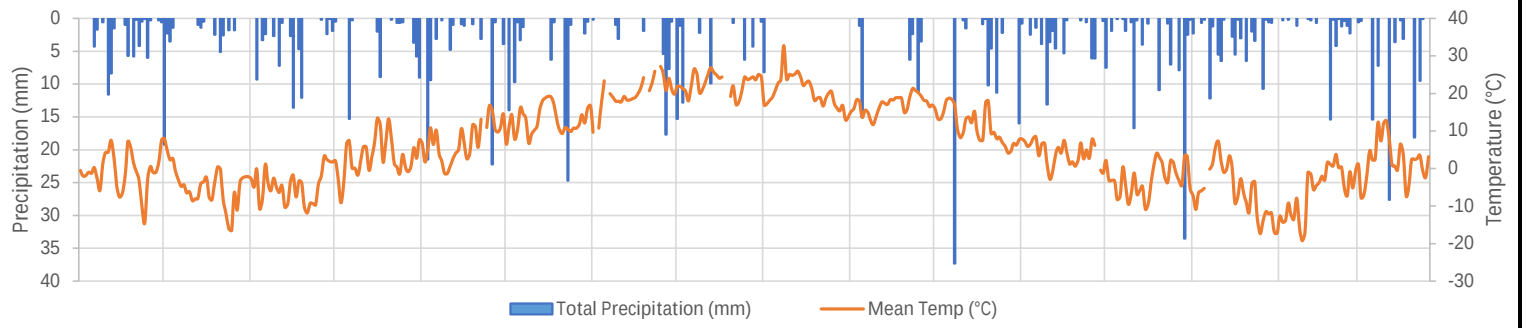
A. Total Daily Precipitation and Mean Daily Temperature (Welland-Pelham, ON, EC Climate ID#6139449) B. Continuous Water Levels & Flows

PROJECT: CA0065457.5367
DATE: April 2026

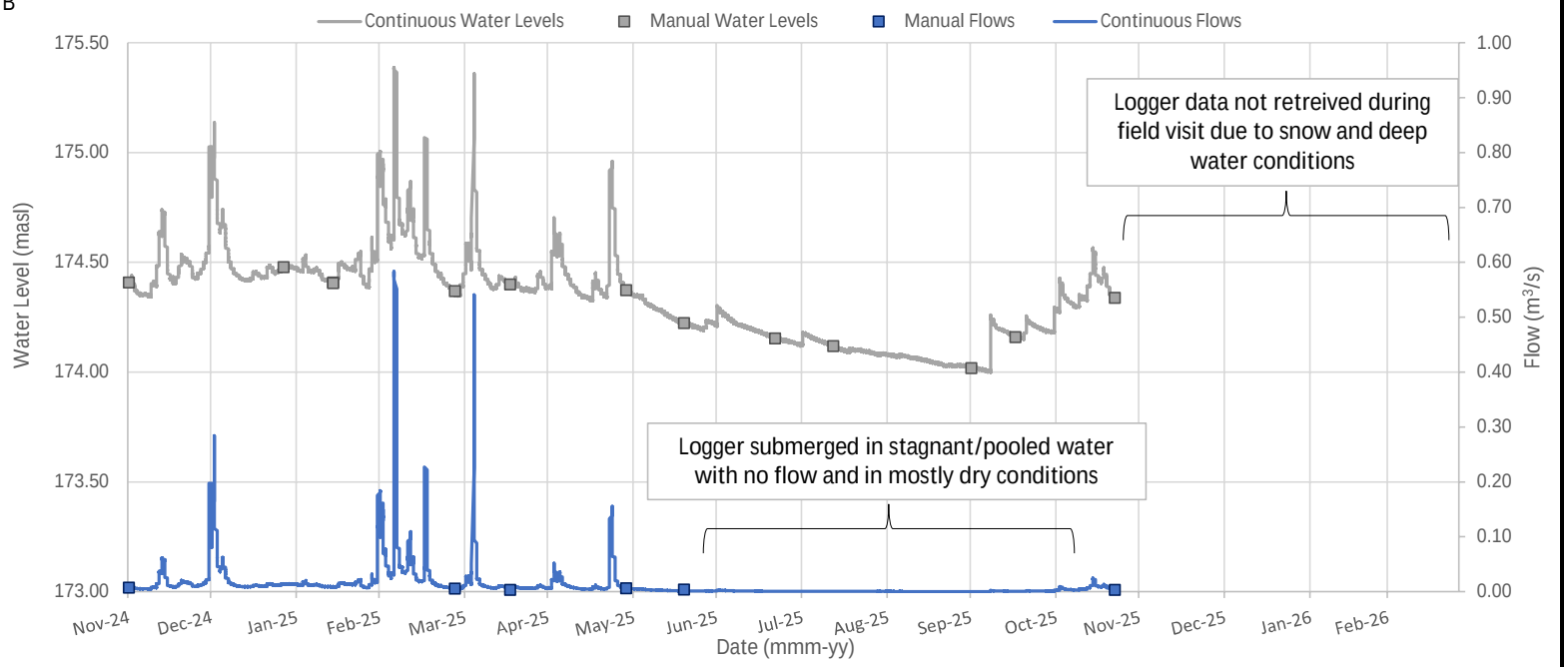
DRAWN: MA
CHECK: MS

2025-2026 Continuous Water Levels at SW8	FIGURE E-2

A



B

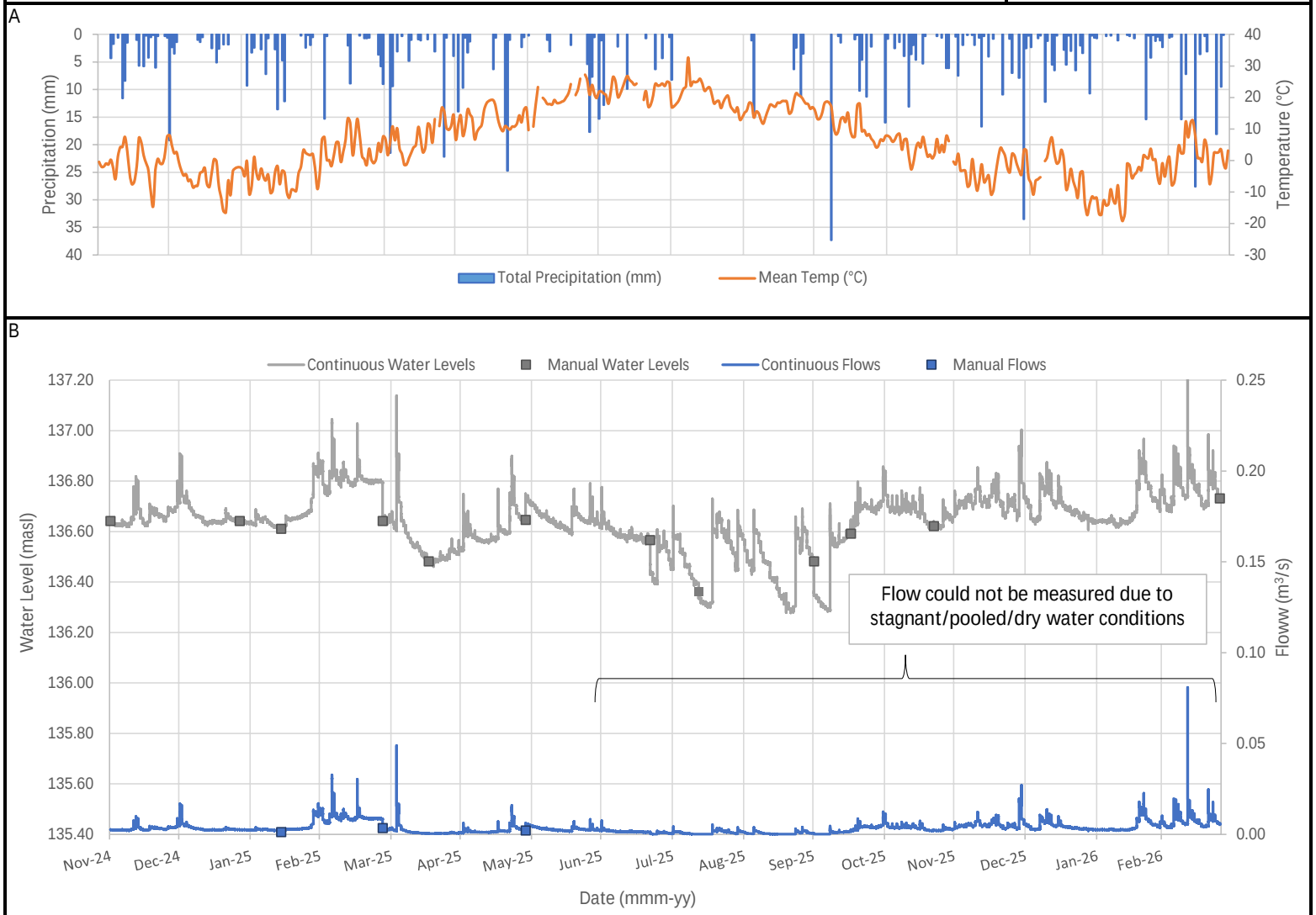


A. Total Daily Precipitation and Mean Daily Temperature (Welland-Pelham, ON, EC Climate ID#6139449) B. Continuous Water Levels & Flows

PROJECT: CA0065457.5367
DATE: April 2026

DRAWN: MA
CHECK: MS

2025-2026 Continuous Water Levels at STN1 | FIGURE E-3



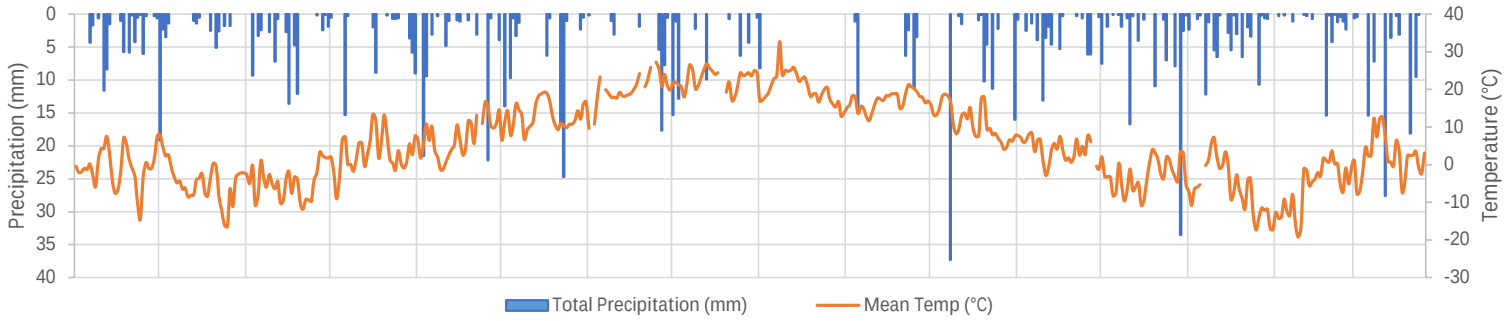
A. Total Daily Precipitation and Mean Daily Temperature (Welland-Pelham, ON, EC Climate ID#6139449) B. Continuous Water Levels & Flows

PROJECT: CA0037248.1905
DATE: April 2026

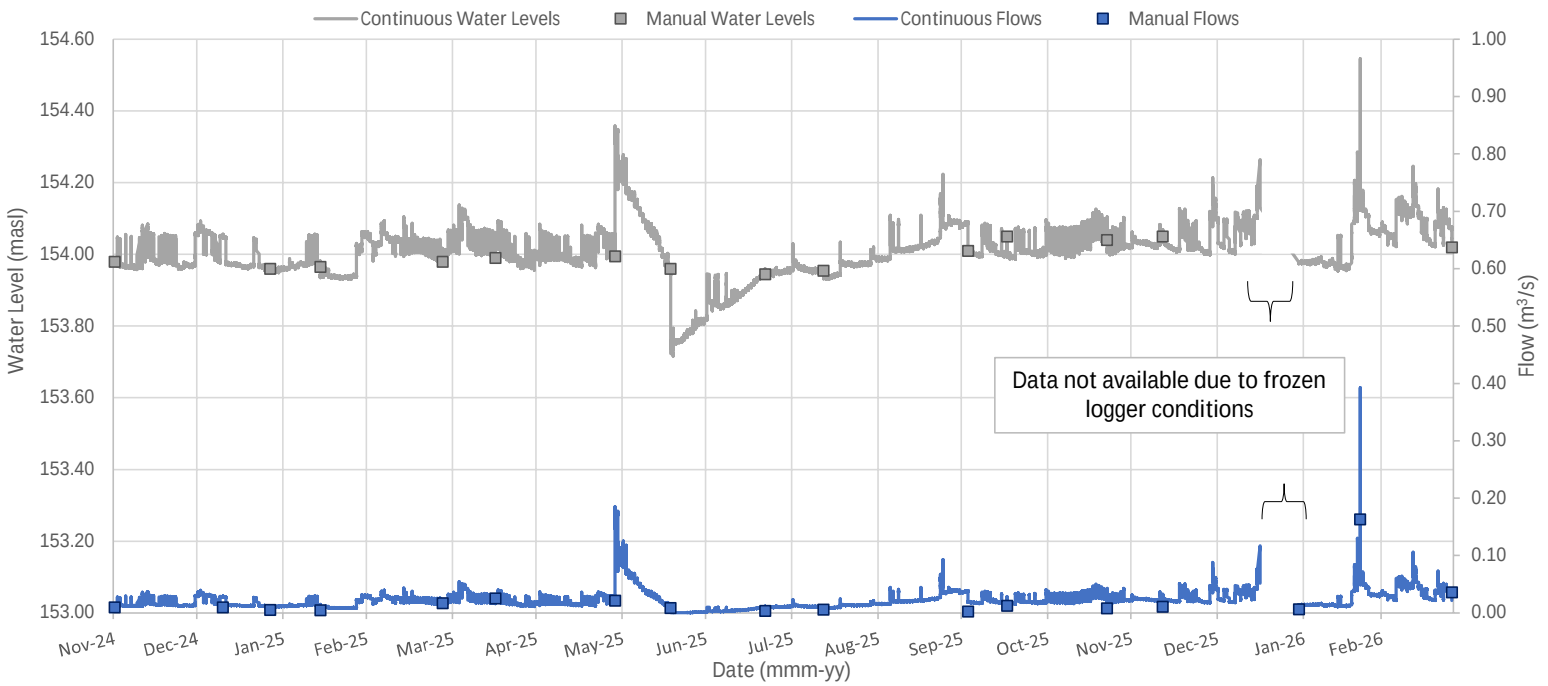
DRAWN: MA
CHECK: MS

2025-2026 Continuous Water Levels at SW2	FIGURE E-4

A



B



A. Total Daily Precipitation and Mean Daily Temperature (Welland-Pelham, ON, EC Climate ID#6139449) B. Continuous Water Levels & Flows

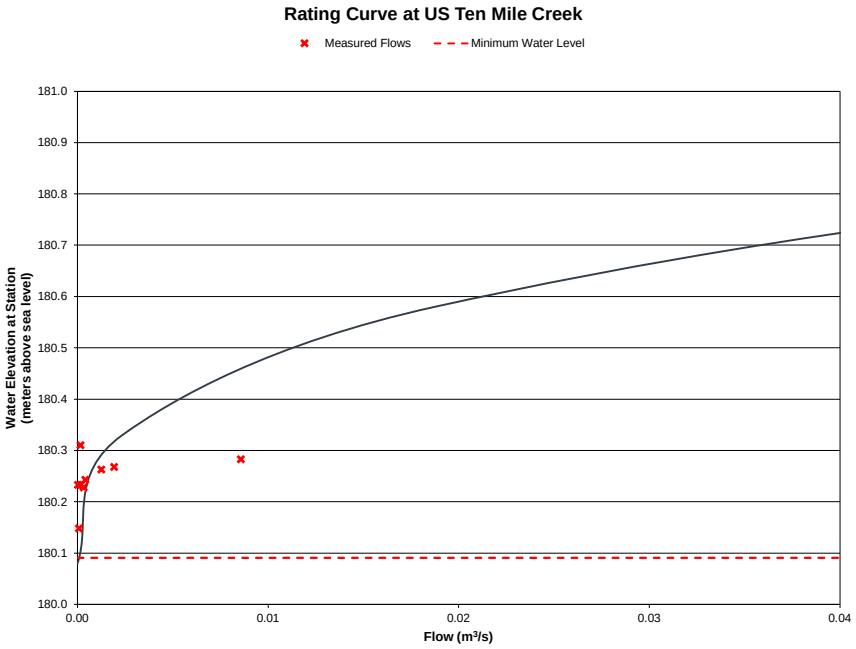
PROJECT: CA0065457.5367
DATE: April 2026

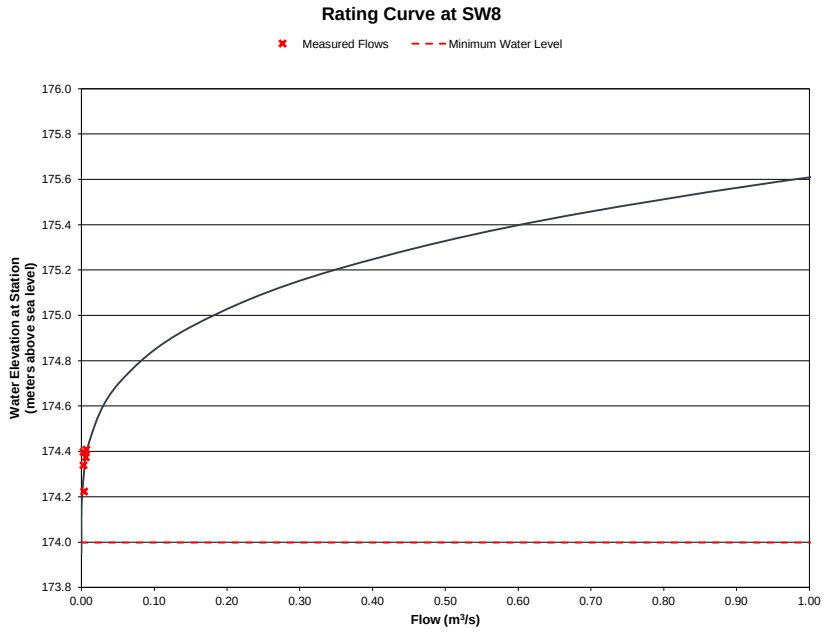
DRAWN: MA
CHECK: MS

APPENDIX F

Stage-Discharge Rating Curves

2025-2026 Stage-Discharge Rating Curves at US Ten Mile Creek and SW8	FIGURE F-1

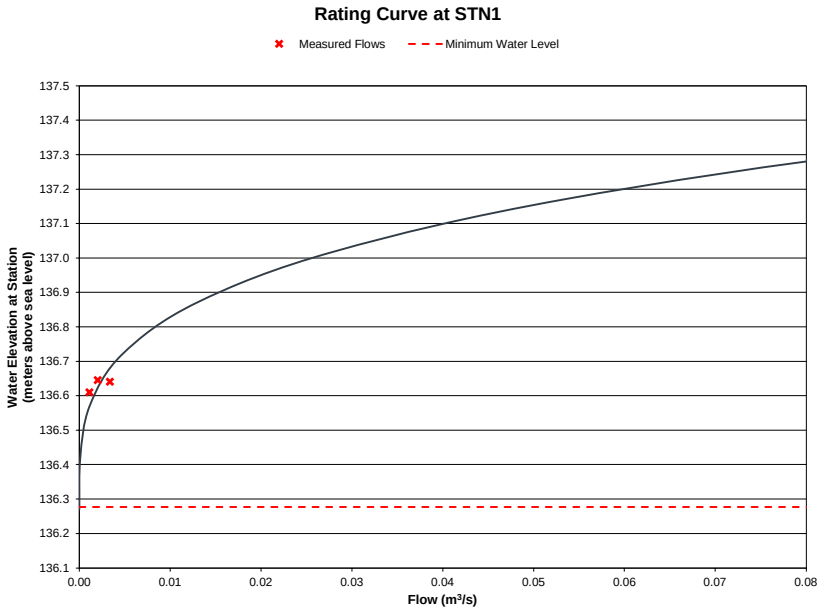


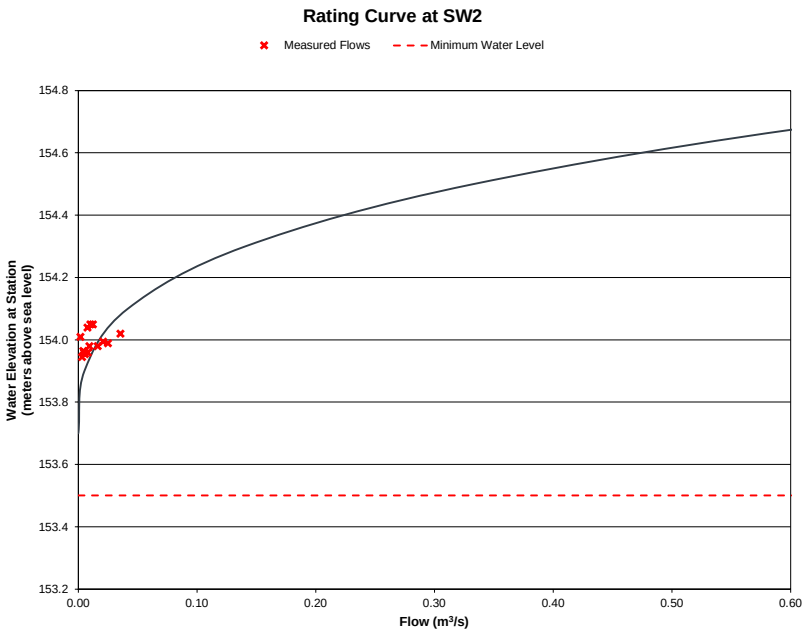


PROJECT NO: CA0065457.5367
DATE: April 2026

DRAWN: MA
CHECK: MS

2025-2026 Stage-Discharge Rating Curves at STN1 and SW2	FIGURE F-2





PROJECT NO: CA0065457.5367
DATE: April 2026

DRAWN: MA
CHECK: MS

APPENDIX G

Water Quality Monitoring Results

Table G-1: Field Water Quality Results

Parameter	Units	Provincial Water Quality Objectives	Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG)		UPSTREAM TEN MILE CREEK (Ten Mile Creek)				STN4 (Tributary of Six Mile Creek)				STN2 (Tributary of the Welland Canal North 1)				SUMP -				STN1 (Tributary of the Welland Canal North 2)				
			Aquatic (Long Term)	Aquatic (Short Term)	15-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	15-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	15-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	15-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	15-Apr-25	28-May-25	17-Jun-25	30-Sep-25	11-Dec-25
Field Measurements																									
pH	-	6.5-8.5	6.5-9.0	-	7.83	8.19	(a)	7.85	8.10	(b)	(b)	(b)	8.03	(b)	(b)	(b)	8.1	8.3	7.99	(c)	7.99	8.08	8.22	7.55	(a)
Tempature	°C	-	-	-	7.9	19.51	(a)	0.023	8.52	(b)	(b)	(b)	8.67	(b)	(b)	(b)	8.68	23.52	19.7	(c)	9.94	13.77	19.41	17.36	(a)
Turbidity	NTU	-	-	-	12.26	24.34	(a)	6.87	3.87	(b)	(b)	(b)	1.79	(b)	(b)	(b)	17.48	3.62	4.09	(c)	0.98	23.40	14.84	9.35	(a)
Dissolved Oxygen	mg/L	5.0-8.0	-	-	7.85	4.32	(a)	11.25	9.05	(b)	(b)	(b)	9.98	(b)	(b)	(b)	9.7	10.59	13.05	(c)	6.98	7.53	5.66	0.8	(a)
Dissolved Oxygen Saturation	%	-	-	-	61.0	43.60	(a)	79.29	72.6	(b)	(b)	(b)	80.5	(b)	(b)	(b)	80.53	110.08	132	(c)	58.43	73.30	54.06	7.46	(a)
Specific Conductivity	µS/cm	-	-	-	1940	447.55	(a)	637.3	550.1	(b)	(b)	(b)	2822	(b)	(b)	(b)	2114	2589.4	3135.1	(c)	1014.8	1010.5	1142.7	908.52	(a)

Note(s):

1 – Denotes values that are above the PWQOs.

1 – Denotes values that are above the CCME

(a) - Denotes station data with pooled/stagnent conditions

(b) - Denotes station data with dry conditions

(c) -Denotes no data collected due to frozen or unsafe conditions

Table G-1: Field Water Quality Results

Parameter	Units	Provincial Water Quality Objectives	Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG)		SW2 (Site Groundwater and Stormwater Discharge to the Old Welland Canal)				WC2 (Old Welland Canal)				WC6 (Old Welland Canal)				SW8 (Ten Mile Creek)				US WELLAND CANAL (Welland Canal)		
			Aquatic (Long Term)	Aquatic (Short Term)	15-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	16-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	17-Jun-25	30-Sep-25	11-Dec-25
Field Measurements																							
pH	-	6.5-8.5	6.5-9.0	-	7.89	8.01	7.91	7.72	8.77	8.49	8.69	8.54	8.74	8.77	8.81	8.83	8.18	8.14	[a]	7.98	8.65	8.43	8.58
Tempature	°C	-	-	-	12.53	19.62	19.6	14.61	6.25	17.77	22.19	1.34	4.21	18.15	19.4	1.57	8.25	16.81	[a]	0.02	18.22	20.54	0.83
Turbidity	NTU	-	-	-	2.04	17.20	17.04	7.39	8.61	5.61	1.31	24.4	2.15	4.56	0	8.3	14.57	98.76	[a]	0	4.55	3.53	5.77
Dissolved Oxygen	mg/L	5.0-8.0	-	-	7.98	6.94	7.86	-	11.38	8.08	9.46	14.63	11.72	8.52	9.46	-	8.18	5.25	[a]	11.12	8.54	8.67	14.37
Dissolved Oxygen Saturation	%	-	-	-	71.8	68.52	79.77	-	86.60	76.44	99.35	106.9	85.07	80.40	94.35	-	66.25	48.40	[a]	78.58	81.33	88.27	103.16
Specific Conductivity	µS/cm	-	-	-	3371.6	4317	5174.6	4376	333.1	336.74	309.95	310.3	289.5	303.2	298.91	266.4	1501.1	1305.3	[a]	1480.9	294.34	293.77	309.98

Note(s):

1 – Denotes values that are above the PWQOs.

1 – Denotes values that are above the CCME

(a) - Denotes station data with pooled/stagnent conditions

(b) - Denotes station data with dry conditions

(c) -Denotes no data collected due to frozen or unsafe conditions

Parameter	Units	Provincial Water Quality Objectives	Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG)		Environmental Protection Act Ontario Regulation 232/98	Environmental Protection Act Ontario Regulation 347	UPSTREAM TEN MILE CREEK (Ten Mile Creek)			STN4 (Tributary of Six Mile Creek)	STN2 (Tributary of the Welland Canal North 1)	SUMP (-)			STN1 (Tributary of the Welland Canal North 2)		SW2 (Site Groundwater and Stormwater Discharge to the Old Welland Canal)				WC2 (Old Welland Canal)				WC6 (Old Welland Canal)				SW8 (Ten Mile Creek)			US WELLAND CANAL (Welland Canal)			ELEVEN MILE CREEK (Eleven Mile Creek)
			Aquatic (Long Term)	Aquatic (Short Term)			15-Apr-25	17-Jun-25	11-Dec-25	15-Apr-25	15-Apr-25	15-Apr-25	17-Jun-25	30-Sep-25	15-Apr-25	17-Jun-25	15-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	16-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	11-Dec-25	17-Jun-25	30-Sep-25	11-Dec-25	25-Mar-26
GENERAL PARAMETERS																																			
Field pH	pH	6.5-8.5	6.5-9.0	-	-	-	7.83	8.19	7.85	8.1	8.03	8.1	8.3	7.99	7.99	8.22	7.89	8.01	7.91	7.72	8.77	8.49	8.69	8.54	8.74	8.77	8.81	8.83	8.18	8.14	7.98	8.65	8.43	8.58	-
Field Temperature	Celsius	-	-	Narrative	-	-	7.9	19.51	0.023	8.52	8.67	8.68	23.62	19.70	9.94	19.41	12.53	19.62	19.60	14.61	6.25	17.77	22.19	1.34	4.21	18.15	19.40	1.57	8.25	16.81	0.02	18.22	20.54	0.83	-
Lab pH	pH	6.5-8.5	6.5-9.0	-	-	-	8.02	7.97	8.14	8.08	8.14	7.99	8.05	7.86	8.1	8.16	7.99	7.97	7.73	8	8.2	8.21	8.39	8.17	7.98	8.32	8.03	8.18	7.99	8.12	7.95	8.22	8.16	8.14	7.71
Bicarb. Alkalinity	mg/L as CaCO3	-	-	-	-	-	-	-	-	-	-	-	-	130	-	-	-	-	300	-	-	-	98	-	-	-	110	-	-	-	-	-	95	-	-
Carb. Alkalinity	mg/L as CaCO3	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	1.5	-	-	-	2.3	-	-	-	1.1	-	-	-	-	-	1.3	-	-
Total Alkalinity	mg/L as CaCO3	-	-	-	-	-	200	110	150	220	390	140	110	130	260	440	220	300	300	250	100	99	100	110	94	100	110	100	200	280	180	98	96	110	87
Salinity	-	-	-	-	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	2	3	<2	<2	<2	<2	<2	<2	<2	2	<2	<2	<2	<2	<2	<2	<2	-
Turbidity	NTU	-	-	-	-	-	10	17	7.3	1.1	0.5	3.1	1	2.8	0.6	15	3.6	6	8.3	6.3	1.8	2.8	1.4	4	1.7	2	1.3	3.7	8.1	77	1.2	1.7	1.7	5.9	37
Total Dissolved Solids	mg/L	-	-	-	-	-	1010	255	815	280	1540	1530	1900	2200	615	930	2170	2980	-	2990	185	180	160	150	145	190	-	150	795	735	940	160	150	135	180
Total Suspended Solids	mg/L	-	-	-	-	-	12	18	<10	<10	11	<10	<10	7	<10	26	<10	11	8	12	<10	<10	3	<10	<10	<10	3	<10	<10	37	<10	<10	6	13	11
Hardness (CaCO3)	mg/L	-	-	-	-	-	320	150	320	260	550	920	1000	1300	400	580	1000	1400	1700	1300	130	130	120	130	120	120	120	130	340	370	430	120	120	130	110
Dissolved Organic Carbon	mg/L	-	-	-	-	-	10	5.1	7.5	2.3	2.8	1.4	2	2.1	6.9	5.3	3.3	2.5	2.5	3.3	2	2.2	2.4	2.1	2	2.1	2.2	2.1	9.4	13	6.4	2.1	2.3	2.1	8.3
Total Organic Carbon (TOC)	mg/L	-	-	-	-	-	11	6	8.1	2.4	3	1.4	2.2	2.1	7.5	6.6	3.4	2.8	2.7	3.5	2.1	2.5	2.3	2.2	2.1	2.4	2.3	2.1	10	15	6.4	2.5	2.2	2.2	9.3
Conductivity	umho/cm	-	-	-	-	-	1900	440	1500	550	2700	2100	2600	3200	1100	1500	3300	4200	5000	4600	340	320	320	340	290	300	290	320	1500	1300	1600	300	300	330	310
Dissolved Oxygen	mg/L	-	-	-	-	-	8.5	7.28	7.54	9.61	10.5	10.2	11	9.2	8.1	6.99	8.93	7.92	8.57	10	11.6	9.14	9.04	11.3	11.9	9.29	9.77	11.5	8.88	5.14	9.55	9.35	9.08	11.1	8.65
ANIONS & NUTRIENTS																																			
Langelier Index (@ 20C)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.837	-	-	-	-	1.11	-	-	-	0.559	-	-	-	0.218	-	-	-	-	-	0.302	-	-0.309
Langelier Index (@ 4C)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.594	-	-	-	-	0.869	-	-	-	0.308	-	-	-	-0.033	-	-	-	-	-	0.051	-	-0.559
Saturation pH (@ 20C)	-	-	-	-	-	-	-	-	-	-	-	-	-	7.02	-	-	-	-	6.62	-	-	-	7.83	-	-	-	7.82	-	-	-	-	-	7.86	-	8.02
Saturation pH (@ 4C)	-	-	-	-	-	-	-	-	-	-	-	-	-	7.27	-	-	-	-	6.86	-	-	-	8.08	-	-	-	8.07	-	-	-	-	-	8.11	-	8.27
Dissolved Chloride	mg/L as Cl-	-	-	-	-	-	400	31	300	24	510	140	210	310	80	140	500	660	850	830	25	19	19	20	17	16	16	16	260	180	230	16	15	19	29
Fluoride (F-)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.55	-	-	-	-	0.72	-	-	-	0.11	-	-	-	0.13	-	-	-	-	-	<0.10	-	-
Nitrate	mg/L	-	13	550	-	-	<0.10	<0.010	0.3	<0.10	0.19	0.91	0.01	0.34	<0.10	0.012	1.64	0.034	0.113	2.81	0.16	<0.010	<0.10	0.19	0.14	<0.010	<0.010	0.17	<0.10	<0.010	<0.010	<0.010	<0.10	0.18	<0.010
Nitrite	mg/L	-	0.197	-	-	-	<0.010	0.12	<0.010	<0.010	<0.010	<0.010	0.38	<0.010	<0.010	0.11	0.018	1.81	**2.25**	0.026	<0.010	0.11	<0.010	<0.010	<0.010	0.11	<0.10	<0.010	<0.010	<0.10	<0.010	0.12	<0.010	<0.010	0.016
Nitrate + Nitrite (N)	mg/L	-	-	-	-	-	<0.10	0.12	0.3	<0.10	0.19	0.91	0.39	0.34	<0.10	0.12	1.66	1.85	2.36	2.83	0.16	0.11	<0.10	0.19	0.14	0.11	<0.10	0.17	<0.10	<0.10	<0.10	0.12	<0.10	0.18	<0.010
Total Ammonia-N	mg/L	-	Variable(9)	-	-	-	0.25	**1.1**	<0.050	<0.050	0.34	0.33	**0.46**	0.16	0.13	-	0.28	**0.96**	**0.74**	0.51	0.15	**0.68**	0.07	<0.050	0.059	**2.1**	0.16	<0.050	0.084	0.3	<0.050	**0.51**	0.11	<0.050	0.35
Total Un-ionized Ammonia	mg/L	0.020 (2)	0.019	-	-	-	0.0031	**0.073**	<0.00061	<0.0012	0.0074	0.0084	**0.052**	0.0069	0.0029	**0.057**	0.0059	**0.044**	-	0.0085	0.014	**0.078**	0.016	<0.0019	0.0043	**0.44**	-	<0.0036	0.0024	0.015	<0.00061	**0.084**	0.014	<0.002	-
Total Phosphorus	mg/L	0.020 (3)	Guidance Framework(10)	-	-	-	0.075	0.12	0.1	0.023	0.05	0.013	0.008	0.015	0.023	0.06	0.016	0.007	<0.004	0.026	0.005	0.012	0.004	0.023	0.004	0.006	0.005	0.024	0.041	0.08	0.058	0.01	0.005	0.034	0.092
Total Sulphide	mg/L	-	-	-	-	-	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	0.0033	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	0.0074	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	0.0025	<0.0018	<0.0018	<0.0018	0.0024	<0.0018	-
Dissolved Sulphate (SO4)	mg/L	-	-	-	-	-	56	49	69	29	140	750	1000	1100	170	160	720	960	1200	700	33	28	23	24	20	23	19	21	110	86	190	24	21	21	26
Sulphide (as H2S)	mg/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0035	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0079	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	0.0025	<0.0020	<0.0020
Total BOD	-	-	-	-	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Organic Nitrogen	mg/L	-	-	-	-	-	0.34	0.25	0.46	0.15	0.11	<0.10	0.3	0.14	0.21	<0.10	0.34	0.53	0.21	0.87	<0.10	0.13	0.16	0.25	<0.10	<0.10	<0.10	0.24	0.36	0.87	0.4	<0.10	<0.10	0.24	0.52
Total Chemical Oxygen Demand (COD)	mg/L	-	-	-	-	-	26	22	5	<4.0	8.3	<4.0	9.4	<4.0	16	25	9.7	15	9.3	<4.0	<4.0	9.4	<4.0	<4.0	<4.0	11	<4.0	<4.0	22	41	<4.0	13	<4.0	<4.0	31
Total Kjeldahl Nitrogen (TKN)	mg/L	-	-	-	-	-	0.58	1.3	0.46	0.15	0.45	0.34	0.76	0.3	0.34	0.68 (1)	0.62	1.5	0.95	1.4	0.16	0.81	0.23	0.25	0.15	1.8 (1)	0.14 (2)	0.24	0.44	1.2	0.4	0.59	0.14	0.24	0.87
Orthophosphate (P)	mg/L	-	-	-	-	-	0.034	0.062	0.037	0.012	0.031	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.017	<0.010	0.035	<0.010	<0.010	<0.010	0.046
Miscellanous Parameters																																			
Phenols-4AAP	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Cyanide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	<0.0050	-	-	-	<0.0050	-	-	-	<0.0050	-	-	-	-	-	<0.0050	-	-
WAD Cyanide (Free)	ug/L	-	-	-	-	-	1	<1	<1	<1	<1	2	<1	<0.0010	3	<1	1	<1	<0.0010	<1	2	<1	<0.0010	<1	1	<1	<0.0010	<1	1	<1	<1	<1	<0.0010	<1	<1
NTA	mg/L	-	-	-	-	40	-	-	-	-	-	-	-	<0.050	-	-	-	-	<0.050	-	-	-	<0.050	-	-	-	<0.050	-	-	-	-	-	<0.050	-	-
METALS																																			
Ag	ug/L	0.1	0.25	-	-	-	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Dissolved (0.2u) Aluminum (Al)	ug/L	- ( )	-	-	-	-	10	<5	<5	11	<5	<5	<5	<5	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	8	5	<5	<5	<5	<5	22
Al	ug/L	15, 75 4	5, 100 11	-	-	-	-	-	-	-	-	-	-	43	-	-	-	-	17	-	-	-	52	-	-	-	50	-	-	-	-	-	57	-	**2300**
As	ug/L	5	5	-	-	-	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	1.5	<1.0	1.1	1.3	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1	1	1.8	2.3	<1.0	<1.0	<1.0	1	<1.0
B	ug/L	200	1500	29000	-	-	24	31	11	31	42	430	790	880	110	160	650	1200	1300	650	30	26	29	21	20	24	19	17	19	39	<10	21	22	19	16
Ba	ug/L	- ( )	-	-	-	-	51	21	-	23	65	20	19	26	31	65	35	32	29	-	20	21	21	-	20	21	21	-	36	51	-	21	20	-	23
Be	ug/L	11, 1100 5	-	-	-	-	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ca	ug/L	- ( )	-	-	-	-	88000	40000	-	60000	150000	220000	280000	350000	93000	150000	260000	350000	450000	-	36000	36000	35000	-	32000	34000	36000	-	86000	91000	-	34000	33000	-	27000
Cd	ug/L	0.1, 0.5 6	0.04, variable, 0.37 12	0.11, variable, 7.7 12	5	-	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Co	ug/L	0.90	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.59	0.8	0.71	0.55	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	<0.50	<0.50	<0.50
Cr	ug/L	-	-	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cr (VI)	ug/L	1 ( )	1	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.53	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cu	ug/L	1, 5 7	2, variable, 4, 2 13	-	-	-	2.1	1.3	**6.9**	<0.90	1.3	<0.90	1.1	1.1	<0.90	1.6	1.4	<0.90	<0.90	1.3	1	1.1	<0.90	1	1	1.1	<0.90	1.1	1.8	3.9	2.2	1.1	1.2	1.4	3.3
Fe	ug/L	300	300	-	-	-	**490**	**810**	**310**	<100	160	<100	<100	<100	160	**1200**	280	**530**	**800**	**550**	<100	130	<100	140	<100	<100	<100	<100	**400**	**940**	<100	<100	100	210	**1600**
Hg	ug/L	-	0.026	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
K	ug/L	-	-	-	-	-	3600	1900	-	1300	4100	13000	18000	22000	3900	4600	26000	27000	30000	-	1800	1500	1400	-	1400	1300	1500	-	3600	3100	-	1300	1300	-	3000
Mg	ug/L	-	-	-	-	-	24000	11000	-	23000	43000	75000	91000	100000	35000	53000	90000	110000	150000	-	9700	9500	8900	-	8400	8600	8900	-	27000	35000	-	8900	8300	-	10000
Mn	ug/L	-	Variable(15)	Equation 14	-	-	71	190	-	<2.0	14	13	6.9	23	27	810	60	95	69	-	4.2	8.8	5.7	-	2.9	5.7	5.7	-	35	88	-	5.1	5	-	18
Mo	ug/L	40	73	-	-	-	0.66	0.85	0.65	<0.50	<0.50	0.98	1.1	1.3	3.9	3.2	1.8	0.85	0.72	0.9	0.95	0.9	0.95	1.2	1	1	1.2	1.1	0.57	0.87	0.67	1	1.1	0.95	<0.50
Na	ug/L	-	-	-	-	-	260000	28000	-	15000	360000	120000	180000	230000	74000	120000	300000	370000	480000	-	17000	14000	13000	-	13000	13000	12000	-	160000	120000	-	13000	11000	-	21000
Ni	ug/L	25 ( )	25, variable, 150, 25(16)	-	-	-	1.5	1.1	1.1	<1.0	<1.0	4	2.3	2.1	<1.0	1.8	2.9	2.3	2	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	3.6	<1.0	<1.0	<1.0	<1.0	2.2
Pb	ug/L	1, 3, 5 8	1, variable, 7, 1(17)	-	10	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.94	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.4	<0.50	<0.50	<0.50	<0.50	0.89
Sb	ug/L	20	-	-	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.58	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50	<0.50	<0.50	<0.50
Se	ug/L	100	1	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Si	ug/L	-	-	-	-	-	2200	1300	-	3800	3700	1300	480	1500	3600	9300	3600	5000	6000	-	360	290	410	-	370	230	450	-	2400	1300	-	220	400	-	5900
Sn	ug/L	-	-	-	-	-	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	-	-	<1.0	<1.0	-	-	<1.0	<1.0	-	-	<1.0	<1.0	-	<1.0	-	-	<1.0
Sr	ug/L	-	-	-	-	-	450	200	-	240	740	2000	2500	3000	560	810	3000	4400	6100	-	200	180	170	-	170	160	160	-	420	510	-	160	160	-	110
Ti	ug/L	-	-	-	-	-	21	14	-	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	7.2	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	-	19	13	-	<5.0	<5.0	-	54
Tl	ug/L	0.3	0.8	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	0.055	<0.050	<0.050	<0.050	0.065	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
U	ug/L	5	15	33	-	10000	1.8	0.18	0.53	0.44	1.7	2.3	1.9	1.5	1.8	1.4	1.4	0.91	0.74	1.1	0.38	0.33	0.31	0.36	0.91	0.32	0.45	0.37	1.8	1.6	2.6	0.33	0.33	0.37	0.27
V	ug/L	6	-	-	-	-	1.2	1.3	0.7	<0.50	0.61	<0.50	<0.50	<0.50	<0.50	0.77	<0.50	<0.50	<0.50	<0.50	0.5	<0.50	<0.50	0.5	<0.50	<0.50	<0.50	<0.50	1	1.8	<0.50	<0.50	<0.50	0.61	3.5
W	ug/L	-	-	-	-	-	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zn	ug/L	20	Variable(19)	Variable(18)	-	-	<5.0	<5.0	<5.0	<5.0	9.2	<5.0	<5.0	<5.0	<5.0	5.1	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15	<5.0	5.2	<5.0	<5.0	8.2
Zr	ug/L	4	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0
VOLITILE ORGANIC COMPOUNDS																																			
Benzene	ug/L	100	370	-	5	500	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.17	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.17	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Carbon Tetrachloride	ug/L	-	13.3	-	-	500	-	-	-	-	-	-	-	<0.19	-	-	-	-	-	-	-	-	<0.19	-	-	-	-	-	-	-	-	-	<0.19	-	<0.19
Chlorobenzene	ug/L	15	-	-	-	8000	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	-	<0.20	-	<0.20
Chloroform	ug/L	-	1.8	-	-	10000	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	-	<0.20	-	<0.20
1,2-Dichlorobenzene	ug/L	2.5	0.7	-	-	20000	-	-	-	-	-	-	-	<0.40	-	-	-	-	-	-	-	-	<0.40	-	-	-	-	-	-	-	-	-	<0.40	-	<0.40
1,4-Dichlorobenzene	ug/L	4	26	-	-	500	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,2-Dichloroethane	ug/L	100	100	-	-	500	-	-	-	-	-	-	-	<0.49	-	-	-	-	-	-	-	-	<0.49	-	-	-	-	-	-	-	-	-	<0.49	-	<0.49
1,1-Dichloroethylene	ug/L	40	-	-	-	1400	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	-	<0.20	-	<0.20
Methylene Chloride	ug/L	100	98.1	-	-	5000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl Ethyl Ketone (2-Butanone)	ug/L	400	-	-	-	200000	-	-	-	-	-	-	-	<10	-	-	-	-	-	-	-	-	<10	-	-	-	-	-	-	-	-	-	<10	-	<10
Toluene	ug/L	10	2	-	-	-	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20
Trichloroethylene	ug/L	20	21	-	-	5000	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	-	-	<0.20	-	<0.20
Vinyl Chloride	ug/L	600	-	-	2	-	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	<0.20	<0.20	-	<0.20	<0.20	-	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20
Ethylbenzene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20
p+m-Xylene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20
o-Xylene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20
Total Xylenes	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20	-	-	-	-	-	-	-	<0.20

Note(s):

1.0   **1.0** – Denotes values that are above the CCME   1.0 – Denotes values that are above the Environment   1.0 – Denotes values that are above the Environmental Protection Act Ontario Regulation 347

"-" indicates value not available

– Concentrations represent total concentrations (samples were not filtered) with the exception of aluminum, which was field filtered (0.2 µm) for dissolved concentrations.

(1) MOEE [Ontario Ministry of Environment and Energy], 1999. Policies Guidelines Provincial Water Quality Objectives. Originally published in 1994, reprinted 1999.

(2) Un-ionized ammonia was calculated as per MOEE (1999). A concentration of one half of the detection limit was assigned to non-detectable values. For this calculation, it is assumed that the temperature is 15°C. Note that from 2012 onwards, field recorded temperatures were used rather than assuming a temperature of 15°C.

(3) PWQO for P is based on a value to prevent excessive algae growth.

(4) PWQO for Al depends on pH as follows: pH = 4.5−5.5, PWQO = 0.015 mg/L; pH >5.5−6.5, PWQO = 10% of background concentration; pH >6.5−9.0, PWQO = 0.075 mg/L.

(5) PWQO for Be depends on hardness as follows: hardness <75 mg/L as $CaCO_3$, PWQO = 0.011 mg/L; hardness >75 mg/L as $CaCO_3$, PWQO = 1.1 mg/L.

(6) PWQO for Cd depends on hardness as follows: hardness 0−100 mg/L as $CaCO_3$, PWQO = 0.0001 mg/L; hardness >100 mg/L as $CaCO_3$, PWQO = 0.0005 mg/L.

(7) PWQO for Cu depends on hardness as follows: hardness 0−20 mg/L as CaCO3, PWQO = 0.001 mg/L; hardness >20 mg/L as CaCO3, PWQO = 0.005 mg/L.

(8) PWQO for Pb depends on hardness as follows: hardness <30 mg/L as CaCO3, PWQO = 0.001 mg/L; hardness = 30−80 mg/L as CaCO3, PWQO = 0.003 mg/L; hardness >80 mg/L as CaCO3, PWQO = 0.005 mg/L.

(9) The CCME for long term Ammonia values depends on temperature and pH using a table found at https://ccme.ca/en/chemical/5#_aql_fresh_concentration

(10) Ultra-oligotrophic < 4 µg/L; oligotrophic 4-10 µg/L; mesotrophic 10-20 µg/L; meso-eutrophic 20-35 µg/L; eutrophic 35-100 µg/L; hyper-eutrophic > 100 µg/L

(11) 5 µg/L if pH<6.5; 100 µg/L if pH≥6.5

(12) CCME for Cd depends on hardness as follows: hardness 0−53 mg/L as CaCO3, CWQG= 0.11 µg/L; hardness ≥ 5.3 to ≤ 360 mg/L as CaCO3, CWQG= 10{1.016(log[hardness])-1.71} µg/L; hardness >360 mg/L, CWQG= 7.7 µg/L for short term concentration. Hardness >0 to 17 mg/L as CaCO3, CWQG= 0.04 µg/L; hardness ≥ 17 to ≤ 280 mg/L as CaCO3, CWQG= 10{0.83(log[hardness])-2.46} µg/L; hardness > 280 mg/L, CWQG= 0.3 µg/L for long term concentration

(13) CCME for Cu depends on hardness as follows: hardness 0 to <82 mg/L as CaCO3, CWQG= 2 µg/L; hardness ≥82 to ≤180 mg/L as CaCO3, CWQG= 0.2*e{0.8545[ln(hardness)]-1.465} µg/L; hardness is unknown, CWQG= 2 µg/L for long term concentration.

(14) CCME for Mn depends on hardness as follows: CCME=exp(0.878[ln(hardness)]+4.76) µg/L

(15) The CWQG for manganese (i.e. long-term guideline) is found using the CWQG calculator in Appendix B of the Scientific Criteria Document for the Development of the Canadian Water Quality Guidelines for the Protection of Aquatic Life: Manganese.

(16) CCME for Ni depends on hardness as follows: hardness 0 to ≤ 60 mg/L as CaCO3, CWQG= 25 µg/L; hardness > 60 to ≤ 180 mg/L as CaCO3, CWQG = e{0.76[ln(hardness)]+1.06} µg/L; hardness > 180, CWQG= 150 µg/L ; hardness is unknown, CWQG= 25 µg/L

(17) CCME for Pb depends on hardness as follows: hardness 0 to ≤ 60 mg/L as CaCO3, CWQG= 1 µg/L; hardness > 60 to ≤ 180 mg/L as CaCO3, CWQG = e{1.273[ln(hardness)]-4.705} µg/L; hardness > 180, CWQG= 7 µg/L ; hardness is unknown, CWQG= 1 µg/L

(18) CCME for Zn is calculated using the following equation: CWQG= exp(0.833[ln(hardness mg·L-1)] + 0.240[ln(DOC mg·L-1)] + 0.526) µg/L

(19) CCME for Zn is calculated using the following equation: CWQG=exp(0.947[ln(hardness mg·L-1)] - 0.815[pH] + 0.398[ln(DOC mg·L-1)] + 4.625) µg/L

(20) NDOGT: No data due to overgrowth. Total coliforms and / or E.coli detected

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient, The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

Table G-2: Surface Water Quality Results

Parameter	Units	Provincial Water Quality Objectives	Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG)		Environmental Protection Act Ontario Regulation 232/98	Environmental Protection Act Ontario Regulation 347	UPSTREAM TEN MILE CREEK			STN4	STN2	SUMP			STN1		SW2				WC2				WC6				SW8			US WELLAND CANAL			ELEVEN MILE CREEK
							(Ten Mile Creek)			(Tributary of Six Mile Creek)	(Tributary of the Welland Canal North 1)	-			(Tributary of the Welland Canal North 2)		(Site Groundwater and Stormwater Discharge to the Old Welland Canal)				(Old Welland Canal)				(Old Welland Canal)				(Ten Mile Creek)			(Welland Canal)			(Eleven Mile Creek)
			Aquatic (Long Term)	Aquatic (Short Term)			15-Apr-25	17-Jun-25	11-Dec-25	15-Apr-25	15-Apr-25	15-Apr-25	17-Jun-25	30-Sep-25	15-Apr-25	17-Jun-25	15-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	16-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	11-Dec-25	17-Jun-25	30-Sep-25	11-Dec-25	25-Mar-26
SEMI-VOLITILE ORGANICS																																		
N-Nitrosodimethylamine	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.98	-	-	-	-	<1.90	-	-	-	<1.98	-	-	-	<1.92	-	-	-	-	<2.00	-	-
2,3,4,6-Tetrachlorophenol	ug/L	1	1	-	-	10000	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
2,4,5-T	ug/L	-	-	-	-	28000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
2,4,6-Trichlorophenol	ug/L	18	18	-	-	500	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
2,4-D	ug/L	-	4	-	-	10000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
2,4-Dichlorophenol	ug/L	0.2	0.2	-	-	90000	-	-	-	-	-	-	-	<0.25	-	-	-	-	<0.25	-	-	-	<0.25	-	-	-	<0.25	-	-	-	-	<0.25	-	-
Aldicarb	ug/L	-	1	-	-	900	-	-	-	-	-	-	-	<5.0	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-	<5.0	-	-	-	-	<5.0	-	-
Atrazine	ug/L	-	1.8	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Des-ethyl atrazine	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Atrazine + Desethyl-atrazine	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Bendiocarb	ug/L	-	-	-	-	4000	-	-	-	-	-	-	-	<2.0	-	-	-	-	<2.0	-	-	-	<2.0	-	-	-	<2.0	-	-	-	-	<2.0	-	-
Bromoxynil	ug/L	-	5	-	-	500	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Carbaryl	ug/L	0.2	0.2	-	-	9000	-	-	-	-	-	-	-	<5.0	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-	<5.0	-	-	-	-	<5.0	-	-
Carbofuran	ug/L	-	1.8	-	-	9000	-	-	-	-	-	-	-	<5.0	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-	<5.0	-	-	-	-	<5.0	-	-
Chlorpyrifos (Dursban)	ug/L	0.001	0.002	-	-	9000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Cyanazine (Bladex)	ug/L	-	2	-	-	1000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Diazinon	ug/L	0.08	-	-	-	2000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Dicamba	ug/L	200	10	-	-	12000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Diclofop-methyl	ug/L	-	6.1	-	-	900	-	-	-	-	-	-	-	<0.90	-	-	-	-	<0.90	-	-	-	<0.90	-	-	-	<0.90	-	-	-	-	<0.90	-	-
Dimethoate	ug/L	-	6.2	-	-	2000	-	-	-	-	-	-	-	<2.5	-	-	-	-	<2.5	-	-	-	<2.5	-	-	-	<2.5	-	-	-	-	<2.5	-	-
Dinoseb	ug/L	-	0.05	-	-	1000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
m/p-Cresol	ug/L	1	-	-	-	200000	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Malathion	ug/L	0.1	-	-	-	19000	-	-	-	-	-	-	-	<5.0	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-	<5.0	-	-	-	-	<5.0	-	-
o-Cresol	ug/L	-	-	-	-	200000	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Metolachlor	ug/L	3	7.8	-	-	5000	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Metribuzin (Sencor)	ug/L	-	1	-	-	8000	-	-	-	-	-	-	-	<5.0	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-	<5.0	-	-	-	-	<5.0	-	-
Ethyl Parathion	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Pentachlorophenol	ug/L	-	0.5	-	-	6000	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Phorate	ug/L	-	-	-	-	200	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Picloram	ug/L	-	290	-	-	19000	-	-	-	-	-	-	-	<5.0	-	-	-	-	<5.0	-	-	-	<5.0	-	-	-	<5.0	-	-	-	-	<5.0	-	-
Prometryne	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	-	-	<0.25	-	-	-	<0.25	-	-	-	<0.25	-	-	-	-	<0.25	-	-
Simazine	ug/L	10	10	-	-	1000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Terbufos	ug/L	-	-	-	-	100	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Triallate	ug/L	-	0.24	-	-	23000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Trifluralin	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Benzo(a)pyrene	ug/L	-	0.015	-	-	1	-	-	-	-	-	-	-	<0.0050	-	-	-	-	<0.0050	-	-	-	<0.0050	-	-	-	<0.0050	-	-	-	-	<0.0050	-	-
2,4,5-TP (Silvex)	ug/L	-	-	-	-	400000	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	-	-	-	<0.50	-	-	-	<0.50	-	-	-	-	<0.50	-	-
Methyl parathion	ug/L	-	-	-	-	700	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
POLYAROMATIC HYDROCARBONS																																		
Acenaphthene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Acenaphthylene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Anthracene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Benzo(a)anthracene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Benzo(a)pyrene	ug/L	-	-	-	-	-	<0.0090	-	<0.0090	<0.0090	<0.0090	<0.0090	-	<0.0090	<0.0090	-	<0.0090	-	<0.0090	<0.0090	<0.0090	-	<0.0090	<0.0090	<0.0090	-	<0.0090	<0.0090	<0.0090	-	<0.0090	-	<0.0090	<0.0090	<0.0090
Benzo(b)fluoranthene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Benzo(ghi)perylene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Benzo(k)fluoranthene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Chrysene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Dibenzo(a,h)anthracene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Fluoranthene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Fluorene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Indeno(1,2,3-cd)pyrene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
1-Methylnaphthalene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
2-Methylnaphthalene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Naphthalene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
Phenanthrene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.030	<0.010	-	<0.010	-	<0.030	<0.010	<0.010	-	<0.030	<0.010	<0.010	-	<0.030	<0.010	<0.010	-	<0.010	-	<0.030	<0.010	<0.030
Pyrene	ug/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	-	<0.050	<0.010	-	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.050	<0.010	<0.010	-	<0.010	-	<0.050	<0.010	<0.050
PESTICIDES & HERBACIDES																																		
Glyphosate	ug/L	-	800	27000		28000	-	-	-	-	-	-	-	<10	-	-	-	-	<10	-	-	-	<10	-	-	-	<10	-	-	-	-	<10	-	-
Diquat	ug/L	-	-	-		7000	-	-	-	-	-	-	-	<7.0	-	-	-	-	<7.0	-	-	-	<7.0	-	-	-	<7.0	-	-	-	-	<7.0	-	-
Diuron	ug/L	-	-	-		15000	-	-	-	-	-	-	-	<10	-	-	-	-	<10	-	-	-	<10	-	-	-	<10	-	-	-	-	<10	-	-
Guthion (Azinphos-methyl)	ug/L	-	-	-		2000	-	-	-	-	-	-	-	<2.0	-	-	-	-	<2.0	-	-	-	<2.0	-	-	-	<2.0	-	-	-	-	<2.0	-	-
Paraquat	ug/L	-	-	-		1000	-	-	-	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	<1.0	-	-	-	<1.0	-	-	-	-	<1.0	-	-
Temephos	ug/L	-	-	-		28000	-	-	-	-	-	-	-	<10	-	-	-	-	<10	-	-	-	<10	-	-	-	<10	-	-	-	-	<10	-	-
ORGANOCHLORINATED PESTICIDES																																		
Aldrin	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Dieldrin	ug/L	0.001	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
a-Chlordane	ug/L	0.06	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
g-Chlordane	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
o,p-DDD	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
p,p-DDD	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
o,p-DDE	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
p,p-DDE	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
o,p-DDT	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
p,p-DDT	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Lindane	ug/L	0.01	0.01	-	-	400	-	-	-	-	-	-	-	<0.003	-	-	-	-	<0.003	-	-	-	<0.003	-	-	-	<0.003	-	-	-	-	<0.003	-	-
Endrin	ug/L	-	-	-	-	20	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Heptachlor	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Heptachlor epoxide	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Hexachlorobenzene	ug/L	0.0065	-	-	-	130	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Hexachlorobutadiene	ug/L	0.009	-	-	-	500	-	-	-	-	-	-	-	<0.009	-	-	-	-	<0.009	-	-	-	<0.009	-	-	-	<0.009	-	-	-	-	<0.009	-	-
Hexachloroethane	ug/L	1	-	-	-	3000	-	-	-	-	-	-	-	<0.01	-	-	-	-	<0.01	-	-	-	<0.01	-	-	-	<0.01	-	-	-	-	<0.01	-	-
Methoxychlor	ug/L	0.04	-	-	-	90000	-	-	-	-	-	-	-	<0.01	-	-	-	-	<0.01	-	-	-	<0.01	-	-	-	<0.01	-	-	-	-	<0.01	-	-
Aroclor 1016	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Aroclor 1221	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Aroclor 1232	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Aroclor 1242	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Aroclor 1248	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Aroclor 1254	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Aroclor 1260	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
alpha-BHC	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
beta-BHC	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
delta-BHC	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Endosulfan sulfate	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Endrin aldehyde	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Endrin ketone	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Mirex	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Octachlorostyrene	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Oxychlordane	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Toxaphene	ug/L	0.008	-	-	-	500	-	-	-	-	-	-	-	<0.2	-	-	-	-	<0.2	-	-	-	<0.2	-	-	-	<0.2	-	-	-	-	<0.2	-	-

Note(s):

1.0 **1.0** – Denotes values that are above the CCME 1.0 – Denotes values that are above the Environment 1.0 – Denotes values that are above the Environmental Protection Act Ontario Regulation 347

– For notes 1 to 20, Refer to Page 1

Parameter	Units	Provincial Water Quality Objectives	Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG)		Environmental Protection Act Ontario Regulation 232/98	Environmental Protection Act Ontario Regulation 347	UPSTREAM TEN MILE CREEK			STN4	STN2	SUMP			STN1		SW2				WC2				WC6				SW8			US WELLAND CANAL			ELEVEN MILE CREEK
							(Ten Mile Creek)			(Tributary of Six Mile Creek)	(Tributary of the Welland Canal North 1)	-			(Tributary of the Welland Canal North 2)		(Site Groundwater and Stormwater Discharge to the Old Welland Canal)				(Old Welland Canal)				(Old Welland Canal)				(Ten Mile Creek)			(Welland Canal)			(Eleven Mile Creek)
			Aquatic (Long Term)	Aquatic (Short Term)			15-Apr-25	17-Jun-25	11-Dec-25	15-Apr-25	15-Apr-25	15-Apr-25	17-Jun-25	30-Sep-25	15-Apr-25	17-Jun-25	15-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	30-Sep-25	11-Dec-25	16-Apr-25	17-Jun-25	2-Oct-25	11-Dec-25	16-Apr-25	17-Jun-25	11-Dec-25	17-Jun-25	30-Sep-25	11-Dec-25	25-Mar-26
CALCULATED PARAMETERS																																		
Aldrin + Dieldrin	ug/L	0.001	-	-	-	70	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Chlordane (Total)	ug/L	0.06	-	-	-	700	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
DDT+ Metabolites	ug/L	0.003	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Heptachlor + Heptachlor epoxide	ug/L	-	-	-	-	300	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
o,p-DDD + p,p-DDD	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
o,p-DDE + p,p-DDE	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
o,p-DDT + p,p-DDT	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Total Endosulfan	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	-	-	-	-	<0.005	-	-	-	<0.005	-	-	-	<0.005	-	-	-	-	<0.005	-	-
Total PCB	ug/L	0.001	-	-	-	-	-	-	-	-	-	-	-	<0.05	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	<0.05	-	-
Total Trichlorobenzenes	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	<0.5	-	-
DIOXINS & FURANS																																		
2,3,7,8-Tetra CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.32	-	-	-	-	<1.18	-	-	-	<1.18	-	-	-	<1.18	-	-	-	-	<1.07	-	-
1,2,3,7,8-Penta CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.43	-	-	-	-	<1.47	-	-	-	<1.47	-	-	-	<1.47	-	-	-	-	<1.22	-	-
1,2,3,4,7,8-Hexa CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.11	-	-	-	-	<1.16	-	-	-	<1.16	-	-	-	<1.16	-	-	-	-	<1.31	-	-
1,2,3,6,7,8-Hexa CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.969	-	-	-	-	<0.922	-	-	-	<0.922	-	-	-	<0.922	-	-	-	-	<1.00	-	-
1,2,3,7,8,9-Hexa CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.975	-	-	-	-	<0.971	-	-	-	<0.971	-	-	-	<0.971	-	-	-	-	<1.07	-	-
1,2,3,4,6,7,8-Hepta CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.01	-	-	-	-	<1.13	-	-	-	<1.13	-	-	-	<1.13	-	-	-	-	<1.11	-	-
Octa CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	2.51	-	-	-	-	<4.59 (1)	-	-	-	<4.59 (1)	-	-	-	<4.59 (1)	-	-	-	-	8.85	-	-
Total Tetra CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.32	-	-	-	-	<1.18	-	-	-	<1.18	-	-	-	<1.18	-	-	-	-	<1.07	-	-
Total Penta CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.43	-	-	-	-	<1.69	-	-	-	<1.69	-	-	-	<1.69	-	-	-	-	<1.22	-	-
Total Hexa CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.01	-	-	-	-	<1.01	-	-	-	<1.01	-	-	-	<1.01	-	-	-	-	<1.11	-	-
Total Hepta CDD *	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.01	-	-	-	-	<1.13	-	-	-	<1.13	-	-	-	<1.13	-	-	-	-	<1.11	-	-
2,3,7,8-Tetra CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.13	-	-	-	-	<1.07	-	-	-	<1.07	-	-	-	<1.07	-	-	-	-	<0.834	-	-
1,2,3,7,8-Penta CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.30	-	-	-	-	<1.32	-	-	-	<1.32	-	-	-	<1.32	-	-	-	-	<1.38	-	-
2,3,4,7,8-Penta CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.07	-	-	-	-	<1.11	-	-	-	<1.11	-	-	-	<1.11	-	-	-	-	<1.10	-	-
1,2,3,4,7,8-Hexa CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.43	-	-	-	-	<1.13	-	-	-	<1.13	-	-	-	<1.13	-	-	-	-	<1.34	-	-
1,2,3,6,7,8-Hexa CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.18	-	-	-	-	<0.965	-	-	-	<0.965	-	-	-	<0.965	-	-	-	-	<1.16	-	-
2,3,4,6,7,8-Hexa CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.18	-	-	-	-	<0.986	-	-	-	<0.986	-	-	-	<0.986	-	-	-	-	<1.17	-	-
1,2,3,7,8,9-Hexa CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.39	-	-	-	-	<1.30	-	-	-	<1.30	-	-	-	<1.30	-	-	-	-	<1.39	-	-
1,2,3,4,6,7,8-Hepta CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.19	-	-	-	-	<1.08	-	-	-	<1.08	-	-	-	<1.08	-	-	-	-	<1.16	-	-
1,2,3,4,7,8,9-Hepta CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.41	-	-	-	-	<1.29	-	-	-	<1.29	-	-	-	<1.29	-	-	-	-	<1.35	-	-
Octa CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.39	-	-	-	-	<1.02	-	-	-	<1.02	-	-	-	<1.02	-	-	-	-	<1.12	-	-
Total Tetra CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.13	-	-	-	-	<1.07	-	-	-	<1.07	-	-	-	<1.07	-	-	-	-	<0.834	-	-
Total Penta CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.18	-	-	-	-	<1.21	-	-	-	<1.21	-	-	-	<1.21	-	-	-	-	<1.23	-	-
Total Hexa CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.29	-	-	-	-	<1.08	-	-	-	<1.08	-	-	-	<1.08	-	-	-	-	<1.26	-	-
Total Hepta CDF **	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	<1.29	-	-	-	-	<1.17	-	-	-	<1.17	-	-	-	<1.17	-	-	-	-	<1.25	-	-
SURROGATE RECOVERY (%)																																		
D10-N-nitrosodiethylamine	%	-	-	-	-	-	-	-	-	-	-	-	-	59	-	-	-	-	67	-	-	-	69	-	-	-	75	-	-	-	-	73	-	-
D14-N-Nitrosodi-n-propylamine	%	-	-	-	-	-	-	-	-	-	-	-	-	69	-	-	-	-	75	-	-	-	77	-	-	-	93	-	-	-	-	83	-	-
D6-N-Nitrosodimethylamine	%	-	-	-	-	-	-	-	-	-	-	-	-	24	-	-	-	-	33	-	-	-	29	-	-	-	39	-	-	-	-	32	-	-
D8-N-Nitrosomorpholine	%	-	-	-	-	-	-	-	-	-	-	-	-	47	-	-	-	-	62	-	-	-	51	-	-	-	75	-	-	-	-	58	-	-
D10-Anthracene	%	-	-	-	-	-	79	-	87	90	83	85	-	96	86	-	82	-	109	109	90	-	97	111	86	-	111	112	81	-	109	109	109	100
D14-Terphenyl (FS)	%	-	-	-	-	-	79	-	76	90	83	84	-	85	88	-	84	-	97	96	89	76	87	99	85	-	96	100	82	-	97	-	101	98	83
D8-Acenaphthylene	%	-	-	-	-	-	77	-	73	88	83	85	-	89	82	-	85	-	103	91	90	-	90	94	85	-	103	95	79	-	92	-	99	93	95
4-Bromofluorobenzene	%	-	-	-	-	-	95	100	99	95	95	95	100	95	95	100	95	100	86	99	95	100	95	100	96	100	86	105	95	100	98	100	93	100	102
D4-1,2-Dichloroethane	%	-	-	-	-	-	111	105	98	110	111	109	104	109	108	103	110	105	116	98	110	103	111	99	110	104	116	100	110	104	97	103	113	98	106
D8-Toluene	%	-	-	-	-	-	96	93	100	96	95	98	92	90	97	93	97	92	94	99	96	93	89	99	95	92	95	98	97	93	100	93	92	99	93
2,4,6-Tribromophenol	%	-	-	-	-	-	-	-	-	-	-	-	-	92	-	-	-	-	78	-	-	-	86	-	-	-	75	-	-	-	-	54	-	-
2-Fluorobiphenyl	%	-	-	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	76	-	-	-	74	-	-	-	74	-	-	-	-	48	-	-
2-Fluorophenol	%	-	-	-	-	-	-	-	-	-	-	-	-	38	-	-	-	-	32	-	-	-	33	-	-	-	29	-	-	-	-	19	-	-
D14-Terphenyl	%	-	-	-	-	-	-	-	-	-	-	-	-	75	-	-	-	-	76	-	-	-	79	-	-	-	78	-	-	-	-	77	-	-
D5-Nitrobenzene	%	-	-	-	-	-	-	-	-	-	-	-	-	73	-	-	-	-	73	-	-	-	74	-	-	-	70	-	-	-	-	49	-	-
D5-Phenol	%	-	-	-	-	-	-	-	-	-	-	-	-	23	-	-	-	-	21	-	-	-	22	-	-	-	21	-	-	-	-	14	-	-
2,4,6-Tribromophenol	%	-	-	-	-	-	-	-	-	-	-	-	-	88	-	-	-	-	76	-	-	-	85	-	-	-	70	-	-	-	-	85	-	-
2,4-Dichlorophenyl Acetic Acid	%	-	-	-	-	-	-	-	-	-	-	-	-	83	-	-	-	-	87	-	-	-	88	-	-	-	81	-	-	-	-	84	-	-
2-Fluorobiphenyl	%	-	-	-	-	-	-	-	-	-	-	-	-	87	-	-	-	-	71	-	-	-	93	-	-	-	67	-	-	-	-	89	-	-
D14-Terphenyl (FS)	%	-	-	-	-	-	-	-	-	-	-	-	-	102	-	-	-	-	97	-	-	-	110	-	-	-	93	-	-	-	-	110	-	-
D5-Nitrobenzene	%	-	-	-	-	-	-	-	-	-	-	-	-	84	-	-	-	-	68	-	-	-	90	-	-	-	67	-	-	-	-	85	-	-
2,4,5,6-Tetrachloro-m-xylene	%	-	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	73	-	-	-	60	-	-	-	51	-	-	-	-	67	-	-
Decachlorobiphenyl	%	-	-	-	-	-	-	-	-	-	-	-	-	89	-	-	-	-	104	-	-	-	96	-	-	-	91	-	-	-	-	103	-	-
37CL4 2378 Tetra CDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	75	-	-	-	-	45	-	-	-	70	-	-	-	70	-	-	-	-	79	-	-
C13-1234678 HeptaCDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	102	-	-	-	-	76	-	-	-	108	-	-	-	80	-	-	-	-	109	-	-
C13-1234678 HeptaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	107	-	-	-	-	67	-	-	-	115	-	-	-	76	-	-	-	-	117	-	-
C13-123478 HexaCDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	82	-	-	-	-	78	-	-	-	89	-	-	-	87	-	-	-	-	82	-	-
C13-123478 HexaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	84	-	-	-	-	70	-	-	-	105	-	-	-	88	-	-	-	-	95	-	-
C13-123789 HeptaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	111	-	-	-	-	66	-	-	-	117	-	-	-	69	-	-	-	-	122	-	-
C13-123678 HexaCDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	92	-	-	-	-	72	-	-	-	110	-	-	-	87	-	-	-	-	105	-	-
C13-123678 HexaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	98	-	-	-	-	67	-	-	-	118	-	-	-	81	-	-	-	-	107	-	-
C13-12378 PentaCDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	61	-	-	-	-	86	-	-	-	62	-	-	-	99	-	-	-	-	69	-	-
C13-12378 PentaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	66	-	-	-	-	61	-	-	-	69	-	-	-	80	-	-	-	-	74	-	-
C13-123789 HexaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	97	-	-	-	-	76	-	-	-	102	-	-	-	83	-	-	-	-	103	-	-
C13-234678 HexaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	100	-	-	-	-	76	-	-	-	117	-	-	-	85	-	-	-	-	106	-	-
C13-23478 PentaCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	76	-	-	-	-	79	-	-	-	77	-	-	-	92	-	-	-	-	86	-	-
C13-2378 TetraCDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	74	-	-	-	-	52	-	-	-	73	-	-	-	76	-	-	-	-	82	-	-
C13-2378 TetraCDF **	%	-	-	-	-	-	-	-	-	-	-	-	-	80	-	-	-	-	46	-	-	-	76	-	-	-	61	-	-	-	-	85	-	-
C13-OCDD *	%	-	-	-	-	-	-	-	-	-	-	-	-	102	-	-	-	-	80	-	-	-	110	-	-	-	89	-	-	-	-	108	-	-
PETROLEUM HYDROCARBONS																																		
Total Oil & Grease	mg/L	-	-	-	-	-	0.8	<0.50	1	0.8	<0.50	<0.50	5.5	<0.50	0.6	<0.50	<0.50	<0.50	<0.50	1	0.5	<0.50	0.6	1	0.6	<0.50	<0.50	0.9	<0.50	<0.50	<0.50	<0.50	0.8	<0.50	<0.50
MICROBIOLOGICAL																																		
Fecal coliform	CFU/100mL	-	-	-	-	-	11	19 [1,2]	260 [1,2]	18	4	0	18 [1,2]	14000	1 [1,2]	280 [1,2]	17	44	15000	150 [1,2]	1 [1,2]	43	16000	6 [1,2]	0	15	11000	4	39	89 [1,2]	170 [1,2]	5	4100	9	<10
Background	CFU/100mL	-	-	-	-	-	780	NDOGT [20]	NDOGT [20]	880	960	980	NDOGT [20]	30	NDOGT [20]	NDOGT [20]	700	1500	10	NDOGT [20]	NDOGT [20]	1100	40	NDOGT [20]	580	1000	150	740	740	NDOGT [20]	NDOGT [20]	120	30	620	46000
Total Coliforms	CFU/100mL	-	-	-	-	-	350	NDOGT [20]	NDOGT [20]	490	380	160	NDOGT [20]	240	NDOGT [20]	NDOGT [20]	250	270	240	NDOGT [20]	NDOGT [20]	150	140	NDOGT [20]	14	67	250	38	430	NDOGT [20]	NDOGT [20]	12	70	20	490
Escherichia coli (e-coli)	CFU/100mL	100 E. coli per 100 mL	- [21]	-	-	-	7	NDOGT [20]	NDOGT [20]	15	4	0	NDOGT [20]	30	NDOGT [20]	NDOGT [20]	13	25	<10	NDOGT [20]	NDOGT [20]	36	<10	NDOGT [20]	0	6	40	1	50	NDOGT [20]	NDOGT [20]	1	30	7	-

Note(s):

1.0 **1.0** – Denotes values that are above the CCME 1.0 – Denotes values that are above the Environment 1.0 – Denotes values that are above the Environmental Protection Act Ontario Regulation 347

- For notes 1 to 20, Refer to Page 1

wsp.com