

CORPORATION OF THE CITY OF CLARENCE-ROCKLAND COMMITTEE OF THE WHOLE

> October 19, 2020, 8:00 pm Teleconference

> > Pages

1. Opening of the meeting

PLEASE BE ADVISED THAT COUNCIL MEMBERS WILL BE ATTENDING THIS MEETING ELECTRONICALLY VIA TELECONFERENCE DUE TO THE COVID-19 PANDEMIC SITUATION.

This meeting will be made accessible to the public via Facebook Live ONLY on the City of Clarence-Rockland page: https://www.facebook.com/clarencerockland/

This meeting is scheduled for 8:00 p.m. however, the time may defer as it will begin immediately following the conclusion of the Regular meeting that is scheduled to start at 6:30 p.m.

- 2. Adoption of the agenda
- 3. Disclosure of pecuniary interests
- 4. Petitions / Correspondence

5. Notice of Motion

5.1. Notice of Motion presented by Councillor Carl Grimard and seconded by Councillor Samuel Cardarelli in order to install two stop signs on Sterling Street

WHEREAS the controlled intersections with stop signs on St-Joseph and Sterling streets are all-way stops; and

WHEREAS the only intersection controlled by stop signs on Sterling Street that is not for all directions is the one located at the corner of Platinum and Solara streets; and

WHEREAS in order to maintain the standard of safety for residents in the Morris Village and to slow down the speed of vehicles on the downhill and curved portion of Sterling Street;

BE IT RESOLVED that Council mandates the Infrastructure and Planning Department to install two stops on northbound and southbound of Sterling Street at the intersection of Platinum and Solara streets to maintain uniformity of intersections in this neighbourhood.

6. Report from the United Counties of Prescott and Russell

7.1.	Addition of a preschool group – Daycare services	9
7.2.	Retro reflectivity signs gun and software	15
7.3.	New Alternative Working Arrangements Policy	33
7.4.	Speed assessment Montée Outaouais	57
7.5.	Phase 2 long-term snow disposal facilities	69
7.6.	Infrastructure and Planning Strategic Direction	83
7.7.	Request for Additional Funds - Community Services New Garage Outdoor Yard	99
7.8.	Strategic Plan Update Report	105
7.9.	Annual Reporting – Landfill site	199

7.10. Draft 2021 preliminary Budget

Please note that the 2021 Draft Preliminary Budget document will be made available on Monday, October 19, 2020.

8. Other items

9. Adjournment



CORPORATION DE LA CITÉ DE CLARENCE-ROCKLAND COMITÉ PLÉNIER

> le 19 octobre 2020, 20 h 00 Téléconférence

> > Pages

1. Ouverture de la réunion

VEUILLEZ ÊTRE AVISÉS QUE LES MEMBRES DU CONSEIL PARTICIPERONT À CETTE RENCONTRE VIA TÉLÉCONFERENCE VU LA SITUATION DE PANDÉMIE COVID-19.

Cette réunion sera accessible au public par Facebook Live SEULEMENT à partir de la page de la Cité de Clarence-Rockland: https://www.facebook.com/clarencerockland/

Cette réunion est prévue pour 20h; cependant, l'heure du début pourrait changée puisque celle-ci commencera immédiatement après la conclusion de la réunion régulière qui est prévue pour 18h30.

- 2. Adoption de l'ordre du jour
- 3. Déclarations d'intérêts pécuniaires
- 4. Pétitions / Correspondance

5. Avis de motion

7.

5.1. Avis de motion présenté par le conseiller Carl Grimard et appuyé par le conseiller Samuel Cardarelli pour installer deux arrêts sur la rue Sterling ATTENDU QUE les intersections contrôlées avec panneaux 'arrêt stop' sur les rues St-Joseph et Sterling sont des arrêts en toute direction; et

ATTENDU QUE la seule intersection contrôlée par panneaux 'arrêt stop' de la rue Sterling n'étant pas en toute direction est celle située aux angles de la rue Platinum et Solara; et

ATTENDU QU'afin de maintenir les normes de sécurité des résidents dans le village Morris et de ralentir la vitesse de circulation des véhicules dans la partie descendante et courbée de la rue Sterling;

QU'IL SOIT RÉSOLU que le conseil municipal mandate le département d'infrastructure et d'aménagement du territoire d'installer deux arrêts sur la rue Sterling en direction Nord et Sud à l'intersection des rues Platinum et Solara afin de maintenir l'uniformité des intersections dans ce quartier.

6. Rapport des Comtés unis de Prescott et Russell

Rapports des Comités/Services

7.1.	Ajout d'un groupe préscolaire – Service de Garderies	9
7.2.	Pistolet à rétro-réflectivité pour enseignes et logiciel	15
7.3.	Nouvelle politique sur les régimes de travail non conventionnels	33
7.4.	Évaluation de la vitesse sur la Montée Outaouais	57
7.5.	Phase 2 des sites à long terme de dépôt à neige	69
7.6.	Direction stratégique du département d'infrastructure et aménagement du territoire	83
7.7.	Demande de fonds supplémentaires – Cour extérieure du nouveau garage des Services communautaires	99
7.8.	Rapport de mise à jour sur le plan stratégique	105
7.9.	Rapport annuel - Site d'enfouissement	199

7.10. Ébauche du budget préliminaire 2021

Veuillez noter que l'ébauche du budget préliminaire 2021 sera disponible le lundi 19 octobre 2020.

8. Autres items

9. Ajournement



Declaration of pecuniary interest Déclaration d'intérêt pécuniaire

Date of meeting	
Date de la réunion:	
Item Number	
Numéro de l'item:	
Subject of the item:	
Sujet de l'item :	
Name of Council Member	
Nom du membre du conseil	

I, _____, hereby declare a pecuniary interest in the matter identified above for the following reason :

Je, _____, déclare un intérêt pécuniaire en ce qui concerne l'article cihaut mentionné, pour la raison suivante :

Name (print)	Signature	Date		

This declaration is filed in accordance with the *Municipal Conflict of Interest Act* and will be recorded in the meeting minutes and will be made available in a public registry. / Cette déclaration est soumise sous la *Loi sur les conflits d'intérêt municipaux* et sera enregistrée dans le procès-verbal de la réunion et sera disponible dans un registre public.

Excerpt from the Municipal Conflict of Interest Act, R.S.O. 1990, c. M.50

DUTY OF MEMBER

When present at meeting at which matter considered

5 (1) Where a member, either on his or her own behalf or while acting for, by, with or through another, has any pecuniary interest, direct or indirect, in any matter and is present at a meeting of the council or local board at which the matter is the subject of consideration, the member,

- (a) shall, prior to any consideration of the matter at the meeting, disclose the interest and the general nature thereof;
- (b) shall not take part in the discussion of, or vote on any question in respect of the matter; and
- (c) shall not attempt in any way whether before, during or after the meeting to influence the voting on any such question. R.S.O. 1990, c. M.50, s. 5 (1).

Where member to leave closed meeting

(2) Where the meeting referred to in subsection (1) is not open to the public, in addition to complying with the requirements of that subsection, the member shall forthwith leave the meeting or the part of the meeting during which the matter is under consideration. R.S.O. 1990, c. M.50, s. 5 (2).

Extrait de la Loi sur les conflits d'intérêts municipaux, L.R.O. 1990, chap. M.50

OBLIGATIONS DU MEMBRE

Participation à une réunion où l'affaire est discutée

5 (1) Le membre qui, soit pour son propre compte soit pour le compte d'autrui ou par personne interposée, seul ou avec d'autres, a un intérêt pécuniaire direct ou indirect dans une affaire et participe à une réunion du conseil ou du conseil local où l'affaire est discutée, est tenu aux obligations suivantes :

- a) avant toute discussion de l'affaire, déclarer son intérêt et en préciser la nature en termes généraux;
- b) ne pas prendre part à la discussion ni voter sur une question relative à l'affaire;
- c) ne pas tenter, avant, pendant ni après la réunion, d'influencer de quelque façon le vote sur une question relative à l'affaire. L.R.O. 1990, chap. M.50, par. 5 (1).

Exclusion de la réunion à huis clos

(2) Si la réunion visée au paragraphe (1) se tient à huis clos, outre les obligations que lui impose ce paragraphe, le membre est tenu de quitter immédiatement la réunion ou la partie de la réunion où l'affaire est discutée. L.R.O. 1990, chap. M.50, par. 5 (2).

RAPPORT N° Cliquez ici pour entrer du texte.



Date	07/10/2020
Soumis par	Pierre Boucher
Objet	Ajout d'un groupe préscolaire – Service de Garderies
# du dossier	GAR-RES

1) **NATURE / OBJECTIF :**

Le « Conseil scolaire de district catholique de l'Est ontarien » (CSDCEO) a fait une demande en date du 1^{er} octobre 2020 à la Cité de Clarence-Rockland afin de voir la possibilité d'ajouter un groupe de préscolaire à la licence de garderie déjà existante à l'école élémentaire Sacré-Cœur de Bourget.

2) **DIRECTIVE/POLITIQUE ANTÉCÉDENTE :** N/A

3) **RECOMMANDATION DU SERVICE :**

ATTENDU QUE le CSDCEO a fait une demande aux Services communautaires d'ajouter un groupe préscolaire à la garderie de l'école Sacré-Cœur de Bourget pour un maximum de 16 enfants ; et

ATTENDU QUE le CSDCEO sera responsable de tous les frais reliés à la construction du local ; et

ATTENDU QUE les CUPR ont confirmé qu'il y a des fonds disponibles pour l'aménagement du local et l'équipement nécessaire pour l'ouverture d'un nouveau groupe préscolaire ;

QU'IL SOIT RÉSOLU que le comité plénier recommande au conseil municipal d'accepter l'ajout d'un groupe ainsi que d'un local à la licence du Service afin d'offrir le service convoité.

WHEREAS the *CSDCEO* made a request to Community Services to add a preschool group at the daycare located at Sacré-Coeur school in Bourget, for a maximum of 16 children; and

WHEREAS the *CSDCEO* will be responsible for all costs related to the construction of the premises; and

WHEREAS the UCPR have confirmed that there are funds available for the preparation of the premises as well as the equipment required for the opening of a new preschool group; **BE IT RESOLVED** that the Committee of the Whole recommends that Municipal Council accepts the addition of a group as well as a hall to the Service's license in order to provide the requested service.

4) **HISTORIQUE**:

Il est le souhait du CSDCEO d'avoir un pourvoyeur unique pour la gestion des services de garderies dans l'école de Bourget. Le Service de Garderies de la Cité Clarence-Rockland offre un service de garde parascolaire depuis 2006 et ce partenariat est un succès.

Le CSDCEO souhaite maintenant offrir un service de garde aux enfants de 30 mois à 4 ans afin de répondre à la demande des familles de la Cité.

5) **DISCUSSION**:

Cet ajout permettrait à la garderie Sacré-Cœur de Bourget d'accueillir les enfants 30 mois à 4 ans (préscolaire) et d'ajouter 16 enfants de plus à la licence.

Il serait prévu que ces services soient en place pour l'année scolaire 2021-2022.

Le Service de Garderies de la Cité de Clarence-Rockland gère la garderie Sacré-Cœur de Bourget depuis août 2006. Le partenariat du Service de Garderies entre le CSDCEO et la Cité fut toujours positif et la Cité s'est toujours assurée d'offrir des services de qualité pour répondre aux besoins des enfants et des familles de la municipalité.

CARACTÉRISTIQUES DE LA PROPRIÉTÉ

Les plans d'aménagement pour la salle du groupe préscolaire a été présentés à notre service pour nos commentaires et nos recommandations.

Il est la responsabilité du conseil scolaire de faire les applications visà-vis les permis et les approbations nécessaires pour commencer le projet de construction.

Le CSDCEO travaille présentement sur l'élaboration d'un plan pour démarrer un groupe préscolaire. Un local sera dédié pour ce groupe à l'intérieur de l'école Sacré-Cœur de Bourget. Le CSDCEO travaillera en étroite collaboration avec le Ministère de l'Éducation et le Service de Garderies de la Cité de Clarence-Rockland afin de s'assurer de rencontrer les normes du Ministère. 6) **CONSULTATION :** N/A

7) **RECOMMANDATION OU COMMENTAIRES DU COMITÉ :** N/A

8) **IMPACT FINANCIER (monétaire/matériaux/etc.)**:

Puisque ce rapport recommande la gestion d'un programme additionnel de 2 groupes de 8 enfants et que, selon notre évaluation, ces groupes préscolaires s'autofinancent donc le Service ne prévoit pas de pressions budgétaires reliées à cet ajout.

La garderie serait accréditée pour accueillir 16 enfants de plus qu'à la licence actuelle.

Les taux chargés pour ce service seront les mêmes que tous les programmes préscolaires actuels offerts par la Cité.

Il est important de noter que tous les coûts rattachés à la construction du local ainsi que le terrassement de l'aire de jeu seront la responsabilité du CSDCEO.

Nous avons également reçu la confirmation que les CUPR ont les fonds de démarrage du Ministère de l'Éducation pour l'aménagement et l'équipement de nouveaux programmes. Une demande d'aide financière pour les achats d'équipement et aménagement des locaux prévus pour le groupe préscolaire a été envoyée au CUPR.

9) **IMPLICATIONS LÉGALES :**

La Cité a déjà une entente de service avec le CSDCEO pour la gestion du service de garde dans l'école élémentaire Sacré-Cœur de Bourget.

Si le conseil municipal accepte que le Service de Garderies de la Cité opère le programme préscolaire à l'école Sacré-Cœur de Bourget, nous nous baserons sur les mêmes clauses de l'entente convenue pour le programme existant de ce même conseil scolaire.

10) **GESTION DU RISQUE (RISK MANAGEMENT)**:

Le Service de Garderies de Clarence-Rockland croit en l'importance de prioriser des services de garde de qualité et sécuritaire dans les établissements scolaires de la Cité.

- 11) **IMPLICATIONS STRATÉGIQUES :** N/A
- 12) **DOCUMENTS D'APPUI:** <u>ANNEXE « A »</u> - Lettre CSDCEO



Le 1 octobre 2020

M. Pierre Boucher Directeur des Services communautaires Cité de Clarence-Rockland 1560, rue Laurier Rockland (Ontario) K4K 1P7

Objet : Création d'un local pour un groupe d'âge familial à l'École élémentaire catholique Sacré-Coeur de Bourget / Entente de services

Monsieur,

En suivi à la demande conjointe présentée par le Conseil scolaire de district catholique de l'Est ontarien (CSDCEO) auprès du ministère de l'Éducation de l'Ontario (MÉO) afin d'obtenir du financement pour des projets de construction d'immobilisations pour les programmes de garde d'enfants et pour l'enfance et la famille, le CSDCEO confirme que le MÉO a approuvé le financement pour la création d'un local pour un groupe d'âge familial à l'École élémentaire catholique Sacré-Cœur de Bourget afin de réaliser ce projet.

À cet effet, le CSDCEO désire vous offrir la possibilité d'intervenir une entente de services pour la gestion d'un service de garde agréé pour un groupe d'âge familial (enfants de moins de 18 mois à cinq ans) à l'École élémentaire catholique Sacré-Coeur, dès que la construction sera complétée, en 2021.

Si des informations additionnelles s'avèrent nécessaires, n'hésitez pas à communiquer avec nous.

Veuillez agréer, Monsieur, l'expression de nos sentiments les meilleurs.

Le surintendant des affaires et trésorier,

Martin Lavigne

/cl

c.c. Mme Annie Dugas, surintendante adjointe Mme Julie Marleau, gestionnaire, Service de garde et liaisons communautaires Mme Anne Morris-Bouchard, gérante du Service de garderies, Cité de Clarence-Rockland

Ensemble, nous faisons toute une différence!

875, chemin de comté 17, L'Orignal (Ontario) KOB 1KO **Téléphone** : 613 675-4691 ou sans frais 1 800 204-4098 · **Télécopieur** : 613 675-2921 **Courriel** : courriel@csdceo.org · **Internet** : www.csdceo.ca





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REPORT Nº INF2020-37

Date	Date 07/10/2020				
Submitted by	Raymond Garner				
Subject	Retro softwa	reflectivity re	signs	gun	and
File N°					

1) **NATURE/GOAL**:

The purpose of this report is to transfer the approved funds from the 2020 Capital budget from the Air Pak Compressor to the purchase of a Retro Reflectivity Signs gun with the software.

2) **DIRECTIVE/PREVIOUS POLICY**:

N/A

3) **DEPARTMENT'S RECOMMENDATION :**

WHEREAS as per section 11 of the Ontario Regulation 239/02, the municipality is required to inspect its signs on an annual basis to see if they meet the retro-reflectivity requirements of the Ontario Traffic Manual; and

WHEREAS there is a need to purchase a Retro Reflectivity Signs gun to meet the provincial requirements in keeping signs in good order; and

WHEREAS the amount of \$20,000 was approved in the 2020 Capital budget for the replacement of the Air Pak Compressor;

THAT the Committee of the Whole recommends that Council approves the transfer the approved funds from the 2020 Capital budget for the Air Pak Compressor of \$20,000 towards the purchase of a Retro Reflectivity Signs gun and software in order to allow the department to meet the Provincial minimum maintenance standards as per O.Reg. 239/2.

ATTENDU QUE d'après l'article 11 du Règlement de l'Ontario 239/02, la municipalité doit inspecter ses panneaux sur une base annuelle afin de vérifier si ceux-ci rencontrent les exigences de rétro-réflectivité du Manuel de circulation de l'Ontario; et

ATTENDU QU'il y a un besoin d'acheter un pistolet à rétro-réflectivité pour répondre aux exigences provinciales et garder les panneaux en bon état; et

ATTENDU QU'un montant de 20 000 \$ a été approuvé au budget capital 2020 pour le remplacement du compresseur Air Pak;

QUE le Comité plénier recommande au Conseil d'approuver le transfert des fonds approuvés au budget Capital 2020 pour le compresseur Air Pak de 20 000 \$, envers l'achat d'un pistolet de rétro-réflectivité pour enseigne accompagné du logiciel afin de permettre au département de réponde aux normes provinciales minimales de gestion de l'entretien selon le Règlement de l'Ontario 239/02.

4) **BACKGROUND**:

The Capital Budget for 2020 for the purchase of an Air Pak Compressor was approved by Council on November 18, 2019

5) **DISCUSSION :**

The Department is proposing to replace the funds for the Air Pak Compressor approved in the 2020 budget during budget deliberation, for the purchase of a Retro Reflectivity Signs gun and software. Public Works has an obligation to keep the roads safe and this includes the retro reflectivity of signs in which the Provincial minimum standards to review and repair all road signs every year (O. Reg. 239/02).

The Department was hiring every two years a company to do the retro reflectivity at a cost of \$19,000 per inspection. This did not meet the minimum standards and puts the City at risk of insurance claims or legal action against it due to accidents and injuries.

By purchasing a Retro Reflectivity Signs gun and software, city staff will be able to perform the yearly inspections. In order to purchase a new Retro Reflectivity Signs gun and software and have it in service before the summer ends, the Department recommends transferring the funds from the 2020 Capital Budget Air Pak Compressor.

6) **CONSULTATION:**

The Department is currently undergoing an operational review with a Consultant.

7) **RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS :** N/A

8) **FINANCIAL IMPACT** (expenses/material/etc.):

No financial impact, the funds will be taken from the 2020 Capital budget for the Air Pak Compressor of \$20,000 to the purchase of the greater need of a Retro Reflectivity Signs gun and software.

9) **LEGAL IMPLICATIONS :**

The City has a legal requirement to inspect signs to see that they meet the retro-reflectivity requirements of the Ontario Traffic Manual, once per calendar year as per the Provincial Minimum Standards under O. Reg. 239/2.

10) **RISK MANAGEMENT :**

Not replacing or maintaining the road signs significantly increases the City's risks for potential insurance claims or legal action.

11) **STRATEGIC IMPLICATIONS :**

N/A

12) **SUPPORTING DOCUMENTS:**

Attachment 1 – Municipal Act, 2001 on ONTARIO REGULATION 239/02 - Minimum maintenance standards for municipal highways

ATTACHMENT 1

Municipal Act, 2001 Loi de 2001 sur les municipalités

ONTARIO REGULATION 239/02

MINIMUM MAINTENANCE STANDARDS FOR MUNICIPAL HIGHWAYS

Consolidation Period: From May 3, 2018 to the e-Laws currency date.

Last amendment: 366/18.

Legislative History: 288/03, 613/06, 23/10, 47/13, 366/18.

This Regulation is made in English only.

Definitions

1. (1) In this Regulation,

"bicycle facility" means the on-road and in-boulevard cycling facilities listed in Book 18 of the Ontario Traffic Manual;

"bicycle lane" means,

- (a) a portion of a roadway that has been designated by pavement markings or signage for the preferential or exclusive use of cyclists, or
- (b) a portion of a roadway that has been designated for the exclusive use of cyclists by signage and a physical or marked buffer;

"cm" means centimetres;

- "day" means a 24-hour period;
- "encroachment" means anything that is placed, installed, constructed or planted within the highway that was not placed, installed, constructed or planted by the municipality;
- "ice" means all kinds of ice, however formed;
- "motor vehicle" has the same meaning as in subsection 1 (1) of the *Highway Traffic Act*, except that it does not include a motor assisted bicycle;
- "non-paved surface" means a surface that is not a paved surface;
- "Ontario Traffic Manual" means the Ontario Traffic Manual published by the Ministry of Transportation, as amended from time to time;
- "paved surface" means a surface with a wearing layer or layers of asphalt, concrete or asphalt emulsion;
- "pothole" means a hole in the surface of a roadway caused by any means, including wear or subsidence of the road surface or subsurface;
- "roadway" has the same meaning as in subsection 1 (1) of the Highway Traffic Act;
- "shoulder" means the portion of a highway that provides lateral support to the roadway and that may accommodate stopped motor vehicles and emergency use;
- "sidewalk" means the part of the highway specifically set aside or commonly understood to be for pedestrian use, typically consisting of a paved surface but does not include crosswalks, medians, boulevards, shoulders or any part of the sidewalk where cleared snow has been deposited;
- "significant weather event" means an approaching or occurring weather hazard with the potential to pose a significant danger to users of the highways within a municipality;
- "snow accumulation" means the natural accumulation of any of the following that, alone or together, covers more than half a lane width of a roadway:
 - 1. Newly-fallen snow.
 - 2. Wind-blown snow.

3. Slush;

"substantial probability" means a significant likelihood considerably in excess of 51 per cent;

"surface" means the top of a sidewalk, roadway or shoulder;

"utility" includes any air, gas, water, electricity, cable, fiber-optic, telecommunication or traffic control system or subsystem, fire hydrants, sanitary sewers, storm sewers, property bars and survey monuments;

"utility appurtenance" includes maintenance holes and hole covers, water shut-off covers and boxes, valves, fittings, vaults, braces, pipes, pedestals, and any other structures or items that form part of or are an accessory part of any utility;

"weather" means air temperature, wind and precipitation.

"weather hazard" means the weather hazards determined by Environment Canada as meeting the criteria for the issuance of an alert under its Public Weather Alerting Program. O. Reg. 239/02, s. 1 (1); O. Reg. 23/10, s. 1 (1); O. Reg. 47/13, s. 1; O. Reg. 366/18, s. 1 (1, 2).

(2) For the purposes of this Regulation, every highway or part of a highway under the jurisdiction of a municipality in Ontario is classified in the Table to this section as a Class 1, Class 2, Class 3, Class 4, Class 5 or Class 6 highway, based on the speed limit applicable to it and the average daily traffic on it. O. Reg. 239/02, s. 1 (2); O. Reg. 366/18, s. 1 (3).

(3) For the purposes of subsection (2) and the Table to this section, the average daily traffic on a highway or part of a highway under municipal jurisdiction shall be determined,

- (a) by counting and averaging the daily two-way traffic on the highway or part of the highway; or
- (b) by estimating the average daily two-way traffic on the highway or part of the highway. O. Reg. 239/02, s. 1 (3); O. Reg. 23/10, s. 1 (2); O. Reg. 366/18, s. 1 (3).

(4) For the purposes of this Regulation, unless otherwise indicated in a provision of this Regulation, a municipality is deemed to be aware of a fact if, in the absence of actual knowledge of the fact, circumstances are such that the municipality ought reasonably to be aware of the fact. O. Reg. 366/18, s. 1 (4).

0.1 1				0.1 5	0.1 (0.1 7	C 1 0
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column /	Column 8
Average Daily Traffic (number	91 - 100 km/h	81 - 90 km/h	71 - 80 km/h	61 - 70 km/h	51 - 60	41 - 50 km/h	1 - 40 km/h
of motor vehicles)	speed limit	speed limit	speed limit	speed limit	km/h speed	speed limit	speed limit
	1	1	1	-	limit	-	1
53,000 or more	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	5
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

TABLE CLASSIFICATION OF HIGHWAYS

O. Reg. 366/18, s. 1 (5).

Application

2. (1) This Regulation sets out the minimum standards of repair for highways under municipal jurisdiction for the purpose of clause 44 (3) (c) of the Act. O. Reg. 288/03, s. 1.

(2) REVOKED: O. Reg. 23/10, s. 2.

(3) This Regulation does not apply to Class 6 highways. O. Reg. 239/02, s. 2 (3).

Purpose

2.1 The purpose of this Regulation is to clarify the scope of the statutory defence available to a municipality under clause 44 (3) (c) of the Act by establishing maintenance standards which are non-prescriptive as to the methods or materials to be used in complying with the standards but instead describe a desired outcome. O. Reg. 366/18, s. 2.

MAINTENANCE STANDARDS

Patrolling

3. (1) The standard for the frequency of patrolling of highways to check for conditions described in this Regulation is set out in the Table to this section. O. Reg. 23/10, s. 3(1); O. Reg. 366/18, s. 3(2).

(2) If it is determined by the municipality that the weather monitoring referred to in section 3.1 indicates that there is a substantial probability of snow accumulation on roadways, ice formation on roadways or icy roadways, the standard for patrolling highways is, in addition to that set out in subsection (1), to patrol highways that the municipality selects as representative of its highways, at intervals deemed necessary by the municipality, to check for such conditions. O. Reg. 47/13, s. 2; O. Reg. 366/18, s. 3 (2).

(3) Patrolling a highway consists of observing the highway, either by driving on or by electronically monitoring the highway, and may be performed by persons responsible for patrolling highways or by persons responsible for or performing highway maintenance activities. O. Reg. 23/10, s. 3 (1).

(4) This section does not apply in respect of the conditions described in section 10, subsections 11 (0.1) and 12 (1) and section 16.1, 16.2, 16.3 or 16.4. O. Reg. 23/10, s. 3 (1); O. Reg. 366/18, s. 3 (3).

TABLE PATROLLING FREQUENCY

Class of Highway	Patrolling Frequency
1	3 times every 7 days
2	2 times every 7 days
3	once every 7 days
4	once every 14 days
5	once every 30 days

O. Reg. 239/02, s. 3, Table; O. Reg. 23/10, s. 3 (2).

Weather monitoring

3.1 (1) From October 1 to April 30, the standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once every shift or three times per calendar day, whichever is more frequent, at intervals determined by the municipality. O. Reg. 47/13, s. 3; O. Reg. 366/18, s. 4.

(2) From May 1 to September 30, the standard is to monitor the weather, both current and forecast to occur in the next 24 hours, once per calendar day. O. Reg. 47/13, s. 3; O. Reg. 366/18, s. 4.

Snow accumulation, roadways

4. (1) Subject to section 4.1, the standard for addressing snow accumulation on roadways is,

- (a) after becoming aware of the fact that the snow accumulation on a roadway is greater than the depth set out in the Table to this section, to deploy resources as soon as practicable to address the snow accumulation; and
- (b) after the snow accumulation has ended, to address the snow accumulation so as to reduce the snow to a depth less than or equal to the depth set out in the Table within the time set out in the Table,
 - (i) to provide a minimum lane width of the lesser of three metres for each lane or the actual lane width, or
 - (ii) on a Class 4 or Class 5 highway with two lanes, to provide a total width of at least five metres. O. Reg. 47/13, s. 4; O. Reg. 366/18, s. 5 (1).

(2) If the depth of snow accumulation on a roadway is less than or equal to the depth set out in the Table to this section, the roadway is deemed to be in a state of repair with respect to snow accumulation. O. Reg. 47/13, s. 4.

(3) For the purposes of this section, the depth of snow accumulation on a roadway and, if applicable, lane width under clause (1) (b), may be determined in accordance with subsection (4) by a municipal employee, agent or contractor, whose duties or responsibilities include one or more of the following:

- 1. Patrolling highways.
- 2. Performing highway maintenance activities.
- 3. Supervising staff who perform activities described in paragraph 1 or 2. O. Reg. 47/13, s. 4; O. Reg. 366/18, s. 5 (2).
- (4) The depth of snow accumulation on a roadway and lane width may be determined by,
- (a) performing an actual measurement;
- (b) monitoring the weather; or
- (c) performing a visual estimate. O. Reg. 47/13, s. 4; O. Reg. 366/18, s. 5 (3).

- (5) For the purposes of this section, addressing snow accumulation on a roadway includes,
- (a) plowing the roadway;
- (b) salting the roadway;
- (c) applying abrasive materials to the roadway;
- (d) applying other chemical or organic agents to the roadway;
- (e) any combination of the methods described in clauses (a) to (d). O. Reg. 366/18, s. 5 (4).
- (6) This section does not apply to that portion of the roadway,
- (a) designated for parking;
- (b) consisting of a bicycle lane or other bicycle facility; or
- (d) used by a municipality for snow storage. O. Reg. 366/18, s. 5 (4).

TABLE SNOW ACCUMULATION - ROADWAYS

Class of Highway	Depth	Time
1	2.5 cm	4 hours
2	5 cm	6 hours
3	8 cm	12 hours
4	8 cm	16 hours
5	10 cm	24 hours

O. Reg. 47/13, s. 4; O. Reg. 366/18, s. 5 (5).

Snow accumulation on roadways, significant weather event

4.1 (1) If a municipality declares a significant weather event relating to snow accumulation, the standard for addressing snow accumulation on roadways until the declaration of the end of the significant weather event is,

- (a) to monitor the weather in accordance with section 3.1; and
- (b) if deemed practicable by the municipality, to deploy resources to address snow accumulation on roadways, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 7.

(2) If the municipality complies with subsection (1), all roadways within the municipality are deemed to be in a state of repair with respect to snow accumulation until the applicable time in the Table to section 4 expires following the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 7.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

- (a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and
- (b) address snow accumulation on roadways in accordance with section 4. O. Reg. 366/18, s. 7.

Snow accumulation, bicycle lanes

- **4.2** (1) Subject to section 4.3, the standard for addressing snow accumulation on bicycle lanes is,
- (a) after becoming aware of the fact that the snow accumulation on a bicycle lane is greater than the depth set out in the Table to this section, to deploy resources as soon as practicable to address the snow accumulation; and
- (b) after the snow accumulation has ended, to address the snow accumulation so as to reduce the snow to a depth less than or equal to the depth set out in the Table to this section to provide a minimum bicycle lane width of the lesser of 1 metre or the actual bicycle lane width. O. Reg. 366/18, s. 7.

(2) If the depth of snow accumulation on a bicycle lane is less than or equal to the depth set out in the Table to this section, the bicycle lane is deemed to be in a state of repair in respect of snow accumulation. O. Reg. 366/18, s. 7.

(3) For the purposes of this section, the depth of snow accumulation on a bicycle lane and, if applicable, lane width under clause (1) (b), may be determined in the same manner as set out in subsection 4 (4) and by the persons mentioned in subsection 4 (3), with necessary modifications. O. Reg. 366/18, s. 7.

- (4) For the purposes of this section, addressing snow accumulation on a bicycle lane includes,
- (a) plowing the bicycle lane;
- (b) salting the bicycle lane;
- (c) applying abrasive materials to the bicycle lane;

- (d) applying other chemical or organic agents to the bicycle lane;
- (e) sweeping the bicycle lane; or
- (f) any combination of the methods described in clauses (a) to (e). O. Reg. 366/18, s. 7.

		SNOW ACCUMULA
Column 1	Column 2	Column 3
Class of Highway or	Depth	Time
Adjacent Highway		
1	2.5 cm	8 hours
2	5 cm	12 hours
3	8 cm	24 hours
4	8 cm	24 hours
5	10 cm	24 hours

TABLE SNOW ACCUMULATION – BICYCLE LANES

O. Reg. 366/18, s. 7.

Snow accumulation on bicycle lanes, significant weather event

4.3 (1) If a municipality declares a significant weather event relating to snow accumulation, the standard for addressing snow accumulation on bicycle lanes until the declaration of the end of the significant weather event is,

- (a) to monitor the weather in accordance with section 3.1; and
- (b) if deemed practicable by the municipality, to deploy resources to address snow accumulation on bicycle lanes, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 7.

(2) If the municipality complies with subsection (1), all bicycle lanes within the municipality are deemed to be in a state of repair with respect to snow accumulation until the applicable time in the Table to section 4.2 expires following the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 7.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

- (a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and
- (b) address snow accumulation on bicycle lanes in accordance with section 4.2. O. Reg. 366/18, s. 7.

Ice formation on roadways and icy roadways

5. (1) The standard for the prevention of ice formation on roadways is doing the following in the 24-hour period preceding an alleged formation of ice on a roadway:

- 1. Monitor the weather in accordance with section 3.1.
- 2. Patrol in accordance with section 3.
- 3. If the municipality determines, as a result of its activities under paragraph 1 or 2, that there is a substantial probability of ice forming on a roadway, treat the roadway, if practicable, to prevent ice formation within the time set out in Table 1 to this section, starting from the time that the municipality determines is the appropriate time to deploy resources for that purpose. O. Reg. 366/18, s. 8.

(2) If the municipality meets the standard set out in subsection (1) and, despite such compliance, ice forms on a roadway, the roadway is deemed to be in a state of repair until the applicable time set out in Table 2 to this section expires after the municipality becomes aware of the fact that the roadway is icy. O. Reg. 366/18, s. 8.

(3) Subject to section 5.1, the standard for treating icy roadways is to treat the icy roadway within the time set out in Table 2 to this section, and an icy roadway is deemed to be in a state of repair until the applicable time set out in Table 2 to this section expires after the municipality becomes aware of the fact that a roadway is icy. O. Reg. 366/18, s. 8.

(4) For the purposes of this section, treating a roadway means applying material to the roadway, including but not limited to, salt, sand or any combination of salt and sand. O. Reg. 366/18, s. 8.

(5) For greater certainty, this section applies in respect of ice formation on bicycle lanes on a roadway, but does not apply to other types of bicycle facilities. O. Reg. 366/18, s. 8.

Class of Highway	Time
1	6 hours
2	8 hours
3	16 hours
4	24 hours

TABLE 1 ICE FORMATION PREVENTION

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5	24 hours

TABLE 2 TREATMENT OF ICY ROADWAYS

Class of Highway	Time	
1	3 hours	
2	4 hours	
3	8 hours	
4	12 hours	
5	16 hours	

O. Reg. 366/18, s. 8.

Icy roadways, significant weather event

5.1 (1) If a municipality declares a significant weather event relating to ice, the standard for treating icy roadways until the declaration of the end of the significant weather event is,

- (a) to monitor the weather in accordance with section 3.1; and
- (b) if deemed practicable by the municipality, to deploy resources to treat icy roadways, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 8.

(2) If the municipality complies with subsection (1), all roadways within the municipality are deemed to be in a state of repair with respect to any ice which forms or may be present until the applicable time in Table 2 to section 5 expires after the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 8.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

- (a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and
- (b) treat icy roadways in accordance with section 5. O. Reg. 366/18, s. 8.

Potholes

6. (1) If a pothole exceeds both the surface area and depth set out in Table 1, 2 or 3 to this section, as the case may be, the standard is to repair the pothole within the time set out in Table 1, 2 or 3, as appropriate, after becoming aware of the fact. O. Reg. 239/02, s. 6 (1); O. Reg. 366/18, s. 8 (1).

(1.1) For the purposes of this section, the surface area and depth of a pothole may be determined in accordance with subsections (1.2) and (1.3), as applicable, by a municipal employee, agent or contractor whose duties or responsibilities include one or more of the following:

- 1. Patrolling highways.
- 2. Performing highway maintenance activities.
- 3. Supervising staff who perform activities described in paragraph 1 or 2. O. Reg. 366/18, s. 8 (2).

(1.2) The depth and surface area of a pothole may be determined by,

- (a) performing an actual measurement; or
- (b) performing a visual estimate. O. Reg. 366/18, s. 8 (2).

(1.3) For the purposes of this section, the surface area of a pothole does not include any area that is merely depressed and not yet broken fully through the surface of the roadway. O. Reg. 366/18, s. 8 (2).

(2) A pothole is deemed to be in a state of repair if its surface area or depth is less than or equal to that set out in Table 1, 2 or 3, as appropriate. O. Reg. 239/02, s. 6 (2); O. Reg. 47/13, s. 6.

Class of	Surface Area	Depth	Time	
Highway		-		
1	600 cm ²	8 cm	4 days	
2	800 cm ²	8 cm	4 days	
3	1000 cm ²	8 cm	7 days	
4	1000 cm ²	8 cm	14 days	
5	1000 cm ²	8 cm	30 days	

TABLE 1 POTHOLES ON PAVED SURFACE OF ROADWAY

O. Reg. 239/02, s. 6, Table 1.

TABLE 2 POTHOLES ON NON-PAVED SURFACE OF ROADWAY

Class of Highway	Surface Area	Depth	Time
3	1500 cm ²	8 cm	7 days
4	1500 cm ²	10 cm	14 days
5	1500 cm ²	12 cm	30 days

O. Reg. 239/02, s. 6, Table 2.

 TABLE 3

 POTHOLES ON PAVED OR NON-PAVED SURFACE OF SHOULDER

Class of Highway	Surface Area	Depth	Time
1	1500 cm ²	8 cm	7 days
2	1500 cm ²	8 cm	7 days
3	1500 cm ²	8 cm	14 days
4	1500 cm ²	10 cm	30 days
5	1500 cm ²	12 cm	60 days

O. Reg. 239/02, s. 6, Table 3.

Shoulder drop-offs

7. (1) If a shoulder drop-off is deeper than 8 cm, for a continuous distance of 20 metres or more, the standard is to repair the shoulder drop-off within the time set out in the Table to this section after becoming aware of the fact. O. Reg. 366/18, s. 9 (1).

(2) A shoulder drop-off is deemed to be in a state of repair if its depth is less than 8 cm. O. Reg. 366/18, s. 9 (1).

(3) In this section,

"shoulder drop-off" means the vertical differential, where the paved surface of the roadway is higher than the surface of the shoulder, between the paved surface of the roadway and the paved or non-paved surface of the shoulder. O. Reg. 239/02, s. 7 (3).

TABLE SHOULDER DROP-OFFS

Class of Highway	Time
1	4 days
2	4 days
3	7 days
4	14 days
5	30 days

O. Reg. 366/18, s. 9 (2).

Cracks

8. (1) If a crack on the paved surface of a roadway is greater than 5 cm wide and 5 cm deep for a continuous distance of three metres or more, the standard is to repair the crack within the time set out in the Table to this section after becoming aware of the fact. O. Reg. 366/18, s. 10 (1).

(2) A crack is deemed to be in a state of repair if its width or depth is less than or equal to 5 cm. O. Reg. 366/18, s. 10 (1).

TABLE CRACKS

Column 1	Column 2
Class of Highway	Time
1	30 days
2	30 days
3	60 days
4	180 days
5	180 days

O. Reg. 366/18, s. 10 (2).

Debris

9. (1) If there is debris on a roadway, the standard is to deploy resources, as soon as practicable after becoming aware of the fact, to remove the debris. O. Reg. 239/02, s. 9 (1); O. Reg. 366/18, s. 11.

(2) In this section,

"debris" means any material (except snow, slush or ice) or object on a roadway,

- (a) that is not an integral part of the roadway or has not been intentionally placed on the roadway by a municipality, and
- (b) that is reasonably likely to cause damage to a motor vehicle or to injure a person in a motor vehicle. O. Reg. 239/02, s. 9 (2); O. Reg. 47/13, s. 9.

Luminaires

10. (0.1) REVOKED: O. Reg. 366/18, s. 12.

(1) The standard for the frequency of inspecting all luminaires to check to see that they are functioning is once per calendar year, with each inspection taking place not more than 16 months from the previous inspection. O. Reg. 366/18, s. 12.

(2) For conventional illumination, if three or more consecutive luminaires on the same side of a highway are not functioning, the standard is to repair the luminaires within the time set out in the Table to this section after becoming aware of the fact. O. Reg. 366/18, s. 12.

(3) For conventional illumination and high mast illumination, if 30 per cent or more of the luminaires on any kilometre of highway are not functioning, the standard is to repair the luminaires within the time set out in the Table to this section after becoming aware of the fact. O. Reg. 366/18, s. 12.

(4) Despite subsection (2), for high mast illumination, if all of the luminaires on consecutive poles on the same side of a highway are not functioning, the standard is to deploy resources as soon as practicable after becoming aware of the fact to repair the luminaires. O. Reg. 366/18, s. 12.

(5) Despite subsections (1), (2) and (3), for conventional illumination and high mast illumination, if more than 50 per cent of the luminaires on any kilometre of a Class 1 highway with a speed limit of 90 kilometres per hour or more are not functioning, the standard is to deploy resources as soon as practicable after becoming aware of the fact to repair the luminaires. O. Reg. 366/18, s. 12.

- (6) Luminaires are deemed to be in a state of repair,
- (a) for the purpose of subsection (2), if the number of non-functioning consecutive luminaires on the same side of a highway does not exceed two;
- (b) for the purpose of subsection (3), if more than 70 per cent of luminaires on any kilometre of highway are functioning;
- (c) for the purpose of subsection (4), if one or more of the luminaires on consecutive poles on the same side of a highway are functioning;
- (d) for the purpose of subsection (5), if more than 50 per cent of luminaires on any kilometre of highway are functioning.
 O. Reg. 366/18, s. 12.
- (7) In this section,

"conventional illumination" means lighting, other than high mast illumination, where there are one or more luminaires per pole;

"high mast illumination" means lighting where there are three or more luminaires per pole and the height of the pole exceeds 20 metres;

"luminaire" means a complete lighting unit consisting of,

(a) a lamp, and

(b) parts designed to distribute the light, to position or protect the lamp and to connect the lamp to the power supply. O. Reg. 239/02, s. 10 (7).

Class of Highway	Time
1	7 days
2	7 days
3	14 days
4	14 days
5	14 days

TABLE LUMINAIRES

Signs

11. (0.1) The standard for the frequency of inspecting signs of a type listed in subsection (2) to check to see that they meet the retro-reflectivity requirements of the Ontario Traffic Manual is once per calendar year, with each inspection taking place not more than 16 months from the previous inspection. O. Reg. 23/10, s. 7 (1); O. Reg. 47/13, s. 11 (1); O. Reg. 366/18, s. 13.

(0.2) A sign that has been inspected in accordance with subsection (0.1) is deemed to be in a state of repair with respect to the retro-reflectivity requirements of the Ontario Traffic Manual until the next inspection in accordance with that subsection, provided that the municipality does not acquire actual knowledge that the sign has ceased to meet these requirements. O. Reg. 47/13, s. 11 (2).

(1) If any sign of a type listed in subsection (2) is illegible, improperly oriented, obscured or missing, the standard is to deploy resources as soon as practicable after becoming aware of the fact to repair or replace the sign. O. Reg. 239/02, s. 11 (1); O. Reg. 23/10, s. 7 (2); O. Reg. 366/18, s. 13.

- (2) This section applies to the following types of signs:
- 1. Checkerboard.
- 2. Curve sign with advisory speed tab.
- 3. Do not enter.
- 3.1 Load Restricted Bridge.
- 3.2 Low Bridge.
- 3.3 Low Bridge Ahead.
- 4. One Way.
- 5. School Zone Speed Limit.
- 6. Stop.
- 7. Stop Ahead.
- 8. Stop Ahead, New.
- 9. Traffic Signal Ahead, New.
- 10. Two-Way Traffic Ahead.
- 11. Wrong Way.
- 12. Yield.
- 13. Yield Ahead.
- 14. Yield Ahead, New. O. Reg. 239/02, s. 11 (2); O. Reg. 23/10, s. 7 (3).

Regulatory or warning signs

12. (1) The standard for the frequency of inspecting regulatory signs or warning signs to check to see that they meet the retro-reflectivity requirements of the Ontario Traffic Manual is once per calendar year, with each inspection taking place not more than 16 months from the previous inspection. O. Reg. 23/10, s. 8; O. Reg. 47/13, s. 12 (1); O. Reg. 366/18, s. 13.

(1.1) A regulatory sign or warning sign that has been inspected in accordance with subsection (1) is deemed to be in a state of repair with respect to the retro-reflectivity requirements of the Ontario Traffic Manual until the next inspection in accordance with that subsection, provided that the municipality does not acquire actual knowledge that the sign has ceased to meet these requirements. O. Reg. 47/13, s. 12 (2).

(2) If a regulatory sign or warning sign is illegible, improperly oriented, obscured or missing, the standard is to repair or replace the sign within the time set out in the Table to this section after becoming aware of the fact. O. Reg. 23/10, s. 8; O. Reg. 366/18, s. 13.

(3) In this section,

"regulatory sign" and "warning sign" have the same meanings as in the Ontario Traffic Manual, except that they do not include a sign listed in subsection 11 (2) of this Regulation. O. Reg. 23/10, s. 8.

TABLE REGULATORY AND WARNING SIGNS

Class of Highway	Time
1	7 days
2	14 days

3	21 days
4	30 days
5	30 days

O. Reg. 239/02, s. 12, Table.

Traffic control signal systems

13. (1) If a traffic control signal system is defective in any way described in subsection (2), the standard is to deploy resources as soon as practicable after becoming aware of the defect to repair the defect or replace the defective component of the traffic control signal system. O. Reg. 239/02, s. 13 (1); O. Reg. 366/18, s. 13.

(2) This section applies if a traffic control signal system is defective in any of the following ways:

- 1. One or more displays show conflicting signal indications.
- 2. The angle of a traffic control signal or pedestrian control indication has been changed in such a way that the traffic or pedestrian facing it does not have clear visibility of the information conveyed or that it conveys confusing information to traffic or pedestrians facing other directions.
- 3. A phase required to allow a pedestrian or vehicle to safely travel through an intersection fails to occur.
- 4. There are phase or cycle timing errors interfering with the ability of a pedestrian or vehicle to safely travel through an intersection.
- 5. There is a power failure in the traffic control signal system.
- 6. The traffic control signal system cabinet has been displaced from its proper position.
- 7. There is a failure of any of the traffic control signal support structures.
- 8. A signal lamp or a pedestrian control indication is not functioning.
- 9. Signals are flashing when flashing mode is not a part of the normal signal operation. O. Reg. 239/02, s. 13 (2).

(3) Despite subsection (1) and paragraph 8 of subsection (2), if the posted speed of all approaches to the intersection or location of the non-functioning signal lamp or pedestrian control indication is less than 80 kilometres per hour and the signal that is not functioning is a green or a pedestrian "walk" signal, the standard is to repair or replace the defective component by the end of the next business day. O. Reg. 239/02, s. 13 (3); O. Reg. 366/18, s. 13.

(4) In this section and section 14,

"cycle" means a complete sequence of traffic control indications at a location;

"display" means the illuminated and non-illuminated signals facing the traffic;

- "indication" has the same meaning as in the *Highway Traffic Act*;
- "phase" means a part of a cycle from the time where one or more traffic directions receive a green indication to the time where one or more different traffic directions receive a green indication;
- "power failure" means a reduction in power or a loss in power preventing the traffic control signal system from operating as intended;

"traffic control signal" has the same meaning as in the *Highway Traffic Act*;

"traffic control signal system" has the same meaning as in the Highway Traffic Act. O. Reg. 239/02, s. 13 (4).

Traffic control signal system sub-systems

14. (1) The standard is to inspect, test and maintain the following traffic control signal system sub-systems once per calendar year, with each inspection taking place not more than 16 months from the previous inspection:

- 1. The display sub-system, consisting of traffic signal and pedestrian crossing heads, physical support structures and support cables.
- 2. The traffic control sub-system, including the traffic control signal cabinet and internal devices such as timer, detection devices and associated hardware, but excluding conflict monitors.
- 3. The external detection sub-system, consisting of detection sensors for all vehicles, including emergency and railway vehicles and pedestrian push- buttons. O. Reg. 239/02, s. 14 (1); O. Reg. 47/13, s. 13 (1); O. Reg. 366/18, s. 13.

(1.1) A traffic control signal system sub-system that has been inspected, tested and maintained in accordance with subsection (1) is deemed to be in a state of repair until the next inspection in accordance with that subsection, provided that the municipality does not acquire actual knowledge that the traffic control signal system sub-system has ceased to be in a state of repair. O. Reg. 47/13, s. 13 (2).

(2) The standard is to inspect, test and maintain conflict monitors every five to seven months and at least twice per calendar year. O. Reg. 239/02, s. 14 (2); O. Reg. 47/13, s. 13 (3); O. Reg. 366/18, s. 13.

(2.1) A conflict monitor that has been inspected, tested and maintained in accordance with subsection (2) is deemed to be in a state of repair until the next inspection in accordance with that subsection, provided that the municipality does not acquire actual knowledge that the conflict monitor has ceased to be in a state of repair. O. Reg. 47/13, s. 13 (4).

(3) In this section,

"conflict monitor" means a device that continually checks for conflicting signal indications and responds to a conflict by emitting a signal. O. Reg. 239/02, s. 14 (3).

Bridge deck spalls

15. (1) If a bridge deck spall exceeds both the surface area and depth set out in the Table to this section, the standard is to repair the bridge deck spall within the time set out in the Table after becoming aware of the fact. O. Reg. 239/02, s. 15 (1); O. Reg. 366/18, s. 13.

(2) A bridge deck spall is deemed to be in a state of repair if its surface area or depth is less than or equal to that set out in the Table. O. Reg. 239/02, s. 15 (2); O. Reg. 47/13, s. 14.

(3) In this section,

"bridge deck spall" means a cavity left by one or more fragments detaching from the paved surface of the roadway or shoulder of a bridge. O. Reg. 239/02, s. 15 (3).

Class of Highway	Surface Area	Depth	Time
1	600 cm ²	8 cm	4 days
2	800 cm ²	8 cm	4 days
3	1,000 cm ²	8 cm	7 days
4	1,000 cm ²	8 cm	7 days
5	1,000 cm ²	8 cm	7 days

TABLE BRIDGE DECK SPALLS

O. Reg. 239/02, s. 15, Table.

Roadway surface discontinuities

16. (1) If a surface discontinuity on a roadway, other than a surface discontinuity on a bridge deck, exceeds the height set out in the Table to this section, the standard is to repair the surface discontinuity within the time set out in the Table after becoming aware of the fact. O. Reg. 23/10, s. 9; O. Reg. 366/18, s. 13.

(1.1) A surface discontinuity on a roadway, other than a surface discontinuity on a bridge deck, is deemed to be in a state of repair if its height is less than or equal to the height set out in the Table to this section. O. Reg. 47/13, s. 15.

(2) If a surface discontinuity on a bridge deck exceeds five centimetres, the standard is to deploy resources as soon as practicable after becoming aware of the fact to repair the surface discontinuity on the bridge deck. O. Reg. 23/10, s. 9; O. Reg. 366/18, s. 13.

(2.1) A surface discontinuity on a bridge deck is deemed to be in a state of repair if its height is less than or equal to five centimetres. O. Reg. 47/13, s. 15.

(3) In this section,

"surface discontinuity" means a vertical discontinuity creating a step formation at joints or cracks in the paved surface of the roadway, including bridge deck joints, expansion joints and approach slabs to a bridge. O. Reg. 23/10, s. 9.

TABLE SURFACE DISCONTINUITIES

Class of Highway	Height	Time
1	5 cm	2 days
2	5 cm	2 days
3	5 cm	7 days
4	5 cm	21 days
5	5 cm	21 days

O. Reg. 239/02, s. 16, Table.

Sidewalk surface discontinuities

16.1 (1) The standard for the frequency of inspecting sidewalks to check for surface discontinuity is once per calendar year, with each inspection taking place not more than 16 months from the previous inspection. O. Reg. 23/10, s. 10; O. Reg. 47/13, s. 16 (1); O. Reg. 366/18, s. 13.

(1.1) A sidewalk that has been inspected in accordance with subsection (1) is deemed to be in a state of repair with respect to any surface discontinuity until the next inspection in accordance with that subsection, provided that the municipality does not acquire actual knowledge of the presence of a surface discontinuity in excess of two centimetres. O. Reg. 47/13, s. 16 (2).

(2) If a surface discontinuity on or within a sidewalk exceeds two centimetres, the standard is to treat the surface discontinuity within 14 days after acquiring actual knowledge of the fact. O. Reg. 366/18, s. 14.

(2.1) REVOKED: O. Reg. 366/18, s. 14.

(3) A surface discontinuity on or within a sidewalk is deemed to be in a state of repair if it is less than or equal to two centimetres. O. Reg. 366/18, s. 14.

(4) For the purpose of subsection (2), treating a surface discontinuity on or within a sidewalk means taking reasonable measures to protect users of the sidewalk from the discontinuity, including making permanent or temporary repairs, alerting users' attention to the discontinuity or preventing access to the area of discontinuity. O. Reg. 366/18, s. 14.

(5) In this section,

"surface discontinuity" means a vertical discontinuity creating a step formation at any joint or crack in the surface of the sidewalk or any vertical height difference between a utility appurtenance found on or within the sidewalk and the surface of the sidewalk. O. Reg. 366/18, s. 14.

Encroachments, area adjacent to sidewalk

16.2 (1) The standard for the frequency of inspecting an area adjacent to a sidewalk to check for encroachments is once per calendar year, with each inspection taking place not more than 16 months from the previous inspection. O. Reg. 366/18, s. 15.

(2) The area adjacent to a sidewalk that has been inspected in accordance with subsection (1) is deemed to be in a state of repair in respect of any encroachment present. O. Reg. 366/18, s. 15.

(3) For greater certainty, the area adjacent to a sidewalk begins at the outer edges of a sidewalk and ends at the lesser of the limit of the highway, the back edge of a curb if there is a curb and a maximum of 45 cm. O. Reg. 366/18, s. 15.

(4) The area adjacent to a sidewalk is deemed to be in a state of repair in respect of any encroachment present unless the encroachment is determined by a municipality to be highly unusual given its character and location or to constitute a significant hazard to pedestrians. O. Reg. 366/18, s. 15.

(5) If a municipality determines that an encroachment is highly unusual given its character and location or constitutes a significant hazard to pedestrians, the standard is to treat the encroachment within 28 days after making such a determination, and the encroachment is deemed in a state of repair for 28 days from the time of the determination by the municipality. O. Reg. 366/18, s. 15.

(6) For the purpose of subsection (4), treating an encroachment means taking reasonable measures to protect users, including making permanent or temporary repairs, alerting users' attention to the encroachment or preventing access to the area of the encroachment. O. Reg. 366/18, s. 15.

Snow accumulation on sidewalks

16.3 (1) Subject to section 16.4, the standard for addressing snow accumulation on a sidewalk after the snow accumulation has ended is,

- a) to reduce the snow to a depth less than or equal to 8 centimetres within 48 hours; and
- b) to provide a minimum sidewalk width of 1 metre. O. Reg. 366/18, s. 15.

(2) If the depth of snow accumulation on a sidewalk is less than or equal to 8 centimetres, the sidewalk is deemed to be in a state of repair in respect of snow accumulation. O. Reg. 366/18, s. 15.

(3) If the depth of snow accumulation on a sidewalk exceeds 8 centimetres while the snow continues to accumulate, the sidewalk is deemed to be in a state of repair with respect to snow accumulation, until 48 hours after the snow accumulation ends. O. Reg. 366/18, s. 15.

(4) For the purposes of this section, the depth of snow accumulation on a sidewalk may be determined in the same manner as set out in subsection 4 (4) and by the persons mentioned in subsection 4 (3) with necessary modifications. O. Reg. 366/18, s. 15.

(5) For the purposes of this section, addressing snow accumulation on a sidewalk includes,

- (a) plowing the sidewalk;
- (b) salting the sidewalk;
- (c) applying abrasive materials to the sidewalk;
- (d) applying other chemical or organic agents to the sidewalk; or
- (e) any combination of the methods described in clauses (a) to (d). O. Reg. 366/18, s. 15.

Snow accumulation on sidewalks, significant weather event

16.4 (1) If a municipality declares a significant weather event relating to snow accumulation, the standard for addressing snow accumulation on sidewalks until the declaration of the end of the significant weather event is,

- (a) to monitor the weather in accordance with section 3.1; and
- (b) if deemed practicable by the municipality, to deploy resources to address snow accumulation on sidewalks starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 15.

(2) If the municipality complies with subsection (1), all sidewalks within the municipality are deemed to be in a state of repair with respect to any snow present until 48 hours following the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 15.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

- (a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and
- (b) address snow accumulation on sidewalks in accordance with section 16.3. O. Reg. 366/18, s. 15.

Ice formation on sidewalks and icy sidewalks

16.5 (1) Subject to section 16.6, the standard for the prevention of ice formation on sidewalks is to,

- (a) monitor the weather in accordance with section 3.1 in the 24-hour period preceding an alleged formation of ice on a sidewalk; and
- (b) treat the sidewalk if practicable to prevent ice formation or improve traction within 48 hours if the municipality determines that there is a substantial probability of ice forming on a sidewalk, starting from the time that the municipality determines is the appropriate time to deploy resources for that purpose. O. Reg. 366/18, s. 15.

(2) If ice forms on a sidewalk even though the municipality meets the standard set out in subsection (1), the sidewalk is deemed to be in a state of repair in respect of ice until 48 hours after the municipality first becomes aware of the fact that the sidewalk is icy. O. Reg. 366/18, s. 15.

(3) The standard for treating icy sidewalks after the municipality becomes aware of the fact that a sidewalk is icy is to treat the icy sidewalk within 48 hours, and an icy sidewalk is deemed to be in a state of repair for 48 hours after it has been treated. O. Reg. 366/18, s. 15.

(4) For the purposes of this section, treating a sidewalk means applying materials including salt, sand or any combination of salt and sand to the sidewalk. O. Reg. 366/18, s. 15.

Icy sidewalks, significant weather event

16.6 (1) If a municipality declares a significant weather event relating to ice, the standard for addressing ice formation or ice on sidewalks until the declaration of the end of the significant weather event is,

- (a) to monitor the weather in accordance with section 3.1; and
- (b) if deemed practicable by the municipality, to deploy resources to treat the sidewalks to prevent ice formation or improve traction, or treat the icy sidewalks, starting from the time that the municipality deems appropriate to do so. O. Reg. 366/18, s. 15.

(2) If the municipality complies with subsection (1), all sidewalks within the municipality are deemed to be in a state of repair with respect to any ice which forms or is present until 48 hours after the declaration of the end of the significant weather event by the municipality. O. Reg. 366/18, s. 15.

(3) Following the end of the weather hazard in respect of which a significant weather event was declared by a municipality under subsection (1), the municipality shall,

- (a) declare the end of the significant weather event when the municipality determines it is appropriate to do so; and
- (b) address the prevention of ice formation on sidewalks or treat icy sidewalks in accordance with section 16.5. O. Reg. 366/18, s. 15.

Winter sidewalk patrol

16.7 (1) If it is determined by the municipality that the weather monitoring referred to in section 3.1 indicates that there is a substantial probability of snow accumulation on sidewalks in excess of 8 cm, ice formation on sidewalks or icy sidewalks, the standard for patrolling sidewalks is to patrol sidewalks that the municipality selects as representative of its sidewalks at intervals deemed necessary by the municipality. O. Reg. 366/18, s. 15.

(2) Patrolling a sidewalk consists of visually observing the sidewalk, either by driving by the sidewalk on the adjacent roadway or by driving or walking on the sidewalk or by electronically monitoring the sidewalk, and may be performed by persons responsible for patrolling roadways or sidewalks or by persons responsible for or performing roadway or sidewalk maintenance activities. O. Reg. 366/18, s. 15.

Closure of a highway

16.8 (1) When a municipality closes a highway or part of a highway pursuant to its powers under the Act, the highway is deemed to be in a state of repair in respect of all conditions described in this Regulation from the time of the closure until the highway is re-opened by the municipality. O. Reg. 366/18, s. 15.

- (2) For the purposes of subsection (1), a highway or part of a highway is closed on the earlier of,
- (a) when a municipality passes a by-law to close the highway or part of the highway; and
- (b) when a municipality has taken such steps as it determines necessary to temporarily close the highway or part of a highway. O. Reg. 366/18, s. 15.

Declaration of significant weather event

16.9. A municipality declaring the beginning of a significant weather event or declaring the end of a significant weather event under this Regulation shall do so in one or more of the following ways:

- 1. By posting a notice on the municipality's website.
- 2. By making an announcement on a social media platform, such as Facebook or Twitter.
- 3. By sending a press release or similar communication to internet, newspaper, radio or television media.
- 4. By notification through the municipality's police service.
- 5. By any other notification method required in a by-law of the municipality. O. Reg. 366/18, s. 15.

REVIEW OF REGULATION

Review

17. (1) The Minister of Transportation shall conduct a review of this Regulation and Ontario Regulation 612/06 (Minimum Maintenance Standards for Highways in the City of Toronto) made under the *City of Toronto Act, 2006* every five years. O. Reg. 613/06, s. 2.

(2) Despite subsection (1), the first review after the completion of the review started before the end of 2007 shall be started five years after the day Ontario Regulation 23/10 is filed. O. Reg. 23/10, s. 11.

18. OMITTED (PROVIDES FOR COMING INTO FORCE OF PROVISIONS OF THIS REGULATION). O. Reg. 239/02, s. 18.

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REPORT N° HR-2020-1005-01 New Alternative Working Arrangements Policy

Date	05/10/2020	
Submitted by	Michel Cousineau – CIO and Acting	
	Director, Human Resources	
Subject	New Policy	
File N°	Click here to enter text.	

1) **NATURE/GOAL**:

To obtain Council approval for the new Alternative Work Arrangements (AWA) Policy.

2) **DIRECTIVE/PREVIOUS POLICY :** N/A

3) **DEPARTMENT'S RECOMMENDATION :**

THAT the Committee of the Whole recommends that Council adopts the proposed Alternative Working Arrangements Policy as attached to Report No. HR-2020-1005-1.

QUE le Comité plénier recommande au Conseil d'adopter la politique Régimes de travail non conventionnels proposée, telle que jointe au rapport n° HR-2020-1005-1.

4) **BACKGROUND**:

Since the onset of the 2020 Covid-19 pandemic, organizations have the unprecedented challenge of finding safe, but creative and innovative ways of maintaining their operations and providing services to their clients. The traditional "Where", "When" and "how" of how they do business has had to transform.

One of the very few positive effects of this pandemic is the realization that people can work very efficiently and effectively from home and even, at times, outside of normal working hours.

As the City eventually returns to normal operations, it will need to address these new realities as well as new needs and expectations from its staff.

It is the new normal!

5) **DISCUSSION**:

AWAs are not new. It is just one of the many tools, organizations (including many Ontario municipalities) have been using to help attract and retain quality personnel.

However, AWAs are also a paradigm shift from traditional working conditions. Changes like this need proper planning to ensure we are able to keep proving services to our ratepayers.

As such, the City of Clarence-Rockland has created an AWA Program, which includes a policy as well as an associated set of guidelines for work arrangements that City staff can request and discuss with their managers. Those arrangements include:

- Flexible Hours;
- Compressed Schedules;
- Working Remotely.

All of these arrangements have already been used at one time or another at the City. Compressed Schedules are part of the CUPE Bargaining Agreement and managers typically try to accommodate flexible hours to assist with work-life balance. The same goes for working remotely, which is currently the City's de-facto reality.

NOTE: No AWA will be approved if it causes issues within the department. These issues include:

- Service disruptions (to both internal and external clients);
- Additional workload for colleague(s).

It is the responsibility of the requester and his/her manager to ensure these issues/risks are addressed before the AWA can be approved.

- 6) **CONSULTATION:** N/A
- 7) RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS : N/A

8) **FINANCIAL IMPACT** (expenses/material/etc.):

Additional expenses are minimal and can be covered by normal operation costs.

9) **LEGAL IMPLICATIONS :** N/A

10) **RISK MANAGEMENT :**

Every AWA application will be reviewed and analyzed to ensure any risks to City staff and operations are mitigated properly.

11) **STRATEGIC IMPLICATIONS**:

Policies and initiatives such as this one enable the City to be a palpable employment option in a competitive market.

12) **SUPPORTING DOCUMENTS:**

- City of Clarence-Rockland Alternative Working Arrangements Policy.docx
- City of Clarence-Rockland Alternative Working Arrangements Guidelines.docx
| | Nº Politique /
Policy Nº: | |
|--|------------------------------|---|
| CORPORATION
de la Cité de l of the City of
Clarence-Rockland | Titre / Title: | Régimes de travail non
conventionnels (RTNC) /
Alternative Work
Arrangements (AWA) |
| | Secteur/Sector: | Ressources humaines /
Human Resources |

	Nom/Name	Titre/Title	Date
Auteurs / Authors:			
Révisé par / Revised by:			
Autorisé par / Athorized by:			

1.0 Énoncé de politique	1.0 Policy Statement
La Corporation de la Cité de Clarence- Rockland (la Corporation) encourage et soutient l'équilibre travail-vie personnelle, et favorise les régimes de travail non conventionnels (RTNC), lorsque cela est	The Corporation of the City of Clarence- Rockland (the Corporation) promotes and supports work life balance and encourages alternative work
possible, sans compromettre les exigences opérationnelles et la prestation efficace de services à nos concitoyens et partenaires commerciaux.	compromising operational requirements and effective service delivery to our fellow citizens and business partners.
La Corporation et les personnes participant au programme de RTNC jouent un rôle clé dans la réussite et l'intégrité du programme.	Both the Corporation and the individual participating in the AWA program, play a key role in ensuring the success and the integrity of the program.

2.0 But/Objectif	2.0 Purpose/Objective
	The Corporation is committed to balancing the diverse needs of its employees to foster a culture of service excellence with a focus on; fellow citizens and business partners experience, work life balance, operational performance and staff engagement.
	The AWA Policy is key to meeting these Page 37ଫ଼ନିକାtments and supporting the

Corporation's objectives as an employer of choice by:
 Increasing the Corporation's ability to attract, retain, and engage high quality, high performing employees; Increasing employee engagement; Promoting diversity, innovation and inclusion; Improving operational performance though providing flexible work opportunities Reducing absenteeism; Promoting Work life balance; Addressing office space and operational needs.
The AWA Policy is not meant to be applied for medical accommodations purposes under the Ontario Human Rights Code. For medical accommodations, please refer to the Medical Accommodation Policy. Alternative work arrangements created as part of emergency and business continuity planning are not covered under this policy.

3.0 Définitions	3.0 Defi	nitions
	3.1	Alternative Work Arrangements (AWA, also known as a flexible work arrangements):
		Any work arrangement that differs from the Corporation's standard work schedule, working conditions and/or work location. When establishing flexible work arrangements, the Corporation seeks to provide the employees with means to achieve a balance between professional and personal responsibilities in a manner that benefits both the employee and the Corporation.
Page 3	88 of 661	Common types of AWA

	arrangements include:
3.2	Flextime/staggered hours:
	Flexible start and end times during the work day while the total work hours per day/week remain unchanged.
3.3	Compressed work week (or schedule):
	Working longer shifts per day in exchange for a reduced number of working days in the regular work cycle (weekly or biweekly basis).
3.4	Telework (also referred to as Telecommuting):
	Variety of work arrangements where the work is traditionally performed at one of the employer's work location may be changed to an alternate off- site/satellite location which may include the employee's home. Telework is described as the ability to work anytime, any place using remote access connectivity and mobile technology. Employees may perform telework on the following basis:
	 Emergency basis; Periodic basis; or Permanent basis.

4.0 Portée	4.0 Scope
	The AWA Policy applies to all employees of the Corporation and recognizes that service excellence, working effectively, attaining results and Work Life Balance are a shared responsibility.
	All AWA's will conform with employment laws and collective agreements in place where applicable.

5.0 Procédures et ligne directrices	5.0 Poli	cy Procedures/Guidelines
	The cor associa Guidelir employe understa how to a options Corpora	atent within the policy, the ted AWA Program (Policy and nes), are intended to assist ees and management in and each of the AWA options, apply and administer these consistently across the ation.
	5.1	Standard Provisions
	i)	All AWA requests submitted under the AWA Policy, will be considered and assessed based on; merit, operational requirements and capabilities of the department, the provisions of all relevant policies and guidelines, legislation, Terms and Conditions of Employment and/or relevant Collective Agreement provisions (if applicable).
	ii)	The AWA request must be made by the employee on a voluntary participation basis.
	iii)	All AWA requests require the written approval by their respective Manager or designate.
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	iv)	When a request to participate in the AWA Program on an infrequent, temporary or emergency basis, it may be verbally agreed to by the employee and their Manager or designate.
	v)	During the period the AWA Agreement is in place, the employee status, benefits, leave entitlements, eligibility for authorized overtime and salary are not altered.
	5.2	Occupational Safety and Health
	i)	The employee agrees to maintain a designated and dedicated workspace that meets occupational safety standards for the home office and office ergonomics.
	Ergon Worki Emerç	omic Considerations; ng Alone Call-In Procedures; and gency Preparedness.
	ii)	WSIB liability for work related accidents will continue to apply during the telecommuting work schedule as defined in this agreement.
	iii)	The Employer will not be responsible for any non-work- related injuries that may occur at home. Compensation will be limited to the approved telework times only and will be limited to designated telework workspace.
	iv)	The employee agrees to follow safe work practices and to promptly report any work-related
Page 41	of 661	accident that occurs at the telework (home) office to their supervisor and/or appropriate

		employer representative.
	V)	The employee agrees that joint on-site safety and suitability visits by the employer and/or the Health and Safety Committee Representatives may be performed prior to the commencement of telework and then on a regular basis, with advance notice. These visits will be to ensure that the home office meets basic safety standards and the designated home office is suitable for the tasks to be performed by the employee.
	vi)	Other on-site visits may also be made for the purpose of retrieving equipment and other Employer property in the event of the employee's illness, termination, or any other extraordinary circumstances.
	5.3	Technology, Equipment, Materials and Supports
	i)	The Employer and the employee will asses the equipment requirements in order to ensure that the proper equipment is in place for telework.
	ii)	All software used by the employee on Employer computers must be legally acquired and licensed by the Employer, and installed by appropriate Employer personnel.
	iii)	All the equipment provided for teleworking shall remain the property of the employer and must be returned should employment or the telework agreement terminate.
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iv)	Equipment and supplies provided by the Employer are to be used for the sole purpose of carrying out the Employer's work and shall not be utilized for personal use.
v)	The employee is responsible for all assets belonging to the Employer and will be responsible for the replacement value of those assets that cannot be accounted for.
	The cost of all equipment and supplies provided by the employer will be paid for and maintained by the Employer including the following
5.4	Costs and expenses
i)	The cost of all equipment and supplies provided by the employer will be paid for and maintained by the Employer (eg. Cell phone lines, long distance calls for work etc.).
ii)	The employee is expected to maintain the telework place including items such as; homeowner or tenant insurance, heat and hydro. The employees are also responsible in ensuring that teleworking/operating a home office, does not breach the terms of their household insurance policies.
iii)	The employee is responsible for any costs linked to home renovations required to have a home office.
iv)	The employee is responsible for the maintenance of their own

5.5 Confidentiality and Security

- The employee is responsible to secure and protect the property, documents and information belonging to the Employer.
- ii) Information must be managed and disposed of in accordance with Ontario government guidelines.
- iii) The employee will promptly report to their supervisor, any circumstances or incidents which may comprise the confidentiality of any property, documents or information in connection with their employment.

5.6 Personal / Family Responsibilities

 The employee is responsible to ensure that personal / family responsibilities are managed in a way which allows them to successfully meet their job responsibilities.

5.7 Tax Implications

 Telework may have tax implications for the employee. The employee is responsible for inquiring with the Canada Revenue Agency to obtain the necessary information regarding telework.

5.8 Amending or Cancelling an AWA Plan

Any approved AWA plans may be modified or cancelled by the Corporation or the employee with reasonable notice. Normally a minimum of ten working days' notice will be given before the cancellation or the amendment to take effect unless the change is due to an urgent operational need or emergency.

5.9 Renewal of an AWA Plan

The AWA agreement shall be for a defined period (one year or less) and may be subject to renewal. The intent to renew or terminate the AWA agreement, should be assessed one (1) month prior to the date the AWA agreement in place comes to an end. Failure to submitting a request for renewal within the above time period may cause some delays or cancel the AWA in place on the date which the agreement terminates.

Employees who participate in the AWA Program are required to sign the Terms of Agreement Form which can be found in the AWA Program (Policy and Guidelines).

Where an AWA request has been denied, a request for revision can be filed through the appeal process. Please refer to the AWA Program (Policy and Guidelines) for more details.

Managers who receive a request under the AWA Policy, should consult with the Director of HR for guidance prior to authorizing the said request. For additional information regarding the AWA guidelines, please refer to the

AWA Program.

Date:	Révisé par: / Reviewed by:	Rapport No. / Staff Report No.



CORPORATION de la Cité de l of the City of Clarence-Rockland

ALTERNATIVE WORK ARRANGEMENTS PROGRAM SEPTEMBER 2020

Corporation de la Cité / of the City of Clarence Rockland promotes and supports Work Life Balance and encourages alternative work arrangements without compromising effective service delivery.

INTRODUCTION

The Corporation is committed to balancing the diverse needs of its employees to foster a culture of service excellence with a focus on; fellow citizens and business partners experience, work life balance, operational performance and staff engagement.

The AWA Program is key to meeting these commitments and supporting the Corporation's objectives as an employer of choice by:

- Increasing the Corporation's ability to attract, retain, and engage high quality, high performing employees;
- Increasing employee engagement;
- Promoting diversity, innovation and inclusion;
- Improving operational performance though providing flexible work opportunities
- Reducing absenteeism;
- Promoting Work life balance;
- Addressing office space and operational needs.

The AWA Policy is not meant to be applied for medical accommodations purposes under the Ontario Human Rights Code. For medical accommodations, please refer to the Medical Accommodation Policy.

Alternative work arrangements created as part of emergency and business continuity planning is not covered under this policy.

DEFINITIONS

Alternative Work Arrangements (AWA, also known as a flexible work arrangements):

Any work arrangement that differs from the Corporation's standard work schedule, working conditions and/or work location. When establishing flexible work arrangements, the Corporation seeks to provide the employees with means to achieve a balance between professional and personal responsibilities in a manner that benefits both the employee and the Corporation.

Common types of AWA arrangements include:

Flextime/staggered hours:

Flexible start and end times during the work day while the total work hours per day/week remain unchanged.

Compressed work week (or schedule):

Working longer shifts per day in exchange for a reduced number of working days in the regular work cycle (weekly or biweekly basis).

Telework (also referred to as Telecommuting):

Variety of work arrangements where the work is traditionally performed at one of the employer's work location may be changed to an alternate off-site/satellite location which may include the employee's home. Telework is described as the ability to work anytime, any place using remote access connectivity and mobile technology. Employees may perform telework on the following basis:

- Infrequent basis;
- Emergency basis;
- Periodic basis; or
- Permanent basis.

SCOPE

The AWA Policy applies to all employees of the Corporation and recognizes that service excellence, working effectively, attaining results and Work Life Balance is a shared responsibility.

All AWA's will conform with employment laws and collective agreements in place where applicable.

GUIDELINES

The content within the policy, the associated AWA Plan and procedures, are intended to assist employees and management in understand each of the AWA options, how to apply and administer these options consistently across the Corporation.

Standard Provisions

All AWA requests submitted under the AWA Policy, will be considered and assessed based on; merit, operational requirements and capabilities of the department, the provisions of all relevant policies and guidelines, legislation, Terms and Conditions of Employment and/or relevant Collective Agreement provisions (if applicable).

The AWA request must be made by the employee on a voluntary participation basis.

All AWA request requires the written approval by their respective Manager or designate.

All AWA requests made on an infrequent, temporary or emergency basis may be verbally agreed to by the employee and their Manager or designate. When a request to participate in the AWA Program on an infrequent, temporary or emergency basis, it may be verbally agreed to by the employee and their Manager or designate.

During the period the AWA Agreement is in place, the employee status, benefits, leave entitlements, eligibility for authorized overtime and salary are not altered in any way.

Occupational Safety and Health

The employee agrees to maintain a designated and dedicated workspace that meets occupational safety standards for the home office and office ergonomics.

- . Ergonomic Considerations;
- . Working Alone Call-In Procedures; and
- . Emergency Preparedness.

WSIB liability for work related accidents will continue to apply during the telecommuting work schedule as defined in this agreement.

The Employer will not be responsible for any non-work-related injuries that may occur at home. Compensation will be limited to the approved telework times only and will be limited to designated telework workspace.

The employee agrees to follow safe work practices and to promptly report any workrelated accident that occurs at the telework (home) office to their supervisor and/or appropriate employer representative. The employee agrees that joint on-site safety and suitability visits by the employer and/or the Health and Safety Committee Representatives may be performed prior to the commencement of telework and then on a regular basis, with advance notice. These visits will be to ensure that the home office meets basic safety standards and the designated home office is suitable for the tasks to be performed by the employee.

Other on-site visits may also be made for the purpose of retrieving equipment and other Employer property in the event of the employee's illness, termination, or any other extraordinary circumstances.

Technology, Equipment, Materials and Supports

The Employer and the employee will assess the equipment requirements in order to ensure that the proper equipment is in place for telework.

All software used by the employee on Employer computers must be legally acquired and licensed by the Employer, and installed by appropriate Employer personnel.

All the equipment provided for teleworking shall remain the property of the employer and must be returned should employment or the telework agreement terminate. Equipment and supplies provided by the Employer are to be used for the sole purpose of carrying out the Employer's work and shall not be utilized for personal use.

The employee is responsible for all assets belonging to the Employer and will be responsible for the replacement value of those assets that cannot be accounted for.

The cost of all equipment and supplies provided by the employer will be paid for and maintained by the Employer including the following

Costs and expenses

The cost of all equipment and supplies provided by the employer will be paid for and maintained by the Employer (eg. Cell phone lines, long distance calls for work etc.).

The employee is expected to maintain the telework place including items such as; homeowner or tenant insurance, heat and hydro. The employees are also responsible in ensuring that teleworking/operating a home office, does not breach the terms of their household insurance policies.

The employee is responsible for any costs linked to home renovations required to have a home office.

The employee is responsible for the maintenance of their own equipment.

Confidentiality and Security

The employee is responsible to secure and protect the property, documents and information belonging to the Employer.

Information must be managed and disposed of in accordance with Ontario government guidelines.

The employee will promptly report to their supervisor, any circumstances or incidents which may comprise the confidentiality of any property, documents or information in connection with their employment.

Personal / Family Responsibilities

The employee is responsible to ensure that personal/family responsibilities are managed in a way which allows them to successfully meet their job responsibilities.

Tax Implications

Telework may have tax implications for the employee. The employee is responsible for inquiring with the Canada Revenue Agency to obtain the necessary information regarding telework.

Amending or Cancelling an AWA Plan

Any approved AWA plans may be modified or cancelled by the Corporation or the employee with reasonable notice. Normally a minimum of ten working days' notice will be given before the cancellation or the amendment to take effect unless the change is due to an urgent operational need or emergency.

Renewal of an AWA

The AWA agreement shall be for a defined period (one year or less) and may be subject to renewal. The intent to renew or terminate the AWA agreement, should be assessed one (1) month prior to the date the AWA agreement in place comes to an end. Failure to submitting a request for renewal within the above time period may cause some delays or cancel the AWA in place on the date which the agreement terminates.

AWA Agreements

Employees who participate in an AWA program is required to sign the Terms of Agreement Form which can be found in the AWA Program.

Where an AWA request has been denied, a request for revision can be filed through the appeal process by forwarding the said request in writing to the (Chief Administrative Officer) within ten (10) working days outlining the particulars of the appeal.

Manager who receive a request under the AWA Policy, should consult with the Director of HR for guidance prior to authorizing the said request.

For additional information regarding the AWA guidelines, please refer to the AWA Program.

POLICIES, STANDARDS AND LEGISLATION

The content within the policy and this document are intended to assist employees and management in understand each of the AWA options, how to apply and administer these options consistently across the Corporation.

Standard Provisions

All AWA requests submitted by an employee to her/his Manager or designate under the AWA Policy, will be considered and assessed based on; merit, operational requirements and capabilities of the department, Labour Laws and existing Collective Agreements (where applicable).

- AWA request must be made by the employee and based on a voluntary participation basis.
- All AWA request requires the written approval by their respective Manager or designate.
- AWA requests made on an infrequent, temporary or emergency basis may be verbally agreed to by the employee and their Manager or designate.

Amending or Cancelling an AWA Plan

Any approved AWA plans may be modified or cancelled by the Corporation or the employee with reasonable notice. Normally a minimum of ten working days' notice will be given before the cancellation or the amendment to take effect unless the change is due to an urgent operational need or emergency.

Renewal of an AWA

The AWA agreement shall be for a defined period (one year or less) and may be subject to renewal. The intent to renew or terminate the AWA agreement, should be assessed one (1) month prior to the date the AWA agreement in place comes to an end. Failure to submitting a request for renewal within the above time period may cause some delays or cancel the AWA in place on the date which the agreement terminates.

AWA Agreements

Employees who participate in an AWA program is required to sign the Terms of Agreement Form which can be found in the AWA Program.

Where an AWA request has been denied, a request for revision can be filed through the appeal process by forwarding the said request in writing to the (Chief Administrative Officer) within ten (10) working days outlining the particulars of the appeal.

Manager who receive a request under the AWA Policy, should consult with the Director of HR for guidance prior to authorizing the said request.

APPLICATION PROCESS

- The Employee should initiate the process by having a discussion with his/her manager to assess the possibility of an AWA. The discussion is an opportunity to discuss the details of the AWA as well as any operational considerations before an official request is made.
- The employee fills the AWA Request Form and submits it to his/her manager.
- The manager approves or rejects the request.
- If the request is approved, the employee and manager sign the agreement and enter into an official agreement for the period outlined in the agreement.
- If the request is rejected, the manager provides justification to the employee, who has the option to enter to the appeal process.

ROLES AND RESPONSIBILITIES

Employees

- Initiate the process by submitting a request to their manager;
- Once approved, acknowledge and comply with the alternative work arrangement policy and related process guidelines;
- Initiate the appeal process if the request is rejected.

Managers or designate

- Review AWA requests from their respective employees, consult with HR (as required) and determine if the request is eligible for approval (based on the established criteria);
- Provide approval or justification for rejection to the requester.

Human Resources Representative

• Provide advice and guidance to management and to employees interested in applying for, or already participating in, an alternate work arrangement.

Chief Administrative Officer

• Review all AWA appeals from Managers that have been declined.

APPEAL PROCESS

Where an AWA request from an employee has been denied, a request for revision can be filed through the appeal process by forwarding the said request in writing to their respective Directors within ten (10) working days outlining the particulars of the appeal. Where an AWA request from a Manager has been denied, the same process outlined above applies with the exception that the request is forwarded to the Chief Administrative Officer.



REPORT Nº INF2020-36

Date	12/10/2020
Submitted by	Julian Lenhart
Subject	Speed assessment Monté Outaouais
File N°	

1) **NATURE/GOAL**:

The goal of the report is to provide a recommendation to Council regarding speeding on Monté Outaouais.

2) **DIRECTIVE/PREVIOUS POLICY :** N/A

3) **DEPARTMENT'S RECOMMENDATION :**

WHEREAS speeding in excess of 13 km/h above the posted speeding limit was observed on Montée Outaouais;

THAT Committee of the Whole recommends that Council approves the installation of obstructions on Montée Outaouais to reduce the speed that drivers feel comfortable driving at under free-flowing conditions.

ATTENDU QUE des excès de vitesse de plus de 13 km / h au-dessus de la limite de vitesse affichée ont été observés sur la Montée Outaouais;

QUE le comité plénier recommande que le conseil approuve l'installation d'obstacles sur la Montée Outaouais afin de réduire la vitesse à laquelle les conducteurs se sentent à l'aise de conduire dans des conditions sans restriction.

4) **BACKGROUND**:

The City of Clarence-Rockland uses the 85th percentile speed method to assess and determine the speed at which 85 percent of drivers feel comfortable driving at under free-flowing conditions. Speeding is determined to being an issue if the 85th percentile measured speed is above the posted speed limit. Many studies show that, most people don't drive according to the posted speed limit, but account for the visual aspects of the road and a 'feel' for the road. The visual factors that influence speeds can include:

- Lane and shoulder configurations and widths
- Presence of vertical and horizontal curves
- Sight distance and obstructions
- Presence of surrounding developments to the roadway

The method that the City of Clarence-Rockland uses to influence and reduce the speed that people are driving at is the installation of physical obstructions. The City generally installs pedzones, speed humps or the combination of both pedzones and speed humps as physical obstructions.

5) **DISCUSSION**:

Montée Outaouais was assessed between August 6 and August 22, 2020, the following are the observations of this assessment;

Posted speed limit	50 km/h
85 th percentile speed	63 km/h
Annual Average Daily Traffic	409 vehicles
Total Vehicles	6571

As shown in the table above, the 85th percentile speed was measured at 63 km/h, 13 km/h above the posted speed limit. Given that the 85th percentile speed is above the posted speed limit, the Department recommends installing speed humps along with pedzones on Monté Outaouais.

6) **CONSULTATION:**

N/A

7) RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS : N/A

8) **FINANCIAL IMPACT (expenses/material/etc.):** No financial impact, the purchase and installation of the obstructions will be paid for from the department's operating budget.

9) **LEGAL IMPLICATIONS :** N/A

10) **RISK MANAGEMENT :**

Influencing and reducing the speed that drivers feel comfortable driving at under free-flowing conditions to the posted speed limit, increases safety and reduces the risks for vehicle collisions.

11) **STRATEGIC IMPLICATIONS :** N/A

12) **SUPPORTING DOCUMENTS:** N/A

For Project:	Ch. du Golf August St	ats				
Project Notes:						
Location/Name:	Incoming					
Report Generated:	2020-09-09	16:40				
Speed Intervals	1 km/h					
Time Intervals	Instant					
Traffic Report From	2020-08-06	12:00:00	through	2020-08-22	12:59:59	
85th Percentile Speed	63 km/h					
85th Percentile Vehicles	5584					
Max Speed	102 km/h	on	2020-08-20	14:47:01		
Total Vehicles	6571					
AADT:	409					
Volumes -						
weekly counts						
-	Time	5 Day	7 Day			
Average Daily		424	389			
AM Peak	11:00	31	30			
PM Peak	02:00	35	32			
Speed						
Speed Limit:	50					
85th Percentile Speed:	63					
Average Speed:	53.76					
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Count over limit	499	597	619	835	910	555
% over limit	67.6	66.1	65.4	68.9	71.4	64.2
Avg Speeder	59.0	58.8	58.5	59.8	59.2	58.8
Class Counts						
	Number		%			
VEH_SM	33		0.5			
VEH_MED	6304		95.9			
VEH_LG	234		3.6			
[VEH_SM=motorcycle,	VEH_MED = sedan,		VEH_LG = truck]			

Sunday
394
62.3
58.4

Day/Time Ending	85th pctl (km/h)	85th pctl cnts	Total Cnts	Max Speed	Avg Speeder	% Speed
2020-08-06 01:00:00 PM	64.0	30	35	70	59.1	62.9%
2020-08-06 02:00:00 PM	59.0	22	26	82	59.1	57.7%
2020-08-06 03:00:00 PM	63.0	28	33	70	58.4	57.6%
2020-08-06 04:00:00 PM	64.0	29	34	73	60.3	76.5%
2020-08-06 05:00:00 PM	64.0	26	31	73	59.4	74.2%
2020-08-06 06:00:00 PM	64.0	25	29	73	59.8	86.2%
2020-08-06 07:00:00 PM	65.0	18	21	74	59.9	85.7%
2020-08-06 08:00:00 PM	61.0	18	21	71	59.4	61.9%
2020-08-06 09:00:00 PM	64.0	10	12	67	60.4	83.3%
2020-08-06 10:00:00 PM	59.0	5	6	71	58.4	83.3%
2020-08-06 11:00:00 PM	63.0	3	3	63	56.0	100.0%
2020-08-07 12:00:00 AM	60.0	1	1	60	60.0	100.0%
2020-08-07 01:00:00 AM	**No Data**					
2020-08-07 02:00:00 AM	**No Data**					
2020-08-07 03:00:00 AM	71.0	1	1	71	71.0	100.0%
2020-08-07 04:00:00 AM	**No Data**					
2020-08-07 05:00:00 AM	**No Data**					
2020-08-07 06:00:00 AM	68.0	8	9	69	62.4	77.8%
2020-08-07 07:00:00 AM	62.0	16	19	71	59.1	63.2%
2020-08-07 08:00:00 AM	60.0	18	21	69	57.4	81.0%
2020-08-07 09:00:00 AM	65.0	26	30	80	61.2	60.0%
2020-08-07 10:00:00 AM	62.0	23	27	85	58.9	70.4%
2020-08-07 11:00:00 AM	64.0	20	23	76	60.6	65.2%
2020-08-07 12:00:00 PM	60.0	24	28	70	57.9	50.0%
2020-08-07 01:00:00 PM	64.0	29	34	69	58.4	70.6%
2020-08-07 02:00:00 PM	61.0	21	25	68	57.8	76.0%
2020-08-07 03:00:00 PM	65.0	37	43	78	60.1	76.7%
2020-08-07 04:00:00 PM	70.0	26	30	87	62.4	76.7%
2020-08-07 05:00:00 PM	62.0	38	45	77	59.1	73.3%
2020-08-07 06:00:00 PM	62.0	27	32	69	58.0	68.8%
2020-08-07 07:00:00 PM	69.0	18	21	89	61.0	85.7%
2020-08-07 08:00:00 PM	70.0	11	13	81	68.2	38.5%
2020-08-07 09:00:00 PM	61.0	12	14	67	58.3	71.4%
2020-08-07 10:00:00 PM	71.0	16	19	100	64.1	78.9%
2020-08-07 11:00:00 PM	55.0	3	3	55	53.0	66.7%
2020-08-08 12:00:00 AM	76.0	1	1	76	76.0	100.0%
2020-08-08 01:00:00 AM	**No Data**					
2020-08-08 02:00:00 AM	**No Data**					
2020-08-08 04:00:00 AM	65.0	2	2	65	62.0	100.0%
2020-08-08 05:00:00 AM	**No Data**					
2020-08-08 06:00:00 AM	63.0	7	8	66	61.8	50.0%
2020-08-08 07:00:00 AM	55.0	3	4	71	59.7	75.0%
2020-08-08 08:00:00 AM	60.0	9	11	76	59.8	72.7%
2020-08-08 09:00:00 AM	61.0	22	26	81	58.7	61 5%
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2020-08-08 02:00:00 PM	61.0	30	35	68	57.2	57.1%
2020-08-08 03:00:00 PM	61.0	22	26	71	58.2	73.1%
2020-08-08 04:00:00 PM	60.0	28	33	66	58.2	57.6%
2020-08-08 05:00:00 PM	67.0	20	24	69	61.5	70.8%
2020-08-08 06:00:00 PM	64.0	16	19	74	60.1	78.9%
2020-08-08 07:00:00 PM	61.0	11	13	78	59.2	69.2%
2020-08-08 08:00:00 PM	63.0	15	18	67	59.4	61.1%
2020-08-08 09:00:00 PM	60.0	17	20	66	57.6	50.0%
2020-08-08 10:00:00 PM	67.0	8	9	74	59.0	88.9%
2020-08-08 11:00:00 PM	62.0	3	4	75	65.7	75.0%
2020-08-09 12:00:00 AM	65.0	3	3	65	61.0	66.7%
2020-08-09 01:00:00 AM	53.0	3	3	53	53.0	33.3%
2020-08-09 02:00:00 AM	**No Data**					
2020-08-09 03:00:00 AM	**No Data**					
2020-08-09 05:00:00 AM	57.0	1	1	57	57.0	100.0%
2020-08-09 06:00:00 AM	66.0	3	4	74	65.0	75.0%
2020-08-09 07:00:00 AM	60.0	7	8	67	58.2	62.5%
2020-08-09 08:00:00 AM	63.0	6	7	64	59.8	57.1%
2020-08-09 09:00:00 AM	63.0	18	21	68	58.4	66.7%
2020-08-09 10:00:00 AM	59.0	20	23	62	56.5	43.5%
2020-08-09 11:00:00 AM	58.0	22	26	63	56.0	53.8%
2020-08-09 12:00:00 PM	60.0	22	26	82	58.1	57.7%
2020-08-09 01:00:00 PM	58.0	21	25	69	57.0	56.0%
2020-08-09 02:00:00 PM	58.0	20	24	69	56.6	66.7%
2020-08-09 03:00:00 PM	61.0	26	30	73	59.9	53.3%
2020-08-09 04:00:00 PM	62.0	23	27	69	57.8	59.3%
2020-08-09 05:00:00 PM	64.0	18	21	65	58.5	71.4%
2020-08-09 06:00:00 PM	61.0	9	11	67	58.8	100.0%
2020-08-09 07:00:00 PM	59.0	14	16	79	58.0	62.5%
2020-08-09 08:00:00 PM	59.0	8	10	67	59.2	50.0%
2020-08-09 09:00:00 PM	57.0	10	12	61	55.8	83.3%
2020-08-09 10:00:00 PM	70.0	4	5	73	64.2	100.0%
2020-08-09 11:00:00 PM	63.0	3	3	63	60.5	66.7%
2020-08-10 12:00:00 AM	53.0	1	1	53	53.0	100.0%
2020-08-10 01:00:00 AM	56.0	1	1	56	56.0	100.0%
2020-08-10 02:00:00 AM	**No Data**					
2020-08-10 03:00:00 AM	**No Data**					
2020-08-10 06:00:00 AM	65.0	7	8	66	61.2	62.5%
2020-08-10 07:00:00 AM	65.0	18	21	84	60.4	81.0%
2020-08-10 08:00:00 AM	61.0	18	21	75	57.4	71.4%
2020-08-10 09:00:00 AM	60.0	27	32	69	57.0	65.6%
2020-08-10 10:00:00 AM	61.0	20	23	70	58.3	39.1%
2020-08-10 11:00:00 AM	65.0	19	22	73	61.0	59.1%
2020-08-10 12:00:00 PM	59.0	21	25	74	58.8	52.0%
2020-08-10 01:00:00 PM	61.0	27	32	80	57.4	75.0%
2020-08-10 02:00:00 PM	59.0	22	26	73	57.2	80.8%
2020-08-10 03:00:00 PM	63.0	25	29	69	59.4	58.6%
2020-08-10 04:00:00 PM	60.0	21	25	66	57.4	76.0%
2020-08-10 05:00:00 PM	67.0	34	40	77	61.9	80.0%
2020-08-10 06:00:00 PM	64.0	17	20		59.8	90.0%
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2020-08-10 07:00:00 PM	68.0	15	18	72	60.7	66.7%
2020-08-10 08:00:00 PM	61.0	11	13	72	60.7	53.8%
2020-08-10 09:00:00 PM	63.0	8	9	64	60.8	55.6%
2020-08-10 10:00:00 PM	54.0	3	4	66	60.0	50.0%
2020-08-10 11:00:00 PM	56.0	1	1	56	56.0	100.0%
2020-08-11 12:00:00 AM	**No Data**					
2020-08-11 01:00:00 AM	56.0	1	1	56	56.0	100.0%
2020-08-11 02:00:00 AM	67.0	1	1	67	67.0	100.0%
2020-08-11 03:00:00 AM	**No Data**					
2020-08-11 04:00:00 AM	57.0	1	1	57	57.0	100.0%
2020-08-11 05:00:00 AM	**No Data**					
2020-08-11 06:00:00 AM	60.0	8	10	69	58.3	60.0%
2020-08-11 07:00:00 AM	62.0	15	18	79	60.1	77.8%
2020-08-11 08:00:00 AM	64.0	16	19	66	59.2	89.5%
2020-08-11 09:00:00 AM	65.0	29	34	73	59.6	82.4%
2020-08-11 10:00:00 AM	62.0	26	30	66	57.2	60.0%
2020-08-11 11:00:00 AM	62.0	24	28	69	58.3	82.1%
2020-08-11 12:00:00 PM	64.0	15	18	73	60.6	77.8%
2020-08-11 01:00:00 PM	64.0	18	21	87	60.8	71.4%
2020-08-11 02:00:00 PM	59.0	20	23	64	56.5	65.2%
2020-08-11 03:00:00 PM	60.0	23	27	70	57.9	51.9%
2020-08-11 04:00:00 PM	64.0	27	32	78	59.7	71.9%
2020-08-11 05:00:00 PM	71.0	27	32	81	63.0	59.4%
2020-08-11 06:00:00 PM	61.0	18	21	67	58.5	71.4%
2020-08-11 07:00:00 PM	63.0	17	20	71	59.5	65.0%
2020-08-11 08:00:00 PM	68.0	14	17	73	61.0	70.6%
2020-08-11 09:00:00 PM	56.0	13	15	70	56.9	46.7%
2020-08-11 10:00:00 PM	59.0	3	4	60	57.0	75.0%
2020-08-11 11:00:00 PM	58.0	2	2	58	57.0	100.0%
2020-08-12 12:00:00 AM	58.0	-	-	58	58.0	100.0%
2020-08-12 01:00:00 AM	61.0	-	-	61	61.0	100.0%
2020-08-12 02:00:00 AM	**No Data**	-	-		01.0	
2020-08-12 03:00:00 AM	**No Data**					
2020-08-12 04:00:00 AM	59.0	1	1	59	59.0	100.0%
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2020-08-12 06:00:00 AM	66.0	8	9	68	61.7	77.8%
2020-08-12 07:00:00 AM	63.0	20	24	70	60.2	75.0%
2020-08-12 08:00:00 AM	63.0	25	29	73	57.6	82.8%
2020-08-12 09:00:00 AM	59.0	23	26	66	56.8	69.2%
2020-08-12 10:00:00 AM	58.0	22	25	62	57.7	48.0%
2020-08-12 11:00:00 AM	54.0	26	30	75	59.6	26.7%
2020-08-12 12:00:00 PM	66.0	29	30	75	59.0	58.8%
2020-08-12 01:00:00 PM	60.0	23	28 28	73	57.8	60.7%
2020-08-12 02:00:00 PM	62.0	23	20	73	58.1	69.7%
2020-08-12 02:00:00 PM	63.0	30	35	67	57.2	65 7%
2020-08-12 03:00:00 PM	62.0	26	35	65	57.2	20.770 20.6%
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2020-08-12 09:00:00 PM	64.0	19	22	97	60.5	86.4%
2020-08-12 10:00:00 PM	63.0	9	11	73	59.2	90.9%
2020-08-12 11:00:00 PM	62.0	1	1	62	62.0	100.0%
2020-08-13 12:00:00 AM	58.0	1	1	58	58.0	100.0%
2020-08-13 01:00:00 AM	59.0	2	2	59	57.0	100.0%
2020-08-13 02:00:00 AM	**No Data**					
2020-08-13 03:00:00 AM	**No Data**					
2020-08-13 05:00:00 AM	50.0	1	1	50	0.0	0.0%
2020-08-13 06:00:00 AM	69.0	10	12	78	64.7	91.7%
2020-08-13 07:00:00 AM	58.0	18	21	67	56.8	61.9%
2020-08-13 08:00:00 AM	60.0	20	24	64	57.2	54.2%
2020-08-13 09:00:00 AM	60.0	18	21	73	57.8	71.4%
2020-08-13 10:00:00 AM	48.0	22	26	54	53.0	11.5%
2020-08-13 11:00:00 AM	60.0	20	24	64	58.2	37.5%
2020-08-13 12:00:00 PM	60.0	26	30	61	57.7	53.3%
2020-08-13 01:00:00 PM	61.0	37	44	71	57.9	65.9%
2020-08-13 02:00:00 PM	62.0	32	38	70	58.6	73.7%
2020-08-13 03:00:00 PM	61.0	24	28	68	58.7	71.4%
2020-08-13 04:00:00 PM	64.0	40	47	74	59.8	78.7%
2020-08-13 05:00:00 PM	61.0	27	32	70	59.3	71.9%
2020-08-13 06:00:00 PM	59.0	26	31	79	59.6	61.3%
2020-08-13 07:00:00 PM	64.0	28	33	81	60.1	75.8%
2020-08-13 08:00:00 PM	60.0	16	19	70	58.5	52.6%
2020-08-13 09:00:00 PM	69.0	19	22	80	63.8	59.1%
2020-08-13 10:00:00 PM	75.0	7	8	81	66.4	100.0%
2020-08-13 11:00:00 PM	63.0	2	2	63	60.5	100.0%
2020-08-14 12:00:00 AM	67.0	2	2	67	60.5	100.0%
2020-08-14 01:00:00 AM	**No Data**					
2020-08-14 02:00:00 AM	60.0	1	1	60	60.0	100.0%
2020-08-14 03:00:00 AM	**No Data**					
2020-08-14 04:00:00 AM	**No Data**					
2020-08-14 05:00:00 AM	57.0	1	1	57	57.0	100.0%
2020-08-14 06:00:00 AM	76.0	8	9	76	65.4	100.0%
2020-08-14 07:00:00 AM	63.0	16	19	75	60.2	57.9%
2020-08-14 08:00:00 AM	62.0	13	15	89	61.2	86.7%
2020-08-14 09:00:00 AM	60.0	21	25	80	58.4	84.0%
2020-08-14 10:00:00 AM	58.0	20	23	64	56.9	60.9%
2020-08-14 11:00:00 AM	58.0	17	20	66	57.5	55.0%
2020-08-14 12:00:00 PM	65.0	25	29	75	59.0	75.9%
2020-08-14 01:00:00 PM	66.0	23	27	73	60.2	74.1%
2020-08-14 02:00:00 PM	63.0	26	30	68	57.8	93.3%
2020-08-14 03:00:00 PM	61.0	33	39	74	58.0	66.7%
2020-08-14 04:00:00 PM	65.0	29	34	71	61.2	70.6%
2020-08-14 05:00:00 PM	63.0	25	29	79	61.0	58.6%
2020-08-14 06:00:00 PM	65.0	21	25	73	60.5	64.0%
2020-08-14 07:00:00 PM	63.0	22	26	67	57.8	65.4%
2020-08-14 08:00:00 PM	57.0	 14	17	59	55.8	58.8%
2020-08-14 09:00:00 PM	57.0	9	11	59	56.8	54.5%
2020-08-14 10:00:00 PM	60.0	8	10	77	61.5	80.0%
2020-08-14 11:00:00 PM	64.0	4	5	- 78	61.2	100.0%
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2020-08-15 12:00:00 AM	62.0	3	3	62	59.5	66.7%
2020-08-15 01:00:00 AM	58.0	2	2	58	57.5	100.0%
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2020-08-15 06:00:00 AM	61.0	7	8	63	58.6	87.5%
2020-08-15 07:00:00 AM	60.0	5	6	65	56.6	83.3%
2020-08-15 08:00:00 AM	62.0	14	17	70	58.5	76.5%
2020-08-15 09:00:00 AM	61.0	20	23	74	58.8	43.5%
2020-08-15 10:00:00 AM	59.0	20	23	60	57.1	39.1%
2020-08-15 11:00:00 AM	57.0	31	37	67	56.5	59.5%
2020-08-15 12:00:00 PM	64.0	21	25	74	61.1	76.0%
2020-08-15 01:00:00 PM	65.0	23	27	69	59.8	81.5%
2020-08-15 02:00:00 PM	61.0	22	26	71	58.1	69.2%
2020-08-15 03:00:00 PM	57.0	18	21	63	57.6	42.9%
2020-08-15 04:00:00 PM	62.0	20	23	66	59.9	60.9%
2020-08-15 05:00:00 PM	61.0	12	14	70	59.4	57.1%
2020-08-15 06:00:00 PM	61.0	20	24	67	56.4	66.7%
2020-08-15 07:00:00 PM	64.0	13	15	70	58.2	60.0%
2020-08-15 08:00:00 PM	58.0	10	12	76	59.1	66.7%
2020-08-15 09:00:00 PM	68.0	14	16	76	61.3	75.0%
2020-08-15 10:00:00 PM	66.0	3	3	66	56.7	100.0%
2020-08-15 11:00:00 PM	54.0	3	4	56	53.5	100.0%
2020-08-16 12:00:00 AM	62.0	1	1	62	62.0	100.0%
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2020-08-16 07:00:00 AM	59.0	4	5	68	59.0	80.0%
2020-08-16 08:00:00 AM	63.0	7	8	64	57.8	75.0%
2020-08-16 09:00:00 AM	59.0	17	20	64	56.2	65.0%
2020-08-16 10:00:00 AM	59.0	20	24	69	56.2	75.0%
2020-08-16 11:00:00 AM	57.0	20	23	63	55.8	52.2%
2020-08-16 12:00:00 PM	60.0	29	34	78	59.6	50.0%
2020-08-16 01:00:00 PM	66.0	23	27	75	59.8	63.0%
2020-08-16 02:00:00 PM	62.0	22	26	80	59.9	53.8%
2020-08-16 03:00:00 PM	64.0	30	35	70	59.1	68.6%
2020-08-16 04:00:00 PM	60.0	25	29	67	56.8	58.6%
2020-08-16 05:00:00 PM	57.0	20	24	65	57.0	58.3%
2020-08-16 06:00:00 PM	64.0	19	22	69	59.9	54.5%
2020-08-16 07:00:00 PM	67.0	12	14	88	62.6	78.6%
2020-08-16 08:00:00 PM	63.0	16	19	88	60.0	73.7%
2020-08-16 09:00:00 PM	69.0	8	9	70	60.3	77.8%
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2020-08-17 03:00:00 AM	**No Data**					
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2020-08-17 08:00:00 AM	58.0	15	18	65	56.7	83.3%
2020-08-17 09:00:00 AM	65.0	18	21	87	61.5	61.9%
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2020-08-17 12:00:00 PM	58.0	26	30	68	56.3	50.0%
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2020-08-17 02:00:00 PM	59.0	26	30	70	57.1	50.0%
2020-08-17 03:00:00 PM	65.0	25	29	75	59.9	75.9%
2020-08-17 04:00:00 PM	60.0	31	36	69	57.3	63.9%
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2020-08-17 08:00:00 PM	61.0	14	17	68	59.2	70.6%
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2020-08-19 10:00:00 AM	58.0	28	33	Page 65 of 661	59.6	42.4%

2020-08-19 11:00:00 AM	56.0	30	35	76	56.9	57.1%
2020-08-19 12:00:00 PM	59.0	31	37	81	57.8	54.1%
2020-08-19 01:00:00 PM	58.0	38	45	72	56.9	64.4%
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2020-08-19 03:00:00 PM	60.0	36	42	83	58.7	47.6%
2020-08-19 04:00:00 PM	61.0	36	42	72	57.2	61.9%
2020-08-19 05:00:00 PM	64.0	26	30	68	60.4	66.7%
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2020-08-19 09:00:00 PM	65.0	11	13	69	60.5	76.9%
2020-08-19 10:00:00 PM	63.0	6	7	75	61.8	85.7%
2020-08-19 11:00:00 PM	60.0	3	3	60	54.7	100.0%
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2020-08-20 11:00:00 AM	61.0	36	42	75	58.5	61.9%
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2020-08-20 01:00:00 PM	65.0	26	31	83	59.6	77.4%
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2020-08-20 03:00:00 PM	65.0	33	39	102	59.8	66.7%
2020-08-20 04:00:00 PM	69.0	28	33	85	63.9	63.6%
2020-08-20 05:00:00 PM	67.0	38	45	79	61.8	82.2%
2020-08-20 06:00:00 PM	65.0	25	29	80	59.4	82.8%
2020-08-20 07:00:00 PM	65.0	14	17	78	61.8	82.4%
2020-08-20 08:00:00 PM	59.0	9	11	75	59.4	63.6%
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2020-08-20 10:00:00 PM	69.0	6	7	74	65.0	71.4%
2020-08-20 11:00:00 PM	66.0	4	5	72	60.6	100.0%
2020-08-21 12:00:00 AM	73.0	3	3	73	64.7	100.0%
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2020-08-21 08:00:00 AM	62.0	24	28	64	56.6	78.6%
2020-08-21 09:00:00 AM	64.0	21	25	75	59.6	76.0%
2020-08-21 10:00:00 AM	58.0	22	26	64	55.7	61.5%
2020-08-21 11:00:00 AM	61.0	23	20	68	57.8	66.7%
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2020-08-21 03:00:00 PM	61.0	31	37	71	59.0	81.1%
2020-08-21 04:00:00 PM	61.0	27	32	73	59.1	68.8%
2020-08-21 05:00:00 PM	60.0	21	25	67	58.8	60.0%
2020-08-21 06:00:00 PM	62.0	35	41	75	58.7	78.0%
2020-08-21 07:00:00 PM	60.0	25	29	81	58.5	65.5%
2020-08-21 08:00:00 PM	65.0	16	19	79	57.8	89.5%
2020-08-21 09:00:00 PM	66.0	9	11	69	62.1	63.6%
2020-08-21 10:00:00 PM	61.0	6	7	70	57.8	85.7%
2020-08-21 11:00:00 PM	54.0	3	3	54	53.5	66.7%
2020-08-22 12:00:00 AM	65.0	2	2	65	61.0	100.0%
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2020-08-22 02:00:00 AM	62.0	1	1	62	62.0	100.0%
2020-08-22 03:00:00 AM	55.0	1	1	55	55.0	100.0%
2020-08-22 04:00:00 AM	78.0	1	1	78	78.0	100.0%
2020-08-22 05:00:00 AM	**No Data**					
2020-08-22 06:00:00 AM	76.0	6	7	82	68.0	85.7%
2020-08-22 07:00:00 AM	67.0	5	6	71	59.4	83.3%
2020-08-22 08:00:00 AM	60.0	13	15	74	60.2	40.0%
2020-08-22 09:00:00 AM	62.0	19	22	76	59.7	68.2%
2020-08-22 10:00:00 AM	61.0	31	36	68	57.5	61.1%
2020-08-22 11:00:00 AM	61.0	26	31	72	58.5	61.3%
2020-08-22 12:00:00 PM	64.0	31	37	79	59.7	64.9%
2020-08-22 01:00:00 PM	69.0	2	2	69	69.0	50.0%

Day/Time Ending	85th pctl (km/h)	85th pctl cnts	Total Cnts	Max Speed	Avg Speeder	% Speed
2020-08-07 12:00:00 AM	64.0	214	252	82	59.4	71.4%
2020-08-08 12:00:00 AM	64.0	372	438	100	59.9	70.3%
2020-08-09 12:00:00 AM	63.0	320	376	81	58.7	64.4%
2020-08-10 12:00:00 AM	61.0	258	304	82	58.1	61.8%
2020-08-11 12:00:00 AM	63.0	314	370	84	59.1	68.1%
2020-08-12 12:00:00 AM	64.0	319	375	87	59.3	69.9%
2020-08-13 12:00:00 AM	62.0	379	446	97	58.2	67.5%
2020-08-14 12:00:00 AM	62.0	397	467	81	59.3	63.8%
2020-08-15 12:00:00 AM	63.0	338	398	89	59.3	70.9%
2020-08-16 12:00:00 AM	62.0	280	329	76	58.5	64.4%
2020-08-17 12:00:00 AM	62.0	279	328	88	58.7	62.8%
2020-08-18 12:00:00 AM	63.0	313	368	93	58.9	67.1%
2020-08-19 12:00:00 AM	62.0	449	528	81	58.4	63.4%
2020-08-20 12:00:00 AM	62.0	426	501	94	58.8	63.5%
2020-08-21 12:00:00 AM	65.0	419	493	102	60.4	72.4%
2020-08-22 12:00:00 AM	62.0	373	439	86	58.5	72.9%
2020-08-22 12:59:59 PM	63.0	135	159	82	59.7	63.5%

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REPORT Nº INF2020-38

Date	13/10/2020				
Submitted by	Dave Darch, Julian Lenhart				
Subject	Phase facilitie	2 s	long-term	snow	disposal
File N°					

1) **NATURE/GOAL**:

The purpose of this report is to recommend the retention of Stantec Consulting Limited (Stantec) to provide the required services for Phase 2 of the City's initiative to identify and develop long-term snow disposal facilities for the municipality.

2) **DIRECTIVE/PREVIOUS POLICY :** N/A

3) **DEPARTMENT'S RECOMMENDATION :**

Whereas the City of Clarence-Rockland must establish permanent snow disposal facilities (FDFs) to service the municipality's transportation network; and

Whereas Phase 1: Service Life Requirements of the comprehensive snow disposal needs study was formally approved by Council on October 5, 2020; and

Whereas the administration proposes to initiate Phase 2: SDF Site Selection of the comprehensive snow disposal study as soon as possible; and

Whereas Stantec has been directly involved in multiple permanent snow disposal assignments for the City since 2009 and, as such, is very familiar with the City's long-term snow disposal challenges and requirements; and

Whereas the estimated cost of the Phase 2 assignment is valued at \$49,500 (including HST);

THAT Committee of the Whole recommends that Council approve the appointment of Stantec to provide the required services for Phase 2 to an upset limit of \$49,500 (including HST); and

FURTHER THAT Phase 2 be funded from the previously approved budget allocations for the Rockland and Bourget snow disposal undertakings.

ATTENDU QUE la Cité de Clarence-Rockland doit établir des installations permanentes d'entreposage de la neige (FDF) pour desservir le réseau de transport de la municipalité; et

ATTENDU QUE l'étude de phase 1 : Exigences relatives à l'étude approfondie de la durée de vie de des besoins en matière d'entreposage de la neige, préparé par Stantec, a été officiellement approuvée par le Conseil le 5 octobre 2020; et

ATTENDU QUE l'administration propose de lancer dès que possible la phase 2: Sélection du site SDF de l'étude complète sur l'entreposage de la neige; et

ATTENDU QUE Stantec est directement impliquée dans plusieurs études reliées au site d'entreposage permanente de la neige avec la Cité, soit depuis 2009 et, à ce titre, connaît très bien les défis et les exigences à long terme de la Cité en matière d'entreposage de la neige; et

ATTENDU QUE le coût prévu de l'assignation de la phase 2 est évalué à 49 500 \$ (incluant la TVH);

QUE le comité plénier recommande que le conseil approuve la nomination de Stantec pour fournir les services requis pour la phase 2 jusqu'à une limite de 49 500 \$ (TVH comprise); et

AUSSI QUE la phase 2 soit financée à partir du budget approuvé antérieurement pour les installations permanentes d'entreposage de la neige.

4) **BACKGROUND**:

On February 3, 2020 Council approved staff report number INF 2020 – 02 which detailed a multi- phased approach to identify and implement long-term permanent snow disposal site (s) for the municipality. Subsequently, Phase 1: Service Life Requirements was formally adopted by Council at its October 5, 2020 meeting. Amongst other things, the October 5, 2020 staff report provided an overview of the Phase 2 terms of reference. The Phase 2 component of the overall study will address the following issues:

• permission will be requested from the United Counties of Prescott Russell (UCPR) to use their land parcel data;

- identify suitable SDF sites within each potential candidate area that were identified in the Phase 1 report;
- identify physical characteristics (e.g. vegetation, number and type of structures, grown slope, site dimension etc.) for candidate sites;
- in consultation with City staff, the consultant will refine the list of acceptable SDF sites taking into consideration such issues as development constraints, dense brush/trees, excessive grown slope etc.
- identify candidate sites by applying the secondary selection criteria highlighted in the Phase 1 report;
- depending on the number of properties available, reconsider the strategy option of one larger site near Rockland versus 2 smaller land parcels;
- provide a recommendation for those parcels offering the greatest potential for further evaluation in Phase 3: Design/Approvals;
- if required, attend an " in camera" meeting with Council to discuss the snow disposal strategies and process for land acquisition;

prepare terms of reference and estimate of service fees to complete Phase 3: Design/Approvals

5) **DISCUSSION :**

Consultant Appointment:

As stated in staff's February 3, 2020 report to Council, Stantec has played an extensive role since 2008 in assessing the municipality's snow disposal facility needs. They are on the City's Standing Offer Roster for Environmental Site Assessment, Archaeology and Heritage Assessment assignments. Phase 2 of the SDF study is compatible with this service category.

In view of Stantec's extensive history with the assessment of the City's snow disposal needs and operational matters, staff recommends that the Phase 2 assignment be awarded to Stantec in keeping with the City's Standing Offer procedures.

The City's Standing Offer states that "Roster assignments are intended, for the most part, to be presented to the highest rank consultant within the required category". As detailed in staff's February 3, 2020 report, it is the Department's opinion that Stantec's detailed knowledge and previous involvement in the assessment of the City's snow disposal operation etc. merits that an exemption to the Standing Offer roster selection process be granted in order to retain Stantec for the Phase 2 assignment to an upset limit of \$49,500.

CONSULTATION: 6)

Phase 1 of the study involved consultation with the Ministry of Environment Climate and Parks (MECP) and staff from the United Counties of Prescott-Russell (UCPR). Phase 2 will require increased consultation with both of these organizations as prospective SDF site locations are identified.

7) **RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS:**

N/A

FINANCIAL IMPACT (expenses/material/etc.): 8)

Budget Allocations:

Table 1.1 below summarizes the SDF budget approvals for the Rockland and Bourget SDFs and provides an overview of the original budget allocation, expenditures to date and remaining budget.

Table 1.1

Approved Budget	\$1,353,117
Spent to date	\$30,265
Remaining Budget	\$1,322,852

As detailed in Table 1.1 above, sufficient funds have been approved by Council to cover the costs associated with the terms of reference for Phase 2: Site Selection.
9) **LEGAL IMPLICATIONS :**

Failure to address the MECP concerns with respect to the Bourget at site could ultimately result in an MECP Board Order and/or legal action.

10) **RISK MANAGEMENT :**

Since both of the City's two current snow disposal sites have limited capacities, it is vital that the municipality adopt a long-term strategy to address the municipality's long-term snow disposal site requirements.

11) **STRATEGIC IMPLICATIONS :**

This initiative is consistent with the Environmental Responsibility strategic priority detailed in the City's approved strategic plan.

12) SUPPORTING DOCUMENTS:

Attachment 1: Stantec letter re: level of effort for the Phase 2 assignment



Stantec Consulting Ltd. 1331 Clyde Avenue, Suite 400 Ottawa, ON K2C 3G4

October 7, 2020 File: 163401578

City of Clarence Rockland 1560 Laurier Street Rockland, ON K4K 1P7

Attention: Mr. Dave Darch

Reference: Engineering Services for Phase 2 Snow Disposal Study

INTRODUCTION

Subsequent to the submission of the Phase 1 report by Stantec "*City Clarence Rockland Snow Disposal Study 2020*" dated August 2020, Stantec is pleased to provide this Offer of Engineering Services to undertake Phase 2 of the snow disposal study. The proposed scope of work is described in **Attachment A**.

Phase 2 is the second step of a four step process that Council approved in March 2020 to identify and implement a snow disposal strategy to service the City's disposal needs. The Phase 1 report identified the technical requirements of the strategy and criteria for the identification of suitable candidate areas for the site selection process. Phase 2 will review the land parcels within the candidate areas to further examine the physical features of the parcels and develop additional criteria to refine the list of preferred sites.

With the completion of Phase 2 work (**Attachment A**), the City should be able to select which property(ies) is their preferred choice(s) and proceed with a conditional Offer of Purchase (following an appraisal report by others). The Offer of Purchase would include making the sale conditional on obtaining a zoning amendment, having access to the land for investigative studies and surveys (Phase 3 - Design/Approvals) and confirmation of physical conditions (soil/groundwater/surface water) that were assumed in development of the criteria.

The findings and recommendations of the investigative studies in Phase 3 will provide the technical guidance required to complete the design of the preferred site(s) and Phase 4 will include the Construction/Commissioning of the Sites.

BUDGET

Our proposed scope of work, as described above, would be in accordance with the Terms & Conditions of the SOA and the labour rates approved in the 2019 Standing Offer Agreement for Category 11 services. The proposed level of effort is estimated at **\$ 46,080.00** (including disbursements of \$ 582.50) as detailed in **Table 1** (attached). When a 5% contingency and net tax of 1.8% is added, the total project cost amounts to approximately \$ 49,500. Our charges for our services will be made on an actual time and material basis. If the study extends into 2021, a modest escalation in individual rates would apply, as defined in Category 11 Standing Offer rates for 2021.

If the project requirements or our estimated level of effort needs to change to accommodate and satisfy additional City requirements or another project stakeholder, we will bring these to your attention and request approval for the changes before proceeding with changes to the project scope or level of effort.

Design with community in mind

October 7, 2020 Page 2 of 3

Reference: Engineering Services for Phase 2 Snow Disposal Study

SCHEDULE

The Phase 2 scope of work is estimated to take 12 to 16 weeks, following receipt of written approval to proceed.

ASSUMPTIONS

A significant segment of our scope of work uses a GIS system that requires input from the United Counties of Prescott Russell database for the various shape layers required to describe the environment and land parcel features. We assume that the coordination provided by the UCPR for Phase 1 will continue into Phase 2. Some information may be requested from provincial databases and would incur minor expenses. Our budget includes an estimate of \$ 582.50 for this purpose.

CONSULTATION

Our proposed schedule includes one teleconference with the Ministry of Energy, Conservation & Parks to review the secondary criteria applied to the process for site selection. An agenda will be prepared before the teleconference and Notes of Meeting prepared and circulated electronically following the meeting/ teleconference. A meeting will also be scheduled with City staff to review the site selection process.

INVOICING

Invoicing for work will be done electronically on a monthly basis and include a progress report submitted to the City Project Manager for consideration.

COVID-19

As we are all aware, we are all working in unprecedented times as a result of the COVID-19 pandemic. The situation is a very fluid one. Our proposal is based on what we understand as at today but may change as conditions change. We would be pleased to have a further discussion with you about our respective plans to manage and mitigate the impact of this evolving situation on your proposed project.

CLOSURE

We trust that the above is satisfactory for your purposes at this time. We are available at your convenience to continue to support the City on this important project. Please do not hesitate to contact the undersigned should you have any questions or require any further information.

Yours truly,

Stantec Consulting Ltd.

Gerry Lalonde, M.Eng., P.Eng. Associate Phone: 613-724-4389 Mobile: 613-293-5673 gerry.lalonde@stantec.com Pascal Pitre, M.A.Sc., P.Eng. Managing Principal, Water Phone: 613-724-4395 Mobile: 343-996-1972 pascal.pitre@stantec.com

Design with community in mind

October 7, 2020 Page 3 of 3

Reference: Engineering Services for Phase 2 Snow Disposal Study

By signing this proposal, **City of Clarence-Rockland** authorizes Stantec to proceed with the services herein described and the Client acknowledges that it has read and agrees to be bound by the requirements of the Standing Offer Agreement No. F18-INF-2019-001, Roster Category 11 – Environmental Site Assessment, Archaeology and Heritage Assessment.

This proposal is accepted and agreed on the _____day of _____, 2020.

Per: City of Clarence-Rockland

Dave Darch

Print Name & Title

Signature

Attachments: Table 1: Project Level of Effort Attachment A

City Clarence Rockland Snow Disposal Study Phase 2		/	/	/	/ /	/ /		/	/		
		londe Engine	set Anius And	ineet 1. It	lern there's	AD Alise	Assister P.	Ineet			
TABLE 1: PROJECT LEVEL OF EFFORT	Year	/ V ^Y S ^{Y.}	1 Be. M.	<u>/ २^{०°} ५९° - (</u>	/ 0 76-	/ Ma Po	1 24 M.	/ Hours	Fees	Expenses	Total
Business Cente	r	1634	1634	1634	1634	1634	1634				
Hourly Rates (City CR SOA 2020 * 100%	2020	\$190.50	\$160.75	\$135.00	\$135.00	\$87.55	\$146.25				
PHASE 2 - SNOW DISPOSAL STUDY		Lalonde	Bernius	Posh, T.	Chitat	Moran	Field Work				
Technical and Project management	\$19,382.20										
Monthly progress reports and invoicing (4mths @ 3hrs each)	2020	12.0	1.0		0.0			12.0	\$2,286.00		\$2,286.00
Review Phase 1 report, criteria and mapping	2020	1.0	1.0		0.0			2.0	\$351.25		\$351.25
Kick off meeting to review scope of work	2020	3.0	1.0		0.5			4.5	\$/99./5		\$/99./5
Develop project plan/schedule and H&S forms	2020	1.0	1.0	4.0	1.0	0.0	1.0	2.0	\$331.23		\$331.23
Internal project team coordination	2020	4.0	4.0	4.0	4.0	2.0	4.0	22.0	\$3,245.10		\$3,245.10
Technical - review List 1 and List 2	2020	4.0	2.0	1.0				7.0	\$1,218.50		\$1,218.30
Technical - review List 3 properties	2020	4.0	2.0	1.0	2.0		15.0	7.0	\$1,218.30		\$1,218.30
Technical - Review strategy (T or 2 sites) for aisposal & capital costs	2020	7.5	2.0	1.0	2.0		15.0	27.5	\$4,349.00		\$4,349.00
Memo on Phase 2 mapping results	2020	/.5	4.0	1.0	4.0		4.0	20.5	\$3,331./5		\$3,331./5
Meeting with MECP tollowing parcel identication - MS Teams virtual	2020	3.0	2.0		1.0	1.0		7.0	\$1,115.55		\$1,115.55
Meeting with City statt/Council	2020	3.0	2.0		1.0	1.0		7.0	\$1,115.55		\$1,115.55
Marca ta c	2020							0.0	\$0.00		\$0.00
Mapping	\$0,543.00	2.0			10.5			14.5	¢0.049.50		¢0.040.50
Prepare base map to snow land parcel laentification (est. 100 land parcels)	2020	2.0			12.5			14.5	\$2,008.30		\$2,008.30
Propara CIS layer to show parcels in List 2	2020	2.0			7.5			9.5	\$2,000.00		\$2,000.00
Prepare GIS layer to show parcels in List 2	2020	1.0			7.5			8.5	\$1,203.00		\$1,203.00
Trepare Old layer to show parcers in List 5	2020	1.0			7.5			0.0	\$0.00		ψ1,203.00 \$0.00
	2020							0.0	\$0.00		\$0.00
	2020							0.0	\$0.00		\$0.00
	2020							0.0	\$0.00		\$0.00
	2020							0.0	\$0.00		\$0.00
	2020							0.0	\$0.00		\$0.00
Site Selection	\$20,154.80										
Populate List 1 - Use base map/UCPR GIS for properties - approx. 100	2020	3.2	2.4	16.0				21.6	\$3,155.40		\$3,155.40
Screening for minimum parcel size and dimensions - List 2-1 and List 2-2	2020	1.5	1.0	7.5				10.0	\$1,459.00		\$1,459.00
Populate List 2-1 and List 2-2 with physical characteristics (assume 50 parcels)	2020	2.0	1.0	10.0				13.0	\$1,891.75		\$1,891.75
Screening for physical constraints - List 3	2020	2.4	1.0	12.0				15.4	\$2,237.95		\$2,237.95
Screening for secondary criteria - List 3 (assume 25 properties)	2020	2.4	1.8	12.0				16.2	\$2,366.55		\$2,366.55
Site Inspection to confirm features for List 2	2020	2.0	1.0		0.5	1.0	5.5	10.0	\$1,501.18	\$41.25	\$1,542.43
Site Inspection to confirm features for List 3	2020	2.0	1.0		0.5	1.0	5.5	10.0	\$1,501.18	\$41.25	\$1,542.43
Develop scope of work for Phase 3 and estimate of probable cost	2020	4.0	1.0		0.5	1.0		6.5	\$1,077.80		\$1,077.80
Phase I Closeout	2020	19.0						19.0	\$3,619.50	\$500.00	\$4,119.50
QA/QC	2020	4.0						4.0	\$/62.00		\$/62.00
	2020	┝─────┤						0.0	\$0.00		\$0.00
	2020							0.0	\$0.00		\$0.00
	2020							0.0	\$U.00		\$U.UU
	2020							0.0	\$U.UU		 \$0.00
Total Person-Hours	s 2020	98.5	31.2	65.5	54.0	7.0	34.0	290.2			
		\$18,764	\$5,015	\$8,843	\$7,290	\$613	\$4,973		\$45,497.50	\$582.50	\$46,080.00

Fixed Rate Disbursements (0%)

Total Excluding Taxes \$46,080.00

\$0.00

ATTACHMENT A

City of Clarence-Rockland Snow Disposal Study 2020 Phase 2 Site Selection

Background

In July 2020, Stantec Consulting Ltd (Stantec) submitted a Phase 1 report that evaluated the City's needs for snow disposal over two planning periods, one ending in 2045 and another in 2070. The servicing area included the urban community of Rockland and the five other smaller communities of Bourget, Hammond, Cheney, St Pascal and Clarence Creek. The existing 35kms of urban road is projected to grow at slightly more than 2%/year to add 34kms by 2045 and 100kms by 2070.

At this growth rate, the City calculates the snow volume requirements for an annual snowfall of 390 cms (1:50 year return frequency event) for the current road network (35 kms) to be 157,000 m³ with approximately 65% (102,000 m³) for servicing the urban Rockland area and the remaining 35% (55,000 m³) for the remaining communities. The total compacted snow volume to be disposed by 2045 is projected to be 310,000 m3 and by the year 2070 is 606,000 m3 (assumed distribution between communities remaining at 65/35).

Assuming that two new snow disposal sites are developed, the land area required for each of the SDF sites would be 2.3 ha (Bourget) and 4 ha (Rockland) for 2045 year volumes and increasing to 4.3ha (Bourget) and 7.5ha (Rockland) for 2070 volumes.

If the City decides to develop only one site, then a location near Rockland would provide the greater savings and require land area of 6ha (for 2045) and 9ha (for 2070). These sizes may need to be adjusted in Phase 2 if the available parcel sizes are irregular in shape and cannot accommodate a rectangular pad development.

The City's existing snow disposal sites, one in the industrial Park in Rockland and another within the landfill (Lalonde Road) are not suitable for long term use. The Stantec Phase 1 report had identified potential candidate areas where a snow disposal site(s) could be located based on GIS mapping. Table 1 below (Table M7 of the report) describes the criteria used to do the constraint mapping to identify the potential candidate areas.

This is a request to provide services for Phase 2 to identify and evaluate land parcels within the candidate areas shown in Figure 11 to satisfy the above requirements.

Phase 2 – Site Selection

The following scope of work describes the activities required in Phase 2;

- 1. Consultant to review Phase 1 report and confirm criteria, mapping and minimum parcel sizes for the specified disposal capacities.
- 2. Consultant to obtain permission from the United Counties of Prescott Russell for usage of land parcel data.
- 3. Tabulate a list (#1) of land parcels within each potential candidate area. Include all parcels even though some parcels may only have a portion of its area within the candidate area. For each parcel, identify its civic address, ownership, parcel size (ha), and shape with approximate dimensions.
- 4. Review list #1 and remove parcels that do not meet the minimum parcel size requirement or have an irregular shape that would make development difficult (List #2-1 for parcel size for one site and Lists 2-2 and 2-3 for parcel size for two sites (one for Bourget and another for Rockland)).
- 5. Describe physical characteristics of parcels in List #2-2 and 2-3, this would include type of vegetation (trees/bush, open field, other), number and type of structures on parcel (house, garage, shed, barn), approximate slope of ground surface along length of property, and presence of any natural watercourse. Parcels that exceed the minimum size identified in Lists 2-2 and 2-3 would include those identified in List 2-1. Identify those parcels where a site inspection may be required to confirm

Attachment A

features (such as whether structure is a barn, shed or a house). Take photos from the road right of way of all site inspections for record purposes. Photos with accompanying text to be tabulated for future reference.

- 6. Discuss criteria for refinement of Lists 2-1, 2-2 and 2-3 with City staff and remove parcels of land that have significant constraints for development, such as land that is covered in dense brush/trees, or over 50% of property has ground slope in excess of 5%, or presence of a house/barn or other structure (call this revised lists 3-1, 3-2 and 3-3).
- 7. Review Stantec Memo on secondary criteria for land parcel assessment and discuss with City staff on its application to mapping.
- 8. Using the UCPR database, apply secondary criteria to mapping of parcels in Lists #3 and identify potential properties that satisfy the secondary criteria (call this revised lists 4-1, 4-2 and 4-3). Identify those parcels where a site inspection may be required to confirm features. Take photos from the road right of way of all site inspections for record purposes. Photos with accompanying text to be tabulated for future reference.
- 9. Based on the number of properties available, review strategy of one larger site near Rockland compared to two smaller land parcels and which parcels would fit into this strategy. Objective is to have three land parcels to carry forward for more detailed analysis. If there are less than three sites, review secondary criteria and evaluate if some criteria can be relaxed or alternatively, assume mitigative measures need to be incorporated into the design.
- 10. Prepare Memo to describe mapping process and show parcels identified for each revision. Provide recommendation for parcels offering the most potential for further evaluation in Phase 3. Compare sites and provide description of benefits that each provides and opinion on mitigative measures and costs.
- 11. Review strategy and costs for proceeding to Phase 3 with an approach of one site vs two sites.
- 12. Organize and attend meeting with Ministry of the Environment Conservation and Parks to review the work completed in Phase 2 and the identification of land parcels. Invite other agencies that may have some involvement in Phase 3.
- 13. Participate in closed meeting session with City to discuss the strategy for snow disposal and the process for land purchase.
- 14. Prepare a proposed scope of work and estimate of probable cost for completing Phase 3.

Attachment A

Table 1	Primary Criteria for Candidate Area Identification	
Candidate Area Selection Consideration	Discussion	Criteria for mapping
Geotechnical	All soil types will require base reinforcement for truck traffic - but coarser soils will be more porous and allow downward movement of	Soils type with >50% silt & clay preferred such as the Bearbrook & Wendover series.
Agriculture	As most zoning within City is either Rural or Agriculture, assign preference for land zoned as Rural Policy.	Exclude Agriculture policy area - if this is too restrictive, include Agriculture but avoid Class 1 & 2
Natural/Environmental features (biology) - birds/vegetation	Avoid ANSI, woodlots, SAR, wetlands	UCPR OP Schedule
Environmental Impact Assessment (contamination)	Avoid closed landfills, floodplains, unstable slopes	UCPR OP Schedule
Hydrogeology & GW quality (wells)	Chloride has potential to impact groundwater quality so avoid recharge zone, proximity to wells, and IPZ 1 and IPZ 2	Locate site within groundwater discharge zone and outside of IPZ zones, maintain 100m s/b to wells.
Stormwater/ surface water / drainage	Preference for direct discharge to large receiver via ditch or storm sewer	Exclude land within 30 m of top of bank for specified Class of Stream - UCPR Schedule
Transportation	Locate along arterial or collector road	Zone within 500m of Class 2,3,4 road except where restricted (Figure 3.15 of the MTP)
Cultural (heritage features)	Cemetery, burial grounds	Maintain 100m buffer
Land use adjacent to SDF - sensitive receptors	Nursing homes, hospitals, long term care facilitie	Maintain 500m buffer
Topography	Avoid escarpment and steep slopes (stability)	Existing ground slopes to be less than 5% - UCPR OP



REPORT Nº INF2020-35

Date	09/10/2020
Submitted by	Julian Lenhart
Subject	Infrastructure and Planning Strategic Direction
File N°	

1) **NATURE/GOAL**:

Goal of this report is for Council to receive this report and presentation as information.

2) **DIRECTIVE/PREVIOUS POLICY :** N/A

3) **DEPARTMENT'S RECOMMENDATION :**

WHEREAS the Infrastructure and Planning Department's management team and consultants have done extensive work in reviewing;

- 1) The Department's Strategic Direction
- 2) High-level Operational Review of the Department's six Divisions
- 3) In-depth Operational Review of Public Works Division, and;

WHEREAS these reviews took place over the course of one year;

THAT Report INF2020-35 and the enclosed presentation be received as information; and

THAT Council hereby acknowledges that the Infrastructure and Planning Department will proceed with the implementation of the observations and recommendations outlined in the Strategic Direction Presentation included with Report No. INF2020-35 with understanding that some of the priorities and approaches may change.

ATTENDU QUE l'équipe de gestion du département des infrastructure et de l'aménagement ainsi que les consultants ont effectué un travail considérable en examinent;

- 1) L'orientation stratégique du Département
- 2) Revue opérationnelle de haut niveau des six divisions du Département
- 3) Revue opérationnelle approfondi de la division des travaux publics, et;

ATTENDU QUE ces examens se sont déroulés sur une période d'un an;

QUE le rapport INF2020-35 et la présentation ci-incluse soient reçus à titre d'information; et

QUE le conseil prenne connaissance que le département va procéder à la mise en œuvre des observations et recommandations incluses dans la présentation incluse au rapport no. INF2020-35 avec la compréhension que certaines des priorités et des approches peuvent changer.

4) **BACKGROUND**:

Following Council's approval of these initiatives, during the 2019 budget deliberations, the Department has retained the services of Hamilton Leadership 360 and MA.G.M.A Consulting Management Inc. to review The Department's;

- Strategic Direction
- High-level Operational Review of the Department's six Divisions
- In-depth Operational Review of Public Works Division.

These reviews took place over the course of one year and required the extensive time and effort of the Department's management team as well as key employees.

5) **DISCUSSION**:

The essential work done by the Department along with the consultants, has resulted in the development of the Department's Strategic Direction (Mission) and the strategies that will allow the department to achieve this mission.

6) **CONSULTATION:**

N/A

- 7) RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS : N/A
- 8) FINANCIAL IMPACT (expenses/material/etc.): N/A
- 9) **LEGAL IMPLICATIONS :** N/A
- 10) **RISK MANAGEMENT :** N/A

11) **STRATEGIC IMPLICATIONS**:

These reviews along with the approach set out in this document, strive at aligning the Department's Strategic Direction to the City's Strategic Plan, by concentrating on the most critical, short to long-term needs of both the Department as well as the City.

12) **SUPPORTING DOCUMENTS:** Infrastructure and Planning Strategic Direction Presentation



City of Clarence-Rockland

Infrastructure and Planning Strategic Direction



October 19, 2020



Guiding Principles

- The comments in this document represents the extensive work done by the Department's management team and that of our consultants, which took place over the course of one year. These reviews looked at;
 - 1) The Department's Strategic Direction
 - 2) High-level Operational Review of the Department's six Divisions
 - 3) In-depth Operational Review of Public Works Division
- The comments and recommendations outlined are meant to provide clear direction and are, by no means, a reflection of the hard work and dedication by many to keep this Department operational;
- The recommendations are made with the goal of providing clear direction, breaking down departmental silos and improving performance to the various Department Divisions.
- For the most part, this is NOT a cost-saving exercise; we are freeing up capacity in order to do more while improving the quality of services delivered.



Scope of Work

What we are doing

- Aligning the Department's Strategic Direction to the City's Strategic Plan;
- Developing a culture of leadership, improving sense of community, improving financial management and delivering effective services by focussing on key areas that add the most value such as:
 - Management, Structure and Succession;
 - Health, Safety and Well-being;
 - Workplace and Tools Optimization;
 - Optimization of Asset Management;
 - Planning;
 - Performance, Process Optimization and Continuous Improvement;
- Concentrating on the most critical, short to long-term needs of both the Department as well as the City.

Scope of Reviews

- The Department's Strategic Direction; reviewed the Department's short-term and long-term alignment with the City's Strategic Plan. Resulted in developing the Department's mission, strategic objectives and strategies to achieve objectives;
- High-level Operational Review of the Department; reviewed and identified all services, identified service owners and key processes. Resulted in developing a responsibility matrix and short (1-3 years), mid (3-6 years) and long-term (6-10 years) workplans;
- In-depth Operational Review of Public Works Division; reviewed management structure, roles and responsibilities, succession planning, operation planning and scheduling. Resulted in developing a detailed 10-year work plan.

Strategic Direction

Management, Structure and Succession

- Accountability
- Roles and responsibilities
- Clear lines of communication
- Direction
- Employee growth
- Identify critical positions
- Training, Coaching and Mentoring
- Leadership culture
- Stability
- Succession planning
- Collective agreement

Performance, Process Optimization and Continuous

Improvement

- Identify, Plan, Execute, Review
- Reduce waste (time, cost and excess)
- Identify opportunities •
- Measure KPI •
- Departmental synergy
- LEAN leadership and strategy •
- Employee evaluation and feedback ٠
- Embrace change change management plan
- Industry best practices and networking •
- Streamline processes •
- Process automation (Workflows)
- Quality vs Efficiency
- Create internal capacity ٠
- Maximize Resources •
- Build agility to respond quickly to change ٠
- Performance and task tracking

Health, Safety and Well-being

- Training, coaching and education
- Recognition
- Social Support
- Create a positive work environment and culture •
- Employee satisfaction and engagement (surveys)
- Safety audits
- JHSC role and responsibilities
- HS dashboards and monitoring

Workplace and Tools Optimization

- Invest in employees
- Provide the tools and equipment they need
- Alternative workplace
- Standard operating procedures
- Training on equipment and tools
- Facility improvements and upkeep
- Facility and space rationalization and optimization
- Leveraging technology

Optimization of Asset Management

- Strategic management
- Planned expenditures
- Asset maintenance plans
- Alignment of OP and CAP budgets
- Collaboration
- Service levels
- Manage risks for assets
- Monitoring Inspections
- Maintain Asset inventory •
- **Continuous condition assessments**
- Return on investment
- **Business plans**

- Planning

- End-to-End Visibility
- Goals and operational plans
- Customer centric view and accessibility

service delivery

- Emergency management planning

life of our citizens by actively participating in the maintenance of a healthy and safe environment

Improve financia manage through the provision of excellent services that is effective, efficient and economical.

Mission: contribute to the quality of

- Strategic and tactical plan
- Master plans
- Plan ahead

Strategic Direction Priority Scale



- 1. Department's Readiness (where 0 is the least ready and 4 is the most)
- 2. Risk to Department if not implemented (where 0 is the least risk and 4 is the most)
- 3. Effort versus Value (where 0 is the most effort with least value and 4 is the least effort with the most value)

Example;



Readiness Scale

Risk Scale

Effort vs Value Scale

Priority Scale

Strategic Direction Department's Priority Score





Infrastructure and Planning – Priority Heat Map



What we currently have

- 6 Divisions: Planning, Building, Public Works, Environment, Infrastructure & Asset Management,
 Capital Projects;
- 48 employees that provide over 200 services to internal and external clients;
- Limited internal capacity and heavy reliance on contracted resources for some Divisions;
- Internal resources spread really thin as they try to
 provide all services;
- Inconsistent dissemination of management roles and responsibilities through Departmental Divisions;
- Limited resources to implement planning, tools and process optimization to free up capacity;
- Undefined Key Performance Indicator (KPI) measurements to measure performance of services;

- Inconsistent leadership, management and supervisory training;
- Limited succession planning and opportunities for employee growth and development;
- Limited mentorship, coaching and training for new and existing employees;
- Inconsistent health and safety practices and procedures;
- Inadequate and improper tools to perform tasks efficiently and effectively;
- Limited capacity or ability to respond to change and risk;
- Inconsistent modernization or continuous improvement of some services.

What we will focus on short-term (1 to 3 years) by:

tools and processes;

- Developing 1 to 3 year work plans to address priority areas:
 - Management
 - Workplace and Tools Optimization
 - Optimization of Asset Management
- Completing the Responsibility Matrix with completely defined services and key processes;
- Providing clear and consistent understanding of roles and responsibilities of all employees in regards to delivery of our services;
- Providing leadership, management and supervisory training for all levels of management
- Hiring key positions to increase planning, tool and process optimization and to address capacity issues;
- Freeing up internal capacity by optimizing

- Actively participating in the City's Health and Safety Committee;
- Developing and implementing Standard
 Operating Procedures to standardise
 performance and quality of services;
- Leveraging existing tools and new technologies;
- Completing the corporate asset management program.

What we will focus on long-term (3 to 6 years) • by:

- Developing 3 to 6 year work plans prioritizing:
 - Performance, Process Optimization and Continuous Improvement
 - Planning;
- Adopting a LEAN Six Sigma mentality;
- Training key employees in LEAN Six Sigma Strategies;
- Streamlining key processes and reduce wastes;
- Implementing and measuring KPI's;
- Building resiliency and agility to quickly respond to changing conditions, risks and priorities;
- Creating internal capacity and maximizing resources;

- Implementing a customer centric strategy that focuses on creating a positive experience our customers;
- Revising infrastructure masterplans that could change based on the long term vision and strategic plan.

What we will focus on long-term (6 to 10 years) by:

- Developing 6 to 10 year work plans prioritizing:
 - Structure, Management and Succession;
 - Health, Safety and Well-Being;
- Revising Strategic Direction and strategies that could change based on the long term vision and strategic plan;
- Conducting health and safety audits and implement procedures, practices and policies in compliance with the Health and Safety Act and the Clarence-Rockland Health and Safety policy;
- Developing Health and safety dashboards to measure compliance to policies and practices;
- Revising the Department's structure based on the long term vision and strategic plan;
- Developing and implementing a succession

plan that provide opportunities for employee growth and development.



Recommendations

- That Council receives this presentation as information;
- That the Department proceeds with the implementation of the observations and recommendations made in;
 - The Department's Strategic Direction
 - High-level Operational Review of the Department's six Divisions

• In-depth Operational Review of Public Works Division along with of the approach set out in this document, understanding that some of the priorities and approaches may change.

RAPPORT Nº LOI2020-10-02



Date	19/10/2020
Soumis par	Jean-Luc Jubinville
Objet	Demande de fonds supplémentaires – Cours extérieur du nouveau garage des Services communautaires
# du dossier	

1) **NATURE / OBJECTIF :**

Le but de ce rapport est d'obtenir l'approbation du conseil municipal afin d'augmenter les fonds alloués au projet de construction de la cour extérieure du nouveau garage des Services communautaires afin de combler le manque à gagner pour terminer le projet.

2) **DIRECTIVE/POLITIQUE ANTÉCÉDENTE :**

Lors du processus budgétaire 2020, le conseil municipal a accepté un montant de 424 000\$ au budget capital afin de procéder à la construction de la cour extérieure du nouveau garage des Services communautaires situé au 466 Landry.

3) **RECOMMANDATION DU SERVICE:**

ATTENDU QUE le budget capital 2020 pour la construction de la cour extérieure du nouveau garage des Services communautaires est de 424 000\$; et

ATTENDU QUE les prix des soumissions obtenues pour les deux phases du projet sont plus élevés qu'anticipés ; et

ATTENDU QUE les Services communautaires ont conclu que le remplacement des dômes par une toiture permanente avec une charpente de bois avec un recouvrement en métal permettrait de réduire les coûts du projet tout en respectant les besoins opérationnels du Service; et

QU'IL SOIT RÉSOLU QUE la description du projet de construction de la cour extérieure soit modifiée afin de permettre aux services communautaires de remplacer les dômes de toiles par une toiture permanente avec une charpente de bois avec un recouvrement en métal; et

QU'IL SOIT ÉGALEMENT RÉSOLU QUE le comité plénier recommande au conseil municipal d'autoriser l'augmentation du budget du projet de la nouvelle cour extérieure du garage des Services communautaire au montant total de 76 289\$ dont 62 000\$ sera

financé de la réserve des bâtiments et 14 289\$ de la réserve d'équipement; Tel que recommandé

WHEREAS the 2020 capital budget for the construction of the new Community Services garage exterior courtyard is \$ 424,000; and

WHEREAS the bid price received for the two phases of the project are higher than anticipated; and

WHEREAS the Community Services have concluded that the replacement of the domes by a permanent wood frame roof with a metal covering would reduce the costs of the project while respecting the operational needs of the Service; and

BE IT RESOLVED THAT the description of the construction project for the exterior courtyard be modified to allow community services to replace the domes with a permanent wood frame roof with a metal covering; and

BE IT ALSO RESOLVED THAT the Committee of the Whole recommends to City Council to authorize the Community Services garage exterior yard project budget to be increase by a total amount of \$ 76,289, of which \$ 62,000 will be financed from the buildings reserve and \$ 14,289 from the equipment reserve; As recommended

4) **HISTORIQUE**:

En 2019, la Cité de Clarence-Rockland a acheté l'ancienne station de paramédique situé au coin des rues Landry et Tucker (466 Landry) des CUPR pour une somme de 1\$. Il fut décidé que la bâtisse servirait de nouveau garage pour les opérations des Services communautaires.

Lors du processus budgétaire 2020, le conseil municipal a accepté qu'un montant de 424 000\$ soit investi au 466 Landry afin de construire une nouvelle cour extérieure. La première portion du projet incluait le défrichage, l'excavation, le nivelage du terrain, l'ajout d'agrégats, l'ajout des conduits électrique, installation de l'étang de rétention et l'installation de clôture. La deuxième portion du projet incluait l'installation de deux dômes de toile sur conteneur d'une grandeur de 30 pieds de large par 40 pieds de longueur par installation.

Les Services communautaires ont pris officiellement possession du garage au début du mois de juillet 2020. Les travaux d'excavation ont débuté à la fin du mois d'août 2020.

5) **DISCUSSION**:

Soumission pour les travaux d'excavation : Suite au processus de soumission, les 4 entrepreneurs suivants ont soumis un prix pour la première partie du projet:

<u>Nom de l'entrepreneur</u>	Prix avant taxes
DB Contracting	312,362\$
STP Exc & Const	341,700\$
Maddison Const	458,210\$
CSL Group	506,156\$

Le contrat fut accordé à DB Contracting pour la somme de 312 362\$.

Prix des travaux d'excavation plus élevé qu'anticipé: Lors de la révision finale des plans avant le processus de soumission, un mur de soutainement a dû être ajouté dans le projet. L'ajout de ce mur a occasionné une augmentation considérable du coût du projet. De plus, suite à une discussion avec les entrepreneurs, l'effet de la pandémie a également influencé les prix à la hausse.

Soumission pour l'installation des conteneurs et des dômes : La soumission a été montée de façon à recevoir des prix pour des conteneurs avec dôme en toile et une deuxième options pour des conteneurs avec dômes en métal. Suite au processus de soumission, les 2 entrepreneurs suivants ont soumis un prix:

Nom de l'entrepreneur	Prix pour conteneur et dôme en toile	Prix pour conteneur et dôme de métal
Michanie construction	174 638\$	273 884\$
Asco	177 925\$	227 975\$

Prix des dômes et conteneurs plus élevé qu'anticipé: Après consultation avec les entrepreneurs, l'effet de la pandémie a influencé les prix à la hausse considérablement.

Options de réduction des coûts : Considérant les dépassements de coût du projet, les Services communautaires ont réévalué leurs options afin d'essayer de trouver des économies. Après consultation et selon la recherche de prix, il fut déterminé que des économies majeures pouvaient être effectuées en remplaçant les dômes par une toiture permanente avec une charpente de bois et un recouvrement en métal. Une recherche de prix détaillé effectué par le coordonnateur de projet nous démontre que le coût associé à une telle installation serait d'environ 145 000\$ ce qui représente une économie de plus de 125,000\$. Également, les recherches effectuées démontrent que ce genre de structure respecte les codes du bâtiment.

<u>Charpente de bois / recouvrement en métal vs Dôme en toile :</u> Selon les recherches effectuées, l'option de la charpente de bois/ Page 101 of 661 toiture de métal offre tous les mêmes avantages que le dôme en toile et elle respecte tous les besoins opérationnels des Services communautaires. De plus, le recouvrement de métal sur la charpente de bois aura une durée de vie beaucoup plus longue que le dôme en toile ce qui à long terme évitera des coûts de remplacement.

Esthétique : Les conteneurs avec la charpente de bois et recouvrement de métal seront beaucoup moins haut que les conteneurs avec un dôme. Le Service est d'avis que les conteneurs avec la charpente de bois et le recouvrement de métal seront esthétiquement plus attrayants et moins visibles que les conteneurs avec dômes ce qui permettra à la structure de mieux s'incorporer dans le paysage.

Exemple de conteneur avec dôme :



Exemple de conteneur avec charpente de bois :



Délais dans la construction / Déménagement : L'objectif ultime du service est de compléter l'installation des conteneurs sur les bases de béton avant la saison hivernale afin de pouvoir déménager les opérations du service avant le printemps. Sans les conteneurs le déménagement ne pourra avoir lieu considérant que l'ensemble du matériel se retrouverait à l'extérieur. La construction des deux toitures aura lieu au printemps 2021 à moins que la température clémente permette de compléter le tout plus rapidement.

- 6) **CONSULTATION :** N/A
- 7) **RECOMMANDATION OU COMMENTAIRES DU COMITÉ :** N/A

8) **IMPACT FINANCIER (monétaire/matériaux/etc.)**:

Le tableau ci-dessous résume les dépenses du projet :

		DÉPENSES	MONTANT		
		RÉELLES	ANTICIPER		
	Dépenses déjà effectuées	15 046 \$			
	Contrat de DB contracting	312 362 \$	214 000¢		
	Contingence – Contrat de DB contracting	21 865 \$	514 000\$		
	Taxes applicables (1.8%)	6 016 \$			
	TOTAL DES DÉPENSES DÉJÀ	355 289 \$			
	ENCOURUES				
PHASE 2	Évaluation des coûts - conteneurs avec toiture en bois et recouvrement de métal	145 000\$	110 000\$		
	TOTAL DES DÉPENSES PRÉVUES	500 289\$			
	BUDGET ALLOUÉ		424 000\$		
	DÉFICIT À COMBLER	76 28	76 289\$		

Le déficit à combler de 76 289\$ sera financé comme suit :

- 62 000\$ sera pris de la réserve des bâtiments
- 14 289\$ sera pris de la réserve d'équipement.

Si les contingences ne sont pas dépensées, elles seront retournées dans les réserves appropriées.

9) **IMPLICATIONS LÉGALES :**

N/A

10) **GESTION DU RISQUE (RISK MANAGEMENT) :** N/A

11) **IMPLICATIONS STRATÉGIQUES :**

Selon le plan directeur des parcs et loisirs :

Recommandation 55: Faire évaluer le garage existant. Identifier la valeur du garage existant à des fins de disposition ou de réaffectation à une utilisation municipale différente. Identifier la possibilité de l'achat d'un terrain pour un nouveau garage ou d'un site sur les terrains municipaux existants.

Justification: Le garage actuel ne répond pas aux besoins des Services communautaires.

12) **DOCUMENTS D'APPUI:**

Aucun

REPORT Nº ADMIN 2020-23



Date	19/10/2020
Submitted by	Helen Collier, CAO
Subject	Strategic Plan Update Report
File N°	-

1) **NATURE/GOAL**:

The intent of this report is to provide members of Council with a 2nd progress report on the actions that have taken place to date on Council's approved Strategic Plan (2015-2021).

2) **DIRECTIVE/PREVIOUS POLICY :**

One of the undertakings contained within the 2015-2021 Strategic Plan was a requirement to provide regular updates on the progress of the plan's priorities. Staff provided an initial update in September 2018. Since the term of the current Strategic Plan will come to a close in 2021, it is timely for staff to provide Council with a progress report at this time.

3) **DEPARTMENT'S RECOMMENDATION :**

WHEREAS the City's approved Strategic Plan (2015-2021) identifies the need for the Chief Administrative Officer to provide timely updates on the progress of the Plan; and

WHEREAS the term of the current Strategic Plan will end in 2021;

BE IT RESOLVED that Report ADMIN 2020-23 Strategic Plan Status Report be received as information.

ATTENDU QUE le Plan stratégique (2015-2021) approuvé de la Cité indique que la directrice générale doit fournir des mises à jour sur l'avancement du plan ; et

ATTENDU QUE la durée du Plan stratégique actuel terminera en 2021;

QU'IL SOIT RÉSOLU que le rapport ADMIN 2020-23 Strategic Plan Status Report soit reçu à titre d'information.

4) **BACKGROUND**:

Council's Strategic Plan (2015-2021) has been used by the Administration for the purposes of establishing priorities and establishing the future direction of the municipality. Certainly, the challenges that have been imposed by the floods in 2017 and 2019 along with the impacts of COVID-19 have had a dramatic impact in terms of achieving the priorities listed in the Plan.

Notwithstanding these challenges, the administration has been able to accomplish a considerable number of the goals and objectives highlighted in Appendix B of the current Strategic Plan (Attachment 1). This reflects well on staff's resiliency to perform well in changing work environments.

5) **DISCUSSION :**

As noted in the Background section of this report, the Administration has been actively pursuing the strategic priorities of the Strategic Plan while addressing the challenges cited above. A considerable number of the strategic priorities have been advanced in keeping with the Plan. Some priorities; however, [if still considered to be a strategic priority] may need to be reintroduced in a follow-up strategic plan.

Attachment 2 provides a summary of the progress on the strategic priorities that have been made as of October 19, 2020. The achievements to August 30, 2018 are identified in *italicized* text. Achievements from that point in time to October 19, 2020 are identified in regular script.

Consideration for a Follow-Up Strategic Plan:

The current Strategic Plan has been an invaluable tool to staff in terms of operationalizing Council's priorities over a multiyear time period. It has enabled staff to focus on required policy development, priority actions and funding strategies to address the needs of our stakeholders. A meaningful Strategic Plan, however, is contingent on a consultation process with the municipality's ratepayers and stakeholders. The consultation process provides a venue for our ratepayers and stakeholders to state what is most important to them as the municipality moves forward into the future. This was done in the 2015-2020 plan.

Since the current plan will expire at the end of 2021, Council may wish to give favourable consideration to commencing the process of conducting a new strategic plan in 2021. Depending on how the plan is going to be developed, it may be appropriate to incorporate funding approval for a new strategic plan as part of the upcoming budget deliberation process.

6) **CONSULTATION:**

Extensive stakeholder consultation took place when the initial Strategic Plan was being developed. It represented an essential component in identifying strategic priorities.

7) **RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS :**

8) **FINANCIAL IMPACT** (expenses/material/etc.):

Financial impacts associated with implementation of strategic priorities was addressed by securing Council budgetary approval as needs were identified and implemented.

9) **LEGAL IMPLICATIONS :**

Several of the identified strategic priorities such as the Corporate Emergency Management Response Program and Asset Management provide assistance in mitigating against potential legal actions.

10) **RISK MANAGEMENT :**

Several of the strategic priorities (e.g. Accessibility Five-Year Plan, Long-Range Financing Strategies, etc.) identified in this update enable the municipality to effectively manage potential risks in the delivery of municipal services to the public.

11) **STRATEGIC IMPLICATIONS**:

This update complies with the direction contained in the current Strategic Plan to provide updates to Council regarding the progress of the municipality's strategic priorities.

12) **SUPPORTING DOCUMENTS:**

Attachment 1: Strategic Plan 2015-2021

Attachment 2: Summary of the Progress on the Strategic Priorities as of October 19, 2020


Faites entendre votre voix...C'est votre futur!



Destination

Cité de Clarence-Rockland

PLAN STRATÉGIQUE

2015 à 2021

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Mot du maire et du conseil



Votre conseil est heureux de partager avec vous le Plan stratégique 2015-2021 pour la Cité de Clarence-Rockland.

Ce plan stratégique représente le point culminant d'un processus d'engagement communautaire qui comprenait des ateliers et des sondages en ligne et sur le site Web. Nous tenons à exprimer notre sincère reconnaissance à tous ceux qui ont participé au processus de consultation. Vous avez fourni des renseignements intéressants sur votre vision de l'avenir de Clarence-Rockland, sur les services qui ont une grande valeur et le niveau de satisfaction à l'égard de ces services et, surtout, sur l'identification des priorités municipales.

En fonction de vos commentaires, la municipalité est maintenant en mesure d'aligner les buts et les objectifs de la communauté aux priorités du Conseil, et de rehausser notre responsabilisation auprès de nos parties intéressées. Le plan est axé sur des piliers qui se renforcent mutuellement : **Le sens de la communauté; la santé et le bien-être, la stabilité financière et la responsabilité environnementale.** Ces piliers fonctionnent comme la fondation pour l'établissement de priorités pour le changement.

Ce plan stratégique vise à fournir une orientation et une aide au conseil, à l'administration de la Cité et à la communauté, afin que nous puissions élaborer conjointement des priorités pour nous assurer que nous demeurons une Cité dynamique, saine et viable pour le futur.

La Cité de Clarence-Rockland demeure déterminée à travailler avec ses communautés à faire de la Cité une destination de choix.

Nous sommes maintenant en mesure de prendre les premières mesures importantes pour faire de... **Destination Clarence-Rockland...** une réalité.

.

Mot de la directrice générale

Un processus de planification stratégique représente l'une des plus importantes initiatives qui est entreprise par une municipalité. Il permet à l'administration d'élaborer un « plan » clair et réalisable pour l'établissement des orientations et priorités futures.

Tout au long du processus de planification, les membres du conseil, la communauté et nos employés ont travaillé avec diligence afin d'atteindre des buts et objectifs communs pour transformer une vision collective en réalité.

Je tiens sincèrement à remercier tous les participants qui ont assisté



à nos ateliers et à ceux d'entre vous qui ont pris le temps de répondre au sondage ou de nous écrire afin de partager des idées sur l'orientation future de Clarence-Rockland. Ce plan n'aurait pas pu être réalisé sans votre apport précieux. Nous n'aurions pas pu le faire seul.

Soyez assuré que le plan stratégique sera un « document évolutif ». Les priorités et les directives énoncées dans le plan feront l'objet d'un suivi continuel et seront mises à jour afin de demeurer d'actualité suivant l'évolution des temps.

Encore une fois, merci.

Contexte

En 2015, la Cité de Clarence-Rockland a entrepris un processus de planification stratégique pour définir la vision de la Cité, sa mission, ses buts et ses objectifs pour une période de 3 - 4 ans.

Le processus de planification stratégique a été très interactif, impliquant de nombreuses parties intéressées de Clarence-Rockland. Le plan stratégique 2015-2021 a été développé en se basant sur une large participation et des commentaires de plus de 1300 membres de la communauté, et répond aux besoins qui ont été identifiés par les membres du conseil et de l'administration de la Cité. Par conséquent, les priorités identifiées dans ce plan stratégique représentent un effort de collaboration en tenant compte des besoins des parties intéressées de la communauté de Clarence-Rockland.

À la lumière des commentaires reçus par le biais d'ateliers, de sondages en ligne et de courriels, les quatre (4) piliers stratégiques suivants ont été identifiés comme essentiels à l'exécution efficace des services municipaux pour notre communauté : *Le sens de la communauté, la santé et le bien-être, la stabilité financière et la responsabilité environnementale.*

Nous croyons que ce plan stratégique permettra :

- d'aligner les buts et les objectifs aux priorités du conseil et de renforcer la reddition de comptes auprès de nos parties intéressées,
- de servir de point de référence pour identifier les besoins de la communauté,
- d'assurer l'utilisation efficace des ressources,
- de fournir une orientation aux employés,
- d'établir une interrelation entre les priorités stratégiques et la planification municipale et les approbations budgétaires; et
- servir d'outil pour mesurer et évaluer les opérations quotidiennement en fonction des priorités stratégiques.

Ce plan stratégique représente l'aboutissement d'une « auto-évaluation » et d'un processus de planification exhaustifs. Cela a impliqué la détermination des valeurs municipales; des énoncés de mission et de vision; l'évaluation de la rétroaction de

la communauté; l'identification des piliers de changement; l'établissement de priorités stratégiques, de buts et d'objectifs; et des stratégies de contrôle.

Le tableau 1.1 donne un aperçu du processus de planification stratégique.



Tableau 1.1

Vision

Être le meilleur endroit où vivre en étant accueillant, bilingue, autosuffisant, sécuritaire et axé sur la famille. Clarence-Rockland sera une communauté saine, économiquement viable et sensible à l'environnement qui continuera à investir dans son avenir.

Mission

La Cité de Clarence-Rockland offre d'excellents services municipaux en faisant preuve de leadership, en créant des partenariats et en s'engageant à répondre aux besoins de la communauté. Les services sont offerts de façon efficace, tout en respectant la viabilité financière, l'environnement et le bien-être culturel de la communauté.

Valeurs

Le développement du plan stratégique de la Cité, a été fondé sur les idéologies de base de la municipalité - des idéologies qui reflètent ce à quoi la municipalité croit et comment elles permettraient de déterminer comment la municipalité mènera ses affaires et fournira des services alors qu'elle se dirige vers l'avenir.

À cette fin, la Cité adhère aux valeurs suivantes et s'engage à :

- Fournir un *excellent service à la clientèle* par la recherche et l'intégration des meilleures pratiques des municipalités similaires et par la mise en œuvre de stratégies d'amélioration continue
- *Mener ses affaires de manière ouverte et transparente* en partageant les renseignements opportuns et pertinents aux parties intéressées

- *Mener ses affaires avec intégrité en étant honnête, cohérente et responsable* de toutes les mesures prises par la municipalité
- Respecter les droits individuels des employés et des participants de la communauté pour soutenir un milieu de travail qui illustre l'esprit d'équipe et le respect mutuel.



Consultation communautaire

L'engagement des parties intéressées et la rétroaction représentent un élément fondamental dans l'élaboration de ce plan stratégique. Plusieurs endroits ont été fournis pour maintenir la participation du public au processus de planification stratégique. Les parties prenantes ont été invitées à fournir des informations sur les éléments suivants :

- Les services les plus importants pour la communauté et le niveau de satisfaction dans la prestation de ces services?
- Les forces, faiblesses, possibilités et menaces (FFPM) de la municipalité et de ses parties intéressées
- L'identification d'une vision future pour Clarence-Rockland
- L'identification des principales sources d'information qui sont utilisées lors de la recherche d'information sur les questions municipales
- L'importance d'obtenir plus de possibilités d'emploi et de commerces
- L'identification des priorités municipales

Environ 23 ateliers ont eu lieu entre avril et juin 2015. Un total de 474 participants ont pris part à ces ateliers. De plus, l'accès à un sondage en ligne a été rendu disponible entre le 1er mai et le 8 juillet 2015. Au total, environ 812 citoyens ont participé à ce sondage. Le nombre total de participants représentaient environ 4 % de la population de la Cité.

Les ateliers et les sondages en ligne ont été annoncés par envois postaux, le journal local, les publicités sur les bus et les abribus, panneaux de messages électroniques et le site Web de la Cité

Qu'avons-nous entendu?

Sur la base des résultats des ateliers et des sondages en ligne, un résumé des priorités a été établi par l'administration, identifiant les services qui ont été jugés les plus importants pour la qualité de vie des résidents et des entreprises de Clarence-Rockland, et de manière tout aussi importante, le niveau de satisfaction dans la prestation de ces services.

Dans de nombreux cas, il y avait un « fort alignement » entre l'importance d'un service et le niveau de satisfaction à l'égard de ce service. Par exemple, un service qui était considéré comme très important pour les répondants et qui avait un niveau élevé de satisfaction était présumé comme ayant un « fort » alignement. Inversement, certains services qui étaient considérés comme très importants pour la communauté, mais qui avaient un faible niveau de satisfaction ont été perçus comme ayant un alignement « mauvais » ou « juste » et, en tant que tel, devraient faire l'objet d'attention dans l'identification des priorités pour le plan stratégique. L'annexe A, donne un aperçu de l'analyse d'harmonisation effectuée par le personnel.

Les priorités stratégiques mises en évidence dans ce plan reflètent une volonté de renforcer l'alignement des services de grande valeur lorsqu'il y a lieu et, ainsi, répondre aux besoins identifiés par le conseil et l'administration.

Forces, faiblesses, possibilités et menaces (FFPM)

Afin de déterminer les orientations stratégiques pour aller de l'avant dans l'avenir, il était important pour la municipalité d'entreprendre une évaluation objective d'elle-même. En conséquence, le processus de consultation a demandé aux répondants d'identifier :

- Ce que la Cité fait bien;
- Là où des améliorations sont nécessaires dans la prestation de services;
- Quelles possibilités sont offertes pour répondre aux améliorations nécessaires et se positionner pour faire face aux menaces à l'organisation; et

 Les menaces internes et externes qui pourraient avoir un impact négatif sur la municipalité.

Les résultats de cette analyse représentent une partie intégrante de l'exercice de planification stratégique. L'analyse FFPM sert comme outil de gestion stratégique et permet à la municipalité d'entreprendre une auto-évaluation de ses processus internes actuels, et lui permet d'identifier les possibilités de changement en tenant compte des limitations de l'organisation et toutes les menaces qui pèsent sur elle.

Le tableau 1.2 représente une synthèse de l'analyse FFPM obtenue par l'intermédiaire des processus de consultation.



Tableau 1.2

Cadre du plan stratégique <u>LES PILLIERS STRATÉGIQUES</u>:

La Cité de Clarence-Rockland est déterminée à offrir des services municipaux de manière durable afin de répondre aux besoins actuels et futurs de ses communautés. Ce plan stratégique représente une étape importante dans la réalisation de cet objectif.

Le processus de consultation communautaire a souligné que la municipalité fonctionne au sein des quatre (4) piliers distincts et identifiables suivants. La **vision** de la Cité est soutenue par ces piliers :

Sens de la Communauté

Les résidents et les entreprises de la Cité de Clarence-Rockland sont fiers de leur culture bilingue, de leur riche patrimoine, de l'abondance des éléments naturels, à la fois dans le cadre urbain et rural, et le grand nombre d'installations municipales. Il est important que la municipalité reconnaisse ces attributs et qu'elle fournisse des services qui viennent renforcer ces valeurs communautaires.

SANTÉ ET MIEUX-ÊTRE

La municipalité s'engage à fournir des services qui répondent continuellement à la santé et au mieux-être de ses résidents.

STABILITÉ FINANCIÈRE

La Cité de Clarence-Rockland est soumise à l'augmentation de la demande pour le maintien des infrastructures et les programmes existants et, ainsi, à se positionner pour l'avenir. Par conséquent, il est essentiel que la municipalité s'assure que les niveaux de financement appropriés sont disponibles pour répondre aux besoins et aux attentes de la communauté. Il est nécessaire que le conseil municipal et l'administration évaluent et mettent en œuvre des stratégies de financement novatrices pour faire face aux pressions de financement des besoins futurs.

RESPONSABILITÉ ENVIRONNEMENTALE

La municipalité possède une quantité importante d'infrastructures qui doivent être entretenues de façon écologiquement responsable. La municipalité doit s'assurer que les travaux de réhabilitation sont mis en œuvre pour protéger notre environnement, tout en répondant aux besoins de la communauté. Il est prévu que la municipalité continuera à se développer, créant ainsi des pressions supplémentaires sur la saine gestion de l'environnement.

Les piliers servent à fournir une orientation à la municipalité afin de fournir des services en temps opportun pour répondre aux besoins de fonctionnement. Les piliers fournissent également des orientations pour l'élaboration et la mise en œuvre de priorités stratégiques pour relever les défis auxquels fait face la municipalité alors qu'elle se prépare pour l'avenir.

PRIORITÉS STRATÉGIQUES :

Ce plan stratégique a identifié des priorités stratégiques pour chacun des quatre piliers mentionnés ci-dessus. Le tableau 1.3 identifie les priorités stratégiques pour chacun des quatre (4) piliers.

	Sens de la		Santé et		Stabilité	Responsabilité
	Communauté		Mieux-être		Financière	ENVIRONNEMENTALE
1.	Développement	1.	Transport actif	1.	Développement	1. Gestion de la
	riverain	2.	Normes		économique	croissance
2.	Revitalisation du		d'accessibilité	2.	Croissance	2. Planification
	centre-ville		intégrées		commerciale/	3. Gestion des actifs
3.	Communication	3.	Préparation aux		industrielle	
4.	Image et		situations	3.	Base d'imposition	
	promotion		d'urgence	4.	Possibilités de	
		4.	Installations		financement	
			récréatives			

Tableau 1.3 – Priorités stratégiques

BUTS ET OBJECTIFS :

Pour chaque priorité stratégique référencée dans le tableau 1.3, le plan stratégique identifie des buts et des objectifs concis et mesurables. L'annexe B résume les buts et objectifs liés à chaque priorité stratégique; souligne les exigences budgétaires (le cas échéant) et identifie le département ayant la responsabilité principale de superviser une priorité stratégique. L'annexe C résume la participation du département pour chaque priorité.

Mise en œuvre et suivi

Le plan stratégique doit être un « document évolutif ». Il est essentiel que les actions stratégiques énoncées dans le plan soient identifiables et mesurables. À cet effet, il doit y avoir un mécanisme contenu dans le plan visant à constamment évaluer les progrès des actions du plan stratégique et de s'assurer qu'elles sont contrôlées et ajustées en conséquence. Afin de faire progresser les priorités stratégiques dans toute l'organisation, le plan exigera les actions suivantes :

<u>L'attribution des responsabilités</u> : Les objectifs stratégiques seront assignés à un département principal qui sera chargé de mettre en place les objectifs stratégiques associés. Le chef de service sera tenu de fournir régulièrement des rapports de mises à jour au directeur général sur le progrès des objectifs stratégiques. Il est entendu que d'autres départements peuvent être impliqués dans un objectif stratégique; toutefois, seul le principal département responsable fournira les mises à jour au directeur général.

Examens du rendement : Le cas échéant, les évaluations annuelles du rendement des employés contiennent une exigence pour aborder les buts et objectifs du plan stratégique pour l'année à venir. Le chef de service attribuera les objectifs stratégiques aux employés concernés et s'assurera que des réunions sont organisées avec l'employé tout au long de l'année pour suivre les progrès accomplis sur les objectifs stratégiques.

Budgets annuels : L'administration s'assurera que le financement pour mettre en œuvre les priorités stratégiques sont reflétées dans le projet des programmes de travaux d'immobilisation et d'exploitation aux fins d'examen et d'approbation du conseil.

Rapports au Conseil : Le directeur général fournira des mises à jour semestrielles au conseil sur l'avancement des priorités du plan stratégique. Le directeur général fournira également un rapport de fin d'année pour révision du conseil en ce qui concerne les réalisations de l'administration pour l'année en cours, les projets futurs et un rapport sur l'état de la conformité aux priorités de la planification stratégique. Les actions ci-dessus permettront de s'assurer que les objectifs stratégiques approuvés seront transmis dans toute l'organisation.

<u>Mises à jour</u> : Le plan stratégique sera revu et mis à jour au besoin, au moins tous les cinq ans. Toutefois, comme les facteurs externes et internes l'exigent, il peut être nécessaire de modifier les priorités stratégiques identifiées dans ce plan à une date antérieure.

Réalisations stratégiques

Le processus de planification stratégique a été lancé en 2015; toutefois, depuis ce temps, la municipalité a commencé ou a achevé plusieurs initiatives de priorités stratégiques qui sont complémentaires aux priorités stratégiques contenues dans ce plan. Elles se résument comme suit :

Gestion des actifs : Le conseil a approuvé le cadre pour l'élaboration d'un plan de gestion des actifs de la municipalité. La phase 1 du plan a été approuvée par le conseil municipal en novembre 2017. La phase 2 est prévue pour l'approbation vers le milieu de l'année 2018.

<u>Gestion de la croissance</u> : Les prévisions de croissance (2018-2043) ont été mises au point et seront un élément crucial pour la mise à jour du règlement sur les droits d'aménagement de la Cité. Ces prévisions seront également utilisées pour plusieurs études de viabilisation (par exemple, la mise à niveau de l'usine de traitement de l'eau potable et des eaux usées, études de viabilisation, etc.) qui sont actuellement en cours.

Santé et mieux-être : Un plan directeur des loisirs a été approuvé par le Conseil en 2016.

<u>*Politiques*</u> : Des révisions ont été apportées aux politiques d'achat et aux règlements de la Cité; aux politiques et procédures des technologies de l'information; et aux procédures de fermeture de route. Le conseil a approuvé une politique à l'égard des demandes de la communauté.

<u>Route de comté 17/174</u> La Cité de Clarence-Rockland a établi des liens avec les Comtés unis de Prescott et Russell pour l'amélioration des conditions de transport dans ce corridor.

Développement économique : La Cité a travaillé en collaboration avec les Comtés unis de Prescott et Russell afin d'assurer un engagement de 40 millions de dollars de la province pour l'élargissement du chemin de comté 17. En outre, la municipalité a participé à des réunions avec les gouvernements provinciaux et les députés fédéraux pour s'assurer que l'élargissement du chemin de comté 17/174 demeure une grande priorité pour tous les ordres de gouvernement.

Circuit du patrimoine : En collaboration avec le comité du Patrimoine, le personnel a identifié les sites d'importance historique et développé des brochures et un circuit du patrimoine pour ces sites.

<u>Croissance commerciale/industrielle</u> : Une analyse d'emplacements et des recommandations pour le développement d'un nouveau parc industriel ont été présentées au conseil en 2017. Un plan d'activités détaillé (y compris plusieurs options) a été présenté au conseil dans le cadre d'une réunion à huis clos en septembre 2017. Une proposition pour 2018 a été incluse dans le budget d'immobilisations pour le développement de terrains industriels.

<u>Revitalisation du centre-ville</u> : Le conseil a approuvé un groupement de financement (appelé le programme d'amélioration de base) pour promouvoir l'amélioration de l'activité commerciale existante au cœur du centre-ville. Le budget d'immobilisations de 2017 a également alloué des fonds pour l'embellissement du quartier des affaires au centre-ville

	CATÉGORIE DE	NIVEAU	NIVEAU DE	NIVEAU
	SERVICE	D'IMPORTANCE	SATISFACTION	D'ALIGNEMENT
1	Réparation des rue	96%	22%	FAIBLE
2	Déneigement	92%	63%	BON
3	Services d'incendie et de secours	92%	77%	EXCELLENT
4	Déchets	89%	80%	EXCELLENT
5	Parcs, espaces ouvertes	86%	63%	BON
6	Police	87%	71%	BON
7	Recyclage	84%	74%	EXCELLENT
8	Loisirs	82%	54%	BON
9	Collecteurs d'eaux pluviales/			
	inondations	81%	50%	JUSTE
10	Élargissement RC 17/174	80%	-	-
11	Planification	78%	34%	JUSTE
12	Services de la réglementation	77%	52%	BON
13	Éclairage des rues	76%	64%	EXCELLENT
14	Site Web de la Cité	75%	57%	BON
15	Trottoirs	71%	46%	BON
16	Construction	70%	36%	JUSTE
17	Revitalisation du centre-ville	69%	25%	JUSTE
18	Arts, Culture	63%	32%	JUSTE
19	Bibliothèque	59%	56%	EXCELLENT
20	Transport en commun	55%	25%	BON
21	Garderie	52%	34%	BON

ANALYSE DE L'HARMONISATION DES SERVICES

Plan d'action stratégique 2015 - 2021

		Р	riorité stratégique	e - Développement d	lu secteur riverain	
		OB	JECTIFS	Exigences en matière		
	BUTS	2018	2019-2021	de financement	Départements participants Commentaire	Commentaires
SENS DE LA COMMUNAUTÉ	Augmenter les occasions de développement des loisirs, du tourisme et de développement économiques le long du secteur riverain d'Ottawa	• Se coordonner avec le comité consultatif du Parc Du Moulin afin d'élaborer un plans de conception pour le Parc Du Moulin	 Évaluer les stratégies de mise en œuvre progressive et les impacts des droits d'aménagement pour le Parc Du Moulin Se coordonner avec le personnel de développement économique des CUPR pour identifier les possibilités du secteur riverain Meilleures pratiques de recherche réf. : développement du secteur riverain Développer un plan directeur pour le secteur riverain Enquêter sur les occasions de financement Identifier les partenariats publics/privés pour développer le secteur riverain 	Budget de fonctionnement de la Cité Consultant - 60 K\$	Services communautaires * Infrastructure et aménagement du territoire	

Plan d'action stratégique 2015 - 2021

			Priorité stratég	ique - Revitalisation du	centre-ville	
		OBJECTIFS		F .::		
	BUTS	2018	2019-2021	financement	Départements participants	Commentaires
SENS DE LA COMMUNAUTÉ	Revitaliser le centre-ville	 Examiner les meilleures pratiques des municipalités semblables Élaborer un plan d'amélioration progressive des rues et obtenir les approbations de financement pour la mise en oeuvre Étudier la faisabilité d'incitatifs pour les projets de densification dans le centre-ville et le secteur du village (p. ex. la faisabilité d'utilisation mixte commerciale/ résidentielle) Organiser régulièrement des réunions des associations commerciales 	 Mettre en oeuvre des améliorations progressives pour les infrastructures En cours En cours 	Budgets de fonctionnement et d'immobilisations de la Cité	Infrastructures et aménagement du territoire * Finances et développement économique	

Plan d'action stratégique 2015 - 2021

			Priorité stra	atégique - Con	nmunications	
		OBJECTIFS		Exigences en		
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires
SENS DE LA COMMUNAUTÉ	Améliorer les communications internes et externes en ce qui concerne la prestation des services municipaux	 Déterminer les politiques et procédures nécessaires à la prestation de services municipaux efficaces Hiérarchiser les politiques et les procédures; et élaborer un calendrier de mise en œuvre aux fins d'approbation du conseil 	• En cours	Budget de fonctionnement de la Cité	Bureau de la directrice générale * Tous les départements	

Plan d'action stratégique 2015 - 2021

	Priorité stratégique - Communications					
		OBJE	CTIFS	Exigences en		
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires
SENS DE LA COMMUNAUTÉ	Mettre en œuvre un système de gestion intégré des documents (SharePoint)	 Examiner les meilleures pratiques des municipalités semblables Faire des demandes de proposition pour retenir les services d'un consultant pour la conception de SharePoint pour l'intranet et site Web de la Cité Mise en œuvre des recommandations 	• En cours	Budgets de fonctionnement et d'immobilisations de la Cité • Nomination de consultants 70 K\$	Bureau de la greffe * Tous les départements	

Plan d'action stratégique 2015 - 2021

			Priorité strat	égique - Image et promotion		
		OBJECTIFS		Exigences en		
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires
SENS DE LA COMMUNAUTÉ	Optimiser l'utilisation des ressources en personnel	• Entreprendre l'inventaire des compétences du personnel existant	• En cours • Identifier et mettre en œuvre des possibilités interdépartemental es concernant l'utilisation du personnel	Budget de fonctionnement de la Cité	Ressources humaines * Tous les départements	

Plan d'action stratégique 2015 - 2021

			Priorité strat	égique - Imag	égique - Image et promotion		
		OBJE	CTIFS	Exigences en			
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires	
SENS DE LA COMMUNAUTÉ	Élaborer un plan de relève pour l'administration		 Examiner les meilleures pratiques des municipalités semblables et des entreprises Identifier les postes qui exigent une stratégie de plan de relève Fournir une formation et des opportunités de travail pratique pour les postes désignés 	Budget de fonctionnement de la Cité	Ressources humaines * Tous les départements		

ANNEXE B

Destination - Clarence-Rockland

Plan d'action stratégique 2015 - 2021

		t actif				
	_	0	BJECTIFS	Exigences en		
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires
SANTÉ ET MIEUX-ÊTRE	Promouvoir le transport actif par le développement d'une piste cyclable intégrée et un système de vélos		 Développer les besoins de transport actif pour les zones urbaines et rurales Examiner les meilleures pratiques des municipalités semblables Développer en priorité le plan directeur de transport et les coûts associés pour les zones urbaines et du village. Par la suite, des liens seront évalués entre ces secteurs. Mettre en œuvre les besoins en infrastructure Enquêter sur les programmes de financement fédéraux et provinciaux offerts Développer des normes pour les pistes cyclables et les sentiers 	Budgets de fonctionnement et d'immobilisations de la Cité	Services communautaires * Infrastructures et aménagement du territoire	

Plan d'action stratégique 2015 – 2021

		Priorité	é stratégique -	Préparation a	Préparation aux situations d'urgence		
		OBJECTIFS		Exigences en			
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires	
SANTÉ ET MIEUX-ÊTRE	Mettre à jour le programme de gestion des urgences	 Mettre à jour les règlements du Comité de gestion des urgences Mettre à jour les règlements du plan d'interventions en cas d'urgences Identifier les besoins de formation pour le groupe de maîtrise des situations d'urgences et les soumettre à la province Réaliser et évaluer les exercices d'intervention en cas d'urgences 	• En cours	Budget de fonctionnement de la Cité	Services de la protection * Tous les départements		

Plan d'action stratégique 2015 - 2021

		Prio	rité stratégique - N	ormes d'accessibilité intégrées			
		OBJ	ECTIFS	Exigences en	Départements		
	BUTS	2018	2019-2021	matière de financement	participants	Commentaires	
SANTÉ ET MIEUX-ÊTRE	Mettre à jour le plan d'accessibilité de 5 ans et les politiques connexes	 Examiner le plan d'accessibilité et les politiques actuelles En collaboration avec le comité consultatif sur l'Accessibilité, élaborer le plan et les politiques 2018-2023 Identifier et mettre en œuvre les exigences en matière de formation Identifier les besoins d'accessibilité et les coûts pour les installations de loisirs et les bâtiments administratifs 	 Préparer un rapport de progrès annuel ref : mise en œuvre des mesures d'accessibilité Publier le plan/politiques 2018-2023 sur le site Web Soumettre le plan d'accessibilité et les politiques mis à jour à la province En cours 	Budgets de fonctionnement et d'immobilisations de la Cité	Bureau de la greffe * Services communautaires Infrastructures et aménagement du territoire Services de la protection	• Mise à jour du plan d'accessibilité et des politiques pour les rendre conformes aux normes d'accessibilité intégrées obligatoires	

Plan d'action stratégique 2015 - 2021

	Priorité stratégique - Installations de loisirs								
		OBJECTIFS		Exigences en					
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires			
SANTÉ ET MIEUX-ÊTRE	Élargir les espaces de loisirs intérieurs		 Identifier les besoins de loisirs de la communauté Examiner les meilleures pratiques Établir un partenariat public - privé et élaborer les stipulations Conclure un protocole d'entente avec un partenaire du secteur privé réf. : opération du site 	Budgets de fonctionnement et d'immobilisations de la Cité	Services communautaires * Infrastructures et aménagement du territoire				

Plan d'action stratégique 2015 - 2021

		Prie	orité stratégiqu	Je - Développement économique			
		OBJE	CTIFS	Exigences en			
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires	
STABILITY FINANCIÈRE	Accroître les possibilités de développement économique par l'amélioration du corridor de la route de comté 17 et de l'autoroute 174	 Examiner les initiatives de « pressions politiques » pour élargir et d'améliorer le corridor du chemin de comté 17/174 Se coordonner avec les Comtés unis de Prescott et Russell (CUPR) afin d'élaborer des stratégies de planification et de financement pour élargir la route de comté 17 En collaboration avec les CUPR, rencontrer le maire d'Ottawa pour déterminer la position de la ville en ce qui concerne l'amélioration de l'autoroute 174 En collaboration avec les CUPR, préparer un programme pour les gouvernements fédéral et provincial en ce qui concerne le financement de la route de comté 17 	• En cours • En cours • En cours	Budget de fonctionnement de la Cité	Finances et développement économique * Infrastructures et aménagement du territoire	 Les CUPR sont l'administration routière. Clarence-Rockland aura un rôle de soutien. Ottawa a le pouvoir juridictionnel pour l'autoroute 174 	

Plan d'action stratégique 2015 - 2021

	Priorité stratégique - Taxes								
		OBJE	OBJECTIFS						
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires			
STABILITY FINANCIÈRE	Promouvoir la croissance commerciale et industrielle	 Offre de vente de 5 acres de terrains industriels et commerciaux de la ville (2017) Achever l'évaluation de faisabilité pour le parc commercial 	 Établir une nouvelle réserve pour faciliter l'aménagement du parc commercial Entreprendre une stratégie de développement économique pour le parc commercial 	Budget de fonctionnement de la Cité Retenir les services de consultants - 100 K\$	Finances et développement économique * Infrastructures et aménagement du territoire	• Approuvé en 2017			

Plan d'action stratégique 2015 - 2021

			Priorité s	tratégique - F	atégique - Financement			
	BUTS	BUTS 2018 2019-2021		Exigences en				
				matière de financement	Départements participants	Commentaires		
STABILITY FINANCIÈRE	Élaborer une stratégie de financement à long terme pour répondre aux besoins projetés		 Identifier les besoins financiers à long terme pour le fonctionnement et les immobilisations Rechercher les meilleures pratiques des municipalités semblables Élaborer des politiques financières et des stratégies visant à répondre aux besoins à long terme (p. ex. répartition des limites de la dette, fonds de réserve) 	Budget de fonctionnement de la Cité	Finances et développement économique * Tous les départements	• Assumer qu'un programme de gestion des actifs et qu'une mise à jour du reglement sur les frais de developpement ont été approuvés.		

Plan d'action stratégique 2015 - 2021

	Priorité stratégique - Infrastructure									
		BUTS 2018 2019-2021		Exigences en						
	BUTS			matière de financement	Départements participants	Commentaires				
STABILITY FINANCIÈRE	Améliorer l'accès à des sources de financement externes (p. ex. programmes fédéral et provincial)		 Identifier les meilleures pratiques afin de déterminer les sources de financement externe et y accéder Identifier les occasions de financement Établir des relations avec des décideurs et des administrateurs de programmes de financement 	Budget de fonctionnement de la Cité	Finances et développement économique * Tous les départements	• Impliquera la recherche dans les secteurs public et privé				

Plan d'action stratégique 2015 - 2021

		n de la croissance					
		OBJE	CTIFS	Exigences en			
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires	
RESPONSABILITÉ ENVIRONNEMENTALE	Mettre à jour le règlement des droits d'aménagemen t de la Cité	 Rencontrer des promoteurs et des constructeurs afin de discuter du processus de mise à jour (2017) Déterminer les besoins en matière d'infrastructures et les coûts pour répondre aux projections de croissance Développer des normes en matière d'infrastructures 	 Examiner les besoins en matière d'infrastructures et les coûts avec les promoteurs/ constructeurs Élaborer des politiques en matière de droits d'aménagement et de droits pour diverses formes d'aménagement Approbation des règlements des droits d'aménagement (2019) 	 Consultants financiers/ politiques 100 k\$ (2019) Consultant en ingénierie — 100 k\$ (2018) 	Finances et développement économique * Directrice générale/Bureau de la greffe Finances et développement économique Services communautaires Infrastructures et aménagement du territoire Services de la protection	 La 1re réunion des promoteurs sera convoquée en décembre 2017 Assume que le règlement ne fera pas l'objet d'un appel 	

Plan d'action stratégique 2015 - 2021

	Priorité stratégique - Planification							
	BUTS	OBJECTIFS		Exigences en				
		2018	2019-2021	matière de financement	Départements participants	Commentaires		
RESPONSABILITÉ ENVIRONNEMENTALE	Améliorer les normes de communication et les processus d'approbation avec le développement communautaire	 Convoquer deux réunions par an avec les promoteurs/ constructeurs Mettre en place une l'équipe de révision de demandes de planification, et convoquer les réunions d'équipe avec les demandeurs Adopter des normes d'ingénierie et un processus d'approbation de demandes de développement 	• En cours		Infrastructures et aménagement du territoire * Services communautaires Bureau de la directrice générale	• Projets de documents à être déposés auprès des promoteurs/constructeurs en 2017		

Plan d'action stratégique 2015 - 2021

	Priorité stratégique - Gestion des actifs								
		OBJE	CTIFS	Exigences en					
	BUTS	2018	2019-2021	matière de financement	Départements participants	Commentaires			
RESPONSABILITÉ ENVIRONNEMENTALE	Élaborer le Plan de gestion des actifs de la municipalité	 Établir les niveaux de service et mesures de rendement Évaluation des risques et analyse d'établissement des priorités; établissement des coûts 	 Préparer les politiques de gestion des actifs Soumettre le plan de gestion des actifs à la province 	Budgets de fonctionnement et d'immobilisation	Infrastructures et aménagement du territoire * Services communautaires Finances et développement économique Services d'urgence	Le Plan de gestion des actifs comprend : (1) Phase I et Phase II (2) Mise à jour des règlements des droits d'aménagement (3) Gestion des actifs Politiques (4) « Projets prêts à réaliser »			

Cité de Clarence-Rockland Priorités stratégiques

		Direction générale/	Ressources	Finances et développement	Services	Infrastructures et aménagement	Services de la
Priorités stratégiques	Lancement	Greffe	Humaines	économique	communautaires	du territoire	protection
1. Développement du secteur riverain	2019-2021				٧	V	
2. Revitalisation du centre-vile	2018			V		٧	
3. Élaboration des politiques	2018	٧	V	V	V	V	~
4. Gestion des documents	2018	٧	V	V	V	V	~
5. Inventaire des compétences	2018	V	٧	٧	٧	V	v
6. Planification de la relève	2019-2021	V	v	V	V	√	\checkmark
7. Transport actif	2019-2021				√	√	
8. Accessibilité	2018	V			V	V	~
9. Interventions d'urgence	2018	V	v	√	٧	√	V
10. Espaces de loisirs	2019-2021				V	√	
11. Route de comté 17/174	2018			٧		V	
12. Croissance industrielle	2018			٧		√	
13. Planification financière à long terme	2019-2021	v	V	√	V	√	\checkmark
14. Financement externe	2019-2021	V	V	√	V	√	\checkmark
15. Règlement redevances d'aménagement	2018	V		٧	V	٧	v
16. Développement communautaire	2018	v			٧	٧	
17. Gestion des actifs	2018	v		<u>۷</u>	<u>۷</u>	٧	٧
2018/2019-2021		8/3	4/3	9/3	8/6	11/6	7/3




Destination

City of Clarence-Rockland

STRATEGIC PLAN

2015 to 2021

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Message from Mayor and Council



Your Council is pleased to share with you the 2015-2021 Strategic Plan for the City of Clarence-Rockland.

This Strategic Plan represents the culmination of a comprehensive community engagement process which included workshops, online and website surveys. We would like to extend our sincere appreciation to all those that participated in the consultation process. You provided significant insight into your vision for the future of Clarence-Rockland; which services are highly valued and the level of satisfaction with the delivery of these services and, most importantly, the identification of municipal priorities.

Based on your feedback, the municipality is now positioned to align community goals and objectives with Council's priorities and enhance our accountability with our stakeholders.

The Plan is focused on four mutually supportive Pillars: **Sense of Community**; **Health and Wellness; Financial Stability and Environmental Responsibility.** These Pillars function as the foundation in establishing priorities for change.

This Strategic Plan is intended to provide focus and assistance to Council, the City's administration and the community so that we may collaboratively develop priorities to ensure that we remain a vibrant, healthy and sustainable City as we move forward into the future.

The City of Clarence-Rockland remains committed to working with its communities to make the City a destination of choice.

We are now positioned to take those first important steps to make.... **Destination Clarence-Rockland.....** a reality.

Message from the Chief Administrative Officer

A strategic planning process represents one of the most important initiatives that is undertaken by a municipality. It enables the administration to develop a clear and achievable "blueprint" in the establishment of future directions and priorities. Throughout the planning process, members of Council, the community and our employees have worked diligently to achieve common goals and objectives to transform a collective vision into reality.

I would like to express a sincere thank you to all participants who attended our workshops and those



of you who took time to fill out the survey or write to us to share ideas about the future direction of Clarence-Rockland. This plan would not have been possible without your valued input, we could not have done it alone.

Please be assured that the Strategic Plan will be a "living document". The priorities and directions articulated in the plan will be continuously monitored and updated to remain current with the changing times.

Again, thank you .

Background

In 2015, the City of Clarence- Rockland initiated a Strategic Planning process to define the City's Vision, Mission, Goals and Objectives for a 3 - 4 year time period.

The Strategic Planning process was very much an interactive one involving many of Clarence-Rockland's stakeholders. The 2015-2021 Strategic Plan has been developed based on extensive participation and feedback from over 1300 community members and addresses the needs that have been identified by Council members and the City's administration. The priorities identified in this Strategic Plan, therefore, represent a collaborative effort taking into consideration the needs of the Clarence-Rockland community stakeholders.

Based on the feedback received through workshops, online surveys and emails, the following four (4) Strategic Pillars were identified as pivotal to the efficient and effective delivery of municipal services to our community: *Sense of Community, Health and Wellness, Financial Stability and Environmental Responsibility.*

We believe that this Strategic Plan will:

- align goals and objectives with Council's priorities and enhance accountability to our stakeholders,
- serve as a reference point to identify community needs,
- ensure the effective and efficient use of resources,
- provide direction to employees,
- establish an interrelationship between strategic priorities and municipal planning and budget approvals; and
- serve as a tool to measure and evaluate day-to-day operations against strategic priorities

This Strategic Plan represents the culmination of an extensive "self-assessment" and planning process. This involved a determination of Corporate Values; Mission and Vision Statements; assessment of community feedback; identification of Pillars for change; establishment of strategic priorities, goals and objectives; and monitoring strategies.

Table 1.1 provides an overview of the Strategic Planning process.





Vision

To be the best place to live, by being welcoming, bilingual, self-sufficient, safe and family oriented. Clarence-Rockland will be a healthy, economically sustainable and environmentally sensitive community that will continuously invest in its future.

Mission

The City of Clarence- Rockland provides excellent local government services by demonstrating leadership, partnerships and a commitment to meet community needs. Services are delivered efficiently and effectively while respecting financial sustainability, the environment and the cultural well-being of the community.

Values

The development of the City's Strategic Plan, has been founded on the core ideologies of the municipality - ideologies that reflect what the organization believes in and how these will determine how the municipality will conduct its business and provide services as it moves forward into the future.

To this end, the City embraces the following values and commits to:

- provide *excellence in customer service* by researching and incorporating best practices of peer municipalities and implementing continuous improvement strategies
- *conduct its business in an open and transparent manner* by sharing timely and relevant information to stakeholders
- conduct its affairs with integrity by being honest, consistent and *accountable* for all actions taken by the municipality.

• *respect the individual rights* of employees and community stakeholders to support a work environment that exemplifies teamwork and mutual respect



Community Consultation

Stakeholder engagement and feedback represented a fundamental underpinning in the development of this Strategic Plan. Numerous venues were provided to secure public input into the strategic planning process. Stakeholders were requested to provide insight into the following:

- what services are most important to the community and what is the satisfaction level in the provision of the services?
- strengths, weaknesses, opportunities and threats (SWOT) to the municipality and its stakeholders
- identifying a **Vision** for a future Clarence-Rockland
- identifying key information sources that are used when seeking information about municipal issues
- importance of securing more retail and employment opportunities
- identifying municipal priorities

Approximately 23 workshops were held in April-June, 2015. These workshops involved a total of 474 participants. Supplementing the workshops, access to an online survey was available from May 1-July 8, 2015. Approximately 812 citizens in total participated in this survey opportunity. The total number of participants represented approximately 4% of the City's population.

The workshops and online surveys were advertised via mail-outs, the local newspaper, bus and bus shelter adds, electronic message boards and the City's website.

What Did We Hear?

Based on the results of the workshops and online surveys, a prioritized summary was compiled by the administration identifying the services that were considered most important to the quality of life of Clarence-Rockland residents and businesses and, as importantly, the associated level of satisfaction in the provision of these services.

In many instances, there was a "strong alignment" with the importance of a service and the level of satisfaction with that service. By example, a service which was viewed as very important to the respondents and had a corresponding high level of satisfaction was assumed to have a "strong" alignment. Conversely, some services that were viewed as very important to the community but had a low level of satisfaction. These services would be seen as having a "poor" or "fair" alignment and, as such, warranted attention in identifying priorities for the Strategic Plan. Appendix A provides an overview of the alignment analysis conducted by staff.

The Strategic Priorities highlighted in this Plan reflect a desire to strengthen the alignment of highly valued services where warranted and, as well, respond to needs identified by Council and the administration.

Strengths, Weaknesses, Opportunities and Threats (SWOT)

In order to identify strategic directions to move forward into the future, it was important for the organization to undertake an objective assessment of itself. Accordingly, the consultation process requested respondents to identify:

- what the City does well;
- where improvements are required in the provision of services;
- what opportunities are available to address needed improvements and position itself to deal with threats to the organization ; and

• internal/external threats that could have a negative impact on the municipality.

The results of this analysis represents an integral consideration in the strategic planning exercise. The SWOT analysis serves as a strategic management tool and enables the municipality to undertake a self-assessment of its current internal processes, and allows it to identify opportunities for change taking into consideration limitations of the organization and any threats facing it.

Table 1.2 represents a consolidated summary of the SWOT analysis obtained through the consultation processes.



Table 1.2

The Strategic Plan Framework

STRATEGIC PILLARS:

The City of Clarence-Rockland is committed to the provision of municipal services in a sustainable manner to meet the present and future needs of its communities. This Strategic Plan represents a significant milestone in achieving this objective.

The community consultation process highlighted that the municipality operates within the following four (4) separate and identifiable Pillars. The City's **Vision** is supported by these Pillars:

SENSE OF COMMUNITY

The residents and businesses in the City of Clarence-Rockland are proud of their bilingual culture, their rich heritage, the abundance of natural features in both a rural and urban setting and the extensive number of municipal facilities. It is important that the municipality acknowledge these traits and provide services that reinforce these community values.

HEALTH AND WELLNESS

The municipality commits to providing services that respond to the continued health and well-being of its residents.

FINANCIAL STABILITY

The City of Clarence-Rockland is subject to increasing demands to maintain existing infrastructure and programs and, as well, position itself for the future. It is, therefore, critical that the municipality ensure that appropriate levels of funding are available to meet community needs and expectations. It is necessary that Council and the administration assesses and implement innovative funding strategies to meet the pressures of funding future requirements.

ENVIRONMENTAL RESPONSIBILITY

The municipality has a significant amount of infrastructure that needs to be maintained in an environmentally responsible manner. The municipality must

ensure that timely rehabilitation works are implemented to protect our environment while meeting the needs of the community. It is anticipated that the municipality will continue to grow thus placing further pressures on sound environmental stewardship.

The Pillars serve to provide a focus for the municipality in order to provide timely services to meet operational needs. The Pillars provide guidance for the development and implementation of strategic priorities to meet the challenges facing the municipality as it moves forward into the future.

STRATEGIC PRIORITIES:

This Strategic Plan has identified Strategic Priorities for each of the four Pillars referenced above. Table 1.3 identifies Strategic priorities for each of the four (4) Pillars.

	SENSE OF	HEALTH AND		FINANCIAL STABILITY		l	NVIRONMENTAL
	COMMUNITY		WELLNESS RESP		RESPONSIBILITY		
1.	Riverfront	1.	Active	1.	Economic	1.	Growth
	Development		Transportation		Development		Management
2.	Downtown	2.	Integrated	2.	Commercial/Industrial	2.	Planning
	Revitalization		Accessibility		Growth	3.	Asset
3.	Communication		Standards	3.	Tax Base		Management
4.	Image and	3.	Emergency	4.	Funding		
	Promote		Preparedness		Opportunities		
		4.	Recreational				
			Facilities				

Table 1.3 – Strategic Priorities

GOALS AND OBJECTIVES:

For each Strategic Priority referenced in Table 1.3, the Strategic Plan identifies concise and measurable goals and objectives for each priority. **Appendix B** summarizes the associated goals and objectives for each Strategic Priority; highlights budget requirements (where necessary) and identifies the lead department assigned primary responsibility to oversee a Strategic Priority. **Appendix C** summarizes departmental involvement for each Priority.

Implementation and Monitoring

The Strategic Plan must be a "living document". It is critical that the strategic actions itemized in the Plan be identifiable and measurable. As such, there must be a mechanism contained within the Plan to continuously assess the progress of the Strategic Plan's action items and ensure that they are monitored and adjusted accordingly. In order to cascade Strategic Priorities throughout the organization, the Plan will require the following actions:

Assignment of Responsibilities: Strategic Goals will be assigned to a lead department that will assume responsibility for implementation of the associated Strategic Objectives. The department head will be required to provide regular report updates to the Chief Administrative Officer on the progress of the Strategic Goals. It is understood that other departments may be involved in a Strategic Goal; however, only the lead department head will provide the updates to the Chief Administrative Officer.

Performance Reviews: As appropriate, annual employee performance reviews will contain a requirement to address Strategic Plan goals and objectives for the forthcoming year. The department head will assign the Strategic Objectives to appropriate employees and ensure that regular progress meetings are convened with the employee throughout the year to monitor progress on Strategic Objectives.

<u>Annual Budgets</u>: The administration will ensure that funding to implement Strategic Priorities are reflected in the draft capital works and operating programs for Council's consideration and approval.

<u>Reporting to Council</u>: The Chief Administrator Officer (CAO) will provide Council with semi-annual updates on the progress of the Strategic Plan Priorities. The CAO will also provide a year-end report for Council's review in respect of the accomplishments of the administration for the current year, future undertakings and a status report on compliance with Strategic Planning Priorities.

The above actions will ensure that approved Strategic Objectives are cascaded throughout the organization.

<u>Updates</u>: The Corporate Strategic Plan will be reviewed and updated as necessary at least every 5 years. However, as external and internal factors dictate, it may be necessary to amend the Strategic Priorities identified in this plan at an earlier date.

Strategic Accomplishments

The Strategic Planning process was initiated in 2015; however, since that time, the municipality has commenced or completed several Strategic Priority initiatives that are complementary to the Strategic Priorities contained in this Plan. They are summarized as follows:

Asset Management: Council has approved the framework for the development of a Corporate Asset Management Plan. Phase 1 of the Plan was approved by City Council in November, 2017. Phase 2 is scheduled for approval by mid-year 2018.

<u>Growth Management</u>: Growth forecasts (2018-2043) have been developed and will be a critical component for the update of the City's Development Charge Bylaw. These forecasts, also, will be used for several servicing studies (e.g. water and wastewater treatment plant upgrades, master servicing studies etc.) that are currently underway.

Health and Wellness: A Recreation Master Plan was approved by Council in 2016.

Policies: Revisions have been made to the City's purchasing policies and bylaw; information technology policies and procedures; and road closure procedures. Council has approved a policy with respect to addressing community requests.

County Road 17/174: The City of Clarence-Rockland has been liaising with the United Counties of Prescott and Russell to advance transportation improvements to this corridor.

Economic Development: The City has worked collaboratively with the United Counties of Prescott Russell to secure a \$40 million commitment from the province for the widening of County Road 17. Additionally, the municipality has participated in meetings with provincial and federal elected representatives to ensure that the widening of County Road 17/174 remains a high priority with all levels of government.

Heritage Tour: In conjunction with Heritage Committee, staff has identified sites of historical significance and developed pamphlets and a heritage tour of these sites.

<u>Commercial/Industrial Growth</u>: A location analysis and recommendation for the development of a new industrial park was presented to Council in 2017. A detailed business plans, including several options was presented to Council at an in-camera session in September 2017. A proposal for 2018 has been included in the 2018 Capital Budget for development of industrial lands.

<u>Revitalization of Downtown Core</u>: Council approved a funding partnership (referred to as the Core Improvement Program) to encourage improvements to the existing businesses within the downtown core. The 2017 capital works budget has also allocated funding for the beautification of the downtown business core.

		LEVEL OF	LEVEL OF	ALIGNMENT
	SERVICE CATEGORY	IMPORTANCE	SATISFACTION	LEVEL
1	Street Repairs	96%	22%	POOR
2	Snow Clearing	92%	63%	GOOD
3	Fire and Rescue	92%	77%	EXCELLENT
4	Garbage	89%	80%	EXCELLENT
5	Parks, Open Space	86%	63%	GOOD
6	Police	87%	71%	GOOD
7	Recycling	84%	74%	EXCELLENT
8	Recreational	82%	54%	GOOD
9	Storm Drain/Flood	81%	50%	FAIR
10	Widening C-R 17/174	80%	-	-
11	Planning	78%	34%	FAIR
12	By-law Enforcement	77%	52%	GOOD
13	Street Lighting	76%	64%	EXCELLENT
14	City Website	75%	57%	GOOD
15	Sidewalks	71%	46%	GOOD
16	Construction	70%	36%	FAIR
17	Downtown Revitalization	69%	25%	FAIR
18	Arts, Culture	63%	32%	FAIR
19	Library	59%	56%	EXCELLENT
20	Transit	55%	25%	GOOD
21	Daycare	52%	34%	GOOD

SERVICE ALIGNMENT ANALYSIS

2015 - 2021 Strategic Action Plan

			Strategic Prio	rity - Riverfror	nt Development	
		OBJEC	CTIVES	Funding.	Deuticipation	
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
SENSE OF COMMUNITY	To increase recreation, tourism and economic development opportunities along Ottawa Riverfront	• Liaise with Park Advisory Committee to develop concept plan for Du Moulin Park	 Evaluate staged implementation strategies and Development Charge impacts for Du Moulin Park Liaise with UCPR economic development staff to identify riverfront opportunities Research best practices re: riverfront development Develop riverfront Master Plan Investigate funding opportunities Identify public/private partnerships to develop riverfront 	City - Operating Budget Consultant - \$60K	Community Services * Infrastructure and Planning	

2015 - 2021 Strategic Action Plan

			Strategic Pri	ority - Downtown Revit	alization	
		OBJE	CTIVES			
	GOALS	2018	2019-2021	Funding Requirements	Participating Department(s)	Comments
SENSE OF COMMUNITY	To revitalize the downtown core area	 Review best practices of peer municipalities Develop phased street improvement plan and obtain implementation funding approvals Research feasibility of incentives for densification projects in the core downtown and village areas (e.g. feasibility of mixed use commercial/ residential) Convene regular business association meetings 	 Implement phased infrastructure improvements Ongoing Ongoing 	City - Operating and Capital budgets	Infrastructure and Planning * Finance and Economic Development	

2015 - 2021 Strategic Action Plan

			Strategic I	Priority - Communications		
		OBJEC	CTIVES	Euro el ince	Deuticination	
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
SENSE OF COMMUNITY	To enhance external and internal communications regarding delivery of municipal services	 Identify policies and procedures required to deliver efficient and effective municipal services Prioritize policies and procedures; and develop an implementation schedule for council approval 	 Ongoing 	City - Operating Budget	Office of the CAO * All Departments	

2015 - 2021 Strategic Action Plan

			munications			
		OBJEC	CTIVES	Franklin e		
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
SENSE OF COMMUNITY	To implement an integrated document management system (SharePoint)	 Review best practices of peer municipalities Issue RFP to retain consultant to design SharePoint for intranet and City's Website Implement recommendations 	• Ongoing	City - Operating and Capital Budget • Consultant appointment \$70K	Clerk * All Departments	

2015 - 2021 Strategic Action Plan

			Strategic Pr	riority - Image and Promote		
		OBJEC	CTIVES	F		
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
SENSE OF COMMUNITY	Optimize utilisation of staff resources	• Undertake skills inventory of existing staff compliment	 Ongoing Identify and implement inter- departmental opportunities regarding staff utilization 	City - Operating Budget	Human Resources * All Departments	

2015 - 2021 Strategic Action Plan

			Strategic Pr	iority - Image	and Promote	
		OBJEC	CTIVES	Funding	Deuticipatina	
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
SENSE OF COMMUNITY	Develop corporate succession plan		 Research best practices of peer municipalities and businesses Identify positions requiring a succession plan strategy Provide training and hands-on work opportunities to designated positions 	City - Operating Budget	Human Resources * All Departments	

2015 - 2021 Strategic Action Plan

			Strategic Priority -	Active Transp	ortation	
		OE	BJECTIVES	Funding	Deuticipatina	
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
HEALTH AND WELLNESS	To promote active transportation by developing an integrated bike path and cycling system		 Develop active transportation needs for urban and rural areas Review best practices of peer municipalities Develop prioritized master transportation plan and associated costs for the urban and village core areas. Subsequently, linkages will be assessed between these areas. Implement infrastructure needs Investigate possible Provincial and Federal funding programs Develop cycling and path standards 	City - Operating and Capital	Community Services * Infrastructure and Planning	

2015 - 2021 Strategic Action Plan

			Strategic Prior	ity - Emergen	cy Preparedness	
		OBJEC	CTIVES	F dia a	Deuticipation	
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
HEALTH AND WELLNESS	Update Corporate Emergency Management Response Program	 Update Emergency Management Committee By-Law Update Emergency Response Plan By-Law Identify training requirements for Emergency Control Group and submit to Province Conduct and evaluate annual Emergency Response Exercise 	• Ongoing	City - Operating Budget	Protective Services * All Departments	

2015 – 2021 Strategic Action Plan

		Stra	tegic Priority -	Integrated Ac	Integrated Accessibility Standards		
		OBJEC	CTIVES	From alling as	Deuticipation		
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments	
HEALTH AND WELLNESS	To update accessibility 5 year plan and associated policies	 Review current Accessibility Plan and Policies In conjunction with Accessibility Advisory Committee, develop 2018-2023 Plan and Policies Identify and implement training requirements Identify accessibility needs and costs for recreation and administration buildings 	 Prepare annual progress report re: implementation of accessibility measures Post 2018-2023 plan/policies on web-site Submit updated Accessibility Plan and Policies to Province Ongoing 	City - Operating and Capital Budget	Clerk * Community Services Infrastructure and Planning Protective Services	• Update of Accessibility Plan and Policies will comply with mandatory Integrated Accessibility Standards (IASR)	

2015 - 2021 Strategic Action Plan

	Strategic Priority - Recreational Facilities							
		OBJE	CTIVES					
	GOALS	2018	2019-2021	Funding Requirements	Department(s)	Comments		
HEALTH AND WELLNESS	To expand indoor recreational space		 Municipality to identify its community recreation needs Review best practices Establish public - private partnership and develop terms of reference Execute a memorandum of understanding with private sector partner re: operation of site 	City - Operating and Capital Budget	Community Services * Infrastructure and Planning			

2015 - 2021 Strategic Action Plan

	Strategic Priority - Economic Development							
		OBJEC	CTIVES	Funding	Dorticipating			
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments		
FINANCIAL STABILITY	Increase Economic Development opportunities by improving County Road 17 and Highway 174 corridor	 Review current "lobbying" initiatives to expand and improve County Road 17/174 corridor Liaise with United Counties of Prescott and Russell (UCPR) to develop planning and funding strategies to expand County Road 17 In conjunction with UCPR, meet with Ottawa Mayor to determine City's position in regard to Highway 174 improvements In conjunction with UCPR prepare brief to Federal and Provincial governments in regard to funding County Road 17 	 Ongoing Ongoing Ongoing Ongoing 	City - Operating Budget	Finance and Economic Development * Infrastructure and Planning	 UCPR is road authority. Clarence-Rockland will be in a support role. Ottawa is jurisdictional authority for Highway 174 		

2015 - 2021 Strategic Action Plan

	Strategic Priority - Taxes							
		OBJE	CTIVES		Deuticipation			
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments		
FINANCIAL STABILITY	To promote commercial and industrial growth	 Tender sale of 5 acres of City commercial and industrial land (2017) Complete feasibility assessment for business park 	 Establish new reserve to facilitate future business park development Undertake economic development strategy for business park 	City - Operating Budget Retain consultant - \$ 100K	Finance and Economic Development * Infrastructure and Planning	• Approved in 2017		

APPENDIX B

Destination - Clarence-Rockland

2015 - 2021 Strategic Action Plan

			Strate	egic Priority -	Funding	
	OBJECTIVES		CTIVES	Funding	Destisiantian	
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments
FINANCIAL STABILITY	To develop a long range financing strategy to meet projected needs		 Identify long range operating and capital financial needs Research best practices of peer municipalities Develop financial policies and strategies to address long term needs (e.g. pay-as-you-go debt limits, reserve funds) 	City - Operating Budget	Finance and Economic Development * All departments	• Assumes 10 year asset management programs and Development Charge By- Law update are approved.

2015 - 2021 Strategic Action Plan

		astructure				
	GOALS	OBJEC	CTIVES			
		2018	2019-2021	Funding Requirements	Department(s)	Comments
FINANCIAL STABILITY	To enhance access to external funding sources (e.g. Federal and Provincial Programs)		 Identify best practices to determine/access external funding sources Identify funding opportunities Establish relationship with decision makers and administrators of funding programs 	City - Operating Budget	Finance and Economic Development * All Departments	• Will involve research of both public and private sectors

APPENDIX B

Destination - Clarence-Rockland

2015 - 2021 Strategic Action Plan

	Strategic Priority - Growth Management								
	OBJECTIVES			Funding.	Deutisiaatiaa				
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments			
ENVIRONMENTAL RESPONSIBILITY	To update City's Development Charge By-Law	 Meeting with developers and builders to discuss update process (2017) Determine infrastructure needs and costs to address growth projections Develop infrastructure standards 	 Review infrastructure needs and costs with developers/ builders Develop Development Charges policies and charges for various forms of development Development Charge By-law approval (2019) 	 Financial/Policy consultants - \$100K (2019) Engineering consultant - \$100K (2018) 	Finance and Economic Development * CAO/Clerk Finance and Economic Development Community Services Infrastructure and Planning Protective Services	 1st developer meeting will be convened in December 2017 Assumes By-Law not appealed 			

2015 - 2021 Strategic Action Plan

			Strate	gic Priority - Planning			
		OBJEC	CTIVES		Deutisiaatina		
	GOALS	2018	2019-2021	Requirements	Department(s)	Comments	
ENVIRONMENTAL RESPONSIBILITY	To improve communications standards and approval processes with development community	 Convene two developer/builder meetings per year Establish planning application review team and convene team meetings with applicants Adopt engineering standards and development application approval process 	Ongoing Ongoing		Infrastructure and Planning * Community Services CAO's Office	• Draft documents to be tabled with developers/builders in 2017	

2015 - 2021 Strategic Action Plan

	Strategic Priority - Asset Management							
		OBJEC	CTIVES	Funding Requirements	Particinating			
	GOALS	2018	2019-2021		Department(s)	Comments		
ENVIRONMENTAL RESPONSIBILITY	Develop Corporate Asset Management Plan	 Establish levels of service and performance measures Risk assessment and prioritization analysis; costing 	 Prepare asset management policies Submit corporate asset management plan to province 	Operating and Capital budgets	Infrastructure and Planning * Community Services Finance and Economic Development Emergency Services	Corporate Asset Management Plan comprises: (1) Phase I and Phase II (2) Development Charges Bylaw update (3) Asset Management Policies (4) "Shovel Ready Projects"		

City of Clarence-Rockland Strategic Priorities

			Human	Finance and	Community	Infrastructuro	Protoctivo
			Dunian		Continuinty		FIOLECTIVE
Strategic Priorities	Initiate	CAO/Clerk	Resources	Development	Services	and Planning	Services
1. Riverfront Development	2019-2021				٧	٧	
2. Revitalize Downtown	2018			V		V	
3. Policy Development	2018	V	V	V	V	V	٧
4. Document Management	2018	V	v	V	V	V	V
5. Skills Inventory	2018	V	۷	V	V	V	٧
6. Succession Planning	2019-2021	V	٧	V	√	√	V
7. Active Transportation	2019-2021				٧	V	
8. Accessibility	2018	V			٧	V	٧
9. Emergency Response	2018	v	V	V	V	V	٧
10. Recreation Space	2019-2021				√	V	
11. County Rd 17/174	2018			٧		V	
12. Industrial Growth	2018			٧		V	
13. Long Range Financial Planning	2019-2021	V	V	٧	V	V	V
14. External Funding	2019-2021	V	V	٧	V	V	V
15. DC By-Law	2018	v		٧	٧	V	٧
16. Development Community	2018	V			√	V	
17. Asset Management	2018	V		V	V	V	V
2018/2019-2021		8/3	4/3	9/3	8/6	11/6	7/3
				Strategic Priority - Riverfront Develo	opment		
--------------------	---	--	--	--	---	---	--
			OBJEC	TIVES			
	GOALS	2018	2019-2021	2019-2021 As at Oct 19, 2020		Participating Department(s)	
SENSE OF COMMUNITY	To increase recreation, tourism and economic development opportunities along Ottawa Riverfront	• Liaise with Park Advisory Committee to develop concept plan for Du Moulin Park	 Evaluate staged implementation strategies and Development Charge impacts for Du Moulin Park Liaise with UCPR economic development staff to identify riverfront opportunities Research best practices re: riverfront development Develop riverfront Master Plan Investigate funding opportunities Identify public/private partnerships to develop riverfront 	Concept plan for Du Moulin Park completed; however, requires land acquisition. Currently considering land acquisition strategy. Will be the subject of a future staff report to Council.	City - Operating Budget Consultant - \$60К	Community Services * Infrastructure and Planning	

				Strategic Priority - Downtown Revita	alization	
			OBJEC	CTIVES		
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)
SENSE OF COMMUNITY	To revitalize the downtown core area	 Review best practices of peer municipalities Develop phased street improvement plan and obtain implementation funding approvals Research feasibility of incentives for densification projects in the core downtown and village areas (e.g. feasibility of mixed use commercial/ residential) Convene regular business association meetings 	 Implement phased infrastructure improvements Ongoing Ongoing 	CSW retained to develop a phased street improvement program and costing strategies. A master plan design has been developed for the downtown revitalization. Estimated cost of the revitalization works is \$4.5 million. The design will be presented to Council in the near future. Consultation during the design process included open houses and one-on-one meetings with impacted businesses. Staff has researched the feasibility of financial incentives for densification on projects in the downtown core.	City - Operating and Capital budgets	Infrastructure and Planning * Finance and Economic Development

				Strategic Priority - Communicati	ions		
			OBJEC	TIVES			
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Department(s)	
SENSE OF COMMUNITY	To enhance external and internal communications regarding delivery of municipal services	 Identify policies and procedures required to deliver efficient and effective municipal services Prioritize policies and procedures; and develop an implementation schedule for council approval 	• Ongoing	Staff introduced weekly correspondence package for Council's information due to the COVID-19 impact, Directors meet 3 times per week to discuss communication strategies with the public. The 2020 budget approved funding for improvements to the City's website. The retention of a firm to update the website is currently out to tender and will be awarded in November 2020. Expanded online payment services: residents can now pay taxes, licenses, etc. online Introduced an electronic pay system for daycare in 2019. The system enables city staff to communicate directly with daycare clients	City - Operating Budget	Office of the CAO * All Departments	

				Strategic Priority - Communicati	ations			
			OBJEC					
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Department(s)		
SENSE OF COMMUNITY	To implement an integrated document management system (SharePoint)	 Review best practices of peer municipalities Issue RFP to retain consultant to design SharePoint for intranet and City's Website Implement recommendations 	• Ongoing	Review best practices of peer municipalities has been completed. An RFP to retain a consultant to design SharePoint has been completed and awarded to StoneShare Consulting. The SharePoint capital project is being implemented on a "phased-in" basis and is now 80%-90% complete. SharePoint needs to be implemented for Protective Services. This is the only outstanding department. COVID-19 has impacted the timing of the "rollout" of SharePoint.	City - Operating and Capital Budget Consultant appointment \$70К	Clerk * All Departments		

				Strategic Priority - Image and Pro	Promote			
			OBJEC	TIVES	Funding	Participating Department(s)		
	GOALS	2018	2019-2021	As at Oct 19, 2020	Requirements			
SENSE OF COMMUNITY	Optimize utilization of staff resources	• Undertake skills inventory of existing staff compliment	• Ongoing • Identify and implement inter- departmental opportunities regarding staff utilization	Skills inventory not yet completed. Staff undertaken a position of management service program review in 2021. This will address succession planning requirements, of staff skills inventory, etc. it will result in a corporate wide development plan.	City - Operating Budget	Human Resources * All Departments		

				Strategic Priority - Image and Pro	mote	
			OBJEC	TIVES	- "	5
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)
SENSE OF COMMUNITY	Develop corporate succession plan		 Research best practices of peer municipalities and businesses Identify positions requiring a succession plan strategy Provide training and hands-on work opportunities to designated positions 	Will be identifying positions requiring a succession plan study in Q1 2021. Replacement strategy will be developed for these positions. Administration will also determine employee development requirements in 2021.	City - Operating Budget	Human Resources * All Departments

		Strategic Priority - Active Transportation						
			OBJEC	TIVES				
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)		
HEALTH AND WELLNESS	To promote active transportati on by developing an integrated bike path and cycling system		 Develop active transportation needs for urban and rural areas Review best practices of peer municipalities Develop prioritized master transportation plan and associated costs for the urban and village core areas. Subsequently, linkages will be assessed between these areas. Implement infrastructure needs Investigate possible Provincial and Federal funding programs. Develop cycling and path standards 	Master Transportation Study (which included active transportation requirements) was approved by Council in 2019. The study identified long-term active transportation plan capital priorities and associated costs. Development of the Master Transportation Study involved extensive community consultation The City applied for grants and was successful with some for pathway construction. Recreational Advisory Trail Committee has been formed. Committee terms of reference have been adopted. Meetings are not as frequent due to impacts of COVID-19. The meetings should start up in 2021. Capital program proposed to connect the main trail system in Morris Village, Phase 5 to Caron Street in 2021.	City - Operating and Capital	Community Services * Infrastructure and Planning		

				Strategic Priority - Emergency Prepa	paredness		
			OBJEC	CTIVES		5	
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Department(s)	
HEALTH AND WELLNESS	Update Corporate Emergency Management Response Program	 Update Emergency Management Committee By-Law Update Emergency Response Plan By- Law Identify training requirements for Emergency Control Group and submit to Province Conduct and evaluate annual Emergency Response Exercise 	• Ongoing	The 2019 flood and the COVID-19 pandemic have been ruled by the province as "real life" emergency response exercises, and as such, the municipality does not need to conduct a desktop emergency exercise in 2019 and 2020. A "tabletop" emergency response exercise was developed for November 4, 2020. This exercise will include the United Counties of Prescott-Russell and has been deferred until 2021. Emergency Management Committee By-law has been updated and approved by Council.	City - Operating Budget	Protective Services * All Departments	

				Strategic Priority - Integrated Acce	essibility Standards			
			OBJEC	TIVES				
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments	
HEALTH AND WELLNESS	To update accessibility 5 year plan and associated policies	 Review current Accessibility Plan and Policies In conjunction with Accessibility Advisory Committee, develop 2018-2023 Plan and Policies Identify and implement training requirements Identify accessibility needs and costs for recreation and administration buildings 	 Prepare annual progress report re: implementation of accessibility measures Post 2018-2023 plan/policies on web-site. Submit updated Accessibility Plan and Policies to Province Ongoing 	A review of current accessibility plans and policies has been completed by staff. Plans and policies for 2018-2022 have been developed and adopted by Council. Annual reviews are conducted for accessibility plans. This is currently in progress. Updated accessibility plan and policies submitted to the province. In 2020, accessibility improvements have been made to two parks. (Hammond and Dutrisac Parks). These works were carried out by Community Services. The identification and implementation of training requirements is ongoing. Grants: Play structures in Hammond (\$85,535).	City - Operating and Capital Budget	Clerk * Community Services Infrastructure and Planning Protective Services	• Update of Accessibility Plan and Policies will comply with mandatory Integrated Accessibility Standards (IASR)	

				Strategic Priority - Recreational Fa	cilities	
			OBJE	F ound in a	Deuticiantian	
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Department(s)
HEALTH AND WELLNESS	To expand indoor recreational space		 Municipality to identify its community recreation needs Review best practices Establish public - private partnership and develop terms of reference Execute a memorandum of understanding with private sector partner re: operation of site 	Recreation Master Plan (2015-2030) previously approved by Council. The Plan will be updated and presented to Council in the fall of 2021. Costs associated with the retention of required external services will be addressed as part of the 2022 budget. The administration has not yet undertaken the initiatives identified in 2019-20 21 columns.	City - Operating and Capital Budget	Community Services * Infrastructure and Planning

				Strategic Priority - Economic D			
			OBJEC	TIVES			
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments
FINANCIAL STABILITY	Increase Economic Development opportunities by improving County Road 17 and Highway 174 corridor	 Review current "lobbying" initiatives to expand and improve County Road 17/174 corridor Liaise with United Counties of Prescott and Russell (UCPR) to develop planning and funding strategies to expand County Road 17 In conjunction with UCPR, meet with Ottawa Mayor to determine City's position in regard to Highway 174 improvements In conjunction with UCPR prepare brief to Federal and Provincial governments in regard to funding County Road 17 	 Ongoing Ongoing Ongoing Ongoing 	Brief in support of highway improvements to County Road 17/174 presented to the Ministry of Transportation at the 2020 ROMA conference in Toronto.	City - Operating Budget	Finance and Economic Development * Infrastructure and Planning	 UCPR is road authority. Clarence- Rockland will be in a support role. Ottawa is jurisdictional authority for Highway 174

				Strategic Priority - Tax	es		
			01	BJECTIVES			
GOALS		2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments
To promote commercial and industrial growth	 Tenda acres o comme industr (2017) Comp feasibil assessr busines 	er sale of 5 f City ercial and ial land olete ity nent for ss park	 Establish new reserve to facilitate future business park development Undertake economic developmen t strategy for business park 	Staff submitted an overall economic development strategy for Council's consideration at its October 5, 2020 meeting. The strategy would be initiated in 2021 and would address a number of economic development issues such as future business parks, etc. Funding requirements for the economic development strategy would be considered as part of the 2021 budget deliberation process.	City - Operating Budget Retain consultant \$ 100К	Finance and Economic Development* Infrastructure and Planning	• Approved in 2017

FINANCIAL STABILITY

				Strategic Priority - Fund	ding		
		OBJECTIVES					
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments
FINANCIAL STABILITY	To develop a long range financing strategy to meet projected needs		 Identify long range operating and capital financial needs Research best practices of peer municipalities Develop financial policies and strategies to address long term needs (e.g. pay-as-you-go debt limits, reserve funds) 	Developed reserve/reserve fund policy Council approved Debt Management Policy in process of developing a multiyear financial plan; this will require finalization of the corporate asset management plan and long range operating costs. Initiated a review of " best practices" of peer municipalities.	City - Operating Budget	Finance and Economic Development* All departments	• Assumes 10 year asset management programs and Development Charge By- Law update are approved.

			Strategic Priority - Infrastruc	cture			
	OBJECTIVES						
GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments	
To enhance access to external funding sources (e.g. Federal and Provincial Programs)		 Identify best practices to determine/access external funding sources Identify funding opportunities Establish relationship with decision makers and administrators of funding programs 	Nothing has occurred on this initiative to date. This will commence once a multi-year financial plan has been adopted by Council.	City - Operating Budget	Finance and Economic Development * All Departments	• Will involve research of both public and private sectors	

FINANCIAL STABILITY

				Strategic Priority - Growth Mana	agement			
ĺ		OBJECTIVES						
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments	
	To update City's Development Charge By-Law	 Meeting with developers and builders to discuss update process (2017) Determine infrastructure needs and costs to address growth projections Develop infrastructur e standards 	 Review infrastructure needs and costs with developers/ builders Develop Development Charges policies and charges for various forms of development Development Charge By-law approval (2019) 	Developed local service standards and DC background study in 2019. Both of these documents circulated to the development community for review and comment. As required, convened a public meeting (Nov 2019) regarding the proposed Development Charge Bylaw. DC bylaw adopted by Council in January, 2020 based on recent decisions from the province, the City must revise its DC by-law with respect to "soft services". This will be done in 2021. A staff report will be forwarded to Council in early 2021 regarding the recent changes to "soft services" and a recommended course of action to address these changes.	 Financial/Policy consultants - \$100K (2019) Engineering consultant - \$100K (2018) 	Finance and Economic Development* CAO/Clerk Finance and Economic Development Community Services Infrastructure and Planning Protective Services	 1st developer meeting will be convened in December 2017 Assumes By- Law not appealed 	

ENVIRONMENTAL RESPONSIBILITY

			Strategic Priority - Plannin	ority - Planning				
	OBJE		DBJECTIVES					
GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments		
To improve communications standards and approval processes with development community	 Convene two developer/builder meetings per year Establish planning application review team and convene team meetings with applicants Adopt engineering standards and development application approval process 	• Ongoing • Ongoing	Staff endeavored to convene the annual meeting with the developers in 2019 but it was mutually agreed that this meeting be replaced by the consultation process involved in developing the new DC by-law. Local servicing standards circulated for stakeholder comment and included in the DC by- law and background study. Separate meeting convened with developers regarding fee development charge process DC background study circulated to developers for comment. Streamlined and amended development deposit process for building permits etc. will restart annual meeting with developers in 2021		Infrastructure and Planning * Community Services CAO's Office	• Draft documents to be tabled with developers/builders in 2017		

ENVIRONMENTAL RESPONSIBILITY

			Strategic Priority - Asset Management						
		OBJECTIVES							
	GOALS	2018	2019-2021	As at Oct 19, 2020	Funding Requirements	Participating Department(s)	Comments		
ENVIRONMENTAL RESPONSIBILITY	Develop Corporate Asset Management Plan	 Establish levels of service and performance measures Risk assessment and prioritization analysis; costing 	 Prepare asset management policies Submit corporate asset management plan to province 	Comprehensive Asset Management work plan approved by Council. The work plan is structured to meet the provincial asset management timelines. Reinstated the 2017 asset management program (Phase 1). Scheduling a facilitated workshop with Council this fall to discuss principles of asset management. Working on RFP to purchase asset management software. Applied for FCM grant for workshop, staff training and software acquisition.	Operating and Capital budgets	Infrastructure and Planning * Community Services Finance and Economic Development Emergency Services	Corporate Asset Management Plan comprises: (1) Phase I and Phase II (2) Development Charges Bylaw update (3) Asset Management Policies (4) "Shovel Ready Projects"		



REPORT Nº INF2020-33

Date	25/09/2020		
Submitted by	Denis Longpré		
Subject	Annual Reporting – Landfill site		
File N°	INF2020-33		

1) **NATURE/GOAL**:

The purpose of this report is to present to Council the Clarence-Rockland Landfill Site Annual Monitoring and Operations reports as required under the site's Environmental Compliance Approval (ECA).

2) **DIRECTIVE/PREVIOUS POLICY :** N/A

3) **DEPARTMENT'S RECOMMENDATION :**

THAT the 2019 Clarence-Rockland Landfill Site Annual Monitoring and Operations reports presented under Report No. INF2020-33 be received as information.

QUE les rapports annuels intitulés '2019 City of Clarence-Rockland Landfill Site Monitoring' et 'Operations Reports' tel que présenté dans le rapport no. INF2020-33, soient reçus à titre d'information.

4) **BACKGROUND**:

The City of Clarence-Rockland owns and operates a 50 hectares landfill site (12 hectares waste footprint) located at 2335 Lalonde Road. In 2001, the Ministry of the Environment issued an amended provisional ECA for the expansion of the landfill for an additional 740,000 m³ of waste to be accepted. The City also operates a Leaf and Yard (L&Y) waste transfer station and its activities are included in this report

This annual report must be prepared and submitted to the Ministry of the Environment / Conservation and Parks (MOECP) by March 31^{st} of each year. A copy of the report has been submitted to MOECP by JP2G on the City's behalf

Council, as custodian of the landfill site, must be aware of the annual report's contents including results, recommendations and action items so that it may direct resources to make all necessary corrections. Approval of the report is not required.

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waste to be accepted. The City also operates a Leaf and Yard (L&Y) waste transfer station and its activities are included in this report

This annual report must be prepared and submitted to the Ministry of the Environment / Conservation and Parks (MOECP) by March 31^{st} of each year. A copy of the report has been submitted to MOECP by JP2G on the City's behalf

Council, as custodian of the landfill site, must be aware of the annual report's contents including results, recommendations and action items so that it may direct resources to make all necessary corrections. Approval of the report is not required.

In 2016, Jp2g have taken over the monitoring of the site and the editing of the report, which used to be completed by Stantec for the previous 15 years. The previous *Annual Report* has been divided into two distinctive reports, the *Annual Operations Monitoring Report* and the *Annual Monitoring Report*.

The Annual Monitoring Report describes and discusses the impact of leachate and contaminants on associated sampling locations (surface water, landfill gas and groundwater) to provide a snapshot of the impact of the landfill site on the nearby environment. Trends of these impacts are analyzed to ensure that they respect designated standards at the boundaries of the site. Exceedance of standards at those locations would trigger the need for contingency measures, and require the owner of the site to take appropriate measures to limit the spread of contaminants on surrounding private properties.

The *Operations Report* endeavours to portray the operations that transpired during the reporting year. Best practices in terms of landfill site operations could be summarized in the three following points:

- Maximize waste diversion at the site in order to limit the amount of waste landfilled, and;
- To limit the spread of leachate and contaminants in the environment, and;
- To limit or avoid negative impacts of site operations on nearby properties.

The *Monitoring Report* will point to any deficiencies in terms of site operations and recommended the appropriate measures to be taken.

5) **DISCUSSION :** Annual Operations Report:

During 2019, waste was deposited in the north section of the landfilling

area. Based on a site survey completed in November 2019, the measured volume of waste and daily cover deposited at the landfill over this period was approximately 12,500m3. Prorating this value to a period of 12 months, the approximate volume of waste and cover is approximately 15,000m3.

Using the actual volumes measured over the last five years (2015-2019), the average per capita landfilling rate was calculated to be 0.6m3 /year, which is lower than the design per capita of 0.832 m3 /year.

At this rate (the 5-year average of approximately 15,000 cubic metres), the landfill's remaining capacity of approximately 535,000 cubic metres would reach capacity in over 30 years - (2056). This is an additional 7 years of life capacity added since 2017 report (2049).

Based on the information presented in this report, the following summarizes the main recommendations for 2020, these being;

- Continue with the groundwater, surface water and landfill gas monitoring programs to demonstrate continued compliance with regulatory requirements. Consider the installation of a new well adjacent to weigh scale for assessment of landfill gas migration. Assess landfill gas in all buildings.
- As indicated in the Solid Waste Management Strategy, the City of Clarence-Rockland should review the feasibility to include organics collection (source separated organics and leaf and yard waste) for the next collection contract, to be renewed in 2021. Many elements of the Proposed Food and Organic Waste Framework (November 2017), drafted under the Waste-Free Ontario Act, are pointing towards an emphasis on the diversion of food and other organic waste, which could mean requirements for the City of Clarence-Rockland to put in place a collection system for these types of waste. While the Leaf and Yard Waste Transfer Station is practical at this point in time, in the larger picture, should the City be required to collect source separated organics

(projection from the Proposed Food and Organic Waste framework, puts this date a 2027), it will be more practical to collect L&Y waste curbside at the same time.

- Undertake a detailed topographic survey of the active waste fill areas to provide an annual waste deposition.
- Review strategy developed for the Waste Recycling Study and implement recommendations to further improve diversion.
- Conduct the refresher training for WHMIS, First Aid, and review ECA conditions and operating practices as required. 6. Continue the use of

the entrance weigh scales to be able to more accurately invoice clients on a per weight basis.

- Continue with the operation of the new HHW depot.
- Continue with the operation of the leaf and yard collection in Rockland.
- Investigate the potential to divert clean chipped wood (branches) to an appropriate facility, within the limits and requirements of the ECA.
- Complete a site survey to accommodate a waste deposition analysis. Include pickup of all on-site roads, buildings and the weigh scales

The Municipality has confirmed the following operational changes in 2019. They include:

- March 2019 new employee hired
 - New full-time staff was approved in the 2019 budget and was created to reduce dependence on public works, capacity issues and reduced hours of part-time staff.
- May 2019, a second-hand truck was acquired
- No chipped wood was used this past year at the landfill
- The new Geoware software that was purchased in 2018 is fully operational

• In August 2019 new fencing was installed along the eastern property line.

• One monitoring well was decommissioned (G14-92).

Annual Monitoring Report:

On the south boundary, the cut-off wall appears to be successful in mitigating downgradient waste disposal site related impact and no further mitigation measures are recommended.

On the eastern side, a Contamination Attenuation Zone (CAZ) and attenuation pond are present and the results indicate that a source other than the landfill (roadside, agricultural and/or particulate entrapment during sampling) might be contributing to the concentrations elevated above upgradient levels in that area. As further mitigation measures to the east, it is recommended to ban snow disposal activities everywhere on site.

Since the northern trigger well is located 140 m inward from the leachate attenuation zone northern boundary, additional mitigation measure in this area are also not warranted at this time. However, to verify this assumption, it is recommended to install a new monitoring well along the northern boundary.

As mitigation measures for the west boundary, it is recommended to acquire additional land to extend the CAZ and also to sample the nearest residential

wells.

The monitoring program at the WDS should continue in 2020 in the spring and summer for groundwater and in the spring, summer and fall for surface water. The following elements are recommended for the 2020 monitoring program. Monitoring locations are provided in Figure 7.

• Continue the discussion to acquire additional CAZ on the west side of the site.

• Consider the installation of a new compliance well on the northern CAZ boundary to confirm that the RUC exceedances on that side are contained within the site boundaries.

• As due diligence and to obtain baseline conditions, it is recommended to sample the nearest residential wells to the west of the site at least once. The sample should be collected before the residential water treatment system, if present and analysed for the surveillance parameters.

• Continue to inspect the site including the area north of the mound to determine if additional maintenance activities are required to minimize leachate.

- The City should continue to apply interim and final cover as requested under the ECA to minimize leachate generation.
- In its next review of the site, the Ministry could confirm whether or not Condition 2(17) of the ECA is still applicable and indicate the best course of action in relation to this outstanding amendment.
 - Condition 2(17) required an amendment to the ECA to account for HHW hour changes, new site entrance, the weigh scale and other related works. This included a requirement for a *Storm Water Management Plan* (SWMP). Since the site was reconfigured slightly different (no second entrance and paved areas were added) a SWMP was no longer required as per our engineering team. All other items have been addressed.
- Some house keeping around certain monitoring wells; cleaning debris, fallen trees, broken pipes, etc.
- Beaver activities have been noticed near the culvert on the east side of the pond. It is recommended to inspect the culvert as part of the surface water monitoring program to ensure that it remains unblocked.
- A review of the surface water trigger parameters might be appropriate to ensure that the parameter selected best represent the leachate quality at the site as opposed to ambient agricultural/roadside conditions.

Municipal Operations Staff is in constant communication with the MECP to address the ground contamination form the snow disposal site. Options and recommendations will be presented to the MECP in 2021.

6) **CONSULTATION:** N/A

7) RECOMMENDATIONS OR COMMENTS FROM COMMITTEE/ OTHER DEPARTMENTS :

N/A

8) **FINANCIAL IMPACT** (expenses/material/etc.):

The following tasks have been included in the 2021 draft budget changes, as recommended by the reports.

Install 2 new monitoring wells and decommissioning 1 well	\$11,500
Repairs to all wells as noted	\$2,500
Topographic survey	\$2,500
Sampling and analysis of residential wells	\$3,150

Accurate technical and financial impacts of the recommendations to increase the CAZ to the West are not available at this moment.

Once costs are known, they will be assessed to be budgeted in the next few years, at the appropriate moment.

9) **LEGAL IMPLICATIONS :**

The Bourget Landfill Site is subject to an Environmental Compliance Approval (ECA) that is under the jurisdiction of the Ministry of Environment, Conservation and Parks (MECP). Should the municipality default on its obligations from the ECA, the MECP would be in its right to put an order on the activities conducted at this site. The requests from the MECP could have significant impacts on day-to-day operations and be effective immediately.

The MECP will also revise both reports and provide the City of Clarence-Rockland with requirements for the monitoring program in due time.

10) **RISK MANAGEMENT :**

The purpose of both reports presented is to assess the acceptability of operations and contaminants migration of the landfill site. The largest risk is inaction in regards to the recommendations discussed in the report. To avoid challenging and costly situations, it is recommended that the City tackles the recommendations within a reasonable time frame.

11) **STRATEGIC IMPLICATIONS :** N/A

12) **SUPPORTING DOCUMENTS:**

Attachment 1 - Annual Operations Monitoring Report Attachment 2 – Annual Monitoring Report

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City of Clarence-Rockland, ON 2019 Annual Operations Monitoring Report Final Report



Prepared For:



Prepared by

Jp2g Consultants Inc. 1150 Morrison Drive, Suite 410, Ottawa, Ontario, K2H 8S9 T.613.828.7800 F.613.828.2600 Jp2g Project No. 17-6021C March 2020







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2	1	Ministry of the Environment, Conservation and Parks (District Office)

Jp2g Consultants Inc. Signatures

Report Prepared By:

Andrew Buzza, P.Geo Project Manager | Environmental Services

Report Reviewed By:

1

Kevin Mooder, MCIP RPP Principal | Environmental Services



EXECUTIVE SUMMARY

The City of Clarence-Rockland own and operate a landfill located on Lot 15, Concession IV, United Counties of Prescott and Russell (**Figure 1**). In 2001, the Ministry of the Environment issued an amended provisional ECA No. A471203 dated October 18 for the expansion of the landfill site (50 ha total site area, 12 ha footprint, and an additional 740,000m³ of waste). This 2019 annual report was prepared to satisfy Conditions 6.6 and 6.7 of the revised ECA A471203 dated October 21, 2009 as amended. The City also operates a transfer facility (Provisional ECA No. 1998-6QQ13K) issued on June 26, 2006 for leaf and yard waste. Activities related to the Leaf and Yard Waste are included in this report. Results of Environmental Monitoring are provided under separate cover.

During 2019, waste was deposited in the north section of the landfilling area. Based on a site survey completed in November 2019, the measured volume of waste and daily cover deposited at the landfill over this period was approximately 12,500m³. Prorating this value to a period of 12 months, the approximate volume of waste and cover is approximately 15,000m³.

The 2019 existing conditions plan is shown in **Figure 2.** Final contours are provided in **Figure 3**, and **Figures 4** through **8** illustrate the waste cross sections. Using the actual volumes measured over the last five years (2015-2019), the average per capita landfilling rate was calculated to be 0.6m³/year, which is lower than the design per capita of 0.832 m³/year. At this rate (the 5-year average of approximately 15,000 cubic metres), the landfill's remaining capacity of approximately 535,000 cubic metres would reach capacity in over 30 years.

Based on the information presented in this report, the following summarizes the main recommendations for 2020:

- 1. Continue with the groundwater, surface water and landfill gas monitoring programs to demonstrate continued compliance with regulatory requirements. Consider installing new well adjacent to the weigh scale for assessment of landfill gas migration.
- 2. Continue with the operation of the leaf and yard collection in Rockland. In 2019 the leaf and yard waste facility was open to the public from April to the end of November 2019.
- 3. Review strategy developed for the Waste Recycling Study and implement recommendations to further improve diversion.
- 4. Conduct the staff refresher training for WHMIS, First Aid as required. Review ECA conditions and operating practices.
- 5. Consider the cessation of snow disposal activities at the site.



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Table 1 - Remaining Capacity in Expansion Area



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- Figure 2 2019 Existing Conditions Plan
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- Figure 6 Cross Sections E and F
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APPENDICES

- Appendix A Environmental Compliance Approval
- Appendix B Compliance Summary Table ECA No. A471203
- Appendix C Decommissioned water well record
- Appendix D Household Hazardous Waste Report
- Appendix E Cover Material Report
- Appendix F Waste Diversion Report
- Appendix G Leaf and Yard Waste Compliance Summary Table



1.0 INTRODUCTION

The City of Clarence-Rockland own and operate a landfill site (the Site) located on Lot 15, Concession IV, United Counties of Prescott and Russell (**Figure 1**). The Ministry of Environment, Conservation and Parks (MECP, previously named the MOE, MOEE, MOECC and referred to as the Ministry) issued an amended provisional ECA No. A471203 dated October 18, 2001 for the expansion of the Site (50 ha total site area, 12 ha footprint, and an additional 740,000m³ of waste). In January 2002, the City began waste disposal operations within Cell 1 of Phase 1 of the landfill expansion. ECA No. A471203 was later amended on October 21, 2009 (replacing former ECAs) and more recently amended on September 9, 2015 and August 19, 2016.

A small wetland /pond was created on Site for treatment of contaminated runoff and its operation is covered through ECA 3362-6D7PL4 dated June 24, 2005 issued under the OWRA. Details on the required monitoring as outlined in the ECA are provided in the Environmental Monitoring Report that is provided separately.

Provisional ECA No. 1998-6QQ13K was issued on June 26, 2006 for the operation of a waste transfer station for leaf and yard waste. This report summarizes the waste quantities, operational issues and reporting requirements of the operation of the leaf and yard waste transfer facility that is located on rue Industrielle in Rockland (ECA No. 1998-6QQ13K).

A copy of all ECAs are reproduced in **Appendix A.**

For file continuity, many details of this report are copied and or repeated in part or in whole from the report produced by the consulting firms previously retained for the Site (Stantec Consulting and Golder Associates Ltd.), and from Jp2g Consultants Inc. 2017, 2018 and 2019.

2.0 PURPOSE OF ANNUAL REPORT

The reporting requirements for the landfill site is outlined in Condition 6 - Record Keeping and Reporting of ECA No. 471203 dated October 21, 2009, specifically Conditions 6(6) and 6(7). Condition 6(6) requests that a written report on the development, operation and monitoring of the site be completed annually (the "Annual Report"). The Annual Report shall be submitted to the District Manager, by March 30, of the year following the period being reported on. In this instance, the reporting date is March 30, 2020 to document the 2019 activities that were completed at the landfill site. Condition 6(7) outlines the required contents of the Annual Report. There are typically two components to the report: environmental monitoring results and operational details. The environmental monitoring report addresses the requirements of sampling as outlined in ECAs No A471203 and 3362-6D7PL4. The environmental monitoring report is submitted separately.

3.0 SUMMARY OF REPORTING REQUIREMENTS

The conditions established in the Environmental Compliance Approval provide the guidelines for the operation of the landfill. Condition 1 is administrative with the balance of conditions being directly related to the operation and monitoring of the site. A compliance summary table for ECA No. 471203 is provided in **Appendix B.**



A summary of reporting requirements as outlined in Item 6(7) of the ECA are listed below and discussed in subsequent sections.

- A- calculations of the volume of waste landfilled, the daily and intermediate covers, the final cover and the overall volume of the site capacity used during the reporting period;
- *B-* a comparison of the actual capacity used to the estimates of the capacity estimated;
- *C-* an estimate of the remaining site life;
- *D-* any changes in operations, equipment, or procedures used at the Site, any operating problems encountered, and corrective actions taken;
- *E-* details on the monitoring program undertaken, outlining monitor locations, analytical parameters sampled, and frequency of sampling;
- F- an analysis and interpretation of the surface water and groundwater monitoring data, a review of the adequacy of the monitoring program, conclusions of the monitoring data, and recommendations for any changes that may be necessary;
- G- summary of inspections undertaken at the Site;
- *H-* summary of any public complaints received, and the responses made;
- *I-* summary of activities undertaken at the HHW depot;
- *J-* a discussion of cover stockpile activities including use, timing, locations and erosion protection;
- *K-* status update on the final cover placement, and seeding activities undertaken in the closed sections of the Landfill;
- *L-* a discussion of the waste diversion performance achieved by the Owner reported on a per capita basis;
- *M-* a statement as to the compliance with all conditions of this Certificate and the other relevant Ministry's groundwater and surface water requirements.
- *N-* recommendations respecting any proposed changes in the operation of the Site;
- *O-* and any other information that the Regional Director or the District Manager may require.

4.0 LANDFILL SITE OPERATIONS

4.1 Site Capacity and Site Life

Approved Site Capacity

The August 2000 City of Clarence-Rockland EPA Landfill Expansion Design, Operation and Maintenance Report (Stantec, 2000) states that the total capacity of the landfill, once developed to the final contours, will contain 974,000 cubic metres. This total waste disposal capacity is comprised of 740,000m³ contained within the expansion area of 5 hectares and 234,000m³ (existing) within the former 1994 interim expansion of the landfilling area to 6.9 hectares.

Remaining Service Life

The landfill service life ends when 740,000 cubic metres of air space has been consumed by waste when final waste contours are reached. In the Environmental Assessment documentation, the design service life was estimated to be approximately twenty-five (25) years based on the following assumptions:



- population projection based on a design population 26,657 for 2002 that included the former municipalities of Rockland, Clarence, North Plantagenet and the Village of Plantagenet;
- achieving a waste compaction density of 600 kg/m³;
- using 20% of total volume for daily cover; and
- using a per capita waste generation of 0.832m³/year which includes waste from all sectors (residential, commercial and institutional).

Based on a comparison of site surveys completed in January and November 2019, the calculated material placed in the landfill was approximately 12,500m³ over this period of time (i.e. 10 months). Prorating this volume over a 12-month period results in yearly deposition rate of approximately 15,000m³. A summary of the waste depositions and remaining capacity are provided below and in **Table 1**.

2019 Deposition Volume:

- 15,000 m³
- 2015-2019 range = 13 897m³ to 17,962m³
- 2015-2019 average = 15,556m³

Remaining Capacity (using 10 month difference of surveys value)

- <u>ACAD: 536987m³ +/-</u>
- <u>Algebraic:</u> 522,524m³
- Avg 529,755m³
- RPD = 2.73%

The 2019 volume (15,000 cubic metres) is the same as the previous year and lower than the 5-year average and is in the order of 0.58m³/capita/year based on the 2019 prorated Clarence Rockland population of 25,902. The 2019 per capital waste volume is slightly less than the design per capita value of 0.82 m³/year.

Based on the five-year average from 2015 to 2019 (15,556 m³/year) the estimated site life is estimated to be approximately 30 years. (519,685m³ avg remaining / 15,556 m³ <u>5-year avg</u>).

Over time, as the depth of the waste increases, it is anticipated that increased compaction and organic decomposition will result in some capacity being regained. The remaining capacity in 2008 was adjusted to reflect this. And similarly, in 2017, a total site survey was completed, and the remaining capacity adjusted to reflect this. It is recommended that in 2022 a total site survey be complete and the remaining site capacity be evaluated.

Table 1 is adapted from Stantec (2016) and provides a summary of estimated remaining capacity, remaining capacity based on the latest site survey. The per capita waste volumes are based in the Clarence-Rockland populations and pro-rated for 2019.



	Clarence- Rockland	CR Design Vol. (m³)	CR Annual Vol.	CR Remaining	m³ per	capita
	Population		(comparative survey) m ³	Vol (m ³)	Per yr	Per 5 yr avg
Year	Note 1 & 2	Note 3	Note 4	Note 5		
2001				740000		
2002	21,754		11,100	728,900	0.51	
2003	22,335		23,300	705,600	1.04	
2004	22,931		13,745	691,855	0.60	
2005	23,543		21,929	669,926	0.93	
2006	22,124		17,422	652,504	0.79	0.77
2007	22,394		19,072	633,432	0.85	0.84
2008 Note 6	22,667		21,665	690,825	0.96	0.83
2009	22,944		15,904	674,921	0.69	0.84
2010	23,224		16,420	658,501	0.71	0.80
2011	23,507		14,360	644,141	0.61	0.76
2012	23,794		11,460	632,681	0.48	0.69
2013	24,084		14,040	618,641	0.58	0.62
2014	24,378		12,388	606,253	0.51	0.58
2015	24,675	14,122	16,730	580,736	0.68	0.57
2016	24,976	13,897	13,270	567,466	0.53	0.56
2017 Note 6	25,281	15,224	17,962	549,504	0.71	0.60
2018	25,589	15,390	14,819	534,685	0.58	0.60
2019	25,902	15,945	15,000	519,685	0.58	0.62
2056	40,079	22,043		12,185	0.00	0.55

Table 1: Remaining Capacity in Expansion Area

Notes

- Note 1 Population for Clarence Rockland adjusted by Census in 2006 and 2011
- Note 2 Population is based on a yearly increase of 1.0122 (Census 2006 to 2011 showed annual geometric increase to be 1.0122).
- Note 3 Design criteria is based on a 5-year running average (in 2019, 5-year running average is 0.62 cubic metres/capita/year).
- Note 4 Actual volumes measured each based on yearly site surveys
- Note 5 Remaining volume adjusted yearly to reflect quantities from surveys
- Note 6 Complete site surveys completed to assess waste settlement.



4.1.1 Waste Deposited in 2019

The 2019 waste contours and waste footprint are shown on the Existing Conditions Plan (Figure 2). Figure 3 shows the final contours and Figures 4 to 8 identify waste sections of the landfill.

During 2019, waste was continued to be deposited in the north portion of the site. In January 2019, August and November 20202, Jp2g Consultants Inc. completed topographic surveys of the waste and waste mound using a "Spectra Precision SP80 GPS. The prorated volume of waste deposited in 2020 is estimated to be approximately 15,000m³ of waste/cover deposited as reported in **Section 4.1**.

4.2 Changes to the Site Operations, Equipment of Procedures

The Municipality has confirmed the following operational changes in 2019. They include:

- March 2019 new employee hired
- May 2019, a new truck was acquired
- No chipped wood was used this past year at the landfill
- The new Geoware software that was purchased in 2018 is fully operational
- In August 2019 new fencing was installed along the eastern property line.
- One monitoring well was decommissioned (G14-92). The Water Well Record is provided in **Appendix C**.

Scale Data: This year, more details were added to scale and Geoware software (i.e.waste types, origin, quantities, etc.) The following is a list of information generated.

- Material Type Summary Report
- Material Source Summary Report
- Facility Summary Report
- Customers Summery Report
- Business Type Summery Report

Regarding the actual landfilling, there have been no operational changes or problems.

Windrow composting of leaf and yard material continued in 2019, within the limits and requirements of the ECA. Although no compost is currently cured and ready for use, this practice has permitted a perceived significant reduction in the volume of material in a short period of time. This is in contrast to the "static pile" method that was historically used.

In 2016, an emergency response plan for fire and or medical was established and all concerned staff were trained on the emergency response plan. A copy of the plan is kept on site at all times.

4.3 Environmental Monitoring – Groundwater and Surface Water

Details on the environmental monitoring completed at the site in 2019 are provided by Jp2g Consultants Inc. under separate cover. The details include as discussion on monitoring locations, the direction of groundwater flow and compliance with applicable guidelines. As requested in ECA 3362-6D7PL4, sections of the Environmental Monitoring Report provide details on surface water conditions at the site and an evaluation of the results in comparison to provincial guidelines. Recommendations for future monitoring are provided.


4.4 Summary of Inspections undertaken at the Site.

As per ECA Conditions 6(1) and 6(2) there are requirements for inspection and records of HHW transfer operations. ECA Conditions 6(3) and 6(4) relate to the landfill site. In 2019 there were no MECP Inspections.

4.5 Summary of Complaints

In 2019, the Municipality did not receive any complaints from the public that were related to the operations of the landfill site.

4.6 HHW Activities

A summary of activities undertaken at the HHW depot in 2019 is summarized by the Municipality in **Appendix D**.

4.7 Interim Cover Material

A summary and discussion of cover stockpile and use is summarized by the Municipality and is provided in **Appendix E.**

4.8 Final Cover Material

The Municipality reports that a large amount of interim and a small amount of final cover was placed on the northern toe in 2019. The next anticipated need for significant final cover placement and associated seeding is anticipated to be in 2020.

4.9 Waste Diversion

The Municipality has provided details on waste diversion. A summary is provided in Appendix F.

4.10 Compliance with Conditions of the ECA

A compliance summary table is provided in **Appendix B.**

4.11 Changes to the Operation of the Site

There have been no significant changes to the landfilling in 2019.

4.12 Additional Information

In 2019, the banks of the pond were again inspected and any areas that were thought to be low were "bolstered" and raised. The staff gauge that had been knocked over has been re-established. Accordingly, recordings will be again initiated in 2019.



5.0 WASTE TRANSFER STATION

Provisional Environmental Compliance Approval (Certificate of Approval) No. 1998-6QQI3K was issued on June 26, 2006 for the operation of a waste transfer station for leaf and yard waste (reproduced in **Appendix A**). Conditions 1 through 16 are general conditions dealing with definitions, compliance, interpretation, legal obligations, adverse effects, change of owner, inspections and information and record retention. Conditions 17 through 46 address the operations and maintenance of the transfer station and are summarized in the form of a compliance Summary Table provided in **Appendix G**.

In accordance with Condition 46 an annual report covering the previous year is required. A summary of reporting requirements outlined in Condition 46 of the ECA are located below and discussed in the subsequent sections:

- A a detailed monthly summary of the type and quantity of all wastes received and transferred from the site, including the destination of the waste;
- B any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the site and during the facility inspections and any mitigative actions taken;
- C a statement as to compliance with all Conditions of this Provisional Certificate of Approval and with the inspection and reporting requirements of the Conditions herein;
- D a summary of any complaints that were received as a result of the operation of this site, and a summary of mitigative actions taken to resolve the complaint; and
- E any recommendations to minimize environmental impacts from the operation of the site and to improve site operations and monitoring program in this regard.

5.1 Waste Types Received

The certificate of approval for the transfer station permits the acceptance of leaf and yard waste for transfer to the landfill for final disposal. The site supervisor conducts daily inspections and in 2019 noted that only grass clippings, garden refuse, leaves, hedge clippings, wood products, branches and natural Christmas trees were accepted at the site.

All waste accepted at the transfer station is transferred to the City of Clarence Rockland landfill site. Records of the number of loads and volume of material delivered to the landfill site are maintained at the Municipal Office.

5.2 Site Operations

The Site Supervisor conducts daily site inspections and completes daily reports. The reports address the conditions of the ECA and include a section for comments and actions required, if any. The City should maintain copies of the daily inspection reports and a copy of this report onsite for a minimum of one calendar year following submission of the annual monitoring report. The site custodian also records the number of residents that use the site.



5.3 Complaints

During 2019, no complaints were received from the public regarding the transfer station.

5.4 Recommendations

The following recommendations are made for the Transfer Station for the 2020 operating season:

- Should the transfer station remain open, continue with the record keeping so that the loads transferred off site are counted.
- Review the requirements of the ECA No. 2009-A471203, record keeping, and emergency procedures with the site attendant. This should be included as part of the refresher courses to be offered following the completion of site improvements
- Conduct a site inspection and implement any necessary changes or repairs (such as gate or fencing repairs, modifications to signage).

6.0 **RECOMMENDATIONS**

Based on the information presented in this report, the following summarizes our main recommendations for 2020, these being;

- 1. Continue with the groundwater, surface water and landfill gas monitoring programs to demonstrate continued compliance with regulatory requirements. Consider the installation of a new well adjacent to weigh scale for assessment of landfill gas migration. Assess landfill gas in all buildings.
- 2. As indicated in the Solid Waste Management Strategy, the City of Clarence-Rockland should review the feasibility to include organics collection (source separated organics and leaf and yard waste) for the next collection contract, to be renewed in 2021. Many elements of the Proposed Food and Organic Waste Framework (November 2017), drafted under the Waste-Free Ontario Act, are pointing towards an emphasis on the diversion of food and other organic waste, which could mean requirements for the City of Clarence-Rockland to put in place a collection system for these types of waste. While the Leaf and Yard Waste Transfer Station is practical at this point in time, in the larger picture, should the City be required to collect source separated organics (projection from the Proposed Food and Organic Waste framework, puts this date a 2027), it will be more practical to collect L&Y waste curbside at the same time.
- 3. Undertake a detailed topographic survey of the active waste fill areas to provide an annual waste deposition.
- 4. Review strategy developed for the Waste Recycling Study and implement recommendations to further improve diversion.



- 5. Conduct the refresher training for WHMIS, First Aid, and review ECA conditions and operating practices as required.
- 6. Continue the use of the entrance weigh scales to be able to more accurately invoice clients on a per weight basis.
- 7. Continue with the operation of the new HHW depot
- 8. Investigate the potential to divert clean chipped wood (branches) to an appropriate facility, within the limits and requirements of the ECA.
- 9. Complete a site survey to accommodate a waste deposition analysis. Include pickup of all on-site roads, buildings and the weigh scales.

7.0 LIMITATIONS AND USE OF REPORT

This report has been prepared for the exclusive use of the City of Clarence Rockland for the purpose of annual operations monitoring and reporting at the subject property. Any use that a third party makes of this report, or any reliance on or decisions to be made on it, are the responsibility of such third parties. Jp2g Consultants Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

FIGURES



Notes:

Data from Land Information Ontario, 2015 Shapefiles created by Jp2g Consultants Inc. Landfill site boundary approximate



Clarence-Rockland WDS

Bourget, ON





1:25,000	Figure 1- Site Location Plan	
	Drawn By: JF	
Project No. 17-6021C	Checked by: AB	
	Date: March 2020	















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NOTES
1) BASE PLAN AND EXISTING INFORMATION COURTESY OF STANTEC INC.
 2019 SURVEY COMPLETED BY JP2G CONSULTANTS INC. ON NOVEMBER 26, 2019.



	PROJECT 17-6021C
-ROCKLAND WASTE DISPOSAL SITE	PLOTTED 06-MAR-2019
, CONCESSION IV, FORMER TOWNSHIP OF CLARENCE, UNITED COUNTIES OF PRESCOTT-RUSSELL	FIGURE
CROSS SECTION I-I1	0

APPENDIX A

ENVIRONMENTAL COMPLIANCE APPROVAL



Ministère de l'Environnement CERTIFICATE OF APPROVAL MUNICIPAL AND PRIVATE SEWAGE WORKS NUMBER 3362-6D7PL4

The Corporation of the City of Clarence-Rockland 1560 rue Laurier Rockland, Ontario K4K 1P7

Site Location:City of Clarence Rockland Waste Disposal Site
Lot 15, Concession 4
City of Clarence-Rockland, United Counties of Prescott and Russell

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a stormwater and leachate impacted groundwater management facility servicing the Clarence-Rockland Waste Disposal Site, located on Lot 15, Concession 4, United Counties of Prescott and Russell, consisting of:

- one (1) existing dug-out borrow pit (pond) serving as a natural attenuation facility for stormwater runoff and leachate impacted groundwater, which is approximately 450 m long and 50 m to 100 m wide with a maximum depth of 2.5 m and a total surface area of 3.3 ha, receiving stormwater runoff from a 19.3 ha drainage area, providing a total storage capacity of 40,000 m³ at the current discharge elevation of 49.5 m, located at the northeast side of the landfill site footprint, discharging to Cobbs Lake Creek which eventually discharges to Ottawa River;
- upgrades to the east bank of the pond to raise the bank elevation to 51.0 m and the pond outlet elevation to 50.5 m increasing the maximum storage capacity of the pond to 63,175 m ³;
- plugging the pond's east bank drainage outlets and infilling of an approximately 80 m long ditch immediately downstream of the pond outlet to promote infiltration of pond contents to groundwater;
- including all associated controls and appurtenances.

all in accordance with Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the City of Clarence-Rockland dated April 13, 2005, and drawings and design brief prepared by Stantec Consulting Ltd., Ottawa, Ontario.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Act" means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"*Certificate*" means this entire certificate of approval document, issued in accordance with Section 53 of the *Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Act;

"District Manager" means the District Manager of the Kingston District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means The Corporation of the City of Clarence-Rockland and includes its successors and assignees;

"Previous Works" means those portions of the sewage works previously constructed and approved under a certificate of approval;

"Proposed Works" means the sewage works described in the supporting the supporting the support of the support o

documentation referred to herein, to the extent approved by this Certificate;

"Regional Director" means the Regional Director of the Eastern Region of the Ministry;

"*Works*" means the sewage works described in the *Owner*'s application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* and includes both *Previous Works* and *Proposed Works*.

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

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(3) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the issuance date of this *Certificate*.

3. CHANGE OF OWNER

(1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:

- (a) change of Owner;
- (b) change of address of the Owner;

(c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the <u>Business Names Act</u>, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the <u>Corporations Information Act</u>, R.S.O. 1990, c. C 39 shall be included in the notification to the *District Manager*; Page 232 of 661

(2) In the event of any change in ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate*, and a copy of such notice shall be forwarded to the *District Manager* and the *Director*.

4. SURFACE WATER MONITORING

(1) The *Owner* shall carry out the following surface water monitoring program. Surface water grab samples shall be collected during spring (April/May), Summer (August), and Fall (November) from the designated sampling locations and shall be analyzed for the parameters listed in Table 1.

Table 1 - Surface Water MonitoringSampling Locations: GS11, GS12, GS14			
Parameter		Field Monitoring Parameter	
Calcium	Silver	Conductivity (Field)	
Magnesium	Strontium	pH(Field)	
Sodium	Sulphur	Temperature	
Potassium	Thallium	Dissolved Oxygen	
Aluminum	Titanium	Water Levels***	
Barium	Vanadium		
Beryllium	Zinc		
Boron	Alkalinity		
Cadmium	BOD5		
Chromium	TDS		
Cobalt	Chloride		
Copper	Nitrate		
Iron	Nitrite		
Lead	Sulphate		
Manganese	TKN		
Mercury	Ammonia		
Molybdenum	COD		
Nickel	DOC		
Total Phosphorus	Phenols		
Silicon	Hardness*		
	Un-ionized Ammonia**		

Note: * Hardness - calculated from laboratory analyses results of calcium and manganese

** Un-ionized Ammonia - calculated from laboratory analyses results for ammonia and field measurements for pH and temperature.

*** Water levels shall be measured at staff gauges installed for the designated sampling points.

(2) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the surface water monitoring activities required by subsection (1)

5. GROUNDWATER MONITORING

(1) The *Owner* shall undertake groundwater monitoring in accordance with Conditions 46 (a) and 46 (c) of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time.

(2) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the groundwater monitoring activities required by subsection (1)

6. OPERATIONS AND MAINTENANCE

(1) The *Owner* shall undertake an inspection of the condition of the stormwater management facility, at least once a year, and undertake any necessary cleaning and maintenance to prevent the excessive build-up of sediment and/or decaying vegetation.

(2) The *Owner* shall maintain a logbook to record the results of the stormwater management facility inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site or operational office of the *Owner* for inspection by the Ministry.

(3) The *Owner* shall compare surface water monitoring results obtained from sampling point **GS12** under Condition 4 (1) with the concentrations of the trigger parameters listed in Table 2 to identify any potential leachate impact to surface water discharged from the site to the receiving stream.

Table 2 - Surface Water Trigger Parameters		
Parameter	Concentration (mg/L)	
Ammonia (un-ionized)	0.02	
Boron	0.20	
Iron	0.30	
Total Phosphorus	0.05	

(4) In the event that a monitoring result for any of the parameters listed in Table 2 exceeds its corresponding trigger concentration, the *Owner* shall immediately initiate the implementation of Condition 53 of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time.

(5) Surface water trigger parameters and concentrations outlined in Table 2 under subsection (3) shall be modified from time to time **only** after receiving a written concurrence from the *District Manager* or an approval from the Director designated for the purpose of Section 37 of the *Environmental Protection Act*.

7. <u>REPORTING</u>

(1) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.

(2) The *Owner* shall prepare, and submit to the *District Manager*, an annual performance report as a separate section of the annual report required under Condition 63 of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all surface water monitoring data and comparison of results to the trigger concentrations outlined in Table 2 under Condition 6(3), including an overview of the success and adequacy of the Page 234 of 661

Works.

(b) a description of any operating problems encountered and corrective actions taken;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works*;

(d) any other information the District Manager requires from time to time.

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

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Certificate* and continue to operate the *Works* in compliance with it.

4. Condition 4 and 5 are included to enable the *Owner* to evaluate and demonstrate the performance of the *Works*, on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the design objectives specified in the *Certificate* and that the *Works* does not cause any impairment to the receiving watercourse.

5. Condition 6 is included to require that the *Works* be properly operated, maintained, and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.

6. Condition 7 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Certificate*, so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

In accordance with Section 100 of the <u>Ontario Water Resources Act</u>, R.S.O. 1990, Chapter 0.40, as amended, 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 <u>Ontario Water Resources Act</u>, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
 The grounds on which you intend to rely at the hearing in relation to <u>each</u> portion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the works are located;

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

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 2300 Yonge St., 12th Floor P.O. Box 2382 Toronto, Ontario M4P 1E4 AND

The Director Section 53, *Ontario Water Resources Act* Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 24th day of June, 2005

Mohamed Dhalla, P.Eng. Director Section 53, *Ontario Water Resources Act*

SH/ c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Limited



Ministry of the Environment and Climate Change Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A471203 Notice No. 2 Issue Date: August 19, 2016

The Corporation of the City of Clarence-Rockland 1560 Laurier St Clarence-Rockland, Ontario K4K 1P7

	iteCity of Clarence-Rockland Waste Disposal Site
Location:	Lot 15, Concession 4
	Clarence-Rockland City, United Counties of Prescott
	and Russell

You are hereby notified that I have amended Approval No. A471203 issued on October 21, 2009 and amended on 9th day of September, 2015 for the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

Amendment to the Existing Approval of Sewage Works No. 3362-6D7PL4

2(17) The *Owner* shall submit an Application for amendment of the ECA No. 3362-6D7PL4, in order to amend this ECA and include the stormwater management works on the *Site* required due to the currently proposed *HHW* depot, new site entrance, weigh scales and other related works. This Application shall be submitted to the *Ministry* by December 31, 2016, as required under Section 20.2 of the EPA.

The reason for this amendment to the Approval is to extend the date to submit the application to amend the ECA No. 3362-6D7PL4.

This Notice shall constitute part of the approval issued under Approval No. A471203 dated October 21, 2009 as amended.

In accordance with Section 139 of the Environmental Protection Act, 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 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

 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;
 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:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The environmental compliance approval number;
- 6. The date of the environmental compliance approval;
- 7. The name of the Director, and;
- 8. 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:

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment and Climate Change 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5
M4V 1P5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.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 19th day of August, 2016

Dale Gable, P.Eng. Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*

RM/

c: Area Manager, MOECC Cornwallc: District Manager, MOECC OttawaJocelyn Chabot, The Corporation of the City of Clarence-Rockland



Ministry of the Environment and Climate Change Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL NUMBER A471203 Notice No. 1 Issue Date: September 9, 2015

The Corporation of the City of Clarence-Rockland 1560 Laurier Street Clarence-Rockland, Ontario K4K 1P7

Site Location: City of Clarence-Rockland Waste Disposal Site Lot 15, Concession 4 City of Clarence-Rockland, United Counties of Prescott and Russell

You are hereby notified that I have amended Approval No. A471203 issued on October 21, 2009 for the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

I. The following definitions are hereby added to the Environmental Compliance Approval No. A471203;

"*Certificate* " or "*Approval* " or "*Environmental Compliance Approval* " means this entire provisional Approval document, issued in accordance with section 39 of the *EPA*, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A".

II. Condition 2(1) of the *Environmental Compliance Approval* No. A471203 is hereby amended by revising the *Site* Configuration such that the revised Condition 2(1) reads as follows;

Operation

- 2(1) The *Site* shall be operated and maintained at all times including management and disposal of all waste in accordance with the *EPA*, *Regulation 347*, the conditions of this *Approval*, and the Report listed as item No. 26 of the Schedule A (including the Site Entrance and Facilities Reconfiguration as shown on the Plan listed as item No. 27). At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.
- III. The following Condition 2(17) is added to the *Environmental Compliance Approval* No. A471203;

Amendment to the Existing Approval of Sewage Works No. 3362-6D7PL4

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- 2(17) The *Owner* shall submit an Application for amendment of the ECA No. 3362-6D7PL4, in order to amend this ECA and include the stormwater management works on the *Site* required due to the currently proposed *HHW* depot, new site entrance, weigh scales and other related works. This Application shall be submitted to the Ministry by June 30, 2016, as required under Section 20.2 of the EPA.
- IV. Condition 8(1) of the *Environmental Compliance Approval* No. A471203 is hereby amended by including the gas monitoring for Weigh Scale House, such that the revised Condition 8(1) reads as follows;

Landfill Gas

- 8(1) Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site* and outside of the Weigh Scale House (as identified in the Figure 2 revised on August 28, 2015, and listed as item No. 32 of the Schedule A), especially enclosed structures which at times are occupied by people. If required, the *Owner* shall ensure that any buildings or structures at the *Site* contain adequate preventive measures to relieve any possible landfill gas accumulation.
- V. Conditions 11(1) and 11(2) of the *Environmental Compliance Approval* No. A471203 are hereby amended such that the revised Conditions 11(1) and 11(2) read as follows;

Household Hazardous Waste (HHW) Depot

- 11(1) The *HHW* depot shall only accept household hazardous wastes and it shall be operated in accordance with the application for a Waste Disposal Site (Transfer) submitted on June 1, 1995 and supporting information, and as modified in the <u>Design Operation and Maintenance Report</u>, dated August 2000, and as amended by Report listed as item No. 26 of the Schedule A.
- 11(2) No household hazardous waste will be stored in HHW Depot for more than 90 days on the Site.
- VI. The following Items are hereby added to Schedule "A" and form part of the *Environmental* Compliance Approval No. A471203;
- 25. Application for Amendment to the ECA #A471203 for Clarence-Rockland Landfill Entrance and Facilities Reconfiguration, dated June 1, 2015 and received on June 15, 2015, including supporting documentation.
- 26. Report entitled "City of Clarence-Rockland Amendment to Landfill *Environmental Compliance Approval*, Landfill Site Entrance and Facilities Reconfiguration, prepared by Stantec Consulting Ltd", dated March 6, 2015.
- 27. Figure 4 included in the Report listed as item No. 26, and entitled as "Site Layout Landfill Site Entrance And Facilities Reconfiguration", signed/stamped by Gerry Lalonde Stantec Consulting Inc. on Jaunary 21, 2015.

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- 28. Email from Gerry Lalonde Stantec Consulting Inc., dated August 12, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, providing additional information regarding the amendment of the Sewage Works ECA No. 3362-6D7PL4.
- 29. Email from Gerry Lalonde Stantec Consulting Inc., dated August 14, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, providing additional information supplementing the Report listed in item No. 25 of Schedule A.
- 30. Email from Denis Longpré, Manager of Environment and Water, Infrastructure and Engineering, City of Clarence-Rockland City, dated August 28, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, providing additional information supplementing the Report listed in item No. 26 of Schedule A.
- 31. Email from Gerry Lalonde Stantec Consulting Inc., dated August 28, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, regarding landfill gas monitoring adjacent to the Weigh Scale House, and regarding the approval application for Stormwater management works.
- 32. Revised Figure 2 included in the Email listed as item No. 31, and entitled as "Weigh Scale House Floor Plan - Landfill Site Entrance And Facilities Reconfiguration", submitted by Gerry Lalonde Stantec Consulting Inc. on August 28, 2015.

The reason(s) for this amendment to the Approval is (are) as follows:

e

- 1. The reason for amending Condition 2(1), 11(1) and 11(2) of the *Approva* 1 is as follows: all in accordance with the application for approval dated June 1, 2015 and received on June 15, 2015, and including supporting documentation.
- 2. The reasons for Condition 8(1) is to ensure that off site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*
- 3. The reason for adding Condition No. 2(17) is to ensure that the Approval for the site stormwater management works is updated to include the stormwater from the proposed new infrastructure and that the site sewage works are constructed and operated in accordance with the Approval from the Ministry as required under the Environmental Protection Act.

This Notice shall constitute part of the approval issued under Approval No. A471203 dated October 21, 2009.

In accordance with Section 139 of the Environmental Protection Act, 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 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in

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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.

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:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The environmental compliance approval number;
- 6. The date of the environmental compliance approval;
- 7. The name of the Director, and;
- 8. 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:

The Secretary* Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M50, 155	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment and Climate Change 135 St. Clair Avenue West, 1st Floor Toronto, Ontario
M5G 1E5		Toronto, Ontario

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.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 9th day of September, 2015



KH/

- c: Area Manager, MOECC Cornwall Area Office.
- c: District Manager, MOECC Ottawa District. Gerry Lalonde, P.Eng., Stantec Consulting Ltd.

Jan D. Gable

Dale Gable, P.Eng. Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*





3 V OCT, 2009

Ministry of the Environment Ministère de l'Environnement

CITÉ CLARENCE-ROCKLAND

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE NUMBER A471203 Issue Date: October 21, 2009

The Corporation of the City of Clarence Rockland 1560 Laurier St Rockland, Ontario The City of Clarence Rockland, Ontario K4K 1P7

Site Location: Lot 15, Concession 4 The City of Clarence Rockland, United Counties of Prescott and Russell

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Certificate* " means this entire provisional Certificate of Approval document, issued in accordance with section 39 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 EPA as a Director for the purposes of Part V of the EPA;

"District Manager" means the District Manager of the local district office of the Ministry in which the Site is geographically located;

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

"HHW" means household hazardous waste;

"Ministry" means the Ontario Ministry of the Environment;

"NMA " means Nutrient Management Act, 2002, S.O. 2002, c. 4, as amended from time to time;

"*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* and includes its successors or assigns;

"*Owner*" means any person that is responsible for the establishment or operation of the *Site* being approved by this *Certificate*, and includes the Corporation of the City of Clarence Rockland and assigns;

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

"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 or Section 4 of NMA or Section 8 of SDWA.

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

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

"SDWA" means Safe Drinking Water Act, 2002, S.O. 2002, c. 32, as amended;

"*Site* " means the entire waste disposal site, including the buffer lands, contaminant attenuation zone, hazardous waste depot/transfer station and associated buildings and facilities at Lot 15, Concession 4, The City of Clarence Rockland, United Counties of Prescott and Russell; and

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

- a. relevant waste management legislation, regulations and guidelines;
- b. major environmental concerns pertaining to the waste to be handled;
- c. occupational health and safety concerns pertaining to the processes and wastes to be handled;
- d. management procedures including the use and operation of equipment for the processes and wastes to be handled;
- e. emergency response procedures;
- f. specific written procedures for the control of nuisance conditions;
- g. specific written procedures for refusal of unacceptable waste loads; and
- h. the requirements of this *Certificate*.

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

TERMS AND CONDITIONS

1. GENERAL

Compliance

(1) The *Owner* and *Operator* shall ensure compliance with all the conditions of this

Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate*.

In Accordance

(3) Except as otherwise provided by this *Certificate*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

Interpretation

- (4) Where there is a conflict between a provision of any documents listed in Schedule "A" in this *Certificate*, and the conditions of this *Certificate*, the conditions in this *Certificate* shall take precedence.
- (5) 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.
- (6) Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.
- (7) The conditions of this *Certificate* are severable. If any condition of this *Certificate*, or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

Other Legal Obligations

- (8) The issuance of, and compliance with, this *Certificate* does not:
 - (a) relieve any person of any obligation to comply with any provision of any 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 require the *Owner* and *Operator* to furnish any further information related to compliance with this *Certificate*.

Adverse Effect

(9) 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.

(10) Despite an *Owner, Operator* or any other person fulfilling any obligations imposed by this *Certificate, the Owner, Operator or* any other person remains responsible for any contravention of any other condition of this *Certificate* 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.

Change of Ownership

- (11) 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:
 - (a) the ownership of the *Site*;
 - (b) the Operator of the Site;
 - (c) the address of the Owner or Operator; and
 - (d) 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.
- (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.
- (13) In the event of any change in Ownership of the works, other than change to a successor Owner, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Certificate of Requirement/Registration on Title

- (14) The Owner shall:
 - (a) Within 60 days of the date of the issuance of this *Certificate*, submit to the *Director* for review, two copies of a completed Certificate of Requirement with a registerable description of the *Site*; and
 - (b) 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 *Site* and submit to the *Director* the duplicate registered copy immediately following registration.
- (15) Pursuant to Section 197 of the Environmental Protection Act, neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first

giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

Inspections by the Ministry

- (16) No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the EPA, the PA, the SDWA or the NMA, of any place to which this *Certificate* relates, and without limiting the foregoing:
 - (a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
 - (b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate;*
 - (c) to inspect the *Site*, related equipment and appurtenances;
 - (d) to inspect the practices, procedures, or operations required by the conditions of this *Certificate;* and
 - (e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA*, the *OWRA*, the *PA*, the *SDWA* or the *NMA*.

Information and Record Retention

- (17) Any information requested, by the *Ministry*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request, in a timely manner.
- (18) 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 *Certificate* 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 *Certificate* or any statute, regulation or other legal requirement; or
 - (b) acceptance by the *Ministry* of the information's completeness or accuracy.
- (19) The *Owner* shall ensure that a copy of this *Certificate*, in its entirety and including all its Notices of Amendment, and the most current approved Design and Operation Plan for the *Site*, are retained at the *Site* at all times.

2. SITE OPERATION

Operation

(1) The Site shall be operated and maintained at all time including management and disposal of all waste in accordance with the EPA, Regulation 347, and the conditions of this Certificate. At no time shall the discharge of a contaminant that causes or is likely to

cause an adverse effect be permitted

Signs

- (2) A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:
 - (a) the name of the *Site* and *Owner*;
 - (b) the number of the *Certificate*;
 - (c) the name of the *Operator*;
 - (d) the normal hours of operation;
 - (e) the allowable and prohibited waste types;
 - (f) the telephone number to which complaints may be directed;
 - (g) a warning against unauthorized access;
 - (h) a twenty-four (24) hour emergency telephone number (if different from above); and
 - (i) a warning against dumping outside the Site.
- (3) The *Owner* shall install and maintain signs to direct vehicles to working face, recycling areas, *HHW* depot and composting area.
- (4) The *Owner* shall provide signs at recycling depot, *HHW* depot and composting area informing users what materials are acceptable and directing users to appropriate storage area.

Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic

(5) The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Burning Waste Prohibited

(6) The *Owner* shall ensure that no burning of wastes and wood products is taking place at the *Site*.

Scavenging

(7) Except as authorized by a by-law, the *Owner* shall ensure that no scavenging is taking place at the *Site*.

Site Access

- (8) Waste shall only be accepted at the *Site* from the City of Clarence Rockland and Wards 2 and 4 of the Township of Alfred Plantagenet.
- (9) Waste shall only be accepted from 8:00 a.m. to 5:00 p.m. The Site shall be closed on

Sundays and Holidays. The *Owner* may provide alternative hours of operation within the above hours provided that they are correctly posted at the *Site*, that suitable public notification is given of any change.

- (10) On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and two (2) hours after the hours of operation approved by this *Certificate*.
- (11) With the prior written approval from the *District Manager*, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

Site Security

- (12) No waste shall be received, landfilled or removed from the *Site* unless the operator or attendant is present and supervises the operations during operating hours. The *Site* shall be closed when a site operator is not present to supervise landfilling operations.
- (13) The *Site* shall be operated and maintained in a safe and secure manner. During non-operating hours, the *Site* entrance and exit gates shall be locked.

Visual Screening

- (14) The Owner shall maintain the screening berm constructed along Lalonde Road as per Drawing No. I-3-3 entitled "Waste Contours" and Drawing No. I-3-9 entitled "Road and Berm Sections" of Item 18(a) of Schedule "A" attached to this Certificate.
- (15) The *Owner* shall maintain the trees providing the screening of the *Site* operations from Lalonde Road in the area east of the entrance.

3. EMPLOYEE TRAINING

- (1) A training plan for all employees that operate any aspect of 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 *Certificate*.
- (2) All *Trained* Personnel operating the *HHW* depot shall be trained in the following areas:
 - (a) waste paint identification, analysis information and separating procedures for the wastes being handled at the *HHW* depot;
 - (b) proper storage, handling, sorting and shipping procedures of the wastes being handled at the *HHW* depot; and
 - (c) occupational health and safety concerns pertaining to the wastes to be handled at the *HHW* depot.

4. COMPLAINTS RESPONSE PROCEDURE

- (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 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.

5. EMERGENCY RESPONSE

- (1) Any spills, fires or other emergency situations shall be forthwith reported directly to the *Ministry's* Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.
- (2) In addition, the Owner shall submit, to the District Manager a written report within five (5) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the Site.
- (3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *O.Reg. 347*.
- (4) 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) adequately maintained and kept in good repair.
- (5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. RECORD KEEPING AND REPORTING

Daily Log Book

- (1) A daily log shall be maintained in written format and shall include the following information:
 - (a) the type, date and time of arrival, hauler (commercial waste), and quantity (tonnes or volume) of all waste and cover material received at the *Site*;
 - (b) documentation of types, quantities and source of generation of waste received at the *HHW* depot;
 - (c) type, amount and source of waste refused at the *HHW* depot;
 - (d) the area of the *Site* in which waste disposal operations are taking place;
 - (e) a record of litter collection activities and the application of any dust suppressants;
 - (f) a record of the daily inspections; and
 - (g) 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.
- (2) Any information requested, by the *Director* or a *Provincial Officer*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request.

Daily Inspections and Log Book

- (3) An inspection of the entire *Site* and all equipment on the *Site* shall be conducted weekly the *Site* is in operation to ensure that: the *Site* is secure; that the operation of the *Site* is not causing any nuisances; that the operation of the *Site* is not causing any adverse effects on the environment and that the *Site* is being operated in compliance with this *Certificate*. Any deficiencies discovered as a result of the inspection shall be remedied within a reasonable time, including temporarily ceasing operations at the *Site* if needed.
- (4) A record of the inspections shall be kept in a daily log book that includes:
 - (a) the name and signature of person that conducted the inspection;
 - (b) the date and time of the inspection;
 - (c) the list of any deficiencies discovered;
 - (d) the recommendations for remedial action; and
 - (e) the date, time and description of actions taken.
- (5) A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Annual Report

(6) 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*, by March 30 of the year following the period being reported upon.

- (7) The Annual Report shall include the following:
 - (a) calculations of the volume of waste landfilled, the daily and intermediate covers, the final cover and the overall volume of the site capacity used during the reporting period;
 - (b) a comparison of the actual capacity used to the estimates of the capacity estimated;
 - (c) an estimate of the remaining site life;
 - (d) any changes in operations, equipment, or procedures used at the *Site*, any operating problems encountered and corrective actions taken;
 - (e) details on the monitoring program undertaken, outlining monitor locations, analytical parameters sampled, and frequency of sampling;
 - (f) an analysis and interpretation of the surface water and groundwater monitoring data, a review of the adequacy of the monitoring program, conclusions of the monitoring data, and recommendations for any changes that may be necessary,
 - (g) summary of inspections undertaken at the *Site*;
 - (h) summary of any public complaints received and the responses made;
 - (i) summary of activities undertaken at the *HHW* depot;
 - (j) a discussion of cover stockpile activities including use, timing, locations and erosion protection;
 - (k) status update on the final cover placement, and seeding activities undertaken in the closed sections of the Landfill;
 - (1) a discussion of the waste diversion performance achieved by the *Owner* reported on a per capita basis;
 - (m) a statement as to compliance with all conditions of this *Certificate* and the other relevant Ministry's groundwater and surface water requirements;
 - (n) recommendations respecting any proposed changes in the operation of the *Site*; and

(o) any other information that the *Regional Director* or the *District Manager* may require.

7. LANDFILL DESIGN AND DEVELOPMENT

Approved Waste Types

- (1) Only solid non-hazardous municipal waste including asbestos, dewatered sewage sludge and contaminated soil as defined under *Reg.* 347 shall be accepted at the *Site* for landfilling.
- (2) No liquid industrial waste or hazardous wastes as defined under O. Reg. 347 and O.Reg. 558 shall be disposed at the *Site*.
- (3) The *Owner* may continue to accept liquid and solid household hazardous wastes and products requiring special handling or disposal practices, at the *HHW* depot.
- (4) The *Owner* shall develop and implement a program to inspect waste to ensure that the waste received at the *Site* is of a type approved for acceptance under this *Certificate*.
- (5) The Owner shall ensure that all loads of waste are properly inspected by Trained personnel prior to acceptance at the Site and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager, in writing, of load rejections at the Site within five (5) business days from their occurrence.

Capacity

- (6) (a) As approved by the Environmental Assessment dated October 21, 1999, the total additional waste disposal capacity of the expanded Site is 740,000 cubic metres of waste, daily cover and intermediate cover, but excluding the final cover.
 - (b) The total approved waste disposal capacity for the Site is 974,000 cubic metres of waste, daily cover and intermediate cover, but excluding the final cover. This total waste disposal capacity includes the additional disposal capacity from Condition (6)(a), above, and the waste disposed of prior to the above Environmental Assessment approval.

Waste Placement

- (7) No waste shall be placed below existing ground within the fill area to maintain a vertical separation between the groundwater table and the waste.
- (8) Disposal of waste shall only occur within the areas as delineated on Drawing Fig. No. I-3-3 of Item 18(a) of Schedule "A" attached to this *Certificate*.

(9) No waste shall be placed above the final contours shown on Drawing - Fig. No. I-3-4 of Item 18(a) of Schedule "A" attached to this *Certificate*.

Service Area

(10) Only waste that is generated within the boundaries of the City of Clarence Rockland and Wards 2 and 4 of the Township of Alfred Plantagenet may be accepted at the *Site*.

Cover

(11) Daily and interim cover material shall be applied in accordance with Section 3.3 of Item 14(a) of Schedule "A" attached to this *Certificate* and as follows:

Daily cover

(a) By the end of each working day, the entire working face shall be covered with a minimum thickness of 100 mm of daily cover.

Interim cover

(b) In areas where landfilling has been temporarily discontinued for twelve (12) months or more, a minimum thickness of 300 mm of intermediate cover shall be placed.

Final Cover

- (c) Final Cover In areas where landfilling has been completed to final contours, a minimum 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (final cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.
- (12) (a) Contaminated soil that is not a hazardous waste as defined by O.Reg. 347, either mixed with clean soil or own its own, and biosolids from the City of Clarence Rockland's Water Pollution Control Plant mixed with soil, compost and/or wood chips, may be used as daily cover provided that its use does not cause any adverse effects;
 - (b) Subject to Condition 12 (a), if the application of the contaminated soil as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a *Provincial Officer*, the use of the contaminated soil shall be immediately discontinued and only clean soil or biosolids mixed with soil, compost and/or wood chips shall be used as daily cover;
 - (c) Subject to Condition 12 (a), if the application of the biosolids as a daily cover causes operational problems, odours or other environmental adverse

effects as verified by a *Provincial Officer*, the use of the biosolids shall be immediately discontinued;

- (d) Compost mixed with clean soil and wood chips mixed with clean soil may also be used as alternative material for daily cover; and
- (e) The *Owner* may mix de-watered sludge with the topsoil. The sludge shall be accounted for in the total volume of waste that was approved for landfilling at the *Site*. If the use of de-watered sludge causes an adverse effect, as verified by a *Provincial Officer*, its use shall be discontinued and only clean soil shall be used.
- (13) Except for the types already approved by Condition 7(12). any alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the *Owner* to the *Director*, copied to the *District Manager* and as approved by the *Director* via an amendment to this *Certificate*. The alternative material shall be non-hazardous according to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:
 - (a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
 - (b) Provision for an aesthetic condition of the landfill during the active life of the *Site;*
 - (c) Provision for vehicle access to the active tipping face; and
 - (d) Compatibility with the design of the *Site* for groundwater protection, leachate management and landfill gas management.

8. LANDFILL MONITORING

Landfill Gas

- (1) Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site*, especially enclosed structures which at times are occupied by people. If required, the *Owner* shall ensure that any buildings or structures at the *Site* contain adequate preventive measures to relieve any possible landfill gas accumulation.
- (2) Landfill gas monitoring shall be undertaken according to the program described in Section 5.4 of Item 18(a) of Schedule "A" attached to this *Certificate*.
- (3) Any changes to the landfill gas monitoring program shall be submitted to the *Director* for approval, prior to their implementation.

Compliance Limits

(4) The *Site* shall be operated in such a way as to ensure compliance with the following:

- (a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site*; and
- (b) Provincial Water Quality Objectives included in the July 1994 publication entitled Water Management Policies, Guidelines, Provincial Water Quality Objectives, as amended from time to time or limits set by the Regional Director, for the protection of the surface water.

Surface Water and Ground Water

- (5) The Owner shall monitor groundwater as per Appendix G, Item 24 of Schedule "A".
- (6) The Owner shall monitor surface water as per Appendix G, Item 24 of Schedule "A".
- (7) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.
- (8). The Owner shall abide by the Certificate of Approval for Sewage Works under Section 53 of <u>Ontario Water Resources Act</u>, R.S.O. 1990 issued to construct, operate, maintain and monitor the proposed wetland and its discharge to the surface water regime, designed to control and treat storm water run-off and leachate-impacted groundwater at the Site.
- (9) Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

Groundwater Wells and Monitors

- (10) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.
- (11) Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.
- (12) Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner*, as required.
 - (a) Unless a well is being abandoned, the *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.
 - (b) All monitoring wells which are no longer required as part of the groundwater

monitoring program, and have been approved by the *District Manager* for abandonment, shall be decommissioned by the *Owner*, as required, in accordance with *O.Reg. 903*, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

- (13) (a) The Owner shall follow the site-specific trigger mechanism program for groundwater contingency measures outlined in Appendix A, Item 20 of Schedule "A" and as revised by MOE correspondence in Appendix "A", Item 23 of Schedule "A".
 - (b) The Owner shall follow the site-specific trigger mechanism program for surface water contingency measures outlined in Appendix A of Item 20 of Schedule "A" and as revised by MOE correspondence in Appendix "A", Item 23 of Schedule "A".
- (14) No changes to the site-specific trigger mechanism shall be implemented prior to receiving approval from the *Director*.
- (15) In the event of a confirmed exceedence of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, the *Owner* shall immediately notify the *District Manager*, and 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.
- (16) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken:
 - (a) The Owner shall notify the District Manager, in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedences;
 - (b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *District Manager* for approval; and
 - (c) The contingency measures shall be implemented by the *Owner* upon approval by the *District Manager*.
- (17) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the *Director* via an amendment to this *Certificate*.

Changes to the Monitoring Plan

- (18) 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. The *Owner* shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.
- (19) Within sixty (60) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, 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 the changes to the monitoring program, to the *Director* requesting the *Certificate* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.
- (20) 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 *Certificate*.

9. CLOSURE PLAN

- (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;
 - (vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; 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, 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; and
- (f) an updated estimate of the contaminating life span of the *Site*, based on the results of the monitoring programs to date.
- (2) Unless amended by the closure plan, closure of the Landfill will be done in accordance with the final contours shown on Figure I-3-4 of Item 18(a) of Schedule "A" attached to this *Certificate*.
- (3) The *Site* shall be closed in accordance with the closure plan as approved by the *Director*.

10. WASTE DIVERSION

- (1) The *Owner* shall direct as much waste from landfilling as is practical and affordable with a view to meeting the Provincial Waste Diversion Objectives, developed by the *Ministry* and as changed from time to time.
- (2) The *Owner* shall submit an annual Waste Diversion Statement as part of its Annual Report described in Condition No. 6 (6), and include the following:
 - (a) updating summary of per capita waste diversion activities and quantities of waste diverted from disposal; and
 - (b) proposed waste diversion program for the next year that describes estimates of waste to be diverted.

11. HOUSEHOLD HAZARDOUS WASTE DEPOT

- The *HHW* depot shall only accept household hazardous wastes and it shall be operated in accordance with the application for a Waste Disposal Site (Transfer) submitted June 1, 1995 and supporting information and as modified in the <u>Design Operation and Maintenance Report</u>, dated August 2000.
- (2) No wastes shall be received at the *HHW* depot prior to April 1, or after October 31 and no waste shall be stored at the *HHW* depot from December 31 to March 31.
- (3) (a) No PCB's shall be accepted at this *HHW* depot. Oil and oil-based paints which have been manufactured prior to 1972, or whose manufacturing date cannot be determined may contain PCB's and shall be handled in the manner prescribed:
 - (i) The oil and oil-based paints shall not be mixed (bulked) with other paints prior to testing. Paints which are lab-packed are not considered to be mixed under this *Certificate*.

- (ii) The oil and oil-based paints shall be tested for PCB's content and shall be handled in the manner outlined in sub condition (a)(iii) if found to contain PCB's.
- (iii) If the oil and oil-based paints are found to have PCB's at or above levels identified in sub condition (a) (iv), it shall be forthwith reported to the *District Manager* and shall be managed in accordance with Ontario Regulation 362/92 and stored or removed from the *HHW* depot to an approved PCB's storage site, in accordance with written instructions from the *District Manager*.
- (iv) The oil and oil-based paints shall not be distributed for reuse if they have any measurable PCB's content. The oil and oil-based paint is considered to be a PCB's waste, if measured levels are equal to or greater than 50 parts per million.
- (b) Except as specified in sub condition (a) (iv), paints collected at the HHW depot may be returned or sold to the general public for reuse provided all transactions are recorded by invoice. Information on the type and volume of paint returned to the public through this HHW depot shall be recorded in the report specified in Condition No. 6 (6).

Storage

- (4) (a) The Owner shall ensure that the wastes are stored in a safe and secure manner, that the operation of the HHW depot does not interfere with any other activities undertaken at the Site and that the wastes are properly handled, packaged or contained so as not to pose any threat to the general public, Site personnel and the environment.
 - (b) No storage facilities other than those approved under this *Certificate* shall be used and fixed storage facilities shall not be moved, replaced or altered.
 - (c) All storage buildings and tanks shall be clearly marked indicating the type and nature of the hazardous waste stored. All points of access to the storage facilities shall be posted to warn that the area contains hazardous materials. Smoking restrictions shall be adhered to and non-smoking signs shall be posted as required by Regulation.
 - (d) All storage buildings shall be properly ventilated and shall be constructed in compliance with fire regulations, municipal by-laws and approvals and in accordance with Ministry of Labour guidelines.
 - (e) All household hazardous waste storage tanks and buildings shall be maintained

under lock and key and access to these facilities shall be limited to trained Site personnel.

- (5) Wastes that are collected and stored shall be in amounts which can be safely handled at the *HHW* depot. In the event that larger amounts are received than anticipated, the *Owner* shall have extra drums and lab-packed containers available on the premises for the storage of the additional waste collected. When the *HHW* depot capacity is reached, the *Owner* shall make arrangements for the removal of waste from the *HHW* depot as soon as possible, but in any event, within five (5) working days.
- (6) Except as specified under Conditions 11(3)(a)(iii) and (b), all waste collected shall be transported from the *Site* by an approved waste management system and disposed of at waste landfill, transfer and processing sites certified to accept these types of wastes.

12. COMPOSTING

- (1) Composting operations at the *Site* shall be carried out in a manner as not to interfere with normal waste disposal operations as approved in this *Certificate*.
- (2) Should the ensuing compost be destined for use by the general public, composting operations at the *Site* shall be carried out in accordance with the Ministry's <u>Interim</u> <u>Guidelines for the Production and Use of Aerobic Compost in Ontario</u>, dated November 1991, and revised from time to time.
- (3) Should the ensuing compost be destined for use as alternative cover material at the *Site*, composting operations at the *Site* must be carried out in a manner that does not cause groundwater or surface water contamination, offensive odours or encourage the presence of vermin or any other adverse effect.

13. LIAISON COMMITTEE

- (1) The Owner shall take all reasonable steps to establish, maintain and participate in a Site Liaison Committee, which is to function within the Terms of Reference, as proposed in Appendix C of Item 18(a) of Schedule "A" attached to this Certificate. The public shall be given an opportunity to comment and provide input before the Terms of Reference are finalized and ready for implementation. The Terms of Reference shall be amended from time to time according to an appropriate procedures included in the Terms of Reference.
- (2) A copy of the Terms of Reference shall be provided to the *District Manager*.
- (3) The Site Liaison Committee shall serve as a focal point for dissemination, consultation, review and exchange of information regarding the operation of the *Site*, results of the environmental monitoring, maintenance, complaint resolution and any new approvals or amendments to the existing approvals related to the operation of this *Site*.

SCHEDULE "A"

- 1. Application for a Certificate of Approval for a Waste Disposal Site, signed by Marco Lalonde, Township of Clarence, and dated July 22, 1992, for an interim expansion of the landfill with the following supporting documentation prepared by McNeely Engineering Consultants Limited and Golder Associates Limited:
 - (a) Volume I Request for Exemption Environmental Assessment Act, dated September 1992
 - (b) Volume II Site Hydrogeology, dated July 1992
 - (c) Volume III Site operations, Development and Closure Plans, dated July 1992
 - (d) Volume IV Natural Environmental Evaluation, dated July 1992
 - (e) resolution #5259
- 2. Report entitled "Hydrogeological Activities, September 1992 to November 1992, Landfill Site Lot 15, Concession IV, Township of Clarence, Ontario" prepared by Golder Associates Limited and dated January 1993.
- 3. Reply to MOEE Comments on Interim Expansion Township of Clarence Landfill Site, prepared by the Township of Clarence and dated May 4, 1993.
- 4. Application for a Certificate of Approval for a Waste Disposal Site, signed by Marco Lalonde, Township of Clarence, and dated October 6, 1993, for an interim expansion of the landfill.
- 5. Letter from Gerry Lalonde, McNeely Engineering Consultants Limited to E. Zaltsberg Ministry of the Environment, dated October 15, 1993, to further clarify the changes in the landfill size and in the total site size.
- 6. Report entitled "1993 Site Operations and Hydrogeological Monitoring Program, Landfill Site Lot 15, Concession IV, Township of Clarence, Ontario", dated January 1994 and prepared by Golder Associates Ltd.
- 7. Report entitled "Addendum Report on Waste Management and Hydrogeological Issues and Comments on Draft Certificate of Approval Application for interim Expansion Landfill Site, Lot 15, Concession IV, Township of Clarence, Ontario", dated March 1994 and prepared by Golder Associates Limited and McNeely Engineering Consultants Limited and revised Figure 2: "Site Plan and Study Area", dated March 22, 1994.
- 8. Report entitled "Addendum Report", dated April 1994 and prepared by Golder Associates Limited and McNeely Engineering Consultants Limited as an addendum to March 1994 Addendum Report on Waste Management and Hydrogeological Issues.
- 9. Application for a Certificate of Approval for a Waste Disposal Site, signed by Jean-Denis Hurtubise, Township of Clarence, and dated June 1, 1995, to establish a Household Hazardous Waste Transfer Depot to service the Township of Clarence.

- 10. Letter to Kim Lendvay, MOEE Eastern Region, from Gerry Lalonde, McNeely Engineering Consultants Ltd., dated July 7, 1995 re: Response to MOEE letter dated June 26, 1995.
- 11. Letter to Michel Dostaler, Township of Clarence from Kim Lendvay, MOEE Eastern Region, dated June 26, 1995 re: Request for additional information.
- 12. A report entitled "Township of Clarence Household Hazardous Waste Transfer Station Engineering Report, Building Plan and operation and Management Plan"; prepared by McNeely Engineering consultants Ltd, and dated October 1995.
- 13. A three page document entitled "Supporting Information to Application for Amendment to Certificate of Approval No. A 471203, Owner of Clarence-Rockland, February 16, 1998" signed by Gerry Lalonde, P.Eng of Stanley Consulting Group Ltd.
- 14. A three page document entitled, Supporting Information to Application for Amendment to Certificate of Approval No. A 471203, City of Clarence Rockland, February 16, 1998 signed by Gerry Lalonde, P.Eng. of Stanley Consulting Group Ltd.
- 15. Application for Approval of a Waste Disposal Site dated February 17, 1998, and signed by R. Sarazin of the Corporation of the City of Clarence Rockland.
- 16. Letter dated March 12, 1998, from R. Sarazin of the Corporation of the City of Clarence Rockland to Director Approvals, Ministry of the Environment.
- 17. Application for Approval of a Waste Disposal Site, dated April 30, 1999 and the attached supporting documents.
- 18. Application for a Certificate of Approval of a Waste Disposal Site dated September 11, 2000 and signed by R. Sarazin, The Corporation of the City of Clarence Rockland, for expansion to the existing landfill site, with the following supporting documentation:
 - Volume I Report entitled "City of Clarence Rockland, EPA Landfill Expansion, Design, Operation and Maintenance Report", dated August 2000, prepared by Stantec Consulting Ltd.
 - (b) Volume II Report entitled "Hydrogeological and Geotechnical Design Considerations, The City of Clarence Rockland, Landfill Expansion, Application under the Environmental Protection Act, The City of Clarence Rockland, Ontario", dated September 2000, prepared by Golder Associates Ltd.
 - (c) Volume III Report entitled "Design and Operation, Geotechnical Memorandums, The City of Clarence Rockland, Landfill Expansion, Application under the Environmental Protection Act, The City of Clarence Rockland, Ontario", dated September 2000, prepared by Golder Associates Ltd.

- (d) Volume IV Report entitled "The City of Clarence Rockland, EPA Landfill Expansion -Year 2000, Appendix IV", dated August 2000, prepared by Stantec Consulting Ltd.
- 19. Facsimile transmission from Gerry Lalonde, Stantec Consulting Ltd. to Roman Krawczyniuk, Ontario Ministry of the Environment, dated November 20, 2000, containing additional information related to review of the potential noise impacts.
- 20. Report entitled "2001 Annual Report on Groundwater and Surface Water Monitoring Program, Clarence-Rockland Landfill Site, City of Clarence-Rockland, Ontario", dated March 2002 and prepared by Golder Associates Ltd.
- 21. Application for a waste disposal site amendment dated August 26, 2003, signed by Richard Sarazin, Director of Physical Services, from the City of Clarence Rockland. re: using biosolids as alternative daily cover.
- 22. Letter dated February 11, 2004, signed by Gerry Lalonde, Stantec Consulting Ltd. to A. Mobberley, MOE. re: additional biosolids handling procedures and mixing locations.
- 23. Report entitled "City of Clarence-Rockland 2008 Annual Operations Monitoring Report", dated March 2009 and prepared by Stantec Consulting Ltd.
- 24. Report entitled "2008 Annual Report on Groundwater and Surface Water Monitoring Program, Clarence-Rockland Landfill Site, City of Clarence-Rockland, Ontario", dated March 2009 and prepared by Golder Associates Ltd.

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

GENERAL

- 1. The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (17), (18) and (19) is to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this Certificate of Approval.
- 2. The reasons for Condition 1(3) 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 reasons for Condition 1(11) 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.
- 4. The reasons for Condition 1(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 Certificate of Approval.

- 5. The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.
- 6. Conditions 1 (14) and (15) 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.
- 7. The reason for Condition 1(16) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

SITE OPERATION

- 8. The reasons for Conditions 2(1), 2(5) and 6(3) 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.
- 9. The reason for Conditions 2 (2), 2(3) and 2(4) is to ensure that users of the *Site* are fully aware of important information and restrictions related to *Site* operations and access under this *Certificate*.
- 10. The reason for Condition 2(6) 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.
- 11. Condition No. 2 (7) is included to ensure protection of public health and safety, and minimization of potential damage to environmental controls, monitoring and other works at the Site due to uncontrolled removal of materials from waste at the Site.
- 12. The reasons for Condition 2(8), 2(9) and 2(10) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.
- 13. The reasons for Condition 2(11) and 2(12) are to ensure that the *Site* is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person 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.
- 14. Conditions Nos. 2 (13), 2(14) and 2(15) are included to ensure that the Site is designed and operated in a way that does not result in a hazard or nuisance to the natural environment or any persons.

EMPLOYEE TRAINING

15. The reason for Conditions 3(1) and 3(2) 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.

COMPLAINTS RESPONSE PROCEDURE

16. The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this *Site* are responded to in a timely and efficient manner.

EMERGENCY RESPONSE

- 17. Conditions 5(1) and 5(2) are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.
- 18. Conditions 5(3), 5(4) and 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

RECORD KEEPING AND REPORTING

- 19. The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Certificate of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.
- 20. The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.
- 21. The reasons for Conditions 6(6) and 6(7) 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.

LANDFILL DESIGN AND DEVELOPMENT

- 22. The reason for Conditions 7(1) to 7(6) inclusive and 7(10) 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.
- 23. Conditions Nos. 7(7), 7(8) and 7(9) are included to specify restrictions on the extent of landfilling at this *Site* based on the Owner's application and supporting documentation.

- 24. The reasons for Condition 7(11) are to ensure that daily/weekly and intermediate cover are 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 reasons for Condition 7 (12) and 7(13) is to specify the approved alternative cover material and to specify requirements for use of alternative cover material at the *Site*.

LANDFILL MONITORING

- 26. Reasons for Condition 8(1), 8(2) and 8(3) are to ensure that off site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*.
- 27. Condition 8(4) is included to provide the groundwater and surface water limits to prevent water pollution at the *Site*.
- 28. Conditions 8(5) to 8(9) inclusive are included to require the Owner to demonstrate that the *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.
- 29. Conditions 8(10), 8(11) and 8(12) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.
- 30. Conditions 8(13) to 8(17) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.
- 31. Reason for conditions 8(18), 8(19) and 8(20) is to streamline the approval of the changes to the monitoring plan.

CLOSURE PLAN

32. The reasons for Condition 9 are to ensure that final closure of the *Site* is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

WASTE DIVERSION

33. Condition 10 is included because they were proposed by the Environmental Assessment Board's report entitled "*Township of Clarence - Clarence Landfill Site, Reasons for Decisions and*

<u>Decisions</u> ", dated May 18, 1994, prepared for the hearing that was required for the Provisional Certificate of Approval for a Waste Disposal Site No. A471203 dated June 20, 1994.

HOUSEHOLD HAZARDOUS WASTE DEPOT

- 34. Conditions Nos. 11(1) and 11(2) are included to ensure that the HHW depot is operated in accordance with the application and supporting documentation and not in a manner which the Director has not been asked to consider.
- 35. Conditions Nos. 11(3), 11(4) and 11(5) are included to ensure that the HHW depot is used only to collect and handle approved wastes from approved HHW depot users and that the waste is stored in a secure and safe manner.
- 36. Condition No. 11(6) is included to insure that all waste is transported and disposed of in an environmentally acceptable manner in accordance with legislation governing the handling of the waste material.

COMPOSTING

37. Condition No. 12 is included to ensure that the Owner undertakes the composting activities in accordance with Ministry's requirements and in a manner that would not result in a hazard or nuisance to the natural environment or any persons.

LIAISON COMMITTEE

38. Condition No. 13 is included to ensure that the Owner takes all reasonable steps to establish a forum for the exchange of information and public dialogue on activities carried out at the Site, so that this open communication with the public and local authorities helps in maintaining high standards for Site operations and provides environmental protection.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A471203 issued on December 13, 1991 and June 20, 1994 and associated notices.

In accordance with Section 139 of the <u>Environmental Protection Act</u>, R.S.O. 1990, Chapter E-19, as amended, 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 142 of the <u>Environmental Protection</u> <u>Act</u>, provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
- 2. The grounds on which you intend to rely at the hearing in relation to eachportion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;

The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, 15th Floor Toronto, Ontario M5G 1E5

<u>AND</u>

The Director Section 39, *Environmental Protection Act* Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 21st day of October, 2009

les Gebrezhi

Tesfaye Gebrezghi, P.Eng. Director Section 39, *Environmental Protection Act*

RM/

8.

c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Ltd.

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Ministry Ministère of the de Environment l'Environnement AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE NUMBER A471203 Notice No. 4

TIME: .

RECEIVED

The Corporation of the City of Clarence-Rockland 1560 rue Laurier Rockland, Ontario K4K 1P7

APR 0 2 2004

STANTEC

Site Location: City of Clarence-Rockland Municipal Waste Disposal Site Lot 15, Concession 4 Clarence-Rockland City, United Counties of Prescott and Russell

You are hereby notified that I have amended Provisional Certificate of Approval No. A471203 issued on December 13, 1991 for a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

Condition 20 is hereby amended to read as follows:

- 20. a) Contaminated soil that is not a hazardous waste as defined by O.Reg. 347 and O. Reg. 558, either mixed with clean soil or own its own, and biosolids from the City of Clarence-Rockland's Water Pollution Control Plant mixed with soil, compost and/or wood chips, may be used as daily cover provided that its use does not cause any adverse effects;
 - b) Subject to Condition 20 (a), if the application of the contaminated soil as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a Provincial Officer, the use of the contaminated soil shall be immediately discontinued and only clean soil or biosolids mixed with soil, compost and/or wood chips shall be used as daily cover;
 - c) Subject to Condition 20 (a), if the application of the biosolids as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a Provincial Officer, the use of the biosolids shall be immediately discontinued and only clean soil contaminated shall be used as daily cover; and
 - d) Compost mixed with clean soil, and wood chips mixed with clean soil may also be used as alternative material for daily cover.

The following items are hereby added to schedule "A".

16. Application for a waste disposal site amendment dated August 26, 2003, signed by Richard Sarazin, Director of Physical Services, from the City of Clarence Rockland. re: using biosolids as alternative

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daily cover.

17. Letter dated February 11, 2004, signed by Gerry Lalonde, Stantec Consulting Ltd. to A. Mobberley, MOE. re: additional biosolids handling procedures and mixing locations.

The reason for this amendment to the Certificate of Approval is as follows:

37. The reason for this amendment is to allow the use of biosolids from the City's Water Pollution Control Plant to be used as alternative daily cover at the City of Clarence-Rockland Municipal Waste Disposal Site, Certificate of Approval No. A471203.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A471203 dated December 13, 1991

In accordance with Section 139 of the <u>Environmental Protection Act</u>, R.S.O. 1990, Chapter E-19, as amended, 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 142 of the <u>Environmental Protection Act</u>, provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
- 2. The grounds on which you intend to rely at the hearing in relation to <u>each</u> portion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 2300 Yonge St., 12th Floor		The Director Section 39, Environmental Protection Act Ministry of Environment and Energy			
			P.O. Box 2382	AND	2 St. Clair Avenue West Elser 12A
			Toronto, Ontario		Z SI. Clair Avenue West, Floor 12A
MAP 1FA					
		M4V 1L5			

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 23rd day of March, 2004

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THIS	NOTICE WAS MAILED
ON 1	March 30, 2004
	la
	(Signed)

AM/

c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Ltd. 🗸

Ian Parrott, P.Eng. Director Section 39, *Environmental Protection Act*

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APPENDIX B

COMPLIANCE SUMMARY TABLE ECA NO. A471203

COMPLIANCE SUMMARY

THE CITY OF CLARENCE ROCKLAND, UNITED COUNTIES OF PRESCOTT AND RUSSELL MOE CERTFICATE NO. A471203 – October 21, 2009 NOTICE NO. 1 – September 9, 2015

For the use and operation of a 12 hectare landfilling area within a total site are of 50 hectares.

Condition	Statement of Compliance
For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:	No Municipality input required.
DEFINITIONS:	
" <i>Certificate</i> " or " <i>Approval</i> " or " <i>Environmental Compliance</i> <i>Approval</i> " means this entire provisional Approval document, issued in accordance with Section 39 of the EPA, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A".	
<i>"Director</i> " 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;	
<i>"District Manager"</i> means the District Manager of the local district office of the <i>Ministry</i> in which the <i>Site</i> is geographically located;	
<i>"EPA</i> " means <i>Environmental Protection Act</i> , R.S.0. 1990, c. E. 19, as amended;	
"HW" means household hazardous waste;	
"Ministry" means the Ontario Ministry of the Environment;	
<i>"NMA</i> " means <i>Nutrient Management Act</i> , 2002, S.O. 2002, c. 4, as amended from time to time;	
<i>"Operator"</i> means any person, other than the Owner's employees, authorized by the <i>Owner</i> as having the charge, management or control of any aspect of the <i>Site</i>	

<i>"Owner"</i> means any person that is responsible for the establishment or operation of the <i>Site</i> being approved by this <i>Certificate</i> , and includes the Corporation of the City of Clarence Rockland and assigns;	
"QWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. 0.40, as amended; "PA	
" means the <i>Pesticides Act</i> , R.S.O. 1990, c. P-I 1, as amended from time to time;	
<i>"Provincial Officer"</i> means any person designated in writing by the Minister as a provincial officer pursuant to Sections of the <i>0 WRA</i> or Section 5 of the <i>EPA</i> or Section 17 of <i>PA</i> or Section 4 of <i>NMA</i> or Section 8 of <i>SDWA</i> .	
"Regional Director" means the Regional Director of the local Regional	
Office of foe Ministry in which the	
Site is located	
<i>"Regulation 347</i> " or <i>"Reg. 347</i> " means Regulation 347, R.R.O. 1990, made under the EPA, as amended from time to time;	
<i>"SDWA"</i> means <i>Safe Drinking Water Act,</i> 2002, S.O. 2002, c. 32, as amended;	
<i>"Site</i> " means the entire waste disposal site, including the buffer lands, contaminant attenuation zone, hazardous waste depot/transfer station and associated buildings and facilities at Lot 15, Concession 4, The City of Clarence Rockland, United Counties of Prescott and Russell; and	
"Trained personnel" means knowledgeable in the following through	
instruction and/or practice: a. relevant waste management legislation.	
regulations and guidelines; b. major environmental concerns pertaining	
to the waste to be handled; c. occupational health and safety	

1	concerns pertaining and wastes to be bandied; d. management procedures including the use and operation of equipment for the processes and wastes to be handled; e. emergency response procedures; f. specific written procedures for the control of nuisance conditions; g. specific written procedures for refusal of unacceptable waste loads; and h. the requirements of this <i>Certificate</i> .	
	TERMS AND CONDITIONS.	
11.	 Change of Ownership 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: a) the ownership of the Site; b) the Operator of the Site; c) the address of the Owner or Operator; and d) 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. 0. 1990, c. B.17, shall be included in the notification. 	During 2019, there were no changes to the Owner, Operator or address of the Owner/Operator.
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.	
13.	In the event of any change in Ownership of the works, other than change to a successor Owner, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.	

14.	 Certificate of Requirement The Owner shall: Within 60 days of the date of the issuance of this Certificate, submit to the Director for review, two copies of a completed Certificate of Requirement with a registerable description of the Site; and 	A Certificate of Requirement for the registration of the October 18/09 Environmental Compliance Approval (Certificate of Approval) was prepared during 2010 and was submitted to the Ministry of the Environment for signature during 2011. It was registered on title to the property.
	• 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 Site and submit to the Director the duplicate registered copy immediately following registration.	
15.	Pursuant to Section 197 of the Environmental Protection Act, neither the Owner nor any person having an interest in the Site shall deal with the Site in any way without first giving a copy of this Certificate to each person acquiring an interest in the Site as a result of the dealing.	During 2019, no persons acquired an interest in the Site.
	Inspection by the Ministry	
16.	 No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the OWRA, the EPA, the PA, the SDWA or the NMA, of any place to which this Certificate relates, and without limiting the foregoing: a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this Certificate are kept; b) to have access to, inspect, and copy any records required to be kept by the conditions of this Certificate; 	Summary of inspections undertaken at the site There were no Ministry Site Inspection Reports or Technical Support Section Reviews provided in 2019.

Condition	Statement of Compliance

	c) to inspect the Site, related equipment and appurtenances;	
	d) to inspect the practices, procedures, or operations required by the conditions of this Certificate; and	
	e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Certificate or the EPA, the OWRA, the PA, the SDWA or the NMA.	
	Information and Record Retention	
17.	Any information requested, by the Ministry, concerning the Site and its operation under this Certificate, including but not limited to any records required to be kept by this Certificate shall be provided to the Ministry, upon request, in a timely manner.	Understood, all relevant materials are scanned and can be made available to Ministry staff on request.
18.	 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 Certificate 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 Certificate or any statute, regulation or other legal requirement; or b) acceptance by the Ministry of the information's completeness or accuracy. 	Understood, no action required
19.	The Owner shall ensure that a copy of this Certificate, in its entirety and including all its Notices of Amendment, and the most current approved Design and Operation Plan for the Site, are retained at the Site at all times.	A copy of the most recent ECA (Environmental Compliance Approval) and Notices are reproduced in Appendix A of this 2019 Annual Report and a copy of the current report is maintained at the Site Office.

2.	SITE OPERATION	
	Operation	
1.	The Site shall be operated and maintained at all times, including management and disposal of all waste in accordance with the EPA, Regulation 347, the conditions of this <i>Approval</i> , and the Report listed as item No. 26 of the Schedule A (including the Site Entrance and Facilities Reconfiguration as shown on the Plan listed as item No. 27). At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.	Understood.
	Signs	
2.	 A sign shall be installed and maintained at the main entrance/exit to the Site on which is legibly displayed the following information: a) the name of the Site and Owner; b) the number of the Certificate; c) the name of the Operator; d) the normal hours of operation; e) the allowable and prohibited waste types; f) the telephone number to which complaints may be directed; g) a warning against unauthorized access; h) a twenty-four (24) hour emergency telephone number (if different from above); and i) a warning against dumping outside the Site. 	
3.	The Owner shall install and maintain signs to direct vehicles	The City has signs directing traffic along access roads and at
4.	to working face, recycling areas, HHW depot and composting area. The Owner shall provide signs at recycling depot, HHW depot and composting area informing users what materials are acceptable and directing users to appropriate storage area.	segregated material storage areas. The entrance sign, HHW depot sign contain information on waste types. Site custodian duties include ensuring that signs directing vehicles are properly maintained and signs directing vehicles to the working face are moved as landfilling operations progress.

Condition	Statement of Compliance

	Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic	
5.	The Site shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.	All season access roads are maintained to provide access the active face. Segregated material areas are located near the site entrance and can be accessed from a paved road. The site is inspected on a regular basis by Orkin PCO Services Inc. for rodent problems. During 2002, the City seeded the berms along Lalonde Road and seeded the interim expansion area as part of the closure activities to reduce dust. The City applies dust suppression materials to on-site roads when necessary.
	Burning Waste Prohibited	
6.	The Owner shall ensure that no burning of wastes and wood products is taking place at the Site.	Understood
	Scavenging	
7.	Except as authorized by a by-law, the Owner shall ensure that no scavenging is taking place at the Site.	The landfill site is fenced, and the site custodian is responsible for ensuring that the entrance gate is locked during non-operating hours to prevent access and scavenging. A sign at the site entrance is erected to notify visitors that scavenging is prohibited. Council resolution no 2015-167 dated December 7th, 2015 permits one person, Mr. L. Lalonde to scavenge Saturdays during hours of operation except during spring and fall free days.
	Site Access	
8.	Waste shall only be accepted at the Site from the City of Clarence Rockland and Wards 2 and 4 of the Township of Alfred Plantagenet.	During 2019, all waste originated from within the City of Clarence Rockland.
9.	Waste shall only be accepted from 8:00 a.m. to 5:00 p.m. The Site shall be closed on Sundays and Holidays. The Owner may provide alternative hours of operation within the above hours provided that they are correctly posted at the Site and that suitable public notification is given of any change.	New By-Law number 2018-48 was adopted, to regulate the management of the City of Bourget Landfill Site. New operating hours as per By-Law 2018-48From April 1st to November 30th:From December 1st to March 31st: -Tuesday: 8:30AM to 12:30PM -Tuesday: 8:30AM to 12:30PM -Friday: 8:30AM to 12:30PM -Friday: 8:30AM to 5PM -Friday: 8:30AM to 5PM -Saturday: 8:30AM to 4PM

	Condition	Statement of Compliance
		-New user fees were amended under By-Law 2018-33 to schedule
		"Q" By-Law 2015-176. Here is a short version of the commonly used
		fees. Rates are calculated by weight (ton).
		-Minimum fee: \$20.00
		-Items with refrigerant: \$20.00
		-Alternative cover and cement: \$45.00 / ton
		-Construction wood: \$45.00 / ton
		-Residential, commercial and construction waste: \$90.00 / ton
		-*Mixed loads: \$135.00 / ton
		-*Asbestos: \$300/ton**
		-Surcharge for prohibited materials: <i>\$10.00 to \$30.00 per item**</i>
		*Surcharges and/or mixed load fee if applicable
		**Conditional to approval by Director of Infrastructure and Planning.
		Contact department prior to planned work.
10	On site equipment used for daily site preparation and closing	Site operations are done in accordance with this condition
10.	activities may be operated one (1) hour before and two (2)	Site operations are done in accordance with this condition.
	hours after the hours of operation approved by this. Certificate	
11.	With the prior written approval from the District Manager.	During 2019, time periods were in accordance with condition 10.
	the time periods may be extended to accommodate	
	seasonal or unusual quantities of waste.	
	Site Security	
12.	No waste shall be received, landfilled or removed from the Site	In accordance with conditions 12 and 13, the site custodian is
	unless the operator or attendant is present and supervises the	responsible for ensuring that the site is locked during non-operating
	operations during operating hours. The Site shall be closed	hours. A locked gate and tence prevent access when the gate is
	operations	
13.	The Site shall be operated and maintained in a safe and secure	
	manner. During non- operating hours, the Site entrance and exit	
	gates shall be locked.	
	Visual Screening	
	riodal opiopining	

	Condition	Statement of Compliance
14.	The Owner shall maintain the screening berm constructed along Lalonde Road as per Drawing No. I-3-3 entitled "Waste Contours" and Drawing No. I-3-9 entitled "Road and Berm Sections" of Item 18(a) of Schedule "A" attached to this Certificate.	In accordance with conditions 14 and 15, a screening berm along Lalonde Road was constructed during 2001 and seeded during the 2002 site works. The berm and trees along Lalonde Road to the east of the site entrance continue to provide an effective visual screen to site operations.
15.	The Owner shall maintain the trees providing the screening of the Site operations from Lalonde Road in the area east of the entrance.	
3.	EMPLOYEE TRAINING	
1.	A training plan for all employees that operate any aspect of 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 Certificate.	In accordance with conditions 1 and 2, in May 2003, Stantec provided training to the landfill staff regarding relevant legislation, the conditions of the ECA and site operations. In 2009 and in 2013, all landfill site employees, MHSW employees and Transfer Station employees received WHMIS and TDG training and certification. Training is recommended to be done for each new employee and refresher courses provided to existing employees on a predetermined schedule (typically every 3 years). Refresher courses should be
2.	All Trained Personnel operating the HHW depot shall be trained in the following areas: waste paint identification, analysis information and separating procedures for the wastes being handled at the HHW depot; proper storage, handling, sorting and shipping procedures of the wastes being handled at the HHW depot; and occupational health and safety concerns pertaining to the wastes to be handled at the HHW depot.	considered once the landfill entrance improvements have been completed.
4.	COMPLAINTS RESPONSE PROCEDURE	
1.	If at any time the Owner receives complaints regarding the	The City established a complaint procedure as part of its EPA
	operation of the Site, the Owner shall respond to these	approval that it continues to follow. Complaints can be made in

	complaints according to the following procedure:	writing at the municipal office or at the landfill site or made verbally
	 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 potification of the complaint, shall 	over the telephone to Township staff. Information on the complaint is entered into a relational database program residing on the City's computer network. Follow up action is recorded on the form and copies of the complaint are provided to Municipal Council on a monthly basis. In 2019 no complaints were received.
	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 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.	
5.	EMERGENCY RESPONSE	
1.	Any spills, fires or other emergency situations shall be forthwith reported directly to the Ministry's Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.	In 2019 no spills were recorded.
2.	In addition, the Owner shall submit, to the District Manager a written report within five (5) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the Site.	

3.	All wastes resulting from an emergency situation shall be managed and disposed of in accordance with O .Reg. 347.	Understood
4. 5.	 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) adequately maintained and kept in good repair. The Owner shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s). 	In accordance with conditions 4 and 5, emergency equipment is contained in the site custodian building. Equipment includes fire extinguisher, shovel, eyewash station, first aid kit, absorbent pads, emergency response contact list and telephone.
6		
0.		
1.	 A daily log shall be maintained in written format and shall include the following information: a) the type, date and time of arrival, hauler (commercial waste), and quantity (tonnes or volume) of all waste and cover material received at the Site; b) documentation of types, quantities and source of generation of waste received at the HHW depot; c) type, amount and source of waste refused at the HHW depot; d) the area of the Site in which waste disposal operations are taking place; e) a record of litter collection activities and the application of any dust suppressants; f) a record of the daily inspections; and g) 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. 	During 2019 activities were recorded for the landfill site and information can be made available to the MECP on request.
2.	Any information requested, by the Director or a Provincial Officer, concerning the Site and its operation under this Certificate, including but not limited to any records required to	Agreed, all field forms, manifests, tickets and other documentation can be provided to Ministry staff on request.

	be kept by this Certificate shall be provided to the Ministry, upon request.	
	Daily Inspections and Log Book	
3.	An inspection of the entire Site and all equipment on the Site shall be conducted weekly when the Site is in operation to ensure that: the Site is secure; that the operation of the Site is not causing any nuisances; that the operation of the Site is not causing any adverse effects on the environment and that-the Site is being operated in compliance with this Certificate. Any deficiencies discovered as a result of the inspection shall be remedied within a reasonable time, including temporarily ceasing operations at the Site if needed.	In accordance with conditions 3 and 4, the site custodian maintains a daily log in a personal diary of his site inspections. The site custodian also completes a daily inspection form that includes the appropriate information.
4.	 A record of the inspections shall be kept in a daily log book that includes: a) the name and signature of person that conducted the inspection; b) the date and time of the inspection; c) the list of any deficiencies discovered; d) the recommendations for remedial action; and e) the date, time and description of actions taken. 	
5.	A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.	Understood. There were no records of refused loads in 2018.
	Annual Report	
6.	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, by March 30 of the year following the period being reported upon.	This 2019 Annual Monitoring Report was submitted prior to March 30, 2020. This report and the environmental monitoring report satisfy the condition 6(6) and 6(7).The Annual Environmental Monitoring Report is prepared and submitted under a separate cover.

The Annual Report shall include the following:
a) calculations of the volume of waste landfilled, the daily and
intermediate covers, the final cover and the overall volume
of the site capacity used during the reporting period;
b) a comparison of the actual capacity used to the
estimates of the capacity estimated;
c) an estimate of the remaining site life;
d) any changes in operations, equipment, or procedures
used at the Site, any operating problems
encountered and corrective actions taken;
e) details on the monitoring program undertaken,
outlining monitor locations, analytical parameters
sampled, and frequency of sampling;
f) an analysis and interpretation of the surface water and
groundwater monitoring data, a review of the adequacy of
the monitoring program, conclusions of the monitoring data,
and recommendations for any changes that may be
necessary,
g) summary of inspections undertaken at the Site;
h) summary of any public complaints received and the responses made;
i) summary of activities undertaken at the HHW depot;
j) a discussion of cover stockpile activities including
use, timing, locations and erosion protection;
K) status update on the final cover placement, and seeding
activities undertaken in the closed sections of the Landfill;
1) a discussion of the waste diversion performance
achieved by the Owner reported on a per capita
Dasis;
m) a statement as to compliance with all conditions of this
Certificate and the other relevant Ministry's groundwater
and surface water requirements;
n) recommendations respecting any proposed changes in the

Condition	

	operation of the Site; and	
	o) any other information that the Regional Director or the District	
	Manager may require.	
7		
1.	Approved Waste Types	
1	Only solid non-hazardous municipal waste including asbestos	One of the site custodians' duties is to ensure that only waste types
	dewatered sewage sludge and contaminated soil as defined	permitted in condition 1 to 5 are accepted.
	under Reg. 347 shall be accepted at the Site for landfilling.	
2.	No liquid industrial waste or hazardous wastes as defined under	
	O. Reg. 347 and O. Reg. 558 shall be disposed at the Site.	
3.	The Owner may continue to accept liquid and solid	
	household hazardous wastes and products requiring	
	special handling or disposal practices, at the HHW depot.	
1	The Owner shall develop and implement a program to inspect	
ч.	waste to ensure that the waste received at the Site is of a	
	type approved for acceptance under this Certificate	
	type approved for acceptance under this Certificate.	
5.	The Owner shall ensure that all loads of waste are properly	
	inspected by trained personnel prior to acceptance at the Site	
	and that the waste vehicles are directed to the appropriate	
	areas for disposal or transfer of the waste. The Owner shall	
	notify the District Manager, in writing, of load rejections at the	
	Site within five (5) business days from their occurrence.	
	Capacity	
6.	a) As approved by the Environmental Assessment dated	Understood. A discussion on the yearly waste deposition and
	October 21, 1999, the total additional waste disposal	remaining site capacity is provided in this report.
	capacity of the expanded Site is 740,000 cubic metres of	
	waste, daily cover and intermediate cover, but excluding	
	the final cover.	
	b) The total approved waste disposal capacity for the Site is	
	Condition	Statement of Compliance
-----	--	---
	974,000 cubic metres of waste, daily cover and intermediate cover, but excluding the final cover. This total waste disposal capacity includes the additional disposal capacity from Condition (6)(a) above, and the waste disposed of prior to the above Environmental Assessment approval.	
7.	WASTE PLACEMENT No waste shall be placed below existing ground within the fill area to maintain a vertical separation between the groundwater table and the waste.	In accordance with the conditions 7, 8 and 9, landfilling operations are conducted following the procedures described in the City of Clarence Rockland, EPA Landfill Expansion, Design, Operation and Maintenance Report dated August 2000 prepared by Stantec
8.	Disposal of waste shall only occur within the areas as delineated on Drawing - Fig. No. I-3- 3 of Item 18(a) of Schedule "A" attached to this Certificate.	Consulting Ltd. Waste placement was done according to the above conditions. In 2019 Jp2g Consultants surveyed and outlined the limits of fill at the northern end of the site and established the limits to the east for future use in this direction.
9.	No waste shall be placed above the final contours shown on Drawing - Fig. No. I-3-4 of Item 18(a) of Schedule "A" attached to this Certificate.	
10.	Service Area Only waste that is generated within the boundaries of the City of Clarence Rockland and Wards 2 and 4 of the Township of Alfred Plantagenet may be accepted at the Site.	During 2019, the landfill serviced the residents of the City of Clarence Rockland only.
11.	Cover Daily and interim cover material shall be applied in accordance with Section 3.3 of Item 14(a) of Schedule "A" attached to this Certificate and as follows:	
	 Daily cover a) By the end of each working day, the entire working face shall be covered with a minimum thickness of 100 mm of daily cover. 	The site custodian is present when the site is open and one of his duties is to ensure that the waste is covered on a daily basis.

	 Interim cover b) In areas where landfilling has been temporarily discontinued for twelve (12) months or more, a minimum thickness of 300 mm of intermediate cover shall be placed. 	The City of Clarence Rockland completed Cell 1 in the fall of 2005 and applied 600 mm of soil cover over Cell 1 side slopes and 300mm soil interim cover over the top of Cell 1 during 2006. During 2014, interim cover was applied to the north east quadrant of Cell 2.
	 <u>Final Cover</u> c) Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 millimetres thick layer of soil of medium permeability and 150 millimetres of top soil (final cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours. 	Some final and or intermitted capping was completed in the fall of 2019 along the northern toe of the waste area. On site cover material is more than sufficient of the anticipated capping.
12.	 a) Contaminated soil that is not a hazardous waste as defined by O. Reg. 347, either mixed with clean soil or on its own, and biosolids from the City of Clarence Rockland's Water Pollution Control Plant mixed with soil, compost and/or wood chips, may be used as daily cover provided that its use does not cause any adverse effects; 	The City typically uses a combination of sand, woodchips mixed with sand and any contaminated soil that they may have at any one time. In 2019 there was no record of using contaminated fill as alternative daily cover.
	 b) Subject to Condition 12 (a), if the application of the contaminated soil as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a Provincial Officer, the use of the contaminated soil shall be immediately discontinued and only clean soil or biosolids mixed with soil, compost and/or wood chips shall be used as daily cover; 	Understood
	 c) Subject to Condition 12 (a), if the application of the biosolids as a daily cover causes operational problems, odours or other environmental adverse effects as verified 	Understood

	Condition	Statement of Compliance	
	by a Provincial Officer, the use of the biosolids shall be immediately discontinued;d) Compost mixed with clean soil and wood chips mixed with clean soil may also be used as alternative material for daily cover; and	Understood	
	e) The Owner may mix de-watered sludge with the topsoil. The sludge shall be accounted for in the total volume of waste that was approved for landfilling at the Site. If the use of de-watered sludge causes an adverse effect, as verified by a Provincial Officer, its use shall be discontinued and only clean soil shall be used.	Understood	
13.	Except for the types already approved by Condition 7(12). any alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the Owner to the Director, c o p i e d to the District Manager and as approved by the Director via an amendment to this Certificate. The alternative material shall be non-hazardous according to Reg. 347 and will be expected to perform at least as well as soil in relation to the following functions:	No other materials were used for cover.	
	 a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires; b) Provision for an aesthetic condition of the landfill during the active life of the Site; c) Provision for vehicle access to the active tipping face; and d) Compatibility with the design of the Site for groundwater protection, leachate management and landfill gas management. 		

8.	LANDFILLING MONITORING	
	Landfill Gas	
1. 2.	Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the Site and outside of the Weigh Scale House (as identified in the Figure 2 revised on August 28, 2015, and listed as item No. 32 of the Schedule A), especially enclosed structures which at times are occupied by people. If required, the Owner shall ensure that any buildings or structures at the Site contain adequate preventive measures to relieve any possible landfill gas accumulation. Landfill gas monitoring shall be undertaken according to the program described in Section 5.4 of Item 18(a) of	On-site buildings have been protected with a geomembrane liner beneath the floor to prevent gas accumulation and the City has installed a permanent gas monitor in the custodian shelter. A portable monitor may be required if additional enclosed structures are added to the site.
3.	Schedule "A" attached to this Certificate. Any changes to the landfill gas monitoring program shall be submitted to the Director for approval, prior to their implementation.	
	Compliance Limits	
4.	 The Site shall be operated in such a way as to ensure compliance with the following: a) Reasonable Use Guideline B-7 for the protection of the groundwater at the Site; and b) Provincial Water Quality Objectives included in the July 1994 publication entitled Water Management Policies, Guidelines, Provincial Water Quality Objectives, as amended from time to time or limits set by the Regional Director, for the protection of the surface water. 	Groundwater monitoring is discussed in the environmental monitoring report.
	Surface Water and Groundwater	
5.	The Owner shall monitor groundwater as per Appendix G, Item 24 of Schedule "A".	Surface water monitoring is discussed in the environmental monitoring report.
6.	The Owner shall monitor surface water - as per Appendix G, Item 24 of Schedule "A".	

7.	A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.	
8.	The Owner shall abide by the Certificate of Approval for Sewage Works under Section 53 of Ontario Water Resources Act , R.S.O. 1990 issued to construct, operate, maintain and monitor the proposed wetland and its discharge to the surface water regime, designed to control and treat storm water "run-off and leachate-impacted groundwater at the Site.	Environmental Compliance Approval 3362- 6D7PL4 for Municipal and Private Sewage Works was issued on June 24, 2005 under Section 53 of OWRA. Surface water monitoring station GS11 is directly east of the wetland and the water quality result at this location would incorporate the discharge from the wetland. The interpretation of the sampling is discussed in the environmental monitoring report.
9.	Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.	The natural ground slopes away from the waste so there is no extraneous water near the active face. Observations during the 2019 survey did not reveal any ponding on top or along the edge of the waste pile.
	Groundwater Wells and Monitors	
10.	The Owner shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.	Understood. These conditions are addressed in the Annual Environmental Monitoring Report.
11.	Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.	

12.	 Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the Owner, as required. a) Unless a well is being abandoned, the Owner shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed. b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the District Manager for abandonment, shall be decommissioned by the Owner, as required, in accordance with O. Reg. 903, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned. 	
	Trigger Mechaniama and Contingency Diana	
1.5	Irigger Mechanisms and Contingency Plans	
13.	 a) The Owner shall follow the site-specific mechanism program for groundwater contingency measures outlined in Appendix A, Item 20 of Schedule "A" and as revised by MOE correspondence in Appendix "A", Item 23 of Schedule "A". b) The Owner shall follow the site-specific trigger mechanism program for surface water contingency measures outlined in Appendix "A" of Item 20 of Schedule "A" and as revised by MOE correspondence in Appendix "A", Item 23 of Schedule "A". 	Conditions 13 through 17 are addressed in the environmental monitoring report.
14.	No changes to the site-specific trigger mechanism shall be	
	implemented prior to receiving approval from the Director.	

15.	In the event of a confirmed exceedance of a site-specific trigger	
	level relating to leachate mounding or groundwater or surface	
	water impacts due to leachate, the Owner shall immediately	
	notify the District Manager, and 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	
	approved ingger mechanisms and associated contingency plans.	
16	If monitoring results investigative activities and/or trigger	
10.	mechanisms indicate the need to implement contingency	
	measures the Owner shall ensure that the following steps are	
	taken:	
	a) The Owner shall notify the District Manager, in writing of the	
	need to implement contingency measures, no later than 30	
	days after confirmation of the exceedances:	
	b) Detailed plans, specifications and descriptions for the design.	
	operation and maintenance of the contingency measures	
	shall be prepared and submitted by the Owner to the District	
	Manager for approval: and	
	c)	
	d) The contingency measures shall be implemented by the	
	Owner upon approval, by the District Manager	
	Swher upon approval by the District Manager.	
17.	The Owner shall ensure that any proposed changes to the site-	
	specific trigger levels for leachate impacts to the surface water or	
	groundwater, are approved in advance by the Director via an	
	amendment to this Certificate	

	Changes to the Monitoring Plan	
18.	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. The Owner shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.	The City will abide with the process described in conditions 18, 19 and 20 when making changes to the environmental monitoring program.
19.	Within sixty (60) days of receiving the written correspondence from the District Manager confirming that the District Manager is in agreement with the proposed changes to the environmental monitoring program, 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 the changes to the monitoring program, to the Director requesting the Certificate be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.	
20.	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 Certificate.	
9.	CLOSURE PLAN	
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:	The landfill has greater than 25 years of remaining service life, thus conditions 1, 2 and 3 did not apply during 2019.

	 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; vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; 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, surface water and landfill gas; ii) 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;
	 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; and
	 f) an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date.
2.	Unless amended by the closure plan, closure of the Landfill will be done in accordance with the final contours shown on Figure I-3-4 of Item 18(a) of Schedule "A" attached to this Certificate.
3.	The Site shall be closed in accordance with the closure plan as approved by the Director.

10.	WASTE DIVERSION	
1.	The Owner shall direct as much waste from landfilling as is practical and affordable with a view to meeting the Provincial Waste Diversion Objectives, developed by the Ministry and as changed from time to time.	Understood.
2.	 The Owner shall submit an annual Waste Diversion Statement as part of its Annual Report described in Condition No. 6 (6), and include the following: a) updating summary of per capita waste diversion activities and quantities of waste diverted from disposal; and b) proposed waste diversion program for the next year that describes estimates of waste to be diverted. 	Conditions 1 and 2 are addressed in Section 4.9 and Appendix E of this report.
11.	HOUSEHOLD HAZARDOUS WASTE DEPOT	
1.	The HHW depot shall only accept household hazardous wastes and it shall be operated in accordance with the application for a Waste Disposal Site (Transfer) submitted June 1, 1995 and supporting information and as modified in the Design Operation and Maintenance Report, dated August 2000, and as amended by Report listed as item No. 26 of the Schedule "A".	The HHW depot is operated in accordance with the Design, Operations and Maintenance Report.
2.	No household waste hazardous waste will be stored in HHW Depot for more than 90 days on the Site.	During 2019, wastes were accepted at the Household Hazardous Waste Depot between April 29 and October 31.
3.	 a) No PCB's shall be accepted at this HHW depot. Oil and oil- based paints which have been manufactured prior to 1972, or whose manufacturing date cannot be determined may contain PCB's and shall be handled in the manner prescribed: i) The oil and oil-based paints shall not be mixed (bulked) with other paints prior to testing. Paints which are lab- packed are not considered to be mixed under this Certificate. 	The Household Hazardous Waste depot operations are addressed in Section 4.6 and Appendix C of this report.

	Condition	Statement of Compliance
ii)	The oil and oil-based paints shall be tested for PCB's content and shall be handled in the manner outlined in sub condition (a)(iii) if found to contain PCB's.	
iii) i∨)	If the oil and oil-based paints are found to have PCB's at or above levels identified in sub condition (a) (iv), it shall be forthwith reported to the District Manager and shall be managed in accordance with Ontario Regulation 362/92 and stored or removed from the HHW depot to an approved PCB's storage site, in accordance with written instructions from the District Manager. The oil and oil-based paints shall not be distributed for reuse if they have any measurable PCB 's content. The oil and oil-based paint is considered to be a PCB's waste, if measured levels are equal to or	
b) Exc at th	greater than 50 parts per million. ept as specified in sub condition (a) (iv), paints collected ne HHW depot may be returned or sold to the general	
pub invo retu reco	lic for reuse provided all transactions are recorded by bice. Information on the type and volume of paint irned to the public through for HHW depot shall be brded in the report specified in Condition No. 6 (6).	

	Stor	age	
4.	a)	The Owner shall ensure that the wastes are stored in a safe and secure manner, that the operation of the HHW depot does not interfere with any other activities undertaken at the Site and that the wastes are properly handled, packaged or contained so as not to pose any threat to the general public, Site personnel and the environment.	The site custodian is responsible for the maintenance and operation of the HHW depot and must ensure that the wastes are properly handled, packaged and contained.
	b)	No storage facilities other than those approved under this Certificate shall be used and fixed storage facilities shall not be moved, replaced or altered.	Understood
	c) /	All storage buildings and tanks shall be clearly marked indicating the type and nature of the hazardous waste stored. All points of access to the storage facilities shall be posted to warn that the area contains hazardous materials. Smoking restrictions shall be adhered to and non-smoking signs shall be posted as required by Regulation.	Signs are posted at the HHW depot warning that the area contains household hazardous waste materials.
	d)	All storage buildings shall be properly ventilated and shall be constructed in compliance with fire regulations, municipal by-laws and approvals and in accordance with Ministry of Labour guidelines.	Understood
	e)	All household hazardous waste storage tanks and buildings shall be maintained under lock and key and access to these facilities shall be limited to trained Site personnel.	It is the site custodians' responsibility to ensure the household hazardous waste depot is maintained under lock and key and only accessed by the site custodian.
5.	Was can l amo extra for t depo for th poss	tes that are collected and stored shall be in amounts which be safely handled at the HHW depot. In the event that larger unts are received than anticipated, the Owner shall have a drums and lab-packed containers available on the premises the storage of the additional waste collected. When the HHW of capacity is reached, the Owner shall make arrangements the removal of waste from the HHW depot as soon as sible, but in any event, within five (5) working days.	Wastes were removed from the Household Hazardous Waste Depot by Drain All. Manifests are maintained by the owner.

	Condition	Statement of Compliance
6.	Except as specified under Conditions 11(3)(a)(iii) and (b), all waste collected shall be transported from the Site by an approved waste management system and disposed of at waste landfill, transfer and processing sites certified to accept these types of wastes.	Wastes were removed from the Household Hazardous Waste Depot by Drain All.
12. 1. 2.	COMPOSTING Composting operations at the Site shall be carried out in a manner as not to interfere with normal waste disposal operations as approved in this Certificate. Should the ensuing compost be destined for use by the general public, composting operations at the Site shall be carried out in accordance with the Ministry's Interim Guidelines for the Production and Use of Aerobic Compost in Ontario, dated November 1991, and revised from time to time.	Windrow composting of leaf and yard material was implemented in 2018, within the limits and requirements of the ECA. Although no compost is currently cured and ready for use, this practice has permitted a significant reduction in volume of material in a short lapse of time compared to the static pile method used in the past.
3.	Should the ensuing compost be destined for use as alternative cover material at the Site, composting operations at the Site must be carried out in a manner that does not cause groundwater or surface water contamination, offensive odours or encourage the presence of vermin or any other adverse effect.	

13.	LIAISON COMMITTEE	
1.	The Owner shall take all reasonable steps to establish, maintain and participate in a Site Liaison Committee, which is to function within the Terms of Reference, as proposed in Appendix C of Item 18(a) of Schedule "A" attached to this Certificate. The public shall be given an opportunity to comment and provide input before the Terms of Reference are finalized and ready for implementation. The Terms of Reference shall be amended from time to time according to an appropriate procedures included in the Terms of Reference.	The City typically publishes an ad in the local paper on an annual basis requesting applications from residents to participate in the Site Liaison Committee (S.L.C.). The City has historically published notifications in the local paper for several years and has only had interest from one member of the public to participate on the committee. The City has an Environment Committee that spearheads many of the City's waste diversion initiatives and performs the same function as the SLC.
2.	A copy of the Terms of Reference shall be provided to the District Manager.	
3.	The Site Liaison Committee shall serve as a focal point for dissemination, consultation, review and exchange of information regarding the operation of the Site, results of the environmental monitoring, maintenance, complaint resolution and any new approvals or amendments to the existing approvals related to the operation of this Site.	

This table should be read in conjunction with the entire Certificate as amended for details. The table has been prepared for the 2019 Annual Report and represents the best available information at the time of writing.

APPENDIX C

DECOMMISSIONED WATER WELL RECORD

Measurem	Ministry Conservents recorded in:	of the Environm vation and Parks Metric XImper	ial Well Tag	g No. (Place Sticker and A TAG	FOUND Regulation	on 903 Ontario W	lell R ater Res	ecord
First Name	dress (Street Number/Nam 560 R.ve Low ation	ast Name / Orgar L – Rock (L ne) i ner	nc 40 M	1. colas Burrelle Aunicipality Pockland	E-mail Address byrrele & clarren Province QV KHK	ce-Aockland ce de 1P76V3	No. (ipc.	Constructed ell Owner area code) $G[0] \lambda \lambda$
Address of	Well Location (Street Num	nber/Name)	Т	ownship	Lot	Concessi	on	
County/Dis	2355 Lalon	ide Rd		th/Tourn//illege				
County/Dis	strict/wurlicipality		C	Bauls and		Ontario	Postal	Code
UTM Coord	dinates Zone Easting	Northin	9 N	Iunicipal Plan and Sublo	t Number	Other		
NAD	83184911	03050-	34754					
Overburd	en and Bedrock Materi	als/Abandonme	nt Sealing Reco	rd (see instructions on the	e back of this form)			
General C	olour Most Comn	non Material	Oth	er Materials	General Descripti	on	From	
			1.1					
-		Annular Spa	ce		Results of	Well Yield Testing	1	
Depth Se	et at (<i>m/ft</i>)	Type of Sealant I	Jsed	Volume Placed	After test of well yield, water was:	Draw Down	R	ecovery Water Level
₽\$P	16 Ba.		f slurdi	(11711)	Other, specify	(min) (m/ft)	(min)	(<i>m/ft</i>)
4	IC VEN	tonite Grou	1 31.14		If pumping discontinued, give reaso	n: Level		
			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			1	1	
			Sale Sa		Pump intake set at (m/ft)			
						2	2	
Meti	hod of Construction		Well Us	e	Pumping rate (Vmin / GPM)	3	3	
Cable To	ool Diamond	D Public		rcial 🔲 Not used	Duration of numbing	4	4	
Rotary (C	Conventional) U Jetting Reverse) Driving	Domestic	Municipa	e Dewatering	hrs + min	5	5	
Boring		Irrigation		& Air Conditioning	Final water level end of pumping (m	(#) 10	10	1 2 3 4
Air percu	becity hand pull	Other, sp	ecify			15	15	
-	Construction R	ecord - Casing		Status of Well	If flowing give rate (<i>l/min / GPM</i>)	15	10	
Inside	Open Hole OR Material	Wall	Depth (m/ft)	Water Supply	Recommended pump depth (m/ft)	20	20	
(cm/in)	(Galvanized, Fibreglass, Concrete, Plastic, Steel)	(cm/in) Fi	rom To	Replacement Well Test Hole		25	25	
2.063	ple	154 +4	6	Recharge Well	Recommended pump rate (I/min / GPM)	30	30	
				Dewatering Well Observation and/or	Well production (//win / ODM)	40	40	1000
		1.0		Monitoring Hole	weir production (umin / GPM)	50	50	
				(Construction)	Disinfected?	60	60	
				Abandoned, Insufficient Supply				
Outside	Construction R	ecord - Screen	Depth (m/ft)	Abandoned, Poor Water Quality	Map of Please provide a map below follo	wing instructions or	the back	ς.
Diameter (cm/in)	(Plastic, Galvanized, Steel)	Slot No.	rom To	Abandoned, other,				
18-10-2					614-9	2		
Mata 5	Water Det	tails	H	ole Diameter	ONM	AP		
water ioun		⊢resnUn ecifv	From	To Diameter (cm/in)				
Water foun	d at Depth Kind of Water	: Fresh Un	tested					
(11	n/ft) Gas Other, spe	ecify						
Water foun	id at Depth Kind of Water	: Fresh Un	tested					
Well Contractor and Well Technician Information								
Business Name of Well Contractor and Well Contractor's Licence No.								
16	Somethis C	ourt state	Uniling browp	1241				
Business A	Business Address (Street Number/Name) Municipality Comments:							
Province	Province Postal Code Business E-mail Address 7 7 1							
ON	LBRSU	2 wrecos	ISP Stre	vtasol, e om	Well owner's Date Package Deliv	ered Min	istry Uso	e Only
Bus Telephone No. (inc. area code) Name of Well Technician (Last Name, First Name)								
Well Technic	Well Technician's Licence No. Signature of Technician and/or Contractor Date Submitted							
36	16 1		8	Page 304 81 6	61 No 201905	A 6 S Received		
0506E (2018/	12)			Ministry's Conv		© Quee	n's Printer fo	or Ontario, 2018

Ministry's Copy





DWG NAME: J:86-ENVIRONMENTAL/ACTIVE/17-6021A - CLARENCE ROCKLAND LANDFILL MONITORING/04 DRAWINGS/2019/SITE PLAN AND GROUNDWATER FLOWSFIGURE6.DWG LAYOUT: FIG.6-LEACHATE SAVED ON January 24, 2019 BY ANDREAS

APPENDIX D

HOUSEHOLD HAZARDOUS WASTE REPORT

Appendic D - Household Hazardous Waste Report

In 2019, the household hazardouswaste depot accepted materials during all months

Below is a lis that outlines the total volume of materials for 2019

Type of Hazardous Waste		Total *
Automotive Batteries (kg)	112c	5,132
Batteries (kg)	121c	202
Light Bulbs (kg)	146t	88
Light Tubes(kg)	146t	534
Acid LP (L)	148c	705
Base LP (L)	148c	800
Rechargeable Batteries (kg)	148c	1,413
Oxidizer LP (kg)	1481	643
Fire Foam (L)	212	87
Glycol (L)	212	1,127
Thinners	213	90
Gasoline Drum (L)	221i	676
Pesticide LP (kg)	242a	819
Oily water (L)	251	2,625
Oil (L)	252l	18,850
Oil Filters (kg)	252l	497
Pharmaceutical LP (kg)	261a	40
Flammable (kg)	2631	12,059
Aerosol (kg)	331	1,149
Propane (kg)	331	777
Fire Extinguishers (kg)	331r	430
Expanding foam (g)	331r	288
Helium compressed	331r	26
Paint (kg)		28,415
Recycled Plastics (kg)		1,904
Compressed Gas(kg)		0
Fertilizer LP (kg)		0
Sharps (kg)		0
Total		79,376

* Volume of material in units as noted

In addition, refrigerant was removed from 264 applicances by a licenced refrigeration technician

APPENDIX E

COVER MATERIAL REPORT

Appendix E - Landfill Site Cover Report

No appreciable interim cover was applied or completed in 2019. Some final capping in the northern area was applied in 2019. Stockpiled cover material at the site is anticipated to be more than sufficient for the upcoming final cover application that is potentially scheduled for next year.

Hybrid poplars have historically been planted along the south and east areas where final cover has been applied. The tree planting initiative was undertaken to assist in erosion prevention and to reduce impact from rainfall by retention of water in plant canopy. Hybrid poplars are also known for their phytoremediation qualities to assist in limiting the dispersal of contaminants in the environment through absorption in their pulp.

Coniferous trees will be planted along the rebuilt area of the berm to prevent erosion, eventually provide shade to the pond to limit eutrophication and serve as a visual barrier to the site from the east.

In 2017 approximately 5,355 tonnes of cover was used at the site. This tonnage is considered similar to what would have been used in 2019.

APPENDIX F

WASTE DIVERSION REPORT

Waste diversion initiative	2019 (tonnes)	2018 (tonnes)	2017 (tonnes)	2016 (tonnes)	2015 (tonnes)
Residential blue box	1769.92	1730.82	1681	1630	1556
Scrap Metal	227	224	232	260	252
Tires	46	63	46	33	50
Mixed Fibers (Roll-off)	52	35.5	40	41	45
Leaf and Yard Waste	1257	484	511	877	777
Chipped Wood	0	1368	1281	691	244
Electronic Waste	34.22	31.66	40	44	41
Household Hazardous Waste	78	73	74	69	79
OCC FEL Bins	167	188	164	102	n/a
Other materials	5	0	8	4	5
Sub-Total	3636.14	4198.346	4077	3751	3049

Appendix F – Waste Diversion Landfill Site Annual Report 2019

The amount of material diverted from the landfill site in 2019 decreased marginally from 2018 and 2017. This is primarily due to the lack of chipped wood. Diversion efforts within the Municipality continue to be a result of:

- Adjustments to the calculation for chipped wood where branches from the transfer station are accounted for in chipped wood and not leaf and yard waste.
- A stable ratio of chipped wood (60%) and sand (40%), however an increased use of sand due to the difficulty to manipulate sandbags as cover material.
- Increase blue box tonnage as a result of the growing communities.
- A small increase in the number of OCC bins distributed to commercial properties within the municipality.
- A steady volume of material from the other diversion initiatives, such as electronics, household hazardous waste and metals.
- A consistent increase in the diversion of tires since 2016.

APPENDIX G

LEAF AND YARD WASTE COMPLIANCE SUMMARY TABLE

COMPLIANCE SUMMARY

THE CITY OF CLARENCE ROCKLAND, UNITED COUNTIES OF PRESCOTT AND RUSSELL MOE CERTFICATE NO. 1998-6QQI3K – June 26, 2006 Waste Transfer Station

	Condition	Statement of Compliance
	Conditions 1 through 16 are general conditions dealing with definitions, compliance, interpretation, legal obligations, adverse effects, change of owner, inspections, and information and record retention. Conditions 17 through 46 address the operations and maintenance of the transfer station and are summarized below.	No Municipality input required.
17.	Operation The Site shall be operated and maintained at all times including management and disposal of all waste in accordance with the EPA, Regulation 347 and the conditions of this Certificate. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.	Understood
18.	Vermin etc. The Site shall be operated and maintained such that vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.	Understood

	Condition	Statement of Compliance
19.	 Waste Type Only the following types of waste shall be accepted at the Site: a) Leaf and Yard waste limited to grass clippings, garden refuse, leaves, hedge clipping, wood products, branches and natural Christmas trees b) No domestic waste may be accepted at the site 	The site supervisor conducts daily inspections to confirm that only acceptable items are delivered to the site.
	Waata Limita	
20.	No more than 100 tonnes of waste per day shall be accepted at the Site.	The City records the number of loads received at the landfill site. The City maintains information on the number of loads received from the transfer station at the landfill site. Since the transfer station
21.	No more than 100 tonnes of waste shall be stored or be present on-site at any time. If for any reason waste cannot be transferred from the site, the Site must cease accepting waste.	does not have a weigh scale, the daily quantity of waste accepted cannot be verified.
22.	No more than 100 tonnes of waste shall be sent for final disposal per day	
23.	No waste shall remain on site for longer than 3 days.	
24.	A perforated plastic drain shall be installed to help maintain a dry base for the storage pad, as described in Section 3.3 of the Design and Operation Plan (April 2006).	A perforated drain pipe was installed along the east limit to remove any ponded water. The drain pipe is connected to the storm sewer on the street.
25.	Service Area Only waste that is generated in Ontario shall be accepted at the Site.	Site attendant inspects all vehicles that bring waste to the transfer station and only residents from the City of Clarence Rockland use the site.
26.	Hours of Operation Waste may be received at the Site from 8:00 am to 8pm on Wednesday, Saturday and Sunday.	During 2019, the hours of operation were 12 hours per week.

	Site Security	
27.	The Site shall be operated and maintained in a secure manner,	The gate is locked when the site attendant is not on duty. A review
	such that unauthorized persons cannot enter the Site. Perimeter	of the site inspection forms showed that the site attendant reviews
	fencing and lockable gate shall be installed prior to this Site	the gate and fencing and padlock daily.
	receiving waste.	
20		The site attendant maintains a record of the number of users of
28.	All waste shall be inspected by Trained personnel prior to being	the transfer station. Site attendant redirects users to the landfill
	accepted at the Site to ensure that the waste is of a type approved	site if the waste brought cannot be accented at the site
	for acceptance under this Certificate.	site if the waste brought cannot be accepted at the site.
20	In the event that a load of waste is refused, a record shall be made	
29.	in the daily log book of the reason the waste was refused and the	
	origin of the waste, if unknown.	
	Site Inspection	
30.	An inspection of the entire Site and all equipment on the Site shall	Site attendant conducts daily inspections of the site and records
	be conducted each day the Site in operation to ensure that: the Site	the information on a daily site inspection form.
	is secure; that the operation of the Site is not causing any	
	nuisances; that the operation of the Site is not causing any adverse	
	effects on the environment and that the Site is being operated in	
	compliance with this Certificate. Any deliciencies discovered as a	
	temporarily ceasing operations at the Site if needed	
	A record of the inspections shall be kept in the daily log book that	
31.	includes the following information:	
	a) the name and signature of person that conducted the	
	inspection;	
	b) the date and time of the inspection;	
	c) a list of any deficiencies discovered;	
	a) any recommendations for remedial action; and	
	e) the date, time and description of actions taken.	

	Training Plan	
32.	A training plan shall be developed and maintained for all	All personnel including replacement staff for vacation and sick
	employees that operate the Site. Only Trained personnel may	days must be provided with training prior to working at the site.
	operate the Site or carry out any activity required under this	Training for WHMIS and TDG was provided to staff in 2013.
	Certificate.	Consideration should be given to updating training in 2021.
	The Owner shall ensure that Trained percention as per Condition 22	
33.	are available at all times during the hours of operation of this Site	
	Trained personnel shall supervise all transfer of waste material at	
	the Site.	
	Complaint Response	
34.	a) If at any time, the Owner receives complaints regarding the	The City follows a similar procedure to the compliant response
	operation of the Site, the Owner shall record and number each	plan implemented for the landfill site. Complaints are called in
	complaint, either electronically or in a separate log book, and	and logged in a database system by the City.
	shall include the following information:	
	i) the nature of the compliant;	
	ii) if complaint is odour or nuisance related, the weather	
	conditions and wind direction at the time of the	
	complaint;	
	III) the name, address and the telephone number of the complainant (if provided); and	
	iv) 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 (if known) and District Manager.	
	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.	

	Emergency Response Plan	
35.	Within 3 months of the date of this Certificate, an Emergency	The Emergency Response Plan developed for the landfill site also
	Response Plan shall be developed and implemented for the Site.	applies to the transfer station. The plan is reviewed annually and
	The plan shall include, but is not necessarily limited to:	kept up to date.
	a) emergency response procedures to be undertaken in the event	
	of a spill or process upset, including specific clean up methods	
	for each different type of waste the site is approved to accept;	
	b) a list of equipment and spill clean-up materials available in case	
	of an emergency; and	
	c) notification protocol with names and telephone numbers of	
	persons to be contacted, including persons responsible for the	
	site, the Ministry's District Office and Spills Action Centre, the	
	local Fire Department, the local Municipality, the local Medical	
	Officer of Health, and the Ministry of Labour, and the names	
	and telephone numbers of waste management companies	
	available for emergency response.	
	The Freeman is Decision of the base of the data and a	
36.	The Emergency Response Plan shall be kept up to date, and a	
	copy shall be retained in a central location on the Site and shall be	
	Response Dian shall be submitted to the District Manager	
	Response Flan shall be submitted to the District Manager.	
	The equipment materials and personnel requirements outlined in	
37.	the Emergency Response Plan shall be immediately available on	
	the Site at all times. The equipment shall be kent in a good state of	
	repair and in a fully operational condition	
	ropuli and in a faily opolational condition.	
	All staff that operate the site shall be fully trained in the use of the	
38.	contingency and emergency response plan, and in the procedures	
	to be employed in the event of an emergency.	
20	The Owner shall immediately take all measures necessary to	
39.	contain and clean up any spill or leak which may result from the	

Condition	Statement of Compliance

	operation of this Site and immediately implement the emergency	
	response plan if required.	
	Closure Plan	
40.	A Closure Plan shall be submitted to the Director for approval at least four (4) months prior to the closure of the Site. The Closure Plan must include, at a minimum, a description of the work that will be done to facilitate closure of the Site and a schedule for completion of that work.	The site opened in 2006. As per resolution 2016-59 the transfer station was to close at the end of 2016. This resolution was not passed by council and the transfer station does in in fact remain open.
41.	The Site shall be closed in accordance with the approved Closure Plan.	
42.	Within 10 days after closure of the Site, the Owner shall notify the Director, in writing, that the Site is closed and that the approved Closure Plan has been implemented.	
43.	Design and Operations Report The Design and Operations Report shall be retained at the Site; kept up to date through periodic revisions; and be available for inspection by Ministry staff. Changes to the Design and Operations Report shall be submitted to the Director for approval.	A copy of the Design and Operation report is maintained at the municipal office.
44.	 Signs A sign shall be posted and maintained at the main entrance/exit to the site displaying in a manner that is clear and legible and contains the following information: 1. the name of the Site and Owner; 2. the number of this Certificate; 3. the name of the operator (if different than Owner); 4. the normal hours of operation; 	The sign at the transfer station has all the information required by this condition. In 2008, The City installed new signs warning against unauthorized access and dumping outside of the site.

	Condition	Statement of Compliance
	 the allowable and prohibited waste types; a telephone number to which complaints may be directed; a twenty-four (24) hour emergency telephone number (if different from above); and a warning against dumping outside the Site. 	
45.	 Daily Log Book A daily log shall be maintained in written format and shall include the following: a) date; b) types, quantities and source of waste received; c) quantity of unprocessed, processed and residual waste on the Site; d) quantities and destination of each type of waste shipped from the Site; e) a record of daily inspections required by this Certificate; f) a record of any spills or process upsets at the site, the nature of the spill or process upset and the action taken for the clean-up or correction of the spill, the time and date of the spill or process upset, and for spills, the time that the Ministry and other persons were notified of the spill in fulfilment of the reporting requirements in the EPA; g) a record of any waste refusals which shall include; amounts, reasons for refusal and actions taken; and h) the signature of the Trained personnel conducting the inspection and completing the report, 	The inspection report lists the type of products typically removed from the site.
46.	 Annual Report By March 31, 2007, and on an annual basis thereafter, the City shall prepare and retain on-site an annual report covering the previous calendar year. Each report shall include, as a minimum, the following information: a) a detailed monthly summary of the type and quantity of all 	A copy of the previous year's annual report is maintained at the landfill and the municipal office until the next monitoring report is prepared.

Condition	Statement of Compliance
wastes received and transferred from the Site, including the	
destination of the waste;	
b) any environmental and operations problems, that could	
negatively impact the environment, encountered during the	
operation of the Site and during the facility inspections and any	
mitigative actions taken;	
c) a statement as to compliance with all Conditions of the	
Provisional Certificate of Approval and with the inspection and	
reporting requirements of the Conditions herein;	
d) a summary of any complaints that were received as a result of	
the operation of this Site, and a summary of mitigative action	
taken to resolve the complaint; and	
e) any recommendations to minimize environmental impacts from	
the operation of the Site and to improve Site operations and	
monitoring programs in this regard.	

City of Clarence-Rockland, ON 2019 Annual Monitoring Report

Prepared For:



Clarence-Rockland

Prepared by

Jp2g Consultants Inc. 1150 Morrison Drive, Suite 410, Ottawa, Ontario, K2H 8S9 T.613.828.7800 F.613.828.2600 Jp2g Project No. 17-6021C March 2020







DISTRIBUTION LIST

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	1		Jp2g Consultants Inc.
2	1	1	Ministry of the Environment, Conservation and Parks (District Office)

Jp2g Consultants Inc. Signatures

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EXECUTIVE SUMMARY

Jp2g Consultants Inc. (Jp2g) was retained by the City of Clarence-Rockland to conduct the 2019 Annual Environmental Monitoring Program for the Clarence Waste Disposal Site (WDS). The 2019 monitoring program included sampling and evaluation of groundwater and surface water quality in the vicinity of the site, as well as WDS gas monitoring. The monitoring program and related reporting was completed to fulfill the requirements of the Environmental Compliance Approval (ECA) in effect for the WDS. The evaluation of the 2019 monitoring program results indicates the following:

- A groundwater divide traverses the central part of the landfill site and directs the leachate groundwater flow primarily to the east/northeast within the shallow overburden sand unit. Some leachate migration into the deeper units has also occurred.
- Significant leachate impacts continue to be detected on the eastern side of the waste mound where wells present elevated concentrations of several leachate indicators such as chloride, total dissolved solids, boron, iron, hardness, manganese, sodium and dissolved organic carbon (DOC).
- The reasonable use concept concentrations were exceeded for one or more trigger parameters in every direction except along the northwest corner, in the area selected as representative of the background groundwater concentrations. The following mitigation measures are recommended:
 - \circ $\;$ augment the Contaminant Attenuation Zone (CAZ) to the west;
 - sample the residential wells to the west;
 - install a new well on the northern property limit;
 - o continue to apply interim and final cover to minimize leachate generation, and
 - o ban snow disposal activities everywhere within the WDS property boundaries.
- Surface water stations located around the on-site pond continue to show evidence of leachate
 impacts with elevated concentrations of chloride, DOC and conductivity. Exceedances of the trigger
 concentrations are found at all stations including upstream of the site. The recommendation to ban
 snow disposal within the WDS property boundaries, including the ban of snow disposal in the
 southeast corner, is re-iterated this year as surface water mitigation measure. Other mitigation
 measures include applying interim and final cover to minimize leachate generation, addressing any
 leachate breakouts in the landfill cover as soon as they are observed, and ensuring that surface water
 flow is channeled, as designed, in the ditches and through the culvert.
- The monitoring program at the WDS should continue in 2020 in the spring and summer for groundwater, and in the spring, summer and fall for surface water. The program should include:
 - Groundwater monitoring inclusive of twelve (12) surveillance wells and twelve (12) routine wells;
 - Sampling of five (5) surface water stations for routine parameters and six (6) stations for surveillance parameters;
 - Perform monitoring wells maintenance and survey the elevation of the repaired wells;
 - Monitor groundwater level, surface water flow (L/sec) and combustible gas in the wells and on-site buildings;
 - Verify the contouring of the waste mound to determine if maintenance activities are required to address any leachate breakouts;
 - Remove and properly disposed of any blown litter including the tire observed near GS12;
 - o Inspect the culvert on the east side of the pond and all ditches to ensure proper flow, and
 - Consult with the Ministry of the Environment, Conservation and Parks (MECP) with regards to the applicability of Condition 2(17) of the ECA.



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1 INTRODUCTION

The Clarence-Rockland Landfill Site is located on Lot 15, Concession IV in the former Township of Clarence, United Counties of Prescott and Russell, Ontario. The site is located north of Lalonde Road approximately 3 kilometers north of Bourget, Ontario and 3 kilometers southwest of St. Pascal, Ontario (see Key Plan, **Figure 1**).

The landfill is owned and operated by the City of Clarence-Rockland (the City). It is an open landfill accepting solid non-hazardous municipal waste, with a total site area of 50 ha and approved waste footprint of 12 ha. Additional operational information, such as the approved and actual volumes of waste at the site, the projected site life, the area of the current waste cell footprint, and information on final cover, slopes, engineering controls and recent site developments, can be found in the annual operations report (provided under separate cover).

This report provides a discussion of the groundwater and surface water geochemistry (including apparent trends over time) at the site based on field data obtained during the 2019 monitoring program carried out by Jp2g Consultants Inc. This report is intended to fulfil part of Condition 6(7) (pertaining to the annual monitoring report) of Amended Provisional Certificate of Approval (C of A, now ECA) No. A471203, dated October 21, 2009 and Condition 7.2 (pertaining to annual reporting) of C of A No. 3362-6D7PL4, dated June 24, 2005. The Monitoring and Screening Checklist is presented in **Appendix A**.

1.1 Site History

According to McNeely Engineering Consultants Limited (1991), the site was opened in the early 1970's to provide waste disposal for the former Township of Clarence residents only. Waste placement began using a trench and fill operation. The depth of the trenches was apparently restricted due to the relatively high groundwater table and caving of the surficial granular layer into the trenches during excavation and operation. According to MacLaren Engineers Inc. (1982), the trench method of operation was converted to an area method of fill in 1982.

The landfill site was originally licensed under Provisional C of A No. A471203 dated November 10, 1980 to accept domestic, commercial and non-hazardous solid industrial waste. An Emergency Provisional C of A No. A471203 dated December 13, 1991 was issued after the local Ministry of the Environment and Climate Change (MOECC) office in Cornwall, now the Ministry of Environment, Conservation and Parks (MECP) the Ministry, advised the former Township of Clarence that their landfill had reached its approved capacity. One of the conditions of the Emergency C of A was that the former Township prepare and submit to the Ministry an application and supporting documentation for a Waste Disposal Site Interim Expansion. The former Township of Clarence embarked on an environmental assessment process to identify a twenty-five year strategy for management of its waste after June 1999.

On January 1, 1998, the Township of Clarence amalgamated with the Town of Rockland to form the City of Clarence-Rockland, which is the current owner and operator of the landfill.

In October 2000, an application for landfill site expansion under the Environmental Protection Act was submitted to the Ministry. This application included the 2000 Golder Associates report on hydrogeological and geotechnical design considerations. Provisional C of A No. 471203 was issued by the Ministry on October 18, 2001 for the expansion of the landfill site (50 ha total site area and 12 ha waste footprint). An amended Provisional C of A No. A471203 was issued in March 23, 2004, October 21, 2009, September 9, 2015, August 19, 2016 and December 20, 2018. The Ministry also issued C of A No. 3362-6D7PL4 on June 24, 2005 for the operation of the on-site pond as a natural attenuation facility for stormwater runoff and leachate-impacted groundwater.

The current ECA for the site can be found in **Appendix B** of this document.

1.2 Site Contact Information

The site contacts are shown in **Table 1**.

Contact	Name	Address	Phone Number	Fax Number	Email Address				
Site Owner/Operator	City of Clarence- Rockland	1560 rue Laurier Street, Rockland, ON K4K 1P7	613-446-6022	613-446-1497					
Groundwater & Surface Water CEP	Andrew Buzza, P.Geo Jp2g Consultants Inc.	1150 Morrison Drive Suite 410 Ottawa, ON K2H 5B7	613-828-7800	613-828-2600	Andrewb@jp2g.com				
Contact Person for Environmental Issues at Site	Nicolas Burelle City of Clarence- Rockland	1560 rue Laurier Street, Rockland, ON K4K 1P7	613-446-6022 ext. 2251	613-446-1497	nburelle@clarence- rockland.com				

Table 1: Site Contacts

1.3 Ministry of the Environment, Conservation and Parks Comments

The most recent correspondence from the Ministry is the amendment of the ECA issued on December 20, 2018. This amendment reflects the updated site entrance and facilities reconfiguration. No additional correspondence was received during the 2019 monitoring period.

The following correspondence was received/issued during the 2017 monitoring period:

- Ministry, Industrial Sewage Inspection Report, City of Clarence Rockland Waste Disposal Site, April 20, 2017.
- Ministry, Solid Non-Hazardous Waste Disposal Site Inspection Report, City of Clarence Rockland Waste Disposal Site, April 20, 2017.



- Ministry, Clarence-Rockland Landfill 2016 Annual Monitoring Report Hydrogeological Review, May 4, 2017.
- City of Clarence-Rockland, Response to Solid Non-Hazardous Waste Disposal Site Inspection Report, Clarence-Rockland Landfill Site, Reference Number 0440-AKURUK, August 29, 2017.

All comments related to the 2017 correspondence have been addressed in the 2017 Annual Monitoring Report (AMR) submitted by Jp2g in March 2018, or in the December 20, 2018 ECA with the exception of the discussion regarding the additional contaminant attenuation zone (CAZ), which is still on-going and the amendment to Sewage Works ECA No. 3362-6D7PL4 as per condition 2(17) of the 2016 ECA No. A471203 amendment. Condition 2(17) requires that the ECA No. 3362-6D7PL4 be amended to account for the household hazardous waste (HHW) depot, the new site entrance, and the weigh scales and other related works. In its next review of the site, the Ministry could provide confirmation that this Condition 2(17) is still applicable and indicate the best course of action in relation to this outstanding amendment.

The latest Ministry correspondence is presented in **Appendix C**.



2 MONITORING PROGRAM

2.1 Objectives

The 2019 groundwater and surface water program was carried out in accordance with Conditions 8(5) and 8(6) of Amended Provisional C of A (now ECA) No. A471203. The objectives of the program were to monitor background water quality; leachate quality; water quality within the area impacted by landfill leachate; and water quality along the interpreted leading edge of the leachate-impacted plume. Monitoring wells were also monitored for methane gas to assess the potential risks with respect to subsurface methane gas migration towards existing and proposed on-site buildings. Groundwater and surface water sampling locations at the landfill site are shown on **Figure 2**. Site stratigraphy and monitoring well construction is presented in **Appendix D**.

2.2 Groundwater Monitoring

The groundwater monitoring sessions were conducted during the spring (April 24-25, 2019) and late summer/early fall (September 25-26, 2019). The groundwater monitoring program included measurement of groundwater elevations and collection of groundwater samples for subsequent chemical analysis for routine and surveillance parameters. A detailed description of the groundwater sampling protocol is presented in **Appendix E**. Laboratory reports of analysis are presented in **Appendix F**. The details of the monitoring wells and the groundwater levels for the 2019 program are presented in **Table G-1** and **G-2** of **Appendix G**, respectively. The inorganic historical analytical results including the 2019 concentrations are presented in **Appendix H-1**. Wells P6-91, P1-91 and P5B-91 were analyzed for volatile organic compounds (VOCs) in 2019 and the results are shown in **Appendix H-2**.

The routine parameters included chloride, hardness, sodium, ammonia, iron, manganese, boron, total phosphorus, dissolved reactive phosphorus (ortho phosphate), alkalinity, dissolved organic carbon (DOC) and total dissolved solids (TDS). Surveillance parameters included all of the routine parameters plus calcium, magnesium, potassium, aluminum, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silicon, silver, strontium, sulphur, thallium, titanium, vanadium, zinc, biochemical oxygen demand (BOD), nitrite, nitrate, sulphate, total kjeldahl nitrogen (TKN), chemical oxygen demand (COD) and phenols. Selected wells that are part of the surveillance package were also analyzed for VOCs.

The temperature, pH and conductivity of the groundwater samples were measured in the field at the time of sample collection. All groundwater samples were placed in coolers with ice packs until they were delivered to the private analytical laboratory. All laboratory chemical and physical analyses on groundwater samples were completed by Caduceon Environmental Laboratories in Ottawa, Ontario.

The wells were inspected at the time of sampling. In 2019, it was reported that trees had fallen in the vicinity of G36-01 and P5B-91 and could potentially damage the wells. It is recommended to move the trees so that they do not compromise the sampling program. During the 2019, the Township obtained information from Jp2g for the placement of signs beside each well. It is recommended to verify that all monitoring well locations are signed.



Locks and/or caps were added to the following wells in 2019: G8-92C, G26-94, G29-97, G31-98A, G13-92, and P5B-91. Well G14-92 was decommissioned between the April and September 2019 events. All wells should continue to be inspected for adequate protective casings and locks and noted where improvements are required.

Well G43-11 appears to be compromised as the casing and the well move together. This should be investigated in 2020. A tubing length and a lock were added to G13-92 in 2019 and that well should be resurveyed to obtain meaningful groundwater elevations.

Maintenance was performed on selected wells over the years and the elevations of **Appendix G** were manually adjusted by subtracting the cut lengths from the top of casing values. When possible, the wells (notably G39-07, G43-11, G14-92 and G13-92) should be resurveyed to obtain more accurate elevations.

Monitoring well G9A-92, was reported in September 2017 to be broken at 1.14 m from the top. This well is used for groundwater elevations only and no issues with the well was reported in 2018 or 2019.

Table 2. 2019 Gloundwater Sampling Program								
Well ID	Coordina	ates (Zone	Required	VC	OCs	Inorg	anics	
	1	8T)	by ECA					
	Easting	Northing		April-19	Sept-19	April-19	Sept-19	
P1-91	487233	5034554	Y – S	V	V	V	V	
P2-90	486888	5034453	Y – R			V	٧	
P3-90			N			Decomm	nissioned	
P4-90	486847	5034686	Y – S			v	Dry	
P5A-91	487123	5034440	N					
P5B-91	487124	5034438	Y – S	V	V	V	V	
P6-91	487171	5034643	Y – S	V	V	V	v	
P7-91	486863	5034936	N					
G8A-92			N					
G8B-92			N					
G8C-92	486865	5034672	Y – R			v	v	
G9A-92	487202	5034432	N					
G9B-92	487202	5034432	N					
G9C-92	487205	5034434	N					
G11-92			N			Desti	royed	
G12-92 ⁽¹⁾	487372	5034397	Y – S			V	Dry	
G13-92	487063	5034945	Y – R			V	Dry	
G14-92	487035	5034756	N					
G15-92	487100	5034621	N					
G17-92 ⁽¹⁾	487332	5034516	Y – R			V	V	
G18-92	486944	5034963	Y – S			√ (Dup G46)	√ (Dup G46)	
G19-92			N			Desti	royed	

Table 2: 2010 Croundwater Sampling Program

The 2019 program is summarized in Table 2 and in Figure 2.

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Well ID	Coordina 1	ates (Zone 8T)	Required by ECA	VOCs		Inorg	anics
	Easting	Northing		April-19	Sept-19	April-19	Sept-19
G20-92	487056	5034389	Y — R			V	Dry
G21-94 ⁽¹⁾	487260	5034413	Y — R			V	Dry
G23-94	486854	5034576	N				
G24-94			N			Dest	royed
G25-94	486845	5034678	N				
G26-94	486833	5034800	Y – S			V	V
G27-97	487159	5034790	Y – R			V	V
G28-97	487266	5034643	Y — R			V	Dry
G29-97	486851	5034577	Y — S			V	v
G30-97	487245	5034672	N				
G31A-98	487352	5034584	N – R			√ (Dup G45)	√ (Dup G45)
G32A-98	486858	5034575	N				
G32B-98			N				
G33A-98	487116	5034947	N				
G33B-98	487116	5034947	N				
G36-01	486934	5034487	Y – R			V	V
G37-01	486941	5034357	Y – S			V	V
G38-03	486900	5034599	Y – R			V	V
G39-07	487311	5034826	Y – R			V	v
G40-07	487414	5034671	Y — R			V	V
G41-10			N			Destroyed	
G42-10	487612	5034816	Y – S			V	V
G43-11	487463	5035074	Y – S			V	Dry
Trip Blank			R	V	٧		

Note:

Y: Yes, N: No, R: Routine Parameters, S: Surveillance Parameters, DUP: Blind duplicate

(1) A cut-off wall was constructed along the southern property boundary of the site during the summer of 2000 separating these monitors from the overburden groundwater plume.

2.3 Surface Water Monitoring

The surface water monitoring sessions were conducted during the spring (April 24, 2019), late summer/early fall (September 24, 2019) and fall (October 31, 2019). The surface water monitoring program included the collection of surface water samples for subsequent chemical analysis for routine and surveillance parameters. The routine parameters included chloride, hardness, sodium, ammonia and unionized ammonia, iron, manganese, boron, total phosphorus, alkalinity, DOC and TDS. Surveillance parameters included all of the routine parameters plus calcium, magnesium, potassium, aluminum, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silicon, silver, strontium, sulphur, thallium, titanium, vanadium, zinc, BOD, nitrite, nitrate, sulphate, TKN, COD and phenols.



The temperature, pH, conductivity and dissolved oxygen content of the surface water samples were measured in the field at the time of sample collection.

Evidence of beaver activities was again noted in 2019 in the form of a beaver lodge observed near GS-12. The culvert on east side of pond was observed to be flowing well at all 2019 surface water sampling events. No breach was observed at the berm which was noted in April 2019 to have been reinforced with more sand fill. The presence of garbage (tire) was noted near GS-12 in October.

The start of a leachate breakout in the ditch near P7-91 was reported in September 2017 and in 2018. In addition, the surface water vegetation from that area (i.e., at S3) was showing rusty staining during the 2018 sampling. The City reported applying final cover in the northern portion of the site in 2017 (see 2017 Annual Operation Report). This area was inspected in 2019 and no evidence of leachate breakouts were observed.

All surface water samples were placed in coolers with ice packs until they were delivered to the private analytical laboratory. A detailed description of the surface water sampling protocol is presented in **Appendix E**. All laboratory chemical and physical analyses on surface water samples were completed by Caduceon Environmental Laboratories in Ottawa, Ontario. Laboratory reports of analysis are presented in **Appendix F**. The 2019 surface water program is presented in **Table 3** and the historical concentrations up to 2019 are presented in **Appendix I**.

SW ID	Inorganic Package	April -19	Sept - 19	Oct -19	UTM Easting (Zone 18)	UTM Northing (Zone 18)
S1	Routine	V	V	V	486827	5034474
S2	Surveillance	V	V	V	486791	5034716
S3	Routine	Dry	Dry	Dry	-	-
GS6	Surveillance	V	V	V	486712	5034186
GS8*	Routine	v	V	V	-	-
GS11	Surveillance	v	V	v	487240	5034686
GS12	Surveillance	V	V	V	487272	5034684
GS15	Surveillance	v	V	V	487253	5034871
G\$17	Surveillance	Dry	Dry	Dry	486819	5034427
GS20	Routine	V	√ (Dup GS22)	V	487601	5034883
GS21	Routine	√ (Dup GS22)	V	√ (Dup GS22)	487517	5034532
Field Blank	Routine or Surveillance					

Table 3: 2019 Surface Water Program

*Labelled as SW#8 on lab report.

Details of the surface water features in the vicinity of the site and the associated surface water monitoring stations are included in **Table 4**. The table also presents the discharged measured during the 2019 monitoring program. Between 10 mm and 50 mm of precipitations were reported on the week leading to each of the 2019 surface water sampling (as per the Ottawa International Airport Climate Station). The



snow disposal ban was not implemented this year and snow was stockpiled in the southeast corner of the site. It is our understanding that snow disposal has occurred in the southeast area for the last 3-4 years. Based on this, it appears that the snow disposal ban has only been consistently implemented in the southwest corner of the site but not in the southeast corner.

Surface Water	Type of Surface	Drainage Pattern / Outlet	Staff Gauge	Sampling Location	Flow April 2019	Flow Sept 2019	Flow Oct 2019
Feature	Water		Location		L/sec	L/sec	L/sec
Western	Perennial	Flows north	N/A	GS6	30	8	8
Stream		then east		S1	40	11	12
		toward Cobbs		S2	30	12	12
		the South Nation River		GS8	30	20	15
Northern periphery	Surface run-offs (man- made)	Flows north then west towards the western stream	N/A	53	Dry	Dry	Dry
Western Ditch	Perennial	Flows east and discharges to Western Stream	N/A	GS17	Dry	Dry	Dry
On-Site	Perennial	No outlet	South End;	GS11	60	62	20
Pond	(Man-		Staff	GS12	No flow	No flow	No flow
	Made)		Gauge #3	GS15	No Flow	No Flow	No Flow
Southeast	Surface	Flows north	N/A	GS20	100	26	22
Snow Stockpile	run-offs (man- made)	then east toward Cobbs Lake Creek	N/A	GS21	102	30	19

Table 4: Surface Water Features and Flows in 2019

2.3.1 Staff Gauges in the On-Site Pond

Staff Gauge #3 was installed in 2006 near the south end of the on-site pond (**Figure 2**) to replace Staff Gauges #1 and #2, which were under water. Staff Gauge #3 was replaced in 2008 but could not be located in recent sampling events. As a result, a new Staff Gauge #3 was installed on May 1, 2017. The reading after installation indicated a water level in the pond of 404 mm. In September and November 2017, the Gauge readings were 470 mm and 235 mm, respectively. In 2018, the staff gauge was destroyed again because it had been installed in irregular flood conditions. It was reinstated again in the fall of 2018 and the water level at that time was 49.922 masl for a corresponding gage reading of 0.2 m.

Readings from the pond staff gauge were difficult to obtained in 2019. In April, the staff gauge was completely submerged with water while in September, the staff gauge could only be observed from a distance. It was noted that the water level in the pond in September 2019 was consistent with previous years and was at about 2.5 feet below the top of the gauge.



2.4 Gas Monitoring

Monitoring wells were monitored for methane gas during the spring and summer groundwater monitoring program. The gas was monitored in the riser or the protective casing of the monitoring wells using a head held detector. In addition, all on-site buildings were measure for methane gas.

2.5 Data Quality

The quality of the laboratory data used in this report (i.e., groundwater and surface water quality results) was evaluated based on laboratory quality assurance/quality control (QA/QC) results, field duplicate results and trip blanks results.

All laboratory chemical and physical analyses on groundwater and surface water samples were performed by Caduceon Environmental Laboratories in Ottawa, Ontario, which is accredited to ISO/IEC 17025:2005 (E), General requirements for the competence of testing and calibration laboratories. The laboratory performs internal QA/QC checks including matrix spikes, spiked blanks, method blanks and laboratory duplicates.

The trip blank results are presented in **Appendix H-2**. The trip blanks were analysed for VOCs and all results were below the detection limit indicating that the samples were not compromised.

The QA/QC program also included duplicate groundwater samples (two for each monitoring session) and surface water samples (one during each of the spring, summer (early fall) and fall monitoring sessions). The relative percent differences (RPDs) were calculated when detected concentrations in both samples were greater than five (5) times the laboratory Method Detection Limit (MDL) (see **Appendix H** and **I**).

General industry standards for RPD are <50% for a single parameter and <20-25% on average. In 2019, all groundwater and surface water average RPDs were less than 25% with the exception of the surface water September duplicate collected at GS20 which reached 72% due to several single parameters RPDs above 50%. A review of the historical results at this location indicate that the concentrations of the September 2019 sampling pair are both generally within historical range. This suggests that the high RPDs at this location are due to the field variability as opposed to sampling or laboratory biases. The surface water sampling pairs from April and October present no parameters above the 50% threshold. The groundwater sampling pairs present a few parameters above the 50% threshold; however, the sample and duplicate groundwater concentrations are generally in the same order of magnitude indicating that the samples have not been compromised and that the difference is due to field variability.

The quality of the field data used in this report was ensured by using calibrated equipment. As discussed in the description of groundwater and surface water sampling protocols (**Appendix E**), the field equipment used to measure temperature, pH, conductivity and dissolved oxygen was calibrated each day prior to use.

Based on the laboratory and field QA/QC protocols, the 2019 laboratory and field data presented in this report are determined to be of acceptable quality and reliable for use.



3 PHYSICAL SETTING

3.1 Hydrostratigraphic Units

The overburden geological conditions in the vicinity of the landfill site can be broadly divided into three layers: a discontinuous surficial granular layer comprising topsoil, silt, silty sand, sandy silt and sand (0 to 5.9m thick); a silty clay layer (7.8 to 12.1m thick); and a glacial till layer (2.4 to 4.1m thick). The bedrock surface exists at about 17 to 26m in depth and consists of dark grey shale. Based on its low hydraulic conductivity, the silty clay layer was interpreted as a confining layer that could restrict most groundwater flow from the landfill to migration within the surficial granular layer. As a result, the current groundwater monitoring program is focused on monitoring wells screened in the granular layer, with selected monitoring wells screened in the silty clay. Toward the eastern property boundary, the granular layer pinches out where peat (0.6 to 2.1m) overlies the silty clay. The monitoring well screen position with respect to the difference geological units is presented in **Appendix G-1**.

A hydrostratigraphic cross-section through the site is presented as **Figure 3**. Further details on the physical hydrogeological setting of the landfill site are described in the report on hydrogeological and geotechnical design considerations for the landfill expansion (Golder Associates, 2000).

3.2 Water Table Elevations and Hydraulic Gradients

The recorded water level data from 2019 is presented in **Appendix G, Table G-2**. Groundwater elevations and the inferred water table contours for the upper overburden units (sand and silty clay) in the April and September 2019 are presented on **Figures 4** and **5**, respectively.

The horizontal groundwater flow direction within the shallow overburden is interpreted to be primarily toward the east/northeast. As discussed in previous reports, there appears to be a groundwater divide which traverses the central part of the landfill site. Based on the 2019 groundwater elevation data and historical water levels, the groundwater divide appears to be located along the axis of monitoring wells G26-94, G25-94, G38-03 and G37-01 (alongside the western stream and western limit of the fill as shown on **Figures 4** and **5**). To the west of this divide, groundwater appears to flow towards the west. The interpreted groundwater flow directions in 2019 are consistent with historical data. A stronger horizontal gradient is observed on the west side of the pond. The groundwater elevations around the pond are generally similar at around 48-49 masl, with the exception of monitoring well G28-97 which continues to show higher elevation at approximately 53 masl and was left out of the contouring of **Figures 4** and **5**. Well G15-92 was also left out of the groundwater flow interpretation since it continues to show levels that are 2m or more below the levels measured in the adjacent wells. Elevation outliers could be the results of the variation in well constructions and vertical screen placement. These two wells might also benefit from being redeveloped to ensure that they continue to be representative of the groundwater conditions.



Consistent with previous years, the groundwater elevations were generally higher in the spring, with some exceptions. The exceptions to higher spring elevations this year were found at G8A-92, G31B-98, G32A-98 and G33A/B-98 screened at deeper intervals in bedrock, till or silty clay. In previous reports, it was reported that higher elevations in the summer at G9C-92 might be attributed to a delaying infiltration effect from the cut-off wall. This year, the delay effect is not as significant and the summer elevation at G9-92 is only 8mm above the spring elevation level, compared to the approximate 1 m difference last year.

Based on groundwater elevations in 2019, horizontal hydraulic gradients ranged from 0.007 on the eastern part of the site (between G40-07 to G42-10; spring elevation 49.23 and 47.70 masl, respectively over 210 m) to 0.10 immediately upgradient of the on-site pond (between G13-92 and G33-98B; spring elevation 53.81 and 47.66 masl, respectively over 60 m). These are in the same order of magnitude as previously reported.

Based on historical water level data, horizontal flow appears to dominate in the sand unit as shown by similar groundwater elevations measured between the B (upper level) and A (lower level) screen elevations of P5-91 (e.g., 57.15 and 57.12 masl in April 2019, A and B respectively).

Monitoring wells G8-92 and G9-92 have three ports screened at different elevations in the upper sand and silt units. In 2019, a downward gradient from port C to ports B and A is present at G8-92 during both the spring and summer programs. This suggest groundwater infiltration in the northwest area of the site, from the sand to the silt unit. Near the cut-off wall at G9-92, the vertical gradient are variables and flow appears to be converging to the mid port B at both events in 2019.

Monitoring wells G31-98, G32-98, and G33-98 are multilevel wells with screens located in the deeper glacial till unit and bedrock shale interface. In 2019, the two levels continue to show relatively similar elevations indicating a predominance of horizontal flow with the exception of G31-98 in September. The elevation in the till unit in September at G31-98B (51.67 masl) is significantly higher than the elevation in the bedrock unit at G31-98A (48.82 masl) indicating a downward flow.

3.3 Horizontal Hydraulic Conductivity

Rising-head tests were previously carried out to estimate the horizontal hydraulic conductivity of the geological units present at the site (Golder Associates, 2000). The range and geometric mean of the horizontal hydraulic conductivity estimates were:

- For the surficial granular layer, a range of 1.5 x 10⁻⁶ metres per second (m/s) to 5.6 x 10⁻⁵ m/s, and a geometric mean of 8.6 x 10⁻⁶ m/s based on fourteen horizontal hydraulic conductivity estimates;
- For the weathered crust of the silty clay layer, a range of 1.1 x 10⁻⁸ m/s to 5.8 x 10⁻⁸ m/s based on two horizontal hydraulic conductivity estimates;
- For the silty clay, a range of 3.5 x 10⁻⁸ m/s to 5.2 x 10⁻¹⁰ m/s, and a geometric mean of 4.0 x 10⁻⁹ m/s based on five horizontal hydraulic conductivity estimates;
- For the glacial till, a range of 8.0 x 10⁻⁵ m/s to 1.1 x 10⁻⁶ m/s based on two horizontal hydraulic conductivity estimates; and
- For the shale bedrock, a range of 1.1 x 10⁻⁵ m/s to 2.2 x 10⁻⁷ m/s, and a geometric mean of 2.2 x 10⁻⁶ m/s based on three horizontal hydraulic conductivity estimates.



3.4 Groundwater Flow Velocity

The range linear groundwater velocity, v, is calculated using the equation:

V = Ki/n

where v = average linear groundwater velocity in units of length of time

- n = dimensionless formation porosity
- K = horizontal hydraulic conductivity in units of length per time

i = dimensions horizontal hydraulic gradient

For unconsolidated deposits such as silts and sands, typical porosity values range from 25 to 50 percent (Freeze and Cherry, 1979). An average porosity of 35 percent for the surficial granular layer was assumed to determine the average liner groundwater velocities in the vicinity of the landfill site.

Using the geometric mean horizontal hydraulic conductivity value for the sand unit (8.6 x 10^{-6} m/s) and the range of horizontal gradients presented above (0.007 to 0.10), the linear horizontal groundwater velocity within the sand unit across the site in 2019 ranged from approximately 5 to 77 m per year and was slightly outside the range of 2 to 62 metres per year previously reported. It is noted that the higher velocity was obtained from summer readings which were collected later this year at the end of September.

3.5 Surface Water Conditions

Local surface water drainage is to the north by way of a stream on the west side of the site and a ditch on the southeast side of the site. The southeast ditch was realigned in 2009 to flow on the south and east (as opposed to west and north) sides of the snow storage area, within the property boundaries. The ditch and stream converge north of the site and flow eastward into Cobbs Lake Creek approximately 1.7 km downstream. Cobbs Lake Creek flows south/southeast to the South Nation River, approximately 10.3 km downstream. There is no surface water outlet from the on-site pond but there are interactions between the pond and the groundwater.

In 2019, water was present in sufficient amount for sampling at all locations except for the northern location S3 and the western ditch location GS17 which were dry during all three events. Unless dry, flow continued to be observed in 2019 at all sampling locations except at the pond locations (GS12 and GS15). The surface water flow rates ranged from 8 to 102 L/sec. See **Table 4** for more details.

The flow rates in 2019 are generally higher than the rates measured in 2016 and 2017. The flow rates in 2019 continue to be generally highest in the spring. Summer rates are equivalent or slightly higher to fall rates. The highest rates this year are found around the southeast snow pile (GS20 and GS21) in the spring.

Beaver activities were first reported at the site in November 2017 and continue to be reported in 2019 in the form of a beaver lodge near GS12. The presence of beavers does not appear to be having any net (positive or negative) effect on the drainage patterns or the size and shape of the pond. The culvert remained unblocked throughout the year. It is recommended to continue to inspect the culvert as part of the surface water monitoring program to ensure that it remains unblocked so that the drainage continues to not be affected by beaver activities.



4 ENVIRONMENTAL RESULTS

4.1 Landfill Gas Monitoring Results

The potential movement of landfill gas toward on-site buildings has been evaluated at the site in previous programs by monitoring combustible gas at G17-92. Between 2002 and 2015, the combustible gas readings at that location have fluctuated between 0 to 160 ppm. Combustible gas was not detected at G17-92 between 2016 and 2019. The wells that presented combustible gas detections in 2017, 2018 or 2019 are presented in **Table 5**. In 2019, combustible gas continues to be detected in risers of the following wells G15-92, G31-98S/D and G32A/B-98 at 2% to 100% lower explosive limit (LEL). Between 2016 and 2019, the highest combustible gas levels continue to be detected at G31-98S and G32B-98, located to the east and west of the waste mound, respectively. The combustible gas levels in 2019 at the other locations are similar to those measured in previous years with the exception of G31-98B which shows a higher detection at 22% LEL this year and G32A-98 which shows a detection at 2% LEL.

	Table 5. Detection of combustible Gas 2017-2015											
Monitoring Well	2017 Results	2018 Results	April 2019	September 2019								
G15-92	0%-9% LEL	No gas detected	No gas detected	20% LEL								
G31-98S	>100% LEL	>100% LEL	No gas detected	100% LEL								
G31-98D	0.06%-3% LEL	0 - 4 % LEL	No gas detected	22% LEL								
G32B-98	0.6%-58% LEL	32 - 100 % LEL	No gas detected	22% LEL								
G32A-98	0%	No gas detected	No gas detected	2% LEL								

Table F. Detection of Combustible Cas 2017 2010

No methane gas was recorded in any of the on-site buildings.

4.2 Groundwater Quality

4.2.1 Leachate Groundwater Plume

The distribution of leachate impacts, based on a multi-parameters evaluation, is shown on **Figure 6**, on **Table 6**, on **Chart 1** and on the first table of **Appendix H-1**.

In 2019, wells P5B-91, P1-91 and P6-91 continue to be the most impacted by leachate with elevated concentrations of several leachate indicators such as chloride, DOC, hardness, TDS, boron, iron, manganese, and sodium. In addition to inorganic parameters, these wells were analyzed for VOCs in 2019. A few VOCs parameters (i.e., benzene, chlorobenzene, toluene and/or xylenes) were detected but all levels were below the Ontario Drinking Water Quality (ODWQ) guidelines.

Table 6 presents a summary of the average concentrations associated with the most impacted wells (leachate impacted) and associated with the background well (G26-94). The table also presents the wells that are considered to be only mildly impacted by leachate and the wells that are considered moderately impacted, based on the relative concentrations of the leachate indicators to background.



This breakdown illustrates that the leachate indicator concentrations decrease along the flow path, on both sides of the groundwater divide to the east, south and southwest of the waste mound. Monitoring wells showing the most evidence of leachate impact are screened in the upper sand unit (P5B-91, P1-91 and P6-91). Monitoring wells located to the west, north and northwest of the site are generally less impacted.

2019 Average Concentrations ⁽²⁾ (mg/L)	Leachate Impacted	Moderately Impacted	Mildly Impacted	Background
Wells	P1-91, P5B-91, P6-91	G38-03, G29-97, G36-01, G37- 01, G20-92 ⁽²⁾ , G17-92, G31A- 98, G40-07, G28-97 ⁽²⁾ , G39-07, G27-97, G42-10, G43-11 ⁽²⁾ , G18-92 (fall)	G8-92, P2-90, P4- 90 ⁽²⁾ , G18-92 (spring), G12-92 ⁽²⁾ , G13-92 ⁽²⁾ , G21-94 ⁽²⁾	G26-94
Chloride	262	81.9	9.0	1.9
Hardness	1001	338	117	26.5
Phosphorous	2.3	2.8	2.8	0.69
TDS	1951	520	150	35.5
Boron	3.4	0.400	0.036	0.007
Iron	25.6	4.6	0.081	<0.005
Manganese	5.6	1.5	0.107	0.0085

Table 6: 2019 Average Groundwater Concentrations and Leachate Impacts

1. Concentrations below the detection limit are not accounted for in the average calculations.

2. Based on spring results only. No sample collected in the fall due to insufficient water.

The Schoeller diagram (**Chart 1**) presents the ionic composition of the groundwater in different sectors of the plume based on the April 2019 results. The interpretation is similar to May 2018. The leachate impacted wells are showed in pink and occupy the upper portion of the graph whereas the background well is shown in dark blue and occupies the lower portion. In between, the mildly impacted wells are shown in green and the moderately impacted wells are shown in grey. Well G37-01 was attributed its own groundwater category last year because it spanned across all water types and was suspected to be under the influence of both the former southwest snow disposal area and the landfill leachate. This year, this well appears closer in concentrations to the moderately leachate impacted wells.





Chart 1: Schoeller Diagram

The interpretation of impacts (**Figure 6**) is similar to the previous years including G13-92, G8-92, and G12-92 located on the north, west and south boundaries, respectively which were moved back to the mildly impacted category in 2019. It is noted that this change in category is not associated with a significant increase or decrease in concentrations but rather to seasonal variations. Several locations in 2019 present concentrations that are relatively higher in the fall than in the spring, notably G18-92 interpreted as mildly impacted in the spring and moderately impacted in the fall. Also noteworthy in 2019 is that the interpretation of impact at P4-90, G12-92, G13-92, G20-92, G21-94, G28-97 and G43-11 is based on the spring results only as these locations were not sampled in the fall due to insufficient water.

In 2019, the concentrations continue to generally decrease along the flow path in all directions. Phosphorous continues to be detected at higher concentrations in peripheral wells located in proximity to agricultural fields (e.g., G43-11 at 14.6 mg/L in April 2019) or in proximity to the western stream (e.g., G29-97 at 13.9 mg/L in April 2019) compared to the leachate impacted wells average concentration (i.e., 2.3 mg/L, see **Table 6**). Phosphorous shows no consistent pattern along the leachate flow path and the elevated concentrations are interpreted to be indicative of ambient deposition from agricultural activities.



Concentrations of chloride at monitoring wells G42-10 and G37-01, both located near snow disposal areas (current and former disposal areas, respectively), are not following the decreasing concentration trend normally observed for this tracer. Concentrations at these locations are elevated above their nearest upgradient wells, screened in the same unit, indicating that the former and current snow disposal activities still act as a point source of contamination. For G42-10, the September chloride concentration is 210 mg/L whereas, upgradient, the chloride concentration is 106 mg/L and 104 mg/L at G40-07 and G39-07, respectively. At G37-01, the September chloride concentrations is 361 mg/L and it is 27.2 mg/L at the upgradient well G36-01.

Wells G21-94 and G12-92, located downgradient of the vertical cut-off wall, are interpreted as being only mildly impacted by leachate based on the 2019 spring. Past results indicate that the concentrations at these wells fluctuate seasonally between the mildly and moderately impacted range and that the cut-off wall partially controls the off-site migration of leachate. Past analyses also indicate that Lalonde road maintenance activities influence the concentrations south of the site, particularly at G21-94 located closest to the road.

In 2017, wells G31A-98 and G31B-98 were sampled to verify the water quality in the bedrock shale and overburden glacial till unit, respectively. The results indicated that concentrations in both units were relatively similar. In 2018 and 2019, only G31A-98 was sampled. The 2018-2019 results from G31A-98 continue to indicate moderate impacts to the bedrock unit.

Background concentrations at the site have been represented in previous studies by P4-90, P2-90, G11-92/G39-07. In 2019, P4-90 and P2-90 continue to be interpreted as not being significantly impacted by leachate, whereas G39-07 continues to show evidence of being under the influence of the WDS and/or southeast snow stockpile area. Well G26-94 located to the northwest of the waste mound presents no historical evidence of impact and continues to be recommended for use as representative of background at the site. It is screened in the sand unit upgradient of the waste mound and water is expected to flow east from G26-94 through the northern portion of the site, which is not significantly impacted by the leachate plume.

4.2.2 Trends in Groundwater Quality

Historical groundwater concentrations are presented on **Graphs J-1** to **J-9** in **Appendix J** for selected monitoring wells. For the most part, concentrations are relatively stable since at least 2013 indicating a fairly steady leachate plume. Exceptions include continued increasing trends for ammonia and sodium at P6-91. Increasing trends reported in previous years at G29-97, G43-11, G12-92 and G18-92 now appear to have stabilized.

Chloride concentrations were reported to be on a decreasing trend at G42-10 in 2018 and the decrease was attributed to the discontinuing of the snow disposal in that area. In 2019, the concentrations appear to be within the historical range with no more apparent decreasing trend. The recurrent concentrations could be related to the stockpiling of snow in the southeast corner in 2019, as reported by the Municipality. The phosphorous concentrations reported to be on a decreasing trend at G26-94 appear to have stabilized in 2019.

In 2019, surveillance parameters were added to G39-07 to gain a better understanding of the COD distribution in that area. As suspected, a source other than the landfill is contributing to the elevated concentrations of COD at G43-11 (e.g., 500 mg/L in April 2019) since the concentrations of COD at that location is higher than the nearest upgradient concentrations at well G39-07 (e.g., 125 mg/L in April 2019). Likewise, the COD concentration in April 2019 at G12-92 (i.e., 1300 mg/L) is greater than the concentration at the upgradient wells P1-91 (i.e., 212 mg/L) and P5B-91 (i.e., 115 mg/L) during the same period. This might be due to entrapment of fines in the samples (especially considering that G43-11 and G12-92 are screened or partially screened in silty clay) and/or the nearby roadways.

As reported in previous annual reports, the predictive modelling completed as part of the landfill site expansion (Golder Associated, 2000) predicted that groundwater concentrations of chloride in year 2015 upgradient and downgradient of the on-site pond and at the eastern site boundary would be approximately 150, 35 and 25 mg/L, respectively, assuming a five-fold dilution in the pond. In 2016 and 2017, the concentrations measured at the site were at or below the predicted concentrations. In 2018 and 2019, the concentrations upgradient of the pond continue to be below the predicted value (G27-97; 136 mg/L in August 2018 and 94 mg/L in April 2019 vs modeled concentration of 150 mg/L) whereas the downgradient concentrations have exceeded the predicted value (G39-07; 93.4 mg/L in August 2018 and 82.2 mg/L in April 2019 vs modeled concentration of 35 mg/L and G43-11; 35.8 mg/L in August 2018 and 35.7 in April 2019 vs modeled concentration of 25 mg/L). The concentrations in 2018 and 2019 continue to be above the predicted value at G42-10 (e.g., 226 mg/L in August 2018 and 172 mg/L in April 2019 vs 25 mg/L). It is suspected that the increase of chloride above the predictive model along the eastern boundary is in part due to the southeast snow disposal site.

4.2.3 Ontario Drinking Water Quality Guidelines Evaluation

Table 7 presents a summary of the exceedances of the ODWQ guidelines at the boundary wells in comparison with the exceedances detected at the background and leachate wells. The background well (G26-94) presents no exceedances of the ODWQ Guidelines with the exception of one anomalous concentration of chromium in April 2019. The chromium concentration returned to below the detection and to within historical range in September 2019. The leachate representative well (P6-91) presents the most exceedances (10) of ODWQ guideline values. All other boundary locations present one or more exceedances of ODWQ aesthetic objectives of alkalinity, aluminum, chloride, DOC, hardness, TDS, iron, and/or manganese. Health related exceedances are limited to aluminum on the east and northeast boundaries and aluminum and boron at the leachate indicator well.

Wells P5B-91, P1-91 and P6-91 were analyzed for VOCs in 2019. A few VOCs parameters (i.e., benzene, chlorobenzene, toluene and/or xylenes) were detected but all levels were below the Ontario Drinking Water Quality (ODWQ) guidelines.



4.2.4 Domestic Water Wells

The Ministry's Water Well Information System (WWIS) was consulted to obtain water well records within 500 m of the site boundary (Golder Associated, 2015 Annual Monitoring Report). Six wells are reported to be within this area, excluding those wells with a location accuracy of greater than 300 m. Well ID 5605742, 5605743, 5600200 and 5603990 are water supply wells completed in bedrock with at least 18 m casing. Given the presence of at least 7 m of silty clay above the bedrock in each of these well records, the wells were not considered vulnerable to landfill leachate impacts.

Well ID 5602076 is a water supply well completed in the overburden (sand and gravel) and appears to correspond to the well on the former Brazeau property at the southeast corner of the site. Finally, Well ID 7039373 appears to have been drilled at the Brazeau Sanitation property in 2006, but there is no other information in the WWIS on the intended use, depth of construction of the well.

From 2002 to 2005, as part of the City of Clarence-Rockland compensation policy regarding the expansion of the landfill, groundwater sampling was carried out at the domestic well on the property adjacent to the southeastern portion of the landfill site (the Brazeau well). Golder Associates was informed that the Brazeau property was purchased by the City of Clarence-Rockland in early 2006, and the private residence located on the property was demolished in 2008.

The 2017, 2018 and 2019 annual monitoring results indicate that well G29-97 screened in the sandy unit and located along the western edge of the site is moderately impacted by leachate. Leachate also appears to be present in GS17 where elevated concentrations of chloride, boron and iron were detected in the summer 2018. GS17 has insufficient water for sampling in all three surface water events of 2019. A groundwater flow direction towards the west is also possible based on the interpretation of groundwater elevation. This suggests that leachate might be migrating towards the west.

It is estimated, based on the most recent Google Earth image, that there are four residences along the east side of Champlain Road that could be sampled. Based on the leachate distribution at the site, the presence of clay, the main groundwater flow directions, and the distance to the houses, it is not expected that these domestic wells would be impacted by leachate. However, as due diligence and to obtain baseline conditions, it is recommended to sample the nearest residential wells to the west of the site at least once. The sample should be collected before the residential water treatment system, if present and analysed for the surveillance parameters.

	ODWQ Gui (mg/	idelines L)	Leachate (P6-91)	Background (G26-94)	West Boundary (G29-97)	South Boundary (G37-01)	Southeast Boundary (G12-92)	East Boundary (G42-10)	North Boundary (G18-92)	Northeast Boundary (G43-11)
Alkalinity	Aesthetic	500	Х						Х	
Chloride	Aesthetic	250	Х			Х				
DOC	Aesthetic	5	Х		Х		х	Х	Х	Х
Hardness	Aesthetic	100	Х		Х	Х		Х	Х	Х
Nitrate	Health	10								
Nitrite	Health	1								
Sulphate	Aesthetic	500								
TDS	Aesthetic	500	Х		Х	Х		Х	Х	
Aluminum	Health	0.1	Х					Х		Х
Barium	Health	1								
Boron	Health	5	Х							
Cadmium	Health	0.005								
Chromium	Health	0.05		Х						
Copper	Aesthetic	1								
Iron	Aesthetic	0.3	Х					Х	Х	Х
Lead	Health	0.01								
Manganese	Aesthetic	0.05	Х		Х			Х	Х	Х
Mercury	Health	0.001								
Sodium	Aesthetic	200	Х							
Zinc	Aesthetic	5								

Table 7: 2019 ODWQ Guideline Exceedances at Selected Wells

X Indicates 2019 concentration (s) exceeded guideline

-- Indicates 2019 concentration (s) below guideline



4.3 Surface Water Quality

The surface water quality near the landfill site was previously subdivided into three groups which are (i) the stream to the west of the site and the ditch which discharges into the stream, (ii) the on-site pond and (iii) the ditch in the southeastern portion of the site, east of the on-site pond. In 2009, the southeastern ditch was realigned, and it stopped being sampled. Sampling of the southeast ditch was reinstated in 2017 at GS20 and GS21 following a 2016 recommendation from the Ministry's technical surface water specialist. In 2018, S3 located along the northern toe of waste mound was reinstated along with GS8 located downstream of the western ditch to evaluate surface water quality north of the site.

4.3.1 Leachate in Surface Water

The surface water results are presented in **Appendix I**. The interpreted 2019 distribution of impacts is represented on the first table of **Appendix I**.

Station GS6 is located on the south site of Lalonde Road, in the upstream section of the western stream. Station GS6 presents the lowest chloride concentrations and is considered representative of background conditions.

The on-site pond locations (GS11, GS12 and GS15) continue to show the highest concentrations in 2019 for most parameters. The concentrations in the on-site pond are also significantly higher than background. The pond is regulated under ECA No. 3362-6D7PL4 and acts as natural attenuation facility for stormwater runoff and leachate-impacted groundwater at the site. The concentrations of leachate indicators in the pond are lower than those measured at leachate groundwater well P6-91 indicating an attenuation of contaminants in the pond as designed.

The northern toe sampling location S3 was dry during all events this year and, consequently, the sector is interpreted as not being affected by leachate impacted surface water. Likewise, GS17 feeding into the western stream was dry during all events and that sector is interpreted as not being affected by leachate impacted surface water in 2019. The maintenance work completed in that area by the Township (i.e., final cover) appear to have successfully mitigated the leachate breakouts observed in the past.

The western stream at S1, S2 and GS8 is showing concentrations generally within the background range except for the fall (October) event which shows relatively elevated concentrations of some parameters including chloride, hardness and TDS. The western stream is interpreted as being intermittently impacted by leachate under lower flow conditions observed in the fall. The 2019 results continue to indicate that input to the stream are present along the length of the landfill since concentrations of certain parameters such as chloride decrease along the flow path (e.g., in October chloride concentrations are 90.5 mg/L, 87.3 mg/L and 60.0 mg/L at S1, S2 and GS8, respectively) while others fluctuate such as iron ((e.g., in October iron concentrations are 0.767 mg/L, 0.627 mg/L and 0.870 mg/L at S1, S2 and GS8, respectively).

In the eastern ditch at GS20 and GS21, chloride concentrations continue to be elevated above background levels throughout the years. These locations also present relatively higher levels of other leachate indicators in September/October such as chloride, DOC, hardness and TDS. The eastern ditch stations were reinstated in 2017 as surveillance stations in order to identify potential leachate input to the Rozon-



Seguin Municipal Drain and to determine the need for additional surface water stations up and downstream of the Drain (see **Appendix C**, MOECC, 2016 letter for more details). In the past, it was observed that concentrations were generally higher at the downstream end of the ditch (GS20), indicating that the ditch pickups leachate as it flows around the southeast snow disposal site. In 2019, concentrations are relatively equivalent for the same period at both locations suggesting a relatively constant input from the snow disposal site at both ends of the ditch. Snow disposal should be discontinued in the southeast corner. Sampling of GS20 and GS21 should continue to monitor the water quality recovery upon cessation of snow disposal activities. It is recommended in 2020 to analyse GS20 for the full list of surveillance parameters to help with the interpretation of distribution of leachate impacts at the site. No other sampling location along the Drain is recommended at this time.

4.3.2 Trends in Surface Water

Historical concentrations are shown on the trend graphs in **Appendix K** for surface water locations GS17 (**Graph K-1**), S1 (**Graph K-2**), GS11 (**Graph K-3**), GS15 (**Graph K-4**) and GS20 (**Graph K-5**) of the western ditch, of the western stream, of the west side of the on-site pond, of the east side of the on-site pond, and of the eastern ditch, respectively. The graphs present the concentrations of selected leachate indicators.

All graphs show a significant drop in 2016 because the reporting units changed from ug/L up to 2015 to mg/L onwards. Since 2016, the concentrations at GS17 and S1 have been relatively stable or decreasing. The concentrations at GS11 and GS15 increased until about 2006 and have since been fluctuating along the same average concentrations. Concentrations at GS20 in the downstream end of the eastern ditch appear stable since 2018.

Surface water concentrations fluctuate between sampling events in 2019 with no common seasonal trends across the site. Some parameters are generally highest in the fall (October) such as chloride, hardness and TDS at GS6, S1, S2, GS8, while others are highest in the spring (April) such as iron at GS6, S1, S2 and S8.



4.3.3 Water Quality Objectives Evaluation

Table 8 presents the parameters that exceeded the Ontario Provincial Water Quality Objectives (PWQO) at the surface water monitoring locations. All locations had two or more of the following parameters detected at concentrations above the PWQO: unionized ammonia, chloride, phosphorus, sulphate, aluminum, boron, cobalt, copper, iron and field pH. There were no exceedances of nitrite or vanadium this year. The on-site pond at GS11 is the station showing the most exceedances with 9 parameters exceeding the PWQO. This station is also the one presenting the highest concentrations of leachate indicators. Exceedances are also found off-site at the upstream background location (GS6) and, based on past results, in the upstream western ditch location (GS17) indicating that the surface water entering the site is somewhat influence by sources of contamination other than the landfill (e.g., agricultural and roadside activities).

In 2016, the guideline values from the Canadian Water Quality Guidelines for freshwater (CWQG FW) and the British Columbia Water Quality Guidelines for freshwater (BC WQG FW) were added to the quality evaluation for nitrate, nitrite, chloride and sulphate as requested by the Ministry's technical reviewer. Surface water location GS11 located in the on-site pond presented exceedances of the CWQG for chloride in 2016 to 2019. Nitrite was also in exceedance at that location in 2018 but not in 2019. The hardness at this location continued in 2019 to exceed the range for which sulphate guideline values are provided under the BC WQG (i.e., >250 mg/L). The other locations did not present exceedances of these parameters.



	S1 Western Stream	GS8 West- ern Stream	GS6 West-ern Upstream	GS11 On-site pond (central)	GS12 On-site pond (central)	GS15 On-site pond (north sector)	GS17 West- ern ditch	GS21 Eastern Ditch Upstream	GS20 Eastern Ditch Down- stream
Unionized ammonia				X	X	Х	Dry		
Chloride				Х					
Nitrate									
Nitrite									
Phosphorus	Х	Х	Х	Х	Х	Х		Х	Х
Sulphate				Х					
Aluminum dissolved	Х	х	Х	х	х	х			
Beryllium									
Boron				Х	Х	Х		Х	
Cadmium									
Cobalt				Х					
Copper	Х			Х					
Iron	Х	Х	Х	Х	Х	Х		Х	Х
Lead									
Mercury dissolved									
Molybdenum									
Nickel									
Selenium									
Silver									
Thallium									
Vanadium									
Zinc									
Phenolics									
pH (field)					Х				

 Table 8: 2019 Surface Water PWQO Exceedances

-- Indicates concentration below the PWQO

X Indicates concentration exceeds the PWQO Blank indicates analytes not tested.



5 SITE COMPLIANCE

5.1 Groundwater Compliance

5.1.1 Reasonable Use Criteria

The "reasonable use" approach to protect groundwater quality was developed by the MOE to determine acceptable limits of contaminant discharge from Municipal WDS based on what the "reasonable use" of groundwater on adjacent properties is. The maximum concentration of a particular contaminant in groundwater, which is allowed to leave the WDS property, is termed the Reasonable Use Criteria (RUC). It is calculated based on the Ontario Drinking Water Quality Standards (ODWQS) and a representative background concentration for that particular parameter.

The permitted degradation factor is the amount of degradation between background and ODWQS values that is considered by the MOECC to have only a negligible effect on the use of the water. For drinking water use, as in the case of the WDS, non-health related parameters have a permitted degradation of 50% (0.5) while health related parameters have a permitted degradation of 25% (0.25). The equations used to derive the RUC are presented below.

Non-Health Related:

 $C_{allow} = P_b + (C_m P_b) \times 25\%$ $C_{allow} = P_b + (C_m P_b) \times 50\%$

where:

C_{allow} = Maximum allowable concentration of parameter as per the RUC guidelines.

C_m = Maximum acceptable concentration (MAC) of parameter as per the ODWS/OG.

P_b = Chosen background value of parameter.

Based on previous study (Golder and Associates 2015 Monitoring Report), the compliance evaluation parameters at the site have been identified as chloride, sodium, DOC, TDS, boron, iron and manganese.

The groundwater technical review completed by the Ministry in 2006 previously flagged potential issues with the use of P4-90 as the background well for RUC calculations and Golder Associates has reported P2-90 and G11-92/G39-97 as being potentially impacted by leachate in previous annual reports. Accordingly, and as presented earlier in this report, background well G26-94 is believed to be a better indicator of background conditions at the site than previously used wells and was used for the 2017, 2018 and 2019 RUC calculations. **Graph J-2** shows that concentrations have been relatively stable or decreasing at G26-94, making it suitable for the RUC calculations. As done previously by Golder Associates, the median background concentrations were derived from the entire historical concentrations data set up to 2019. The maximum allowable concentrations derived using the 2019 median values are near equal to the 2018 derived values indicating that conditions are stable at the selected background well. The results are presented in **Table 9**.



Trigger Parameter	Median 2019 (Pb)	Permitted degradation (x)	Maximum Acceptable Concentration (C _{M)}	Maximum Allowable Concentration 2018 (C _{allow})	Maximum Allowable Concentration 2019 (Callow)							
Chloride	3.2	0.5	250	127	127							
DOC	2.1	0.5	5	3.6	3.6							
TDS	47.5	0.5	500	274	274							
Boron	0.009	0.25	5	1.3	1.3							
Iron	0.0095	0.5	0.3	0.2	0.2							
Manganese	0.006	0.5	0.05	0.03	0.03							
Sodium	8.75	0.5	200	105	104							

Table 9: 2019 RUC Calculations

5.1.2 RUC Compliance

Table 10 presents the summary of the evaluation of the RUC compliance at the boundary wells. The table shows that there is non-compliance of one (1) or more trigger parameters at every boundary location. The type and amount of RUC non-compliance is similar to those observed in 2016 and 2017.

Trigger Parameter	RUC	Background (G26-94)	West Boundary (G29-97)	South Boundary (G37-01)	Southeast Boundary (G12-92)	Southeast Boundary (G17-92)	East Boundary (G42-10)	North Boundary (G18-92)	Northeast Boundary (G43-11)
Chloride	127	<0.5-1.9	4.4-20.3	<u>178-361</u>	20.6	24.7-33.4	<u>172-</u> <u>210</u>	2.3- 47.7	35.7
Dissolved Organic Carbon	3.6	1.3-3.2	<u>12-19.9</u>	1.1- <u>3.8</u>	<u>22.3</u>	<u>10.3-</u> <u>12.7</u>	<u>32.5-</u> <u>45.8</u>	<u>8.2-</u> <u>26.7</u>	<u>47.8</u>
Total Dissolved Solids	274	35-36	<u>456-570</u>	<u>379-687</u>	149	215- <u>320</u>	<u>496-</u> <u>691</u>	106- <u>741</u>	<u>353</u>
Boron, dissolved	1.3	0.006- 0.008	0.062- 0.094	0.008	0.013	0.027- 0.045	0.116- 0.362	0.083- 0.321	0.276
Iron, dissolved	0.2	<0.005	<0.005	<0.005	0.028	<u>0.62-</u> <u>0.736</u>	<u>0.883-</u> <u>5.38</u>	0.137- <u>0.387</u>	<u>1.53</u>
Manganese, dissolved	0.03	0.004- 0.013	<u>3.47-</u> <u>3.48</u>	0.021- <u>0.034</u>	0.017	<u>0.717-</u> <u>0.991</u>	<u>0.436-</u> <u>0.825</u>	<u>0.443-</u> <u>0.485</u>	<u>0.217</u>
Sodium, dissolved	104	3.2-5.8	34.1- 34.9	94.3- <u>164</u>	33.2	15.4-16.3	<u>114-</u> <u>166</u>	4.3- 12.5	73.5

Table 10: 2019 RUC Compliance Evaluation

47.9: Indicates value exceeds the RUC

The reasonable use concept concentrations were exceeded for one or more trigger parameters in every direction except along the northwest corner, in the area selected as representative of the background groundwater concentrations (excluding the sporadic manganese concentrations at G26-94).



A recommendation to augment the CAZ to the west of the site was made in previous reports to assist with mitigating the impacts in that direction.

Based on the 2019 results, the concentrations at G18-92 (**Appendix J, Chart J8**) are fluctuating along a stable average since 2013 and the 140m attenuation zone available to the north is likely sufficient to contain these RUC exceedances. To verify this assumption, it is recommended to install a new compliance well on the northern CAZ boundary.

On the south boundary, the cut-off wall appears to be successful in mitigating downgradient waste disposal site related impact based on the difference in concentrations between the upgradient (P1-91 and P5B-91) and downgradient (G17-92) sides of the wall. The high seasonal variability at G21-94 suggests that the roadside activities have a higher impact on the water quality in this area than the landfill leachate migration. Accordingly, the wall is considered an appropriate to address the leachate related non-compliance and no further mitigation measures are recommended for this area.

On the eastern side, a CAZ and attenuation pond are present, and the 2019 results continue to indicate that a source other than the landfill (particulates entrapment, roadside and/or agricultural) might be contributing to the concentrations elevated above upgradient levels at G43-11. To further mitigate the impact along the eastern boundary, it is recommended to ban the disposal of snow in the southeast corner and also anywhere else within the site property boundaries.

The City should continue to apply interim and final cover as requested under the ECA to minimize leachate generation across the site.

5.2 Surface Water Compliance

5.2.1 Trigger Parameters and Concentrations

The surface water compliance evaluation parameters at the site have been established previously at the site as boron, iron, total phosphorus and unionized ammonia. The trigger concentrations are established based on the 75th percentile concentrations at the non-impacted station GS6 as shown in **Table 11**. The 75th percentile is calculated based on the entire historical dataset. The selected trigger concentration is the highest of either the 75th percentile or the PWQO. The trigger values have remained steady over the last annual monitoring programs of 2016 to 2019 with the exception of ammonia. A unit conversion error was corrected in 2019 resulting in an increased 75th percentile for ammonia.

Parameter (mg/L)	75th Percentile (GS6)	PWQO	2019 Trigger Concentrations
Ammonia, unionized (Field)	0.87	0.02	>0.87
Phosphorus	0.08	0.03	>0.08
Boron	0.02	0.2	>0.2
Iron	1.5	0.3	>1.5

Table 11: 2019 Surface Water Trigger Parameters and Concentrations



5.2.2 Surface Water Compliance

Appendix M shows the surface water compliance evaluation. The evaluation was performed by comparing the measured concentrations at all surface water locations (unless dry) to the trigger concentrations. The data was separated by season to identify any seasonal trend.

The most exceedances are found in the spring (April) at which time all stations, including the background station present at least on exceedance of a trigger concentration. The fewer exceedances are found in the fall (October), at that time, only the on-site pond and eastern ditch present exceedances. This is contrary to the observations that some leachate parameters are highest in the fall (see **Section 4.3.2**). A review of the surface water trigger parameters might be appropriate to ensure that the parameter selected best represent the leachate quality at the site as opposed to ambient agricultural/roadside conditions.

There is no exceedance of the trigger concentration for ammonia this year at all locations as a result of the increase in trigger concentration for this parameter (see **Section 5.2.1**). Phosphorous and iron exceedances are limited to the western stream and eastern ditch stations, with the exception of one exceedance of phosphorous in the on-site pond in the spring at GS12. Boron exceedances are found at the on-site pond stations and in the eastern ditch only. The most exceedances are found in the eastern ditch in the early fall/late summer (September) which presents 3 out of 4 parameters in excess of the trigger concentrations. The distribution of exceedances seems to indicate different water profiles between the western stream, on-site pond and eastern ditch.

The on-site pond is designed to attenuate leachate before it migrates off-site and as such, exceedances of the trigger concentrations at GS11, GS12 and GS15 are to be expected and no additional mitigation measure are required at this time.

The eastern ditch presents exceedances of phosphorous, boron and iron. The upstream and downstream eastern ditch stations have equivalent concentrations suggesting that they are representative of ambient conditions and not hydraulically connected to the groundwater leachate plume at the site (otherwise concentrations would be expected to vary with distance from the landfill). Accordingly, these exceedances are attributed to other sources such as the snow dump, roadside activities and agricultural practices. Snow disposal activities should be discontinued as a mitigation measure.

The western ditch is in compliance with the trigger concentrations in the fall (October) indicating that the leachate impacts are mild and intermittent. As contingency measure, it is recommended to continue the application of the waste cover as per the regular landfill operation program to ensure that infiltration and leachate migration are mitigated.



6 CONCLUSION AND CONTINGENCY MEASURES

In 2019, leachate impacts continue to be detected on the eastern side of the waste mound where wells present elevated concentrations of several leachate indicators such as chloride, total dissolved solids, boron, iron, hardness, manganese, sodium and dissolved organic carbon. A few volatile organic compounds were also detected at these locations, but levels were below the ODWQ guidelines.

A decrease in leachate indicator concentrations is observed along the flow path, on both sides of the groundwater divide to the east, south and southwest of the waste mound with several wells showing moderate leachate impact. Monitoring wells located to the west, northwest and north of the site are generally less impacted. Monitoring wells showing the most evidence of leachate impact are screened in the upper sand unit. Some leachate migration into the deeper silty clay and till units and into the shallow bedrock unit has also occurred.

The reasonable use concept concentrations were exceeded for one or more trigger parameters in every direction except along the northwest corner, in the area selected as representative of the background groundwater concentrations.

As mitigation measures for the west boundary, it is recommended to acquire additional land to extend the CAZ and also to sample the nearest residential wells.

On the south boundary, the cut-off wall appears to be successful in mitigating downgradient waste disposal site related impact and no further mitigation measures are recommended.

On the eastern side, a CAZ and attenuation pond are present and the results indicate that a source other than the landfill (roadside, agricultural and/or particulate entrapment during sampling) might be contributing to the concentrations elevated above upgradient levels in that area. As further mitigation measures to the east, it is recommended to ban snow disposal activities everywhere on site.

Since the northern trigger well is located 140 m inward from the leachate attenuation zone northern boundary, additional mitigation measure in this area are also not warranted at this time. However, to verify this assumption, it is recommended to install a new monitoring well along the northern boundary.

The surface water trigger concentrations are exceeded for one or more parameter at each surface water station at one or more of the 2019 sampling events. The concentrations of leachate indicators in surface water are generally highest at the on-site pond. The western stream is showing mild and intermittent leachate impact whereas the eastern ditch is showing surface water quality influenced by ambient conditions. Mitigation measures recommended to address surface water trigger exceedances are to continue to apply of waste cover as per the regular landfill operation program and ban snow disposal at the site.

The 2019 interpretation of surface water shows a disparity between seasonally elevated leachate indicators and the frequency of trigger concentrations exceedances. A review of the surface water trigger parameters might be appropriate to ensure that the parameter selected best represent the leachate quality at the site as opposed to ambient agricultural/roadside conditions.



7 MONITORING PROGRAM FOR 2020

The monitoring program at the WDS should continue in 2020 in the spring and summer for groundwater and in the spring, summer and fall for surface water. The following elements are recommended for the 2020 monitoring program. Monitoring locations are provided in **Figure 7**.

- Continue the discussion to acquire additional CAZ on the west side of the site.
- Consider the installation of a new compliance well on the northern CAZ boundary to confirm that the RUC exceedances on that side are contained within the site boundaries.
- As due diligence and to obtain baseline conditions, it is recommended to sample the nearest residential wells to the west of the site at least once. The sample should be collected before the residential water treatment system, if present and analysed for the surveillance parameters.
- Continue to inspect the site including the area north of the mound to determine if additional maintenance activities are required to minimize leachate.
- The City should continue to apply interim and final cover as requested under the ECA to minimize leachate generation.
- Continue the groundwater surveillance monitoring program inclusive of the following wells along the boundaries of the site and the leading edges of the leachate plume:
 - South boundary (G37-01 and P5B-91);
 - Southeast boundary (G12-92);
 - east boundary (G42-10);
 - north boundary (G18-92);
 - northeast boundary (G43-11);
 - west boundary (G29-97), (P4-90);
 - background (G26-94);
 - leachate (P6-91 and P1-91);
 - eastern plume migration (G39-07); and
 - nearest residential wells (estimated to be 4 wells along the east side of Champlain Road).
- Continue testing for VOCs at the surveillance wells P1-91, P5B-91 and P6-91.
- Continue the routine monitoring program inclusive of the following wells, in order to evaluate the leachate migration at the site: G8-92, G38-03, P2-90, G36-01, G20-92, G21-94, G17-92, G31A-98, G28-97, G40-07, G27-97, G13-92.
- The following surveillance wells should be used as compliance points and for contingency measures trigger. These wells are located along the leading edges of the plume: G18-92 (or new monitoring well along the northern boundary if available), GS26-94, G29-97, G37-01, G12-92, G17-92, G42-10, G43-11.



- Continue the surveillance monitoring program at surface water stations S2, GS6, GS11, GS15, GS17 and GS20. Continue the routine monitoring program at surface water S1, S3, GS8, GS12 and GS21.
- Collect a representative number of blind duplicates, trip and field blanks.
- Measure combustible gas levels in all headspace of monitoring wells and in on-site buildings.
- The surface water flow measurements should continue to be reported in L/sec for consistency. Continue to request that the detection limits for surface water comply with the CWQG for nitrite, nitrate, and chloride and bring required equipment to be able to take the staff gauge measurements.
- In its next review of the site, the Ministry could confirm whether or not Condition 2(17) of the ECA is still applicable and indicate the best course of action in relation to this outstanding amendment.
- Follow-up on the following maintenance requirements identified in 2019:
 - Move the fallen trees near GS36-01 and P5B-91 so that they do not comprise the sampling program.
 - Re-developed G28-97 and G15-92 to ensure that they are representative of the groundwater conditions.
 - Verify that all well locations are signed, have protective casings are locked.
 - Evaluate the conditions of well G43-11, repair or make recommendations for upgrade/replacement.
 - Adjust length of well G13-92 and provide updated top of pipe elevation as follow-up to the 2019 addition of a tubing length to this location.
 - Survey all well locations for vertical control.
 - Remove any blown litter including the tire observed near GS12.
- Beaver activities have been noticed near the culvert on the east side of the pond. It is recommended to inspect the culvert as part of the surface water monitoring program to ensure that it remains unblocked.
- A review of the surface water trigger parameters might be appropriate to ensure that the parameter selected best represent the leachate quality at the site as opposed to ambient agricultural/roadside conditions.



8 LIMITATIONS AND USE OF REPORT

This report was prepared for the exclusive use of the City of Clarence-Rockland. Any use which a third party makes of this report, or and reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Jp2g Consultants Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This WDS impact report involves a limited sampling of locations to assess the probability of contamination on site. The test data, chemical analyses, and conclusions given herein are the results of analyzing the groundwater encountered during the sampling programs. Based upon the total number of test holes performed, these are considered to be fairly representative of the groundwater conditions within each area tested. It should be noted, however, that any assessment regarding the presence of contamination on the property is based on interpretation of conditions determined at specific locations and depths. Chemical results are limited to those parameters tested.

FIGURES



Notes:

Data from Land Information Ontario, 2015 Shapefiles created by Jp2g Consultants Inc. Landfill site boundary approximate



Clarence-Rockland WDS

Bourget, ON





1:25,000	Figure 1- Site Location Plan		
	Drawn By: JF		
Project No. 17-6021C	Checked by: AB		
	Date: March 2020		



DWG NAME: \\JP2GOTTNAS\PROJECT DATA\6-ENVIRONMENTAL\ACTIVE\17-6021A - CLARENCE ROCKLAND LANDFILL MONITORING\04 DRAWINGS\2019\AMR\SITE PLAN AND GROUNDWATER FLOWS FOR CAZ.DWG LAYOUT: FIG.2-SITE PLAN SAVED ON March 5, 2020 BY ANDREAS

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MONITORING WELL LOCATIONS

DECOMMISSIONED OR DESTROYED MONITORING WELLS

SURFACE WATER MONITORING STATIONS

TOPOGRAPHIC CONTOUR, METRES (GEODETIC DATUM)

CROSS-SECTION LOCATION IN PLAN (FOR CROSS-SECTION DETAILS REFER TO FIGURE 3 OF THIS REPORT)

1. BASE MAP COURTESY OF GOLDER ASSOCIATES (2016-02-22). PROJECT NO. 1520771

CLARENCE AND ROCKLAND LANDFILL MONITORING

CLARENCE-ROCKLAND, ONTARIO



Jp2g Consultants Inc. ENGINEERS · PLANNERS · PROJECT MANAGERS

> 12 INTERNATIONAL DRIVE, PEMBROKE, ON Phone: (613)735-2507, Fax:(613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON Phone: (613)828-7800, Fax: (613)828-2600

IGNED: RM		PROJECT No.:	17-6021C
AFTED: BWS	'RM/AS	REVISION DATE:	04/03/2020
ECKED: AB	APPROVED: AB	REVISION No.:	
ALE: 1:4000			

FIGURE 2

SITE PLAN AND GROUNDWATER FLOWS FOR CAZ.DWG


DWG NAME: J:16-ENVIRONMENTAL\ACTIVE\17-6021A - CLARENCE ROCKLAND LANDFILL MONITORING\04 DRAWINGS\2019\CROSS SECTION FIGURE 3.DWG LAYOUT: FIGURE 3 SAVED
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DWG NAME: \\JP2GOTTNAS\PROJECT DATA\6-ENVIRONMENTAL\ACTIVE\17-6021A - CLARENCE ROCKLAND LANDFILL MONITORING\04 DRAWINGS\2019\AMR\SITE PLAN AND GROUNDWATER FLOWS FOR CAZ.DWG LAYOUT: FIGURE 4 SPRING GW SAVED ON March 5, 2020 BY ANDREAS

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LEGEND	
+	MONITORING WELL LOCATIONS
•	DECOMMISSIONED OR DESTROYED MONITORING WELLS
A	SURFACE WATER MONITORING STATIONS
49	TOPOGRAPHIC CONTOUR, METRES (GEODETIC DATUM)
Å.	CROSS-SECTION LOCATION IN PLAN (FOR CROSS-SECTION DETAILS REFER TO FIGURE 3 OF THIS REPORT)
98.46	SPRING 2019 GROUNDWATER ELEVATION
98,46	NOT USED FOR SPRING 2019 GROUNDWATER ELEVATION
\rightarrow	DIRECTION OF SPRING 2019 GROUNDWATER FLOW
50 50	SPRING 2019 GROUNDWATER CONTOUR

IGNED: RM		PROJECT No.:	17-6021C
AFTED: BWS/RM/AS		REVISION DATE:	05/03/2020
CKED: AB APPROVED: AB		REVISION No.:	
LE: 1:4000			

FIGURE 4



DWG NAME: \\JP2GOTTNAS\PROJECT DATA\6-ENVIRONMENTAL\ACTIVE\17-6021A - CLARENCE ROCKLAND LANDFILL MONITORING\04 DRAWINGS\2019\AMR\SITE PLAN AND GROUNDWATER FLOWS FOR CAZ.DWG LAYOUT: FIGURE 6 LEACHATE SAVED ON March 5, 2020 BY ANDREAS

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ROCKLAND LANDFILL

Phone: (613)735-2507, Fax:(613)735-4513

Phone: (613)828-7800, Fax: (613)828-2600

IGNED: RM		PROJECT No.:	17-6021C
AFTED: BWS/RM/AS		REVISION DATE:	05/03/2020
ECKED: AB APPROVED: AB		REVISION No.:	
ALE: 1:4000			

FIGURE 5



DWG NAME: \\JP2GOTTNAS\PROJECT DATA\6-ENVIRONMENTAL\ACTIVE\17-6021A - CLARENCE ROCKLAND LANDFILL MONITORING\04 DRAWINGS\2019\AMR\SITE PLAN AND GROUNDWATER FLOWS FOR CAZ.DWG LAYOUT: FIGURE 7 PROPOSED SAVED ON March 5, 2020 BY ANDREAS

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IGNED: RM		PROJECT No.:	17-6021C
AFTED: BWS/RM/AS		REVISION DATE:	05/03/2020
ECKED: AB	APPROVED: AB	REVISION No.:	
LE: 1:4000			

APPENDIX A

Monitoring and Screening Checklist

Appendix D-Monitoring and Screening Checklist General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.

Instructions: A complete checklist consists of:

(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.

(b) completed contact information for the Competent Environmental Practitioner (CEP)

(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:

For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

(a) the person holds a licence, limited licence or temporary licence under the Professional Engineers Act; or

(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

Definition of Surface water CEP:

A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information			
Waste Disposal Site Name	City of Clarence-Rockland		
Location (e.g. street address, lot, concession)	Lot 15, Concession 4		
GPS Location (taken within the property boundary at front gate/ front entry)	487270, 5034450 (zone 18)		
Municipality	City of Clarence-Rockland		
Client and/or Site Owner	City of Clarence-Rockland		
Monitoring Period (Year)	2019		
This	Monitoring Report is being submitted under the following:		
Environmental Compliance Approval Number:	A471203		
Director's Order No.:			
Provincial Officer's Order No.:			
Other:			

Report Submission Frequency	●Annual ○Other		
The site is: (Operation Status)		●Open ○Inactive ○Closed	
Does your Site have a Total Approved Capacity?		YesNo	
lf yes, please specify Total Approved Capacity	740000	Units	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?		O Yes No	
If yes, please specify Maximum Approved Fill Rate		Units	
Total Waste Received within Monitoring Period (Year)	See Operation Report	Units	
Total Waste Received within Monitoring Period (Year) <i>Methodology</i>			
Estimated Remaining Capacity	See Operation Report	Units	
Estimated Remaining Capacity Methodology			
Estimated Remaining Capacity Date Last Determined		1	
Non-Hazardous Approved Waste Types	 Domestic Industrial, Commercial & Institutional (IC&I) Source Separated Organics (Green Bin) Tires 	 Contaminated Soil Wood Waste Blue Box Material Processed Organics Leaf and Yard Waste 	 Food Processing/Preparation Operations Waste Hauled Sewage Other:
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial (separate waste classes by comma)			
Year Site Opened (enter the Calendar Year <u>only</u>)	1980	Current ECA Issue Date	19-Aug-2016
Is your Site required to submit Fina	ncial Assurance?	0 @	Yes No
Describe how your Landfill is designed.		Natural Attenuation o Partially engineered Factorial	nly OFully engineered Facility acility
Does your Site have an approved Contaminant Attenuation Zone?		() () ()	Yes No

If closed, specify C of A, control or au date:	uthorizing document closure	
Has the nature of the operations at the site changed during this monitoring period?		⊖Yes ⊚No
If yes, provide details:		
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)		OYes ⊚No

about the site and site knowledg	ge, it is my opinion that:	
Sampling and Monitor	ing Program Status	:
 Move fallen trees near GS36-01 and P5B-91. -Redevelop G28-97 and G15-92. -Add protective casing and/or lock to P1-91, P2-90, P4-9 P6-91, P7-91, G17-92, G18-92, G37-01 and G42-10. -Evaluate the conditions of well G43-11; repair as needed or make recommendation to upgrade. -Adjust length of G13-92 and provide updated top of pipelevation. 		
○Yes ●No ○Not Applicable	If no, list exceptions below or attach information.	
Description/Explanation for change (change in name or location, additions, deletions)		Date
	about the site and site knowledg Sampling and Monitor OYes No Yes No Not Applicable Description/Explanation for ch (change in name or location, ad Dry	about the site and site knowledge, it is my opinion that: Sampling and Monitoring Program Status -Redevelop G28-97 and -Add protective casing a PG-91, P7-91, G17-92, G -Evaluate the conditions or make recommendatic -Adjust length of G13-92 elevation. () Yes () Yes () No () Not Applicable Description/Explanation for change (change in name or location, additions, deletions) Dry

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- 4

3) a) Is landfill gas being monitored or controlled at the site?		@Yes ○No	
If yes to 3(a), please answer the next t	two questions below.		
b) Have any measurements been ta period that indicate landfill gas is levels exceeding criteria establish	aken since the last reporting s present in the subsurface at ned for the site?	⊖Yes ⊚ No	
c) Has the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:		●Yes ○No ○Not Applicable	If no, list exceptions below or attach additional information.
Groundwater Sampling Location (c	Description/Explanation for change (change in name or location, additions, deletions)		Date
4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	●Yes ○No	All sampling completed a	as per Jp2g sampling protocols.

	Sampling and Monitoring Program Results/WDS Conditions and Assessment:			
5)	The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment	⊖Yes ●No	The following mitigation measures are recommended: -continue to apply cover to minimize leachate; -augment the CAZ to the west; -sample the residential wells to the west; -install a new well on the northern property limit; -maintain a ban on snow disposal activities.	
6)	The site meets compliance and assessment criteria.	⊖Yes ●No	The reasonable use concept concentrations were exceeded for one or more trigger parameters in every direction except along the northwest corner.	
7)	The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	@Yes ○No	For the most part, concentrations are relatively stable since at least 2013 indicating a fairly steady leachate plume.	
1)	Is one or more of the following risk reduction practices in place at the site: (a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or (b) There is a predictive monitoring program in- place (modeled indicator concentrations projected over time for key locations); or (c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation): <i>i</i> .The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and <i>ii</i> .Seasonal and annual water levels and water quality fluctuations are well understood.		Note which practice(s):	□ (a) □ (b) ☑ (c)
9)	Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	 Yes No Not Applicable 	RUC exceedances of chloride, DOC, TDS, iron, manganese and/or sodium on all side of the WDS except in the northeast corner.	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

O No changes to the monitoring program are recommended	-sample the residential wells to the west; -install a new well on the northern property limit;
The following change(s) to the monitoring program is/are recommended:	
O Changes to site design and operation are recommended	The following mitigation measures are recommended: -continue to apply cover to minimize leachate; -augment the CAZ to the west; -sample the residential wells to the west; -install a new well on the northern property limit; and -maintain a ban on snow disposal activities.
The following change(s) to the site design and operation is/ are recommended:	

Name:				
Seal:	Add Image			
Signature:		Date:		
CEP Contact Information:	Andrew Buzza, P. Geo	<u>.</u>	<u> </u>	
Company:	Jp2g Consultants Inc.			
Address:	1150 Morrison Drive, Suite 410 Ottawa, Ontario K2H 8S9			
Telephone No.:	613-828-7800	Fax No. :	613-828-2600	
E-mail Address:	andrewb@jp2g.com			
Co-signers for additional expertise provided:				
Signature:		Date:		
Signature:		Date:		

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

waterbody (including the nearest so	inace water body/bodies to the	Site).	
Name (s)	 Western Stream On-site pond Cobbs Lake Creek 		
Distance(s)	 80 m from footprint 70 m from footprint 1.7 km 		
Based on all available information a	nd site knowledge, it is my opin	ion that:	
9	Sampling and Monitori	ng Program Status	
 The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions: 	OYes ●No	o Surface water stations be monitored for surveilla leachate in that area. o Surface water station of to be monitored for routir additional stations is nee	S3 and GS8 should continue to ance to evaluate the presence of GS20 and GS21 should continue be parameters; however, no oded along that drain at this time.
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	● Yes ● No Not applicable (No C of A, ● authorizing / control document applies)	If no, specify below or provi	de details in an attachment.
Surface Water Sampling Location	Description/Explana (change in name or locatior	ntion for change n, additions, deletions)	Date
S3	Dry		April, September, October
GS17	Dry		April, September, October

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- 9

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.		○Yes ◉No ○Not Applicable	
b) If yes, all surface water sampl under 3 (a) was successfully com established program from the si protocols, frequencies, location developed per the Technical Gu	ing and monitoring identified ppleted in accordance with the ite, including sampling s and parameters) as idance Document:	○Yes ○No ●Not Applicable	If no, specify below or provide details in an attachment.
Surface Water Sampling Location	Description/Explana (change in name or locatior	tion for change n, additions, deletions)	Date
4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/ QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	●Yes ○No	All sampling completed a	as per Jp2g sampling protocols.

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5)	The receiving water body meets surface water-related compliance criteria and	
	assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation,	
	regulations, Water Management Policies, Guidelines and Provincial Water Quality	
	Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or	
	Table B in the Technical Guidance Document (Section 4.6):	

⊖Yes ●No

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below	w or
provide details in an attachment:	

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
See Annex A		
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	●Yes ○No	The concentrations of leachate indicators in surface water are highest at the on-site pond. The pond is designed to attenuate leachate and, as such the exceedances are expected and associated with the landfill. The western stream intermittent exceedances are associated in part to the landfill and in part ot ambiant conditions from roadside and agricultural settings based on exceedances found in the background location GS6. Around the former snow pile in the eastern ditch, exceedances are associated to other sources such as the former snow dump, roadside activities and agricultural practices.

7)	All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	@Yes ⊖No	
8)	For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g., PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	 ○Yes ○No ○Not Known ●Not Applicable 	No groundwater discharge environment
9)	Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	 Yes No Not Applicable 	Exceedances of the trigger concentrations are found at all stations including upstream of the site. It was determined that no additional surface water mitigation measures are required at this time because the exceedances are either related to off-site sources, attenuated before leaving the site, or already addressed by existing mitigation measures.

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:		
Based on my technical review of the	e monitoring results for the waste disposal site:	
ONo Changes to the monitoring program are recommended	-Surface water stations S3 and GS8 should continue to be monitored for surveillance for a to evaluate the presence of leachate in that area. -Surface water station GS20 and GS21 should continue to be monitored for routine parameters; however, no additional stations is needed along that drain at this time. -Inspect the north ditch area to confirm the absence of leachate breakouts. -Inspect the culvert on the east side of the pond to ensure that it remains unblocked.	
The following change(s) to the monitoring program is/are recommended:		
No changes to the site design and operation are recommended		
The following change(s) to the O site design and operation is/are recommended:		

CEP Signature		
Relevant Discipline	Professional Geoscientist, with 30 years relevant experie	ence
Date:		
CEP Contact Information:	Andrew Buzza, P. Geo	
Company:	Jp2g Consultants Inc.	
Address:	1150 Morrison Drive, Suite 410 Ottawa, Ontario, K2H 8S9	
Telephone No.:	613-828-7800	
Fax No. :	613-828-2600	
E-mail Address:	andrewb@jp2g.com	
Save As		Print Form

APPENDIX B

Environmental Compliance Approval



Ministère de l'Environnement CERTIFICATE OF APPROVAL MUNICIPAL AND PRIVATE SEWAGE WORKS NUMBER 3362-6D7PL4

The Corporation of the City of Clarence-Rockland 1560 rue Laurier Rockland, Ontario K4K 1P7

Site Location:City of Clarence Rockland Waste Disposal Site
Lot 15, Concession 4
City of Clarence-Rockland, United Counties of Prescott and Russell

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a stormwater and leachate impacted groundwater management facility servicing the Clarence-Rockland Waste Disposal Site, located on Lot 15, Concession 4, United Counties of Prescott and Russell, consisting of:

- one (1) existing dug-out borrow pit (pond) serving as a natural attenuation facility for stormwater runoff and leachate impacted groundwater, which is approximately 450 m long and 50 m to 100 m wide with a maximum depth of 2.5 m and a total surface area of 3.3 ha, receiving stormwater runoff from a 19.3 ha drainage area, providing a total storage capacity of 40,000 m³ at the current discharge elevation of 49.5 m, located at the northeast side of the landfill site footprint, discharging to Cobbs Lake Creek which eventually discharges to Ottawa River;
- upgrades to the east bank of the pond to raise the bank elevation to 51.0 m and the pond outlet elevation to 50.5 m increasing the maximum storage capacity of the pond to 63,175 m ³;
- plugging the pond's east bank drainage outlets and infilling of an approximately 80 m long ditch immediately downstream of the pond outlet to promote infiltration of pond contents to groundwater;
- including all associated controls and appurtenances.

all in accordance with Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the City of Clarence-Rockland dated April 13, 2005, and drawings and design brief prepared by Stantec Consulting Ltd., Ottawa, Ontario.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Act" means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"*Certificate*" means this entire certificate of approval document, issued in accordance with Section 53 of the *Act*, and includes any schedules;

"Director" means any Ministry employee appointed by the Minister pursuant to section 5 of the Act;

"District Manager" means the District Manager of the Kingston District Office of the Ministry;

"Ministry" means the Ontario Ministry of the Environment;

"Owner" means The Corporation of the City of Clarence-Rockland and includes its successors and assignees;

"Previous Works" means those portions of the sewage works previously constructed and approved under a certificate of approval;

"Proposed Works" means the sewage works described in the supporting the supporting the support of the support o

documentation referred to herein, to the extent approved by this Certificate;

"Regional Director" means the Regional Director of the Eastern Region of the Ministry;

"*Works*" means the sewage works described in the *Owner's* application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* and includes both *Previous Works* and *Proposed Works*.

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

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

(1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

(3) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

(5) The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the issuance date of this *Certificate*.

3. CHANGE OF OWNER

(1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:

- (a) change of Owner;
- (b) change of address of the Owner;

(c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the <u>Business Names Act</u>, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the <u>Corporations Information Act</u>, R.S.O. 1990, c. C 39 shall be included in the notification to the *District Manager*; Page 382 of 661

(2) In the event of any change in ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate*, and a copy of such notice shall be forwarded to the *District Manager* and the *Director*.

4. SURFACE WATER MONITORING

(1) The *Owner* shall carry out the following surface water monitoring program. Surface water grab samples shall be collected during spring (April/May), Summer (August), and Fall (November) from the designated sampling locations and shall be analyzed for the parameters listed in Table 1.

Table 1 - Surface Water Monitoring Sampling Locations: GS11, GS12, GS14		
Parameter		Field Monitoring Parameter
Calcium	Silver	Conductivity (Field)
Magnesium	Strontium	pH(Field)
Sodium	Sulphur	Temperature
Potassium	Thallium	Dissolved Oxygen
Aluminum	Titanium	Water Levels***
Barium	Vanadium	
Beryllium	Zinc	
Boron	Alkalinity	
Cadmium	BOD5	
Chromium	TDS	
Cobalt	Chloride	
Copper	Nitrate	
Iron	Nitrite	
Lead	Sulphate	
Manganese	TKN	
Mercury	Ammonia	
Molybdenum	COD	
Nickel	DOC	
Total Phosphorus	Phenols	
Silicon	Hardness*	
	Un-ionized Ammonia**	

Note: * Hardness - calculated from laboratory analyses results of calcium and manganese

** Un-ionized Ammonia - calculated from laboratory analyses results for ammonia and field measurements for pH and temperature.

*** Water levels shall be measured at staff gauges installed for the designated sampling points.

(2) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the surface water monitoring activities required by subsection (1)

5. GROUNDWATER MONITORING

(1) The *Owner* shall undertake groundwater monitoring in accordance with Conditions 46 (a) and 46 (c) of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time.

(2) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the groundwater monitoring activities required by subsection (1)

6. OPERATIONS AND MAINTENANCE

(1) The *Owner* shall undertake an inspection of the condition of the stormwater management facility, at least once a year, and undertake any necessary cleaning and maintenance to prevent the excessive build-up of sediment and/or decaying vegetation.

(2) The *Owner* shall maintain a logbook to record the results of the stormwater management facility inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site or operational office of the *Owner* for inspection by the Ministry.

(3) The *Owner* shall compare surface water monitoring results obtained from sampling point **GS12** under Condition 4 (1) with the concentrations of the trigger parameters listed in Table 2 to identify any potential leachate impact to surface water discharged from the site to the receiving stream.

Table 2 - Surface Water Trigger Parameters	
Parameter	Concentration (mg/L)
Ammonia (un-ionized)	0.02
Boron	0.20
Iron	0.30
Total Phosphorus	0.05

(4) In the event that a monitoring result for any of the parameters listed in Table 2 exceeds its corresponding trigger concentration, the *Owner* shall immediately initiate the implementation of Condition 53 of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time.

(5) Surface water trigger parameters and concentrations outlined in Table 2 under subsection (3) shall be modified from time to time **only** after receiving a written concurrence from the *District Manager* or an approval from the Director designated for the purpose of Section 37 of the *Environmental Protection Act*.

7. <u>REPORTING</u>

(1) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.

(2) The *Owner* shall prepare, and submit to the *District Manager*, an annual performance report as a separate section of the annual report required under Condition 63 of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all surface water monitoring data and comparison of results to the trigger concentrations outlined in Table 2 under Condition 6(3), including an overview of the success and adequacy of the Page 384 of 661

Works.

(b) a description of any operating problems encountered and corrective actions taken;

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works*;

(d) any other information the District Manager requires from time to time.

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

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Certificate* and continue to operate the *Works* in compliance with it.

4. Condition 4 and 5 are included to enable the *Owner* to evaluate and demonstrate the performance of the *Works*, on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the design objectives specified in the *Certificate* and that the *Works* does not cause any impairment to the receiving watercourse.

5. Condition 6 is included to require that the *Works* be properly operated, maintained, and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.

6. Condition 7 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Certificate*, so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

In accordance with Section 100 of the <u>Ontario Water Resources Act</u>, R.S.O. 1990, Chapter 0.40, as amended, 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 <u>Ontario Water Resources Act</u>, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
 The grounds on which you intend to rely at the hearing in relation to <u>each</u> portion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the works are located;

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

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 2300 Yonge St., 12th Floor P.O. Box 2382 Toronto, Ontario M4P 1E4 AND

The Director Section 53, *Ontario Water Resources Act* Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 24th day of June, 2005

Mohamed Dhalla, P.Eng. Director Section 53, *Ontario Water Resources Act*

SH/ c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Limited Dontario

Content Copy Of Original

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

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A471203 Notice No. 3 Issue Date: December 20, 2018

The Corporation of the City of Clarence-Rockland 1560 Laurier St P.O. Box 909 Clarence-Rockland, Ontario K4K 1P7

Site Location: City of Bourget Landfill 2335 Lalonde Rd Clarence-Rockland City, United Counties of Prescott and Russell K0A 2E0

You are hereby notified that I have amended Approval No. A471203 issued on October 21, 2009 and amended September 9, 2015 and August 19, 2016 for the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares , , as follows:

The proposed amendment is approved to reflect the revised configuration of site facilities as described in Item 33 of Schedule "A".

The following item is added to Schedule "A" of this Approval:

33. Report titled "City of Clarence-Rockland Amendment to Landfill Environmental Compliance Approval A471203, Landfill Site Entrance and Facilities Reconfiguration" and supporting documentation. Prepared by Stantec Consulting Ltd, August 24, 2018.

The reason for this amendment to the Approval is as follows:

The reason for this amendment is to reflect the updated site entrance and facilities reconfiguration.

This Notice shall constitute part of the approval issued under Approval No. A471203 dated October 21, 2009

In accordance with Section 139 of the Environmental Protection Act, 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 142 of the Environmental Protection Act provides that the Notice requiring the hearing 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:

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

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.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 20th day of December, 2018

Mohsen Keyvani, P.Eng. Director appointed for the purposes of Part II.1 of the *Environmental Protection Act* c: District Manager, MECP Ottawa Phillipe Cormier, The Corporation of the City of Clarence-Rockland



Ministry of the Environment and Climate Change Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A471203 Notice No. 2 Issue Date: August 19, 2016

The Corporation of the City of Clarence-Rockland 1560 Laurier St Clarence-Rockland, Ontario K4K 1P7

	iteCity of Clarence-Rockland Waste Disposal Site
Location:	Lot 15, Concession 4
	Clarence-Rockland City, United Counties of Prescott
	and Russell

You are hereby notified that I have amended Approval No. A471203 issued on October 21, 2009 and amended on 9th day of September, 2015 for the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

Amendment to the Existing Approval of Sewage Works No. 3362-6D7PL4

2(17) The *Owner* shall submit an Application for amendment of the ECA No. 3362-6D7PL4, in order to amend this ECA and include the stormwater management works on the *Site* required due to the currently proposed *HHW* depot, new site entrance, weigh scales and other related works. This Application shall be submitted to the *Ministry* by December 31, 2016, as required under Section 20.2 of the EPA.

The reason for this amendment to the Approval is to extend the date to submit the application to amend the ECA No. 3362-6D7PL4.

This Notice shall constitute part of the approval issued under Approval No. A471203 dated October 21, 2009 as amended.

In accordance with Section 139 of the Environmental Protection Act, 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 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

 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;
 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:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The environmental compliance approval number;
- 6. The date of the environmental compliance approval;
- 7. The name of the Director, and;
- 8. 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:

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment and Climate Change 135 St. Clair Avenue West, 1st Floor Toronto, Ontario M4V 1P5
M4V 1P5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.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 19th day of August, 2016

Dale Gable, P.Eng. Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*

RM/

c: Area Manager, MOECC Cornwallc: District Manager, MOECC OttawaJocelyn Chabot, The Corporation of the City of Clarence-Rockland



Ministry of the Environment and Climate Change Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL NUMBER A471203 Notice No. 1 Issue Date: September 9, 2015

The Corporation of the City of Clarence-Rockland 1560 Laurier Street Clarence-Rockland, Ontario K4K 1P7

Site Location: City of Clarence-Rockland Waste Disposal Site Lot 15, Concession 4 City of Clarence-Rockland, United Counties of Prescott and Russell

You are hereby notified that I have amended Approval No. A471203 issued on October 21, 2009 for the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

I. The following definitions are hereby added to the Environmental Compliance Approval No. A471203;

"*Certificate* " or "*Approval* " or "*Environmental Compliance Approval* " means this entire provisional Approval document, issued in accordance with section 39 of the *EPA*, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A".

II. Condition 2(1) of the *Environmental Compliance Approval* No. A471203 is hereby amended by revising the *Site* Configuration such that the revised Condition 2(1) reads as follows;

Operation

- 2(1) The *Site* shall be operated and maintained at all times including management and disposal of all waste in accordance with the *EPA*, *Regulation 347*, the conditions of this *Approval*, and the Report listed as item No. 26 of the Schedule A (including the Site Entrance and Facilities Reconfiguration as shown on the Plan listed as item No. 27). At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.
- III. The following Condition 2(17) is added to the *Environmental Compliance Approval* No. A471203;

Amendment to the Existing Approval of Sewage Works No. 3362-6D7PL4

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- 2(17) The *Owner* shall submit an Application for amendment of the ECA No. 3362-6D7PL4, in order to amend this ECA and include the stormwater management works on the *Site* required due to the currently proposed *HHW* depot, new site entrance, weigh scales and other related works. This Application shall be submitted to the Ministry by June 30, 2016, as required under Section 20.2 of the EPA.
- IV. Condition 8(1) of the *Environmental Compliance Approval* No. A471203 is hereby amended by including the gas monitoring for Weigh Scale House, such that the revised Condition 8(1) reads as follows;

Landfill Gas

- 8(1) Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site* and outside of the Weigh Scale House (as identified in the Figure 2 revised on August 28, 2015, and listed as item No. 32 of the Schedule A), especially enclosed structures which at times are occupied by people. If required, the *Owner* shall ensure that any buildings or structures at the *Site* contain adequate preventive measures to relieve any possible landfill gas accumulation.
- V. Conditions 11(1) and 11(2) of the *Environmental Compliance Approval* No. A471203 are hereby amended such that the revised Conditions 11(1) and 11(2) read as follows;

Household Hazardous Waste (HHW) Depot

- 11(1) The *HHW* depot shall only accept household hazardous wastes and it shall be operated in accordance with the application for a Waste Disposal Site (Transfer) submitted on June 1, 1995 and supporting information, and as modified in the <u>Design Operation and Maintenance Report</u>, dated August 2000, and as amended by Report listed as item No. 26 of the Schedule A.
- 11(2) No household hazardous waste will be stored in HHW Depot for more than 90 days on the Site.
- VI. The following Items are hereby added to Schedule "A" and form part of the *Environmental* Compliance Approval No. A471203;
- 25. Application for Amendment to the ECA #A471203 for Clarence-Rockland Landfill Entrance and Facilities Reconfiguration, dated June 1, 2015 and received on June 15, 2015, including supporting documentation.
- 26. Report entitled "City of Clarence-Rockland Amendment to Landfill *Environmental Compliance Approval*, Landfill Site Entrance and Facilities Reconfiguration, prepared by Stantec Consulting Ltd", dated March 6, 2015.
- 27. Figure 4 included in the Report listed as item No. 26, and entitled as "Site Layout Landfill Site Entrance And Facilities Reconfiguration", signed/stamped by Gerry Lalonde Stantec Consulting Inc. on Jaunary 21, 2015.

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- 28. Email from Gerry Lalonde Stantec Consulting Inc., dated August 12, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, providing additional information regarding the amendment of the Sewage Works ECA No. 3362-6D7PL4.
- 29. Email from Gerry Lalonde Stantec Consulting Inc., dated August 14, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, providing additional information supplementing the Report listed in item No. 25 of Schedule A.
- 30. Email from Denis Longpré, Manager of Environment and Water, Infrastructure and Engineering, City of Clarence-Rockland City, dated August 28, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, providing additional information supplementing the Report listed in item No. 26 of Schedule A.
- 31. Email from Gerry Lalonde Stantec Consulting Inc., dated August 28, 2015, addressed to Khalid Hussain, Ministry of the Environment and Climate Change, regarding landfill gas monitoring adjacent to the Weigh Scale House, and regarding the approval application for Stormwater management works.
- 32. Revised Figure 2 included in the Email listed as item No. 31, and entitled as "Weigh Scale House Floor Plan - Landfill Site Entrance And Facilities Reconfiguration", submitted by Gerry Lalonde Stantec Consulting Inc. on August 28, 2015.

The reason(s) for this amendment to the Approval is (are) as follows:

e

- 1. The reason for amending Condition 2(1), 11(1) and 11(2) of the *Approva* 1 is as follows: all in accordance with the application for approval dated June 1, 2015 and received on June 15, 2015, and including supporting documentation.
- 2. The reasons for Condition 8(1) is to ensure that off site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*
- 3. The reason for adding Condition No. 2(17) is to ensure that the Approval for the site stormwater management works is updated to include the stormwater from the proposed new infrastructure and that the site sewage works are constructed and operated in accordance with the Approval from the Ministry as required under the Environmental Protection Act.

This Notice shall constitute part of the approval issued under Approval No. A471203 dated October 21, 2009.

In accordance with Section 139 of the Environmental Protection Act, 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 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in

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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.

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:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The environmental compliance approval number;
- 6. The date of the environmental compliance approval;
- 7. The name of the Director, and;
- 8. 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:

The Secretary*		The Director appointed for the purposes of Part II.1 of
Environmental Review Tribunal 655 Bay Street, Suite 1500 AND		the Environmental Protection Act
	AND	Ministry of the Environment and Climate Change
Toronto, Ontario	<u> </u>	135 St. Clair Avenue West, 1st Floor
M5G 1E5		Toronto, Ontario
		M11/105

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.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 9th day of September, 2015



KH/

- c: Area Manager, MOECC Cornwall Area Office.
- c: District Manager, MOECC Ottawa District. Gerry Lalonde, P.Eng., Stantec Consulting Ltd.

Le. D. Gobe

Dale Gable, P.Eng. Director appointed for the purposes of Part II.1 of the *Environmental Protection Act*




3 V OCT, 2009

Ministry of the Environment Ministère de l'Environnement

CITÉ CLARENCE-ROCKLAND

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE NUMBER A471203 Issue Date: October 21, 2009

The Corporation of the City of Clarence Rockland 1560 Laurier St Rockland, Ontario The City of Clarence Rockland, Ontario K4K 1P7

Site Location: Lot 15, Concession 4 The City of Clarence Rockland, United Counties of Prescott and Russell

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the use and operation of a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"*Certificate* " means this entire provisional Certificate of Approval document, issued in accordance with section 39 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 EPA as a Director for the purposes of Part V of the EPA;

"District Manager" means the District Manager of the local district office of the Ministry in which the Site is geographically located;

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

"HHW" means household hazardous waste;

"Ministry" means the Ontario Ministry of the Environment;

"NMA " means Nutrient Management Act, 2002, S.O. 2002, c. 4, as amended from time to time;

"*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* and includes its successors or assigns;

"*Owner*" means any person that is responsible for the establishment or operation of the *Site* being approved by this *Certificate*, and includes the Corporation of the City of Clarence Rockland and assigns;

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

"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 or Section 4 of NMA or Section 8 of SDWA.

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

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

"SDWA" means Safe Drinking Water Act, 2002, S.O. 2002, c. 32, as amended;

"*Site* " means the entire waste disposal site, including the buffer lands, contaminant attenuation zone, hazardous waste depot/transfer station and associated buildings and facilities at Lot 15, Concession 4, The City of Clarence Rockland, United Counties of Prescott and Russell; and

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

- a. relevant waste management legislation, regulations and guidelines;
- b. major environmental concerns pertaining to the waste to be handled;
- c. occupational health and safety concerns pertaining to the processes and wastes to be handled;
- d. management procedures including the use and operation of equipment for the processes and wastes to be handled;
- e. emergency response procedures;
- f. specific written procedures for the control of nuisance conditions;
- g. specific written procedures for refusal of unacceptable waste loads; and
- h. the requirements of this *Certificate*.

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

TERMS AND CONDITIONS

1. GENERAL

Compliance

(1) The *Owner* and *Operator* shall ensure compliance with all the conditions of this

Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate*.

In Accordance

(3) Except as otherwise provided by this *Certificate*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

Interpretation

- (4) Where there is a conflict between a provision of any documents listed in Schedule "A" in this *Certificate*, and the conditions of this *Certificate*, the conditions in this *Certificate* shall take precedence.
- (5) 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.
- (6) Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.
- (7) The conditions of this *Certificate* are severable. If any condition of this *Certificate*, or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

Other Legal Obligations

- (8) The issuance of, and compliance with, this *Certificate* does not:
 - (a) relieve any person of any obligation to comply with any provision of any 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 require the *Owner* and *Operator* to furnish any further information related to compliance with this *Certificate*.

Adverse Effect

(9) 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.

(10) Despite an *Owner, Operator* or any other person fulfilling any obligations imposed by this *Certificate, the Owner, Operator or* any other person remains responsible for any contravention of any other condition of this *Certificate* 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.

Change of Ownership

- (11) 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:
 - (a) the ownership of the *Site*;
 - (b) the Operator of the Site;
 - (c) the address of the Owner or Operator; and
 - (d) 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.
- (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.
- (13) In the event of any change in Ownership of the works, other than change to a successor Owner, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

Certificate of Requirement/Registration on Title

- (14) The Owner shall:
 - (a) Within 60 days of the date of the issuance of this *Certificate*, submit to the *Director* for review, two copies of a completed Certificate of Requirement with a registerable description of the *Site*; and
 - (b) 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 *Site* and submit to the *Director* the duplicate registered copy immediately following registration.
- (15) Pursuant to Section 197 of the Environmental Protection Act, neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first

giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

Inspections by the Ministry

- (16) No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the EPA, the PA, the SDWA or the NMA, of any place to which this *Certificate* relates, and without limiting the foregoing:
 - (a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
 - (b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate;*
 - (c) to inspect the *Site*, related equipment and appurtenances;
 - (d) to inspect the practices, procedures, or operations required by the conditions of this *Certificate;* and
 - (e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA*, the *OWRA*, the *PA*, the *SDWA* or the *NMA*.

Information and Record Retention

- (17) Any information requested, by the *Ministry*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request, in a timely manner.
- (18) 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 *Certificate* 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 *Certificate* or any statute, regulation or other legal requirement; or
 - (b) acceptance by the *Ministry* of the information's completeness or accuracy.
- (19) The *Owner* shall ensure that a copy of this *Certificate*, in its entirety and including all its Notices of Amendment, and the most current approved Design and Operation Plan for the *Site*, are retained at the *Site* at all times.

2. SITE OPERATION

Operation

(1) The Site shall be operated and maintained at all time including management and disposal of all waste in accordance with the EPA, Regulation 347, and the conditions of this Certificate. At no time shall the discharge of a contaminant that causes or is likely to

cause an adverse effect be permitted

Signs

- (2) A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:
 - (a) the name of the *Site* and *Owner*;
 - (b) the number of the *Certificate*;
 - (c) the name of the *Operator*;
 - (d) the normal hours of operation;
 - (e) the allowable and prohibited waste types;
 - (f) the telephone number to which complaints may be directed;
 - (g) a warning against unauthorized access;
 - (h) a twenty-four (24) hour emergency telephone number (if different from above); and
 - (i) a warning against dumping outside the Site.
- (3) The *Owner* shall install and maintain signs to direct vehicles to working face, recycling areas, *HHW* depot and composting area.
- (4) The *Owner* shall provide signs at recycling depot, *HHW* depot and composting area informing users what materials are acceptable and directing users to appropriate storage area.

Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic

(5) The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Burning Waste Prohibited

(6) The *Owner* shall ensure that no burning of wastes and wood products is taking place at the *Site*.

Scavenging

(7) Except as authorized by a by-law, the *Owner* shall ensure that no scavenging is taking place at the *Site*.

Site Access

- (8) Waste shall only be accepted at the *Site* from the City of Clarence Rockland and Wards 2 and 4 of the Township of Alfred Plantagenet.
- (9) Waste shall only be accepted from 8:00 a.m. to 5:00 p.m. The Site shall be closed on

Sundays and Holidays. The *Owner* may provide alternative hours of operation within the above hours provided that they are correctly posted at the *Site*, that suitable public notification is given of any change.

- (10) On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and two (2) hours after the hours of operation approved by this *Certificate*.
- (11) With the prior written approval from the *District Manager*, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

Site Security

- (12) No waste shall be received, landfilled or removed from the *Site* unless the operator or attendant is present and supervises the operations during operating hours. The *Site* shall be closed when a site operator is not present to supervise landfilling operations.
- (13) The *Site* shall be operated and maintained in a safe and secure manner. During non-operating hours, the *Site* entrance and exit gates shall be locked.

Visual Screening

- (14) The Owner shall maintain the screening berm constructed along Lalonde Road as per Drawing No. I-3-3 entitled "Waste Contours" and Drawing No. I-3-9 entitled "Road and Berm Sections" of Item 18(a) of Schedule "A" attached to this Certificate.
- (15) The *Owner* shall maintain the trees providing the screening of the *Site* operations from Lalonde Road in the area east of the entrance.

3. EMPLOYEE TRAINING

- (1) A training plan for all employees that operate any aspect of 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 *Certificate*.
- (2) All *Trained* Personnel operating the *HHW* depot shall be trained in the following areas:
 - (a) waste paint identification, analysis information and separating procedures for the wastes being handled at the *HHW* depot;
 - (b) proper storage, handling, sorting and shipping procedures of the wastes being handled at the *HHW* depot; and
 - (c) occupational health and safety concerns pertaining to the wastes to be handled at the *HHW* depot.

4. COMPLAINTS RESPONSE PROCEDURE

- (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 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.

5. EMERGENCY RESPONSE

- (1) Any spills, fires or other emergency situations shall be forthwith reported directly to the *Ministry's* Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.
- (2) In addition, the Owner shall submit, to the District Manager a written report within five (5) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the Site.
- (3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with *O.Reg.* 347.
- (4) 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) adequately maintained and kept in good repair.
- (5) The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

6. RECORD KEEPING AND REPORTING

Daily Log Book

- (1) A daily log shall be maintained in written format and shall include the following information:
 - (a) the type, date and time of arrival, hauler (commercial waste), and quantity (tonnes or volume) of all waste and cover material received at the *Site*;
 - (b) documentation of types, quantities and source of generation of waste received at the *HHW* depot;
 - (c) type, amount and source of waste refused at the *HHW* depot;
 - (d) the area of the *Site* in which waste disposal operations are taking place;
 - (e) a record of litter collection activities and the application of any dust suppressants;
 - (f) a record of the daily inspections; and
 - (g) 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.
- (2) Any information requested, by the *Director* or a *Provincial Officer*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request.

Daily Inspections and Log Book

- (3) An inspection of the entire *Site* and all equipment on the *Site* shall be conducted weekly the *Site* is in operation to ensure that: the *Site* is secure; that the operation of the *Site* is not causing any nuisances; that the operation of the *Site* is not causing any adverse effects on the environment and that the *Site* is being operated in compliance with this *Certificate*. Any deficiencies discovered as a result of the inspection shall be remedied within a reasonable time, including temporarily ceasing operations at the *Site* if needed.
- (4) A record of the inspections shall be kept in a daily log book that includes:
 - (a) the name and signature of person that conducted the inspection;
 - (b) the date and time of the inspection;
 - (c) the list of any deficiencies discovered;
 - (d) the recommendations for remedial action; and
 - (e) the date, time and description of actions taken.
- (5) A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Annual Report

(6) 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*, by March 30 of the year following the period being reported upon.

- (7) The Annual Report shall include the following:
 - (a) calculations of the volume of waste landfilled, the daily and intermediate covers, the final cover and the overall volume of the site capacity used during the reporting period;
 - (b) a comparison of the actual capacity used to the estimates of the capacity estimated;
 - (c) an estimate of the remaining site life;
 - (d) any changes in operations, equipment, or procedures used at the *Site*, any operating problems encountered and corrective actions taken;
 - (e) details on the monitoring program undertaken, outlining monitor locations, analytical parameters sampled, and frequency of sampling;
 - (f) an analysis and interpretation of the surface water and groundwater monitoring data, a review of the adequacy of the monitoring program, conclusions of the monitoring data, and recommendations for any changes that may be necessary,
 - (g) summary of inspections undertaken at the *Site*;
 - (h) summary of any public complaints received and the responses made;
 - (i) summary of activities undertaken at the *HHW* depot;
 - (j) a discussion of cover stockpile activities including use, timing, locations and erosion protection;
 - (k) status update on the final cover placement, and seeding activities undertaken in the closed sections of the Landfill;
 - (1) a discussion of the waste diversion performance achieved by the *Owner* reported on a per capita basis;
 - (m) a statement as to compliance with all conditions of this *Certificate* and the other relevant Ministry's groundwater and surface water requirements;
 - (n) recommendations respecting any proposed changes in the operation of the *Site*; and

(0) any other information that the *Regional Director* or the *District Manager* may require.

7. LANDFILL DESIGN AND DEVELOPMENT

Approved Waste Types

- (1) Only solid non-hazardous municipal waste including asbestos, dewatered sewage sludge and contaminated soil as defined under *Reg.* 347 shall be accepted at the *Site* for landfilling.
- (2) No liquid industrial waste or hazardous wastes as defined under O. Reg. 347 and O.Reg. 558 shall be disposed at the *Site*.
- (3) The *Owner* may continue to accept liquid and solid household hazardous wastes and products requiring special handling or disposal practices, at the *HHW* depot.
- (4) The *Owner* shall develop and implement a program to inspect waste to ensure that the waste received at the *Site* is of a type approved for acceptance under this *Certificate*.
- (5) The Owner shall ensure that all loads of waste are properly inspected by Trained personnel prior to acceptance at the Site and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager, in writing, of load rejections at the Site within five (5) business days from their occurrence.

Capacity

- (6) (a) As approved by the Environmental Assessment dated October 21, 1999, the total additional waste disposal capacity of the expanded Site is 740,000 cubic metres of waste, daily cover and intermediate cover, but excluding the final cover.
 - (b) The total approved waste disposal capacity for the Site is 974,000 cubic metres of waste, daily cover and intermediate cover, but excluding the final cover. This total waste disposal capacity includes the additional disposal capacity from Condition (6)(a), above, and the waste disposed of prior to the above Environmental Assessment approval.

Waste Placement

- (7) No waste shall be placed below existing ground within the fill area to maintain a vertical separation between the groundwater table and the waste.
- (8) Disposal of waste shall only occur within the areas as delineated on Drawing Fig. No. I-3-3 of Item 18(a) of Schedule "A" attached to this *Certificate*.

(9) No waste shall be placed above the final contours shown on Drawing - Fig. No. I-3-4 of Item 18(a) of Schedule "A" attached to this *Certificate*.

Service Area

(10) Only waste that is generated within the boundaries of the City of Clarence Rockland and Wards 2 and 4 of the Township of Alfred Plantagenet may be accepted at the *Site*.

Cover

 (11) Daily and interim cover material shall be applied in accordance with Section 3.3 of Item 14(a) of Schedule "A" attached to this *Certificate* and as follows:

Daily cover

(a) By the end of each working day, the entire working face shall be covered with a minimum thickness of 100 mm of daily cover.

Interim cover

(b) In areas where landfilling has been temporarily discontinued for twelve (12) months or more, a minimum thickness of 300 mm of intermediate cover shall be placed.

Final Cover

- (c) Final Cover In areas where landfilling has been completed to final contours, a minimum 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (final cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.
- (12) (a) Contaminated soil that is not a hazardous waste as defined by O.Reg. 347, either mixed with clean soil or own its own, and biosolids from the City of Clarence Rockland's Water Pollution Control Plant mixed with soil, compost and/or wood chips, may be used as daily cover provided that its use does not cause any adverse effects;
 - (b) Subject to Condition 12 (a), if the application of the contaminated soil as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a *Provincial Officer*, the use of the contaminated soil shall be immediately discontinued and only clean soil or biosolids mixed with soil, compost and/or wood chips shall be used as daily cover;
 - (c) Subject to Condition 12 (a), if the application of the biosolids as a daily cover causes operational problems, odours or other environmental adverse

effects as verified by a *Provincial Officer*, the use of the biosolids shall be immediately discontinued;

- (d) Compost mixed with clean soil and wood chips mixed with clean soil may also be used as alternative material for daily cover; and
- (e) The *Owner* may mix de-watered sludge with the topsoil. The sludge shall be accounted for in the total volume of waste that was approved for landfilling at the *Site*. If the use of de-watered sludge causes an adverse effect, as verified by a *Provincial Officer*, its use shall be discontinued and only clean soil shall be used.
- (13) Except for the types already approved by Condition 7(12). any alternative materials to soil may be used as weekly and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the *Owner* to the *Director*, copied to the *District Manager* and as approved by the *Director* via an amendment to this *Certificate*. The alternative material shall be non-hazardous according to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:
 - (a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
 - (b) Provision for an aesthetic condition of the landfill during the active life of the *Site;*
 - (c) Provision for vehicle access to the active tipping face; and
 - (d) Compatibility with the design of the *Site* for groundwater protection, leachate management and landfill gas management.

8. LANDFILL MONITORING

Landfill Gas

- (1) Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site*, especially enclosed structures which at times are occupied by people. If required, the *Owner* shall ensure that any buildings or structures at the *Site* contain adequate preventive measures to relieve any possible landfill gas accumulation.
- (2) Landfill gas monitoring shall be undertaken according to the program described in Section 5.4 of Item 18(a) of Schedule "A" attached to this *Certificate*.
- (3) Any changes to the landfill gas monitoring program shall be submitted to the *Director* for approval, prior to their implementation.

Compliance Limits

(4) The *Site* shall be operated in such a way as to ensure compliance with the following:

- (a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site*; and
- (b) Provincial Water Quality Objectives included in the July 1994 publication entitled Water Management Policies, Guidelines, Provincial Water Quality Objectives, as amended from time to time or limits set by the Regional Director, for the protection of the surface water.

Surface Water and Ground Water

- (5) The Owner shall monitor groundwater as per Appendix G, Item 24 of Schedule "A".
- (6) The Owner shall monitor surface water as per Appendix G, Item 24 of Schedule "A".
- (7) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.
- (8). The Owner shall abide by the Certificate of Approval for Sewage Works under Section 53 of <u>Ontario Water Resources Act</u>, R.S.O. 1990 issued to construct, operate, maintain and monitor the proposed wetland and its discharge to the surface water regime, designed to control and treat storm water run-off and leachate-impacted groundwater at the Site.
- (9) Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

Groundwater Wells and Monitors

- (10) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.
- (11) Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.
- (12) Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner*, as required.
 - (a) Unless a well is being abandoned, the *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.
 - (b) All monitoring wells which are no longer required as part of the groundwater

monitoring program, and have been approved by the *District Manager* for abandonment, shall be decommissioned by the *Owner*, as required, in accordance with *O.Reg. 903*, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

- (13) (a) The Owner shall follow the site-specific trigger mechanism program for groundwater contingency measures outlined in Appendix A, Item 20 of Schedule "A" and as revised by MOE correspondence in Appendix "A", Item 23 of Schedule "A".
 - (b) The Owner shall follow the site-specific trigger mechanism program for surface water contingency measures outlined in Appendix A of Item 20 of Schedule "A" and as revised by MOE correspondence in Appendix "A", Item 23 of Schedule "A".
- (14) No changes to the site-specific trigger mechanism shall be implemented prior to receiving approval from the *Director*.
- (15) In the event of a confirmed exceedence of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, the *Owner* shall immediately notify the *District Manager*, and 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.
- (16) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken:
 - (a) The Owner shall notify the District Manager, in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedences;
 - (b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *District Manager* for approval; and
 - (c) The contingency measures shall be implemented by the *Owner* upon approval by the *District Manager*.
- (17) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the *Director* via an amendment to this *Certificate*.

Changes to the Monitoring Plan

- (18) 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. The *Owner* shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.
- (19) Within sixty (60) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, 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 the changes to the monitoring program, to the *Director* requesting the *Certificate* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.
- (20) 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 *Certificate*.

9. CLOSURE PLAN

- (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;
 - (vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; 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, 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; and
- (f) an updated estimate of the contaminating life span of the *Site*, based on the results of the monitoring programs to date.
- (2) Unless amended by the closure plan, closure of the Landfill will be done in accordance with the final contours shown on Figure I-3-4 of Item 18(a) of Schedule "A" attached to this *Certificate*.
- (3) The *Site* shall be closed in accordance with the closure plan as approved by the *Director*.

10. WASTE DIVERSION

- (1) The *Owner* shall direct as much waste from landfilling as is practical and affordable with a view to meeting the Provincial Waste Diversion Objectives, developed by the *Ministry* and as changed from time to time.
- (2) The *Owner* shall submit an annual Waste Diversion Statement as part of its Annual Report described in Condition No. 6 (6), and include the following:
 - (a) updating summary of per capita waste diversion activities and quantities of waste diverted from disposal; and
 - (b) proposed waste diversion program for the next year that describes estimates of waste to be diverted.

11. HOUSEHOLD HAZARDOUS WASTE DEPOT

- The *HHW* depot shall only accept household hazardous wastes and it shall be operated in accordance with the application for a Waste Disposal Site (Transfer) submitted June 1, 1995 and supporting information and as modified in the <u>Design Operation and Maintenance Report</u>, dated August 2000.
- (2) No wastes shall be received at the *HHW* depot prior to April 1, or after October 31 and no waste shall be stored at the *HHW* depot from December 31 to March 31.
- (3) (a) No PCB's shall be accepted at this *HHW* depot. Oil and oil-based paints which have been manufactured prior to 1972, or whose manufacturing date cannot be determined may contain PCB's and shall be handled in the manner prescribed:
 - (i) The oil and oil-based paints shall not be mixed (bulked) with other paints prior to testing. Paints which are lab-packed are not considered to be mixed under this *Certificate*.

- (ii) The oil and oil-based paints shall be tested for PCB's content and shall be handled in the manner outlined in sub condition (a)(iii) if found to contain PCB's.
- (iii) If the oil and oil-based paints are found to have PCB's at or above levels identified in sub condition (a) (iv), it shall be forthwith reported to the *District Manager* and shall be managed in accordance with Ontario Regulation 362/92 and stored or removed from the *HHW* depot to an approved PCB's storage site, in accordance with written instructions from the *District Manager*.
- (iv) The oil and oil-based paints shall not be distributed for reuse if they have any measurable PCB's content. The oil and oil-based paint is considered to be a PCB's waste, if measured levels are equal to or greater than 50 parts per million.
- (b) Except as specified in sub condition (a) (iv), paints collected at the HHW depot may be returned or sold to the general public for reuse provided all transactions are recorded by invoice. Information on the type and volume of paint returned to the public through this HHW depot shall be recorded in the report specified in Condition No. 6 (6).

Storage

- (4) (a) The Owner shall ensure that the wastes are stored in a safe and secure manner, that the operation of the HHW depot does not interfere with any other activities undertaken at the Site and that the wastes are properly handled, packaged or contained so as not to pose any threat to the general public, Site personnel and the environment.
 - (b) No storage facilities other than those approved under this *Certificate* shall be used and fixed storage facilities shall not be moved, replaced or altered.
 - (c) All storage buildings and tanks shall be clearly marked indicating the type and nature of the hazardous waste stored. All points of access to the storage facilities shall be posted to warn that the area contains hazardous materials. Smoking restrictions shall be adhered to and non-smoking signs shall be posted as required by Regulation.
 - (d) All storage buildings shall be properly ventilated and shall be constructed in compliance with fire regulations, municipal by-laws and approvals and in accordance with Ministry of Labour guidelines.
 - (e) All household hazardous waste storage tanks and buildings shall be maintained

under lock and key and access to these facilities shall be limited to trained Site personnel.

- (5) Wastes that are collected and stored shall be in amounts which can be safely handled at the *HHW* depot. In the event that larger amounts are received than anticipated, the *Owner* shall have extra drums and lab-packed containers available on the premises for the storage of the additional waste collected. When the *HHW* depot capacity is reached, the *Owner* shall make arrangements for the removal of waste from the *HHW* depot as soon as possible, but in any event, within five (5) working days.
- (6) Except as specified under Conditions 11(3)(a)(iii) and (b), all waste collected shall be transported from the *Site* by an approved waste management system and disposed of at waste landfill, transfer and processing sites certified to accept these types of wastes.

12. COMPOSTING

- (1) Composting operations at the *Site* shall be carried out in a manner as not to interfere with normal waste disposal operations as approved in this *Certificate*.
- (2) Should the ensuing compost be destined for use by the general public, composting operations at the *Site* shall be carried out in accordance with the Ministry's <u>Interim</u> <u>Guidelines for the Production and Use of Aerobic Compost in Ontario</u>, dated November 1991, and revised from time to time.
- (3) Should the ensuing compost be destined for use as alternative cover material at the *Site*, composting operations at the *Site* must be carried out in a manner that does not cause groundwater or surface water contamination, offensive odours or encourage the presence of vermin or any other adverse effect.

13. LIAISON COMMITTEE

- (1) The Owner shall take all reasonable steps to establish, maintain and participate in a Site Liaison Committee, which is to function within the Terms of Reference, as proposed in Appendix C of Item 18(a) of Schedule "A" attached to this Certificate. The public shall be given an opportunity to comment and provide input before the Terms of Reference are finalized and ready for implementation. The Terms of Reference shall be amended from time to time according to an appropriate procedures included in the Terms of Reference.
- (2) A copy of the Terms of Reference shall be provided to the *District Manager*.
- (3) The Site Liaison Committee shall serve as a focal point for dissemination, consultation, review and exchange of information regarding the operation of the *Site*, results of the environmental monitoring, maintenance, complaint resolution and any new approvals or amendments to the existing approvals related to the operation of this *Site*.

SCHEDULE "A"

- 1. Application for a Certificate of Approval for a Waste Disposal Site, signed by Marco Lalonde, Township of Clarence, and dated July 22, 1992, for an interim expansion of the landfill with the following supporting documentation prepared by McNeely Engineering Consultants Limited and Golder Associates Limited:
 - (a) Volume I Request for Exemption Environmental Assessment Act, dated September 1992
 - (b) Volume II Site Hydrogeology, dated July 1992
 - (c) Volume III Site operations, Development and Closure Plans, dated July 1992
 - (d) Volume IV Natural Environmental Evaluation, dated July 1992
 - (e) resolution #5259
- 2. Report entitled "Hydrogeological Activities, September 1992 to November 1992, Landfill Site Lot 15, Concession IV, Township of Clarence, Ontario" prepared by Golder Associates Limited and dated January 1993.
- 3. Reply to MOEE Comments on Interim Expansion Township of Clarence Landfill Site, prepared by the Township of Clarence and dated May 4, 1993.
- 4. Application for a Certificate of Approval for a Waste Disposal Site, signed by Marco Lalonde, Township of Clarence, and dated October 6, 1993, for an interim expansion of the landfill.
- 5. Letter from Gerry Lalonde, McNeely Engineering Consultants Limited to E. Zaltsberg Ministry of the Environment, dated October 15, 1993, to further clarify the changes in the landfill size and in the total site size.
- 6. Report entitled "1993 Site Operations and Hydrogeological Monitoring Program, Landfill Site Lot 15, Concession IV, Township of Clarence, Ontario", dated January 1994 and prepared by Golder Associates Ltd.
- 7. Report entitled "Addendum Report on Waste Management and Hydrogeological Issues and Comments on Draft Certificate of Approval Application for interim Expansion Landfill Site, Lot 15, Concession IV, Township of Clarence, Ontario", dated March 1994 and prepared by Golder Associates Limited and McNeely Engineering Consultants Limited and revised Figure 2: "Site Plan and Study Area", dated March 22, 1994.
- 8. Report entitled "Addendum Report", dated April 1994 and prepared by Golder Associates Limited and McNeely Engineering Consultants Limited as an addendum to March 1994 Addendum Report on Waste Management and Hydrogeological Issues.
- 9. Application for a Certificate of Approval for a Waste Disposal Site, signed by Jean-Denis Hurtubise, Township of Clarence, and dated June 1, 1995, to establish a Household Hazardous Waste Transfer Depot to service the Township of Clarence.

- 10. Letter to Kim Lendvay, MOEE Eastern Region, from Gerry Lalonde, McNeely Engineering Consultants Ltd., dated July 7, 1995 re: Response to MOEE letter dated June 26, 1995.
- 11. Letter to Michel Dostaler, Township of Clarence from Kim Lendvay, MOEE Eastern Region, dated June 26, 1995 re: Request for additional information.
- 12. A report entitled "Township of Clarence Household Hazardous Waste Transfer Station Engineering Report, Building Plan and operation and Management Plan"; prepared by McNeely Engineering consultants Ltd, and dated October 1995.
- 13. A three page document entitled "Supporting Information to Application for Amendment to Certificate of Approval No. A 471203, Owner of Clarence-Rockland, February 16, 1998" signed by Gerry Lalonde, P.Eng of Stanley Consulting Group Ltd.
- 14. A three page document entitled, Supporting Information to Application for Amendment to Certificate of Approval No. A 471203, City of Clarence Rockland, February 16, 1998 signed by Gerry Lalonde, P.Eng. of Stanley Consulting Group Ltd.
- 15. Application for Approval of a Waste Disposal Site dated February 17, 1998, and signed by R. Sarazin of the Corporation of the City of Clarence Rockland.
- 16. Letter dated March 12, 1998, from R. Sarazin of the Corporation of the City of Clarence Rockland to Director Approvals, Ministry of the Environment.
- 17. Application for Approval of a Waste Disposal Site, dated April 30, 1999 and the attached supporting documents.
- 18. Application for a Certificate of Approval of a Waste Disposal Site dated September 11, 2000 and signed by R. Sarazin, The Corporation of the City of Clarence Rockland, for expansion to the existing landfill site, with the following supporting documentation:
 - (a) Volume I Report entitled "City of Clarence Rockland, EPA Landfill Expansion, Design, Operation and Maintenance Report", dated August 2000, prepared by Stantec Consulting Ltd.
 - (b) Volume II Report entitled "Hydrogeological and Geotechnical Design Considerations, The City of Clarence Rockland, Landfill Expansion, Application under the Environmental Protection Act, The City of Clarence Rockland, Ontario", dated September 2000, prepared by Golder Associates Ltd.
 - (c) Volume III Report entitled "Design and Operation, Geotechnical Memorandums, The City of Clarence Rockland, Landfill Expansion, Application under the Environmental Protection Act, The City of Clarence Rockland, Ontario", dated September 2000, prepared by Golder Associates Ltd.

- (d) Volume IV Report entitled "The City of Clarence Rockland, EPA Landfill Expansion -Year 2000, Appendix IV", dated August 2000, prepared by Stantec Consulting Ltd.
- 19. Facsimile transmission from Gerry Lalonde, Stantec Consulting Ltd. to Roman Krawczyniuk, Ontario Ministry of the Environment, dated November 20, 2000, containing additional information related to review of the potential noise impacts.
- 20. Report entitled "2001 Annual Report on Groundwater and Surface Water Monitoring Program, Clarence-Rockland Landfill Site, City of Clarence-Rockland, Ontario", dated March 2002 and prepared by Golder Associates Ltd.
- 21. Application for a waste disposal site amendment dated August 26, 2003, signed by Richard Sarazin, Director of Physical Services, from the City of Clarence Rockland. re: using biosolids as alternative daily cover.
- 22. Letter dated February 11, 2004, signed by Gerry Lalonde, Stantec Consulting Ltd. to A. Mobberley, MOE. re: additional biosolids handling procedures and mixing locations.
- 23. Report entitled "City of Clarence-Rockland 2008 Annual Operations Monitoring Report", dated March 2009 and prepared by Stantec Consulting Ltd.
- 24. Report entitled "2008 Annual Report on Groundwater and Surface Water Monitoring Program, Clarence-Rockland Landfill Site, City of Clarence-Rockland, Ontario", dated March 2009 and prepared by Golder Associates Ltd.

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

GENERAL

- 1. The reason for Conditions 1(1), (2), (4), (5), (6), (7), (8), (9), (10), (17), (18) and (19) is to clarify the legal rights and responsibilities of the *Owner* and *Operator* under this Certificate of Approval.
- 2. The reasons for Condition 1(3) 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 reasons for Condition 1(11) 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.
- 4. The reasons for Condition 1(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 Certificate of Approval.

- 5. The reason for Condition 1(13) is to ensure that the successor is aware of its legal responsibilities.
- 6. Conditions 1 (14) and (15) 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.
- 7. The reason for Condition 1(16) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act*, the *OWRA*, the *PA*, the *NMA* and the *SDWA*.

SITE OPERATION

- 8. The reasons for Conditions 2(1), 2(5) and 6(3) 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.
- 9. The reason for Conditions 2 (2), 2(3) and 2(4) is to ensure that users of the *Site* are fully aware of important information and restrictions related to *Site* operations and access under this *Certificate*.
- 10. The reason for Condition 2(6) 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.
- 11. Condition No. 2 (7) is included to ensure protection of public health and safety, and minimization of potential damage to environmental controls, monitoring and other works at the Site due to uncontrolled removal of materials from waste at the Site.
- 12. The reasons for Condition 2(8), 2(9) and 2(10) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.
- 13. The reasons for Condition 2(11) and 2(12) are to ensure that the *Site* is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person 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.
- 14. Conditions Nos. 2 (13), 2(14) and 2(15) are included to ensure that the Site is designed and operated in a way that does not result in a hazard or nuisance to the natural environment or any persons.

EMPLOYEE TRAINING

15. The reason for Conditions 3(1) and 3(2) 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.

COMPLAINTS RESPONSE PROCEDURE

16. The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this *Site* are responded to in a timely and efficient manner.

EMERGENCY RESPONSE

- 17. Conditions 5(1) and 5(2) are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.
- 18. Conditions 5(3), 5(4) and 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

RECORD KEEPING AND REPORTING

- 19. The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Certificate of Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the *EPA* and its regulations.
- 20. The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of *Site* inspections are recorded and maintained for inspection and information purposes.
- 21. The reasons for Conditions 6(6) and 6(7) 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.

LANDFILL DESIGN AND DEVELOPMENT

- 22. The reason for Conditions 7(1) to 7(6) inclusive and 7(10) 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.
- 23. Conditions Nos. 7(7), 7(8) and 7(9) are included to specify restrictions on the extent of landfilling at this *Site* based on the Owner's application and supporting documentation.

- 24. The reasons for Condition 7(11) are to ensure that daily/weekly and intermediate cover are 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 reasons for Condition 7 (12) and 7(13) is to specify the approved alternative cover material and to specify requirements for use of alternative cover material at the *Site*.

LANDFILL MONITORING

- 26. Reasons for Condition 8(1), 8(2) and 8(3) are to ensure that off site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*.
- 27. Condition 8(4) is included to provide the groundwater and surface water limits to prevent water pollution at the *Site*.
- 28. Conditions 8(5) to 8(9) inclusive are included to require the Owner to demonstrate that the *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.
- 29. Conditions 8(10), 8(11) and 8(12) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.
- 30. Conditions 8(13) to 8(17) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.
- 31. Reason for conditions 8(18), 8(19) and 8(20) is to streamline the approval of the changes to the monitoring plan.

CLOSURE PLAN

32. The reasons for Condition 9 are to ensure that final closure of the *Site* is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

WASTE DIVERSION

33. Condition 10 is included because they were proposed by the Environmental Assessment Board's report entitled "*Township of Clarence - Clarence Landfill Site, Reasons for Decisions and*

<u>Decisions</u> ", dated May 18, 1994, prepared for the hearing that was required for the Provisional Certificate of Approval for a Waste Disposal Site No. A471203 dated June 20, 1994.

HOUSEHOLD HAZARDOUS WASTE DEPOT

- 34. Conditions Nos. 11(1) and 11(2) are included to ensure that the HHW depot is operated in accordance with the application and supporting documentation and not in a manner which the Director has not been asked to consider.
- 35. Conditions Nos. 11(3), 11(4) and 11(5) are included to ensure that the HHW depot is used only to collect and handle approved wastes from approved HHW depot users and that the waste is stored in a secure and safe manner.
- 36. Condition No. 11(6) is included to insure that all waste is transported and disposed of in an environmentally acceptable manner in accordance with legislation governing the handling of the waste material.

COMPOSTING

37. Condition No. 12 is included to ensure that the Owner undertakes the composting activities in accordance with Ministry's requirements and in a manner that would not result in a hazard or nuisance to the natural environment or any persons.

LIAISON COMMITTEE

38. Condition No. 13 is included to ensure that the Owner takes all reasonable steps to establish a forum for the exchange of information and public dialogue on activities carried out at the Site, so that this open communication with the public and local authorities helps in maintaining high standards for Site operations and provides environmental protection.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A471203 issued on December 13, 1991 and June 20, 1994 and associated notices.

In accordance with Section 139 of the <u>Environmental Protection Act</u>, R.S.O. 1990, Chapter E-19, as amended, 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 142 of the <u>Environmental Protection</u> <u>Act</u>, provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
- 2. The grounds on which you intend to rely at the hearing in relation to eachportion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;

The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, 15th Floor Toronto, Ontario M5G 1E5

<u>AND</u>

The Director Section 39, *Environmental Protection Act* Ministry of the Environment 2 St. Clair Avenue West, Floor 12A Toronto, Ontario M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 21st day of October, 2009

les Gebrezhi

Tesfaye Gebrezghi, P.Eng. Director Section 39, Environmental Protection Act

RM/

8.

c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Ltd.

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Ministry Ministère of the de Environment l'Environnement AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE NUMBER A471203 Notice No. 4

TIME: .

RECEIVED

The Corporation of the City of Clarence-Rockland 1560 rue Laurier Rockland, Ontario K4K 1P7

APR 0 2 2004

STANTEC

Site Location: City of Clarence-Rockland Municipal Waste Disposal Site Lot 15, Concession 4 Clarence-Rockland City, United Counties of Prescott and Russell

You are hereby notified that I have amended Provisional Certificate of Approval No. A471203 issued on December 13, 1991 for a 12 hectare landfilling area within a total site area of 50 hectares, as follows:

Condition 20 is hereby amended to read as follows:

- 20. a) Contaminated soil that is not a hazardous waste as defined by O.Reg. 347 and O. Reg. 558, either mixed with clean soil or own its own, and biosolids from the City of Clarence-Rockland's Water Pollution Control Plant mixed with soil, compost and/or wood chips, may be used as daily cover provided that its use does not cause any adverse effects;
 - b) Subject to Condition 20 (a), if the application of the contaminated soil as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a Provincial Officer, the use of the contaminated soil shall be immediately discontinued and only clean soil or biosolids mixed with soil, compost and/or wood chips shall be used as daily cover;
 - c) Subject to Condition 20 (a), if the application of the biosolids as a daily cover causes operational problems, odours or other environmental adverse effects as verified by a Provincial Officer, the use of the biosolids shall be immediately discontinued and only clean soil contaminated shall be used as daily cover; and
 - d) Compost mixed with clean soil, and wood chips mixed with clean soil may also be used as alternative material for daily cover.

The following items are hereby added to schedule "A".

16. Application for a waste disposal site amendment dated August 26, 2003, signed by Richard Sarazin, Director of Physical Services, from the City of Clarence Rockland. re: using biosolids as alternative

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daily cover.

17. Letter dated February 11, 2004, signed by Gerry Lalonde, Stantec Consulting Ltd. to A. Mobberley, MOE. re: additional biosolids handling procedures and mixing locations.

The reason for this amendment to the Certificate of Approval is as follows:

37. The reason for this amendment is to allow the use of biosolids from the City's Water Pollution Control Plant to be used as alternative daily cover at the City of Clarence-Rockland Municipal Waste Disposal Site, Certificate of Approval No. A471203.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A471203 dated December 13, 1991

In accordance with Section 139 of the <u>Environmental Protection Act</u>, R.S.O. 1990, Chapter E-19, as amended, 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 142 of the <u>Environmental Protection Act</u>, provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
- 2. The grounds on which you intend to rely at the hearing in relation to <u>each</u> portion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

The Secretary*		The Director
Environmental Review Tribunal		Section 39 Environmental Protection dat
2300 Yonge St., 12th Floor		Ministry of Environment and Environ
P.O. Box 2382	AND	2 St. Clair Avenue West Elser 12A
Toronto, Ontario		Z St. Clair Avenue West, Floor 12A
M4P 1E4		Toronio, Omario
		M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 23rd day of March, 2004

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THIS	NOTICE WAS MAILED	
ON 1	March 30, 2004	
2c		
(Signed)		

AM/

c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Ltd. 🗸

Ian Parrott, P.Eng. Director Section 39, *Environmental Protection Act*

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APPENDIX C

MECP Correspondence

P.O. Box 22032 Kingston, Ontario K7M 8S5 613/549-4000 or 1-800/267-0974 Fax: 613/548-6908 Ministère de l'Environnement et de l'Action en matière de changement climatique

C.P. 22032 Kingston (Ontario) K7M 8S5 613/549-4000 ou 1-800/267-0974 Fax: 613/548-6908



MEMORANDUM

26 August 2016

- TO: Marc Robert Senior Environmental Officer Cornwall Area Office Eastern Region
- FROM: Lauren Forrester Surface Water Specialist Technical Support Section Eastern Region
- RE: Clarence-Rockland WDS 2012-2015 Annual Operations Monitoring Reports and Annual Reports on Groundwater and Surface Water Monitoring Program Lot 15, Concession IV, Clarence Township City of Clarence Rockland ECA No. A471203 and ECA No. 3362-6D7PL4

As requested, I have reviewed the City of Clarence-Rockland 2012, 2013, 2014 and 2015 Annual Operations Monitoring Reports, prepared by Stantec Consulting Ltd.. Interpretation of ground and surface water monitoring results is included as Part B to these reports and is prepared by Golder Associates Ltd. (GAL).

I have also consulted the most recent groundwater and surface water comments provided by this office, as well as the latest compliance inspection report (July 16, 2014). Surface water comments were last provided from this office in a memorandum prepared by Gillian Dagg-Foster, dated November 4, 2010 in review of the 2008 and 2009 reports. Groundwater matters were reviewed in a memorandum prepared by Thomas Guo and Robert Holland dated July 29, 2013. The following comments are provided with respect to surface water concerns.

Background

The Clarence-Rockland Waste Disposal Site (WDS) operates under provisional Environmental Compliance Approval (ECA) No. A471203, last amended August 19, 2016. An on-site pond / wetland for collection of leachate impacted water and stormwater is operated under ECA 3362-6D7PL4, issued June 24, 2005. Notice 2 to that Approval, dated August 19, 2016, requires that an application to amend be submitted by December 30, 2016 to amend the ECA to include the stormwater management works on the site.

Cover material is applied on the fill area on a daily basis. Daily cover is described as a mixture of wood chips, dewatered sludge from the Rockland sewage treatment plant, and sand. Stantec estimates the landfill to have 33 years of remaining service life as of 2015.

Snow disposal was formerly undertaken on the west portion of the site (e.g. in 2005, 2006, 2008, 2009). Establishment of a long-term snow disposal facility at the southwest corner of the property was proposed in 2011, but was not supported by the surface water reviewer (Dagg-Foster, 2012). It appears that the City currently stockpiles snow on the eastern corner of the property, north of the former Brazeau property and that this location has been in use since 2002. The snow pile is located hydraulically downgradient of the landfill area, based on the inferred groundwater flow direction, and surface flow from the snow pile is captured by the realigned ditch, described below.

Based on groundwater elevation data, there appears to be a groundwater divide which traverses the central portion of the site. To the west, leachate impacted groundwater migrates westward towards the stream, which has the potential to be impacted by leachate. The primary path for leachate migration is eastward in overburden, with potentially leachate-impacted groundwater migrating eastward from the fill area and on-site pond towards the snow stockpile area and southeast ditch along Labelle Road. A vertical cut-off wall along the southern boundary is intended to prevent groundwater impacts at that boundary; however, the actual effectiveness is unclear based on the most recent groundwater review (Guo and Holland, 2013).

Local surface water drainage is to the north by way of a stream on the west side of the site and a ditch on the southeast side of the site. The ditch was realigned in 2009 to flow on the south and east (as opposed to west and north) sides of the snow storage area, within the property boundaries. The ditch and stream converge north of the site and flow eastward into Cobbs Lake Creek approximately 1.7 km downstream. Cobbs Lake Creek flows south/southeast to the South Nation River, approximately 10.3 km downstream.

Visual signs of leachate impact to the ditch on the west side of the property were documented in the 2014 compliance inspection. City staff attributed this observation to a lack of interim capping on Cell 2 following the removal of cover from Cell 1 to allow placement of waste in Cell 2. The inspection report also states that leachate was observed in the east drainage ditch, but no further mention is made of the eastern watercourse and I suspect this may have been in reference to the on-site pond or its inflow and not the ditch at the east property boundary.

Leachate has been characterized based on water quality in monitoring well P5B-01. Leachate indicator parameters relevant to surface water receptors have been identified as alkalinity, DOC, TDS, unionized ammonia, hardness, total phosphorus, chloride, sodium, sulphate, boron, conductivity, iron, lead, manganese and sodium. The groundwater reviewer recommended that COD also be included as a leachate indicator for this site.

The site is subject to both groundwater and surface water trigger mechanisms.

Results and Discussion

For 2015, samples were collected from S1 and S2 (west stream), GS6 and GS17 (background, west), and GS11, GS12 and GS15 (on-site pond). No changes have been made to the monitoring program over the past four years (2012-2015). Three monitoring locations in the ditch on the southeast portion of the property were eliminated from the monitoring program following realignment of the ditch.

Background for the west stream (GS6) and background for the ditch (GS17) have both been characterized as having concentrations of total phosphorus, iron and aluminum exceeding the Provincial Water Quality Objectives (PWQO) in the majority of samples. This is not unusual for a surface watercourse, especially in agricultural areas, but the observed concentrations are beyond what would be considered typical. Although the PWQO were occasionally exceeded, the background concentrations for metals (75th percentiles) were below the respective PWQO.

West Stream and Ditch

GAL report that S1 and S2 exhibit seasonal variations, with highest concentrations during the summer when water levels are lowest. This is reasonable. Concentrations of key indicator parameters were reported to be similar at S1, S2, GS6 and GS17, indicating that the western stream is not measurably impacted by leachate. Based on an independent review of the submitted data, I agree.

Concentrations of most key indicator parameters at SW2 are similar to GS6 and GS17. Only iron, total phosphorus and dissolved aluminum consistently exceed the PWQO at SW2, with concentrations similar to upstream. Some key indicator parameters were high in November 2014 at both at S2 and to a lesser extent GS17 compared to historical data, but have returned to normal range in 2015 (e.g. many metals, total phosphorus, nitrogen compounds). This should be monitored carefully moving forward.

On-site Pond

GAL report that the on-site pond's outflow was blocked as part of construction activities in 2005 to prevent surface water flow off-site. The pond is intended to dilute leachate-impacted groundwater prior to discharge via groundwater flow east of the pond. Stantec report that an inspection of the wetland in the summer of 2015 revealed abundant emergent vegetation in each of the five rows of the wetland.

GS11, GS12, GS15 in the on-site pond are interpreted to be leachate impacted. At GS11 and GS12, GAL report elevated concentrations of almost all leachate indicator parameters and a long-term increasing trend up to 2011, followed by stable concentrations of many parameters up to 2014, and a possible decrease reported in 2015. I concur.

Based on independent review of sampling data from GS11 since 2012, the Canadian Water Quality Guideline (CWQG) for chloride was exceeded in 80% of samples (n=10, 97-320 mg/L, average 222 mg/L) and the CWQG for boron was exceeded in 82% of samples (n=11, 0.7-2.6 mg/L, average 2.1 mg/L). Unionized ammonia exceeded the PWQO in 64% of samples (n=11, 0.6-176 μ g/L, average 74 μ g/L). Copper, cobalt, iron, vanadium, phenolics, total phosphorus and iron are also elevated compared to the PWQO. Leachate parameters were elevated, but to a lesser extent, at GS12 and GS15. Based on the reported water quality, it remains important that there be no surface water outflow from the pond.

GAL report that the anticipated dilution of leachate impacted groundwater is not occurring and that some surface water flowing to the pond is more impacted than groundwater. GAL further recommends that (groundwater monitoring) results at the eastern boundary will have to be monitored closely to observe if there is potential for exceedances not predicted by the model. I defer to the groundwater reviewer on matters related to groundwater flow from the on-site pond.

Southeast Watercourse

No surface water quality monitoring is undertaken at the southeastern/eastern property boundary; however, groundwater monitoring has revealed possible non-compliance with Ministry of the Environment and Climate Change (MOECC) guideline B-7. Golder reports that the source of the leachate indicator parameters at that boundary may be associated with geological conditions and/or salt-impacted melt-water from the snow stockpile area in the southeastern portion of the property.

The location of the snow stockpile in the southeast corner of the site, immediately adjacent to the realigned ditch, is a concern with respect to surface water. Given that the location of the snow disposal area is down-gradient of the waste mound (according to the interpreted groundwater flow direction), the main concern with respect to leachate impacts is the potential for the acceleration of movement of leachate-impacted groundwater east of the on-site pond and potential to mask leachate-related effects along the southeastern boundary. Contaminants known to be associated with snow removed from roadways include dissolved salts, oil, heavy metals, oxygen demanding organics and particulates. With consideration for the reported failure to achieve the anticipated dilution in the on-site pond (described above) and potential for previously unanticipated leachate impacts at the southeast property boundary, it is my opinion that monitoring of surface water in the southeast ditch / watercourse is again justified.

I recommend that surface water monitoring be reinstated at the former GS21 (or preferably on the upstream side of Lalonde Road in the Lepage Municipal Drain which flows onto the site) and GS20 (at the property boundary, downstream of the snow storage area and prior to the confluence with the west branch of the Rozon-Seguin Municipal Drain). These sampling locations should be sampled consistent with the current program for surveillance stations (e.g. sampled three times per year for the comprehensive list of leachate indicator parameters and field measurement of temperature, pH, conductivity, DO and flow rate at the time of sampling).

If impacts are identified at GS20, it may be necessary to establish additional sampling locations to better understand the significance of those impacts to the drain (e.g. upstream of Lalonde Road in the West Branch of the Rozon Seguin Municipal Drain and downstream of the confluence of the on-site ditch with the drain / upstream of agricultural areas (120-150 metres downstream from GS20)).

Trigger Assessment

With respect to the on-site pond, the requirement to compare surface water results to trigger concentrations given within ECA 3362-6D7PL4 was removed as per correspondence with the MOECC on September 2, 2008 based on the absence of discharge from the pond. The surface water trigger mechanism has been replaced by a groundwater trigger mechanism for monitors east of the pond.

The amended provisional ECA A471203 refers to the surface water trigger mechanism described in Appendix A of the 2001 Annual Report prepared by Golder Associates (2002). Following an exhaustive search of the files in this office, a copy of that report could not be located. It would be helpful if future annual reports included a fulsome description of the current trigger mechanism / contingency plan for the Clarence-Rockland WDS.
To the best of my understanding and based on available information, the trigger mechanism for the Clarence-Rockland WDS consists of an exceedance of the 75th percentile concentration for existing background or PWQO, whichever is greater, at sampling stations SW2 (west boundary) or GS20 (east boundary) for identified site-specific leachate indicator parameters with established PWQO. If resampling confirms that the trigger concentration was exceeded, contingency measures would be triggered. Sampling station GS20 was eliminated following realignment of the ditch on the southeast boundary.

Revised trigger concentrations for boron, iron, total phosphorus and unionized ammonia were calculated by GAL based on data from GS6. These were confirmed through independent review of the submitted data. For 2015, trigger values were identified as 0.2 mg/L for boron (PWQO), 1.50 mg/L for iron (75th percentile), 0.08 mg/L for TP (75th percentile) and 0.02 mg/L for unionized ammonia (PWQO). I recommend that chloride and sulphate also be considered as potential trigger parameters, based on their respective guidelines (CWQG of 120 mg/L for chloride and the hardness-specific BC Ministry of the Environment guideline for sulphate, which have been adopted by the MOECC for the purpose of surface water impact assessment).

Trigger concentrations calculated by GAL were based on data from GS6 only (as opposed to both GS6 and GS17). This represents a conservative approach, as GS17 has been characterized as having higher total dissolved solids, chloride, sodium, phosphorus and zinc. This may result in more frequent and possibly unnecessary triggering of re-sampling and/or contingency measures. Conditions at both background monitoring stations should be carefully considered in evaluating the presence or absence of leachate impacts at S1 and S2.

GAL report that the stream to the west of the fill area is not impacted by landfill leachate at this time. I agree. Iron and total phosphorus each exceed the trigger concentration on several occasions in recent years, but this has typically coincided with elevated concentrations upstream (GS17 and/or GS6). I note that background samples are not typically collected when a resampling is undertaken. Any resampling at S2 as a result of a trigger exceedance should be accompanied by sampling at both background stations to allow the determination of whether the trigger was the result of leachate or upstream sources.

Conclusions and Recommendations

- The watercourse on the west of the property is not measurably impacted by leachate at this time.
- The on-site pond is leachate-impacted, with elevated concentrations of almost all leachate indicator parameters, many of which exceed relevant water quality guidelines, and with increasing trends up to 2011. Concentrations of many parameters appear to have now stabilized, but should be carefully monitored moving forward.
- No surface water monitoring in the southeastern/eastern watercourse was undertaken 2012-2015.

- Stantec and GAL recommend that surface water monitoring continue, with no changes proposed to the surface water monitoring program. As described above, I recommend that GS20 and GS21 be reinstated as Surveillance Surface Water Stations. Additional sampling locations may be required in the future if impacts are identified. This is based on the observed leachate impacts in the on-site pond, reports that anticipated dilution of leachate is not occurring in the on-site pond and possible non-compliance with MOECC guideline B-7 at the eastern property boundary.
- Given the numerous PWQO exceedences in both the inflow to the on-site pond and the ponded water itself, it is important that there continue to be no outflow from the pond to the neighboring watercourse over the long term.
- Stantec recommends that the stormwater management assessment stipulated by Condition 2(17) of the ECA 3362-6D7PL4 be completed and submit application to amend ECA accordingly.
- It would be helpful if future annual reports included a fulsome description of the current trigger mechanism / contingency plan for the Clarence-Rockland WDS.
- Trigger concentrations are calculated using data from GS6 only (as opposed to both GS6 and GS17). This represents a conservative approach, as GS17 has been characterized as having higher TDS, chloride, sodium, phosphorus and zinc. This may result in more frequent and possibly unnecessary triggering of re-sampling and/or contingency measures. Conditions at both background monitoring stations should be carefully considered in evaluating the presence or absence of leachate impacts at S1 and S2.
- Any resampling at S2 as a result of a trigger exceedance should be accompanied by sampling at both background stations to allow the determination of whether the trigger was the result of leachate or upstream sources.
- Surface water results should be compared to CWQG for nitrate, nitrite and chloride. The hardness-specific BC guideline for sulphate should also be consulted.

If you have any questions about these comments, I would be happy to discuss them with you.

"Original Signed By"

Lauren Forrester, M.Sc. LF/sh

- ec: Peter Taylor, Technical Support Section Manager Greg Faaren, Water Resources Unit Supervisor Robert Holland, Regional Hydrogeologist
- c: File SW PR CL 03 06 C4, Clarence-Rockland WDS File SW 13 06 02 07 02, South Nation River Basin (Cobbs Lake Creek) LF/IDS 7811-A8ZLW6; 2220-9XSRD3; 7515-9HQQ8Q; and 4460-96MQ97



VIA email

October 7th, 2016

Mr. Marc Robert Senior Environmental Officer Ministry of the Environment 113 Amelia Street Cornwall ON K6H 3P1

RE: Clarence-Rockland WDS 2012-2015 Annual Operations Monitoring Reports and Annual Reports on Groundwater and Surface Water Monitoring Program <u>Clarence-Rockland Landfill Site</u>

Sir:

Further to your email dated October 4th, 2016 we acknowledge receipt of the Surface Water Group's review. We would like to take this opportunity to inform the Ministry that the City of Clarence-Rockland has retained the services of jp2g Consultants Inc. for the annual monitoring and reporting requirements for the landfill site, following a competitive bidding process. This agreement is for a term of three (3) years starting in 2016.

We will provide jp2g Consultants Inc. with this report and the Groundwater Group's report as soon as it is made available to us.

The 2016 sampling is almost complete and will ensure that these recommendations are all addressed in 2017 and moving forward with future reporting.

Should you have any comments or questions, please do not hesitate to contact us at any time.

Sincerely, Denis Longpré

Environment Manager

c.c. Mr. Jean-Yves Carrier, Director Infrastructures and Planning Mr. Andrew Buzza, jp2g Consultants Inc.

Ministry of the Environment and Climate Change

P.O. Box 22032 Kingston, Ontario K7M 8S5 613/549-4000 or 1-800/267-0974 Fax: 613/548-6908 Ministère de l'Environnement et de l'Action en matière de changement climatique

C.P. 22032 Kingston (Ontario) K7M 8S5 613/549-4000 ou 1-800/267-0974 Fax: 613/548-6908



MEMORANDUM

May 4, 2017

- TO: Melissa Lee Senior Environmental Officer Cornwall Area Office Eastern Region
- FROM: Robert Holland Hydrogeologist Technical Support Section, Water Resources Unit Eastern Region
- RE: Clarence-Rockland Landfill 2016 Annual Monitoring Report Environmental Compliance Approval (ECA) # A471203 Lot 15, Concession IV City of Clarence-Rockland United Counties of Prescott and Russell Hydrogeological Review

I have reviewed the "City of Clarence – Rockland, ON 2016 Annual Monitoring Report, Final Report, march 2017" prepared by J-2g and I offer the following comments.

Table 11 of the report summarized the Reasonable Use (RU) Concentration compliance status of the site in 2016. Based on this information, I agree with the consultant that RU limits were exceeded for one or more trigger parameters in all directions northwest of the site in 2017. I also agree with the consultant that mitigation measures should be undertaken west and east of the site coincident with the predominant groundwater flow directions. The consultant suggests augmentation of the contaminant attenuation zone (CAZ) west of the site by land acquisition. I agree with this approach and would like further details on the acquisition of groundwater rights and/or lands to ensure long term compliance with Reasonable Use limits. A remedial work plan should be submitted by the owner to address these matters. At this time I am prepared to accept that road deicing slat used along Lalonde Road may be contributing to groundwater impacts coincident with the area in and the southern boundary cut off wall and that no remedial measures are required at this time. De-icing agents used on roads are not deemed to be contaminants are per Ont. Reg. 339. The northern CAZ is adequate at this time.

I do not accept that only four monitoring wells, namely G37-01, G12-92, G42-10, and G43-11, are to be used for compliance triggers for contingency purposes. Wells 18-92, G26-94 and G29-97 shall be maintained as compliance wells to assess groundwater impacts around the perimeter of the site to ensure long term groundwater protection as the site is progressively developed.

Future reports should ensure that groundwater trend graphs are consistent with past graphs prepared by the previous consultant. The graphs present on only seven parameters. Hardness, alkalinity, COD, DOC, ammonia, and total phosphorous should be added to these graphs.

Thank you for providing me with an opportunity to comment on this matter. If you have any questions give me a call.

"Original Signed By"

Robert W. Holland, P.Geo. RWH/dv

c: Bob Holland GW PR CR C4 01 02 Ministry of the Environment and Climate Change

Eastern Region Ottawa District Office Cornwall Area Office 113 Amelia St Cornwall ON K6H 3P1 Fax: (613) 933-6402 Tel: (613) 933-7404

Ministère de l'Environnement et de l'Action en matière de changement climatique

Direction régionale de l'Est 113 rue Amelia Cornwall ON K6H 3P1 Télécopieur: (613) 933-6402 Tél:(613) 933-7404



July 21, 2017

The Corporation of the City of Clarence-Rockland 1560 Laurier Street P.O. Box 909 Clarence-Rockland, ON K4K 1P7

Attention: Denis Longpré, Manager of Environment and Water, Infratrusture and Engineering

Mr. Longpré,

RE: Industrial Sewage Compliance Inspection Clarence-Rockland Landfill Site Reference Number 6538-ALKHEB

On April 20, 2017, I completed a Industrial Sewage Compliance Inspection at the Clarence-Rockland (Bourget) Landfill Site. The findings of this inspection are detailed in the attached report.

The City is required to take action to address the compliance issues identified in the inspection. Please refer to Section 5.0 of the inspection report and address the action items within the timeframes provided.

You understanding and anticipated cooperation are appreciated. Should you have any questions or comments or wish to meet to discuss any of the issues identified, please feel free to call me at 613-933-7404 or e-mail me at melissa.lee2@ontario.ca. Yours truly,

Melissa Lee Senior Environmental Officer Cornwall Area Office

File Storage Number: SI RU CR C4 410



Ministry of the Environment and Climate Change Ministère de l'Environnement et de l'Action en matière de changement climatique

Industrial Sewage Inspection Report

Client:	The Corporation of the City of Clarence-Rockland Mailing Address: 1560 Laurier St P.O. Box 909, Clarence-Rockland, Ontario, Canada, K4K 1P7 Physical Address: 1560 Laurier St, Clarence-Rockland, City, United Counties of Prescott and Russell, Ontario, Canada, K4K 1P7 Telephone: (613)446-6022, Extension: 2239, FAX: (613)446-1497, email: rcampeau@clarence-rockland.com Client #: 4328-4G5PYT, Client Type: Municipal Government, NAICS: 221310			
Inspection Site Address:	City of Clarence Rockland Waste Disposal Site Address: Lot: 15, Concession: 4, Geographic Township: CLARENCE, Clarence-Rockland, City, United Counties of Prescott and Russell District Office: Cornwall LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 45.4652, Longitude: -75.1667 Site #: 7049-5RBRBL			
Contact Name:	Denis Longpré	Title:	Manager of Environment and Water, Infrastructure and Engineering	
Contact Telephone:	(613)446-6022 ext 2299	Contact Fax:	(613)446-1497	
Last Inspection Date:				
Inspection Start Date:	2017/04/20	Inspection Finish Date:	2017/04/20	
Region:	Eastern			

1.0 INTRODUCTION

On April 20, 2017, Ontario Ministry of Environment and Climate Change (Ministry) Senior Environmental Officer Melissa Lee, completed a Industrial Sewage Compliance Inspection of The City of Clarence-Rockland (City) Waste Disposal Site (Landfill) stormwater and leachate-impacted groundwater industrial sewage works, located on Lot 15, Concession 4, on the west corner of Lalonde and Labelle Roads in Bourget (Site).

The purpose of the Ministry's Industrial Sewage Compliance Inspection Program is to ensure that facilities that discharge contaminants into the natural environment are in compliance with Ministry legislation and control documents and in conformance with guidelines and standards related to wastewater. Specifically, this includes compliance\conformance with the following documents:

- Environmental Protection Act (EPA);
- Ontario Water Resources Act (OWRA);
- Environmental Compliance Approvals (ECAs);
- Provincial Officer's Orders (POOs) and;

- Procedure B-1-1: Water Management - Guidelines and Procedures of the Ministry of Environment and Energy (The 'Blue Book') and;

- Procedure B-1-5: Deriving Receiving Water Based, Point Source Effluent Requirements for Ontario Waters (The 'Green Book').

The wastewater pond is approved under ECA No. 3362-6D7PL4 (ECA), issued June 24, 2005, to receive surface water and leachate-impacted groundwater. Prior to approval in 2005, the pond discharged at its northeast extent to

Cobb's Lake Creek. Following approval, the outlet was blocked and the contents primarily infiltrate into groundwater. The pond upgrades required for approval also included increasing bank and outlet height to ensure the pond only overflowed when levels reached 50.5 masl.

The pond is located on the landfill site that is approved under ECA No. A471203 (ECA) to accept domestic and commercial solid non-hazardous wastes from within the boundaries of the City of Clarence-Rockland.

This is the first inspection of the sewage works for this site. Denis Longpré, Manager of Environment and Water, Infrastructure and Engineering and Jocelyn Chabot, Environmental Technician, both of the City of Clarence-Rockland, were available during the inspection to provide a Site tour and answer questions. A solid-non hazardous waste disposal site compliance inspection was also completed at the time of the inspection; the results of this inspection are included under separate cover, dated June 30, 2017.

The inspection findings are detailed in Section 4.0 of this report and any actions required are detailed in Section 5.0. The level readings and whether the pond is discharging must be determined by the City of Clarence-Rockland; there is conflicting information contained in recent reports about water levels in the pond that suggest the pond should be discharging, but staff indicate it has not. This must be confirmed by the City as the water quality in the pond exceeds PWQO for many leachate indicator parameters and could be having an impact on surface water in the area if it is discharging; if this is the case, contingency measures may be required to be implemented.

Appendix A: Amended ECA No. 3362-6D7PL4

2.0 INSPECTION OBSERVATION

Facility MEWS (Works) Number: N/A

Sector Type: Waste Disposal

Effluent Type: Landfill Leachate, Storm Water

Receiver Type: Ground Water

The wastewater treatment pond was designed to promote infiltration of surface water into groundwater, but does have an overflow capability once the pond reaches a critical level (50.5 masl). According to staff, the pond has not overflowed.

Certificate of Approval Number(s): Yes C of A Number(s): 3362-6D7PL4

ECA No. 3362-6D7PL4 was issued on June 24, 2005 for an existing on-site pond receiving stormwater and leachate impacted groundwater as well as upgrades to the pond to promote retention and infiltration.

2.1 WASTEWATER TREATMENT PROCESS DESCRIPTION

Surface water reaches the pond by way of on-site ditching and leachate-impacted groundwater enters the pond through groundwater interactions near the pond.

Treatment is provided through retention and natural attenuation; no other mechanical or chemical treatment processes are employed. The pond is very naturalized with well established vegetation on its banks.

The pond approved to discharge to surface water only when water levels exceed 50.5 masl. The receiver is the Cobb's Lake Creek (Ottawa River system). The primary method of effluent disposal is through infiltration into groundwater.

Prior to approval of the pond in 2005, it discharged regularly to Cobb's Lake Creek. Improvements made following the issuance of the ECA included: increasing bank height, narrowing and increasing the height of the outlet drain, plugging other outlets and infilling the receiving ditch for a 80 m stretch, all to promote infiltration over surface water discharge.

2.2 EFFLUENT SUMMARY REPORT

What are the facility's effluent limits based on? Certificate of Approval/Permit

Does the facility comply with its limits? No

The ECA sets out surface water monitoring requirements for three sample locations within the pond GS11, GS12 and GS14. As described in the introduction, the Site is also governed by waste disposal site ECA No. A471203; this approval also sets out surface water sampling of the waste water pond as a requirement. Surface water is analysed for a suite of parameters described in the waste ECAs sampling program and in Table 1 of the sewage works ECA. Sample results are compared to Provincial Water Quality Objectives and the established trigger mechanisms. Table 2 of the sewage works ECA establishes trigger concentration for unionized ammonia, boron, iron and total phosphorus for sampling point GS12.

Surface water trigger concentrations are being exceeded in the stations located in the pond. Therefore it is important to determine whether the pond is discharging its contents to surface water to know whether the contingency plan should be implemented. According to the City and as described in the 2016 annual report, there are no discharges from the pond.

City staff indicate that the pond is inspected once annually and again during monitoring completed by their consultants. The 2016 annual report indicates the pond is not discharging.

The pond is approved (and therefore should be designed) to discharge when the water level reaches a height of 50.5 masl and the banks are supposed to be graded to 51 masl. The last staff gauge reading measured the pond level at 51.02 masl in 2015 and then could not be located in 2016. The pond was viewed during the inspection, but did not appear to be overflowing at its banks. The outlet was not viewed at the time of the inspection, as the pond appeared well below the grade of the banks and the City representatives indicated the pond does not discharge.

Based on the above, there appears to be some question regarding the quality of the water level readings or the actual bank and outlet heights. A staff gauge is also missing. Certainty regarding the discharge of the pond is lacking. As such, the City must provide a topographical survey of the pond's bank and outlet heights, install a new or recover an existing staff gauge and implement an inspection program to ensure the City is aware when the pond is discharging. At a minimum, the pond outlet should be inspected when the water levels in the pond reach a critical height, as determined by the plan.

Please refer to Section 5.0 'Actions Required' for more details.

2.3 SEWAGE TREATMENT WORKS CAPACITY ASSESSMENT

Flow (m³/day)	Year 1 2016	Year 2	Year 3
Average daily flow	0.00	0.00	0.00
Maximum daily flow	0.00	0.00	0.00
Capacity Design	0.00	0.00	0.00
% of capacity (based on average daily flow)	0.00	0.00	0.00

Table 1 of the ECA requires that water levels in the pond be assessed (using staff gauges).

The 2016 annual monitoring report indicates that three staff gauges have been installed in the wastewater pond since 2005 to measure water levels. In 2015, the only remaining staff gauge was surveyed and the water level was determined to be 51.02 masl. In 2016, none of the staff gauges could be located.

As described in the previous section, a more reliable means of assessing works capacity is required.

2.4 SAMPLING REQUIREMENTS

What are the facility's sampling requirements based on? Certificate of Approval/Permit

Does the facility meet sampling requirements?

Yes

Sampling requirements are detailed under Condition 4 of the ECA. The results are described in the annual monitoring report, which also details the results of other monitoring required by the waste disposal site ECA No. A471203.

Based on a review of the monitoring data collected in 2016, the City meets all of its surface water sampling requirements. The trigger concentrations described in Table 2 of the ECA are being exceeded, however, since the pond has not been reported to be discharging, the contingency plan has not been implemented as of yet. As described in Section 2.2 of this report, there is a lack of certainty regarding whether the pond discharges as the level readings suggest otherwise. If it is determined that the pond is discharging, implementation of the contingency plan may be required.

A detailed review of the surface and groundwater monitoring program as it relates to the waste disposal site are described in the Solid Non-Hazardous Waste Disposal Site Inspection dated June 30, 2017. Please refer to this report for more details.

2.5 **REPORTING REQUIREMENTS**

What are the facility's reporting requirements based on? Certificate of Approval/Permit

Does the facility meet reporting requirements?

Yes

Condition 7 of the ECA outlines the annual reporting requirements, which are consistent with those prescribed in waste disposal site ECA No 471203. The 2016 annual report was reviewed as part of this inspection and included all of the information required by this condition.

2.6 FLOW MEASUREMENT

Flow measurement is not required by the ECA.

2.7 MINISTRY SAMPLE RESULTS

Were Ministry samples collected during the inspection?

No

Reason:

The pond was not believed to be discharging to surface water at the time of the inspection.

2.8 FINANCIAL ASSURANCE

Financial assurance is not required for municipally owned sites.

2.9 SPILL PREVENTION AND CONTINGENCY PLANS

Is the facility required to have a Spill Prevention and Contingency Plan (SPCP) as required by Ontario Regulation 224/07?

No

Has the facility had any spills since the last inspection?

No

No

Were all the spills reported to the ministry? $N\!/\!A$

Does the facility's operations or spill history suggest that a SPCP be developed?

Comments:

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

There are no previous non-compliance issues related to the sewage works.

4.0 SUMMARY OF INSPECTION FINDINGS

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment? Yes

Specifics:

Based on the water level readings reported, the lack of staff gauge readings for 2016 and infrequent observation of the outlet, it could not be confirmed that the pond is not discharging or has not discharged in the recent past, to surface water.

This suggests that either the pond upgrades required in 2005 were not completed to satisfy the ECA, or that level readings are incorrect or that the pond discharges more frequently than has been reported.

Aside from ensuring the pond is constructed in accordance with the ECA (Cond 1(2)), resolution of this matter is important to determine whether it is appropriate to implement the contingency measures as the trigger mechanism concentrations are being exceeded in the pond surface water stations.

The City must submit the documentation described in Section 5.0 'Actions Required' below to confirm the compliance of the construction of the pond with the ECA as well as its status as it relates to the method of wastewater disposal.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material?

Specifics:

Was there any indication of minor administrative non-compliance? No

Specifics:

5.0 ACTION(S) REQUIRED

1. By no later than September 1, 2017, please provide the undersigned officer with the following:

- A copy of a topographical survey of the pond showing the bank elevations and the outlet elevation.

- Confirmation that a staff gauge has been installed and properly surveyed to ensure water levels can be accurately measured in the pond.

- A description of an inspection program that will be implemented to ensure the City is aware of when the pond is discharging. At a minimum, the pond outlet should be inspected when the water levels in the pond reach a critical height, as determined by the plan.

- A description of any additional measures that are required to be taken to either comply with or amend the ECA (construction of upgrades, correction to ECA of actual bank heights).

6.0 OTHER INSPECTION FINDINGS

7.0 INCIDENT REPORT

Applicable

8.0 ATTACHMENTS

PREPARED BY: Environmental Officer: Name: District Office: Date: Signature

Melissa Lee Cornwall Area Office 2017/07/19

REVIEWED BY: District Supervisor: Name: District Office: Date:

Michael Seguin Cornwall Area Office 2017/07/21

Signature:

fiched Jege

File Storage Number:

SI RU CR C4 410

Note:

"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"



MinistryMinistèreof thedeEnvironmentl'Environnement

CERTIFICATE OF APPROVAL MUNICIPAL AND PRIVATE SEWAGE WORKS NUMBER 3362-6D7PL4

The Corporation of the City of Clarence-Rockland 1560 rue Laurier Rockland, Ontario K4K 1P7

Site Location: City of Clarence Rockland Waste Disposal Site Lot 15, Concession 4 City of Clarence-Rockland, United Counties of Prescott and Russell

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

a stormwater and leachate impacted groundwater management facility servicing the Clarence-Rockland Waste Disposal Site, located on Lot 15, Concession 4, United Counties of Prescott and Russell, consisting of:

- one (1) existing dug-out borrow pit (pond) serving as a natural attenuation facility for stormwater runoff and leachate impacted groundwater, which is approximately 450 m long and 50 m to 100 m wide with a maximum depth of 2.5 m and a total surface area of 3.3 ha, receiving stormwater runoff from a 19.3 ha drainage area, providing a total storage capacity of 40,000 m³ at the current discharge elevation of 49.5 m, located at the northeast side of the landfill site footprint, discharging to Cobbs Lake Creek which eventually discharges to Ottawa River;
- upgrades to the east bank of the pond to raise the bank elevation to 51.0 m and the pond outlet elevation to 50.5 m increasing the maximum storage capacity of the pond to 63,175 m³;
- plugging the pond's east bank drainage outlets and infilling of an approximately 80 m long ditch immediately downstream of the pond outlet to promote infiltration of pond contents to groundwater;
- including all associated controls and appurtenances.

all in accordance with Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the City of Clarence-Rockland dated April 13, 2005, and drawings and design brief prepared by Stantec Consulting Ltd., Ottawa, Ontario.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Act " means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"*Certificate* " means this entire certificate of approval document, issued in accordance with Section 53 of the *Act*, and includes any schedules;

"*Director* " means any *Ministry* employee appointed by the Minister pursuant to section 5 of the *Act* ;

"District Manager " means the District Manager of the Kingston District Office of the Ministry;

"Ministry " means the Ontario Ministry of the Environment;

"*Owner* " means The Corporation of the City of Clarence-Rockland and includes its successors and assignees;

"*Previous Works*" means those portions of the sewage works previously constructed and approved under a certificate of approval;

"Proposed Works" means the sewage works described in the *Owner*'s application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate*;

"Regional Director " means the Regional Director of the Eastern Region of the Ministry;

"*Works*" means the sewage works described in the *Owner*'s application, this *Certificate* and in the supporting documentation referred to herein, to the extent approved by this *Certificate* and includes both *Previous Works* and *Proposed Works*.

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

TERMS AND CONDITIONS

1. <u>GENERAL PROVISIONS</u>

- (1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
- (2) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.

- (3) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.
- (4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
- (5) The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. <u>EXPIRY OF APPROVAL</u>

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the issuance date of this *Certificate*.

3. <u>CHANGE OF OWNER</u>

- (1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:
 - (a) change of *Owner*;
 - (b) change of address of the *Owner*;
 - (c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the <u>Business Names Act</u>, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager*;
 - (d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the <u>Corporations</u> <u>Information Act</u>, R.S.O. 1990, c. C 39 shall be included in the notification to the *District Manager*;
- (2) In the event of any change in ownership of the *Works*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate*, and a copy of such notice shall be forwarded to the *District Manager* and the *Director*.

4. <u>SURFACE WATER MONITORING</u>

(1) The *Owner* shall carry out the following surface water monitoring program. Surface water grab samples shall be collected during spring (April/May), Summer (August), and Fall (November) from the designated sampling locations and shall be analyzed for the parameters listed in Table 1.

Table 1 - Surface Water MonitoringSampling Locations: GS11, GS12, GS14				
Parameter		Field Monitoring Parameter		
Calcium	Silver	Conductivity (Field)		
Magnesium	Strontium	pH (Field)		
Sodium	Sulphur	Temperature		
Potassium	Thallium	Dissolved Oxygen		
Aluminum	Titanium	Water Levels***		
Barium	Vanadium			
Beryllium	Zinc			
Boron	Alkalinity			
Cadmium	BOD5			
Chromium	TDS			
Cobalt	Chloride			
Copper	Nitrate			
Iron	Nitrite			
Lead	Sulphate			
Manganese	TKN			
Mercury	Ammonia			
Molybdenum	COD			
Nickel	DOC			
Total Phosphorus	Phenols			
Silicon	Hardness*			
	Un-ionized Ammonia**			

- **Note:** * Hardness calculated from laboratory analyses results of calcium and manganese
 - ** Un-ionized Ammonia calculated from laboratory analyses results for ammonia and field measurements for pH and temperature.
 - *** Water levels shall be measured at staff gauges installed for the designated sampling points.
- (2) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the surface water monitoring activities

required by subsection (1)

5. <u>GROUNDWATER MONITORING</u>

- The *Owner* shall undertake groundwater monitoring in accordance with Conditions 46 (a) and 46 (c) of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time.
- (2) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the groundwater monitoring activities required by subsection (1)

6. <u>OPERATIONS AND MAINTENANCE</u>

- (1) The *Owner* shall undertake an inspection of the condition of the stormwater management facility, at least once a year, and undertake any necessary cleaning and maintenance to prevent the excessive build-up of sediment and/or decaying vegetation.
- (2) The *Owner* shall maintain a logbook to record the results of the stormwater management facility inspections and any cleaning and maintenance operations undertaken and shall keep the logbook at the site or operational office of the *Owner* for inspection by the Ministry.
- (3) The Owner shall compare surface water monitoring results obtained from sampling point GS12 under Condition 4 (1) with the concentrations of the trigger parameters listed in Table 2 to identify any potential leachate impact to surface water discharged from the site to the receiving stream.

Table 2 - Surface Water Trigger Parameters			
Parameter	Concentration (mg/L)		
Ammonia (un-ionized)	0.02		
Boron	0.20		
Iron	0.30		
Total Phosphorus	0.05		

- (4) In the event that a monitoring result for any of the parameters listed in Table 2 exceeds its corresponding trigger concentration, the *Owner* shall immediately initiate the implementation of Condition 53 of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time.
- (5) Surface water trigger parameters and concentrations outlined in Table 2 under subsection

(3) shall be modified from time to time **only** after receiving a written concurrence from the *District Manager* or an approval from the Director designated for the purpose of Section 37 of the *Environmental Protection Act*.

7. <u>REPORTING</u>

- (1) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.
- (2) The *Owner* shall prepare, and submit to the *District Manager*, an annual performance report as a separate section of the annual report required under Condition 63 of the Provisional Certificate of Approval Waste Disposal Site Number A471203 Notice No. 1 issued on October 18, 2001 as amended from time to time. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:
 - (a) a summary and interpretation of all surface water monitoring data and comparison of results to the trigger concentrations outlined in Table 2 under Condition 6(3), including an overview of the success and adequacy of the *Works*.
 - (b) a description of any operating problems encountered and corrective actions taken;
 - (c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works*;
 - (d) any other information the *District Manager* requires from time to time.

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

- 1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate*.
- 2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.
- 3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware

of the Certificate and continue to operate the Works in compliance with it.

- 4. Condition 4 and 5 are included to enable the *Owner* to evaluate and demonstrate the performance of the *Works*, on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the design objectives specified in the *Certificate* and that the *Works* does not cause any impairment to the receiving watercourse.
- 5. Condition 6 is included to require that the *Works* be properly operated, maintained, and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented.
- 6. Condition 7 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Certificate*, so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

In accordance with Section 100 of the <u>Ontario Water Resources Act</u>, R.S.O. 1990, Chapter 0.40, as amended, 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 <u>Ontario Water Resources Act</u> , R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

- 1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
- 2. The grounds on which you intend to rely at the hearing in relation to <u>each</u> portion appealed.

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the works are located;

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

This Notice must be served upon:

The Secretary*		The Director
Environmental Review Tribunal		Section 53, Ontario Water Resources Act
2300 Yonge St., 12th Floor		Ministry of the Environment
P.O. Box 2382	AND	2 St. Clair Avenue West, Floor 12A
Toronto, Ontario		Toronto, Ontario
M4P 1F4		M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 24th day of June, 2005



Mohamed Dhalla, P.Eng. Director Section 53, *Ontario Water Resources Act*

SH/

c: District Manager, MOE Cornwall Gerry Lalonde, Stantec Consulting Limited



Ministry of the Environment and Climate Change Ministère de l'Environnement et de l'Action en matière de changement climatique

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the City of Clarence-Rockland Mailing Address: 1560 Laurier St P.O. Box 909, Clarence-Rockland, Ontario, Canada, K4K 1P7 Physical Address: 1560 Laurier St, Clarence-Rockland, City, United Counties of Prescott and Russell, Ontario, Canada, K4K 1P7 Telephone: (613)446-6022, Extension: 2239, FAX: (613)446-1497, email: rcampeau@clarence-rockland.com Client #: 4328-4G5PYT, Client Type: Municipal Government, NAICS: 221310			
Inspection Site Address:	City of Clarence Rockland Waste Disposal Site Address: Lot: 15, Concession: 4, Geographic Township: CLARENCE, Clarence-Rockland, City, United Counties of Prescott and Russell District Office: Cornwall LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 45.4652, Longitude: -75.1667 Site #: 7049-5RBRBL			
Contact Name:	Denis Longpre	Title:	Manager of Environment and Water, Infratrusture and Engineering	
Contact Telephone:	(613)446-6022 ext 2299	Contact Fax:	(613)446-1497	
Last Inspection Date:	2014/07/16			
Inspection Start Date:	2017/04/20	Inspection Finish Date:	2017/04/20	
Region:	Eastern			

1.0 INTRODUCTION

On April 20, 2017, Ontario Ministry of Environment and Climate Change (Ministry) Senior Environmental Officer Melissa Lee, completed a Solid Non-Hazardous Waste Disposal Site Compliance Inspection of The City of Clarence-Rockland (City) Waste Disposal Site (Landfill), located on Lot 15, Concession 4, on the west corner of Lalonde and Labelle Roads in Bourget (Site). The Site is also known as the Bourget Landfill.

The purpose of the Ministry's solid non-hazardous waste disposal site inspection program is to ensure compliance with Ministry legislation and control documents, and are in conformance with policy and guidelines pertinent to active landfill sites. Specifically, this includes compliance with:

- Environmental Protection Act R.S.O. 1990 c. E.19 (EPA)
- Ontario Water Resources Act R.R.O. 1990 c. O.40 (OWRA)
- R.R.O. 1990 Regulation 347 "General Waste Management" (Reg. 347)
- Ontario Regulation 232/98 "Landfilling Sites" (O. Reg. 232/98)
- Environmental Compliance Approvals (ECAs)
- Orders (Provincial Officer's Orders and/or Director's Orders).
- Guideline B-7: Incorporation of the Reasonable Use Concept in Ministry Groundwater Management Activities

The Landfill accepts domestic and commercial solid non-hazardous wastes from within the boundaries of the City of Clarence-Rockland, including all municipal curbside pick-up. The Landfill is open to the public from 8:30 am - 5:00 pm

on Friday and Saturday and is also open to permit-holding contractors Monday to Thursday from 9:00 am - 10:00 am and 2:00 pm and 3:00 pm. The household hazardous waste depot located at the Landfill is open during the summer (April - October) during regular operating hours. The City also holds the occasional 'Free Day' when residents can bring their wastes to the landfill without any fee.

ECA No. A471203 (ECA) governs the waste disposal site. It permits solid non-hazardous waste (including asbestos, dewatered sewage sludge and contaminated soils as defined under Reg. 347) to be landfilled at the Site under specific conditions. The Ministry requires the site be operated, maintained and monitored in accordance with the ECA and related legislation to ensure environmental protection.

The inspection consisted of a review of the latest environmental monitoring program results and related reviews completed by Ministry technical staff, incidents reported since the last inspection and compliance with the current approvals for the Site as well as a physical site inspection to observe current site conditions and review records. The physical inspection included the following areas: the entrance and office building, the east side and top of the waste mound including the working face and material segregation areas, the stormwater management facility and snow disposal area.

Denis Longpré, Manager of Environment and Water, Infratrusture and Engineering and Jocelyn Chabot, Environmental Technician, both of the City of Clarence-Rockland, were available during the inspection to provide a Site tour and answer questions.

The inspection findings are detailed in Section 4.0 of this report and any actions required are detailed in Section 5.0. Overall, the Site appears to be having some impact on surrounding groundwater and surface water features which require some action on the part of the City. Of immediate concern is the relocation of the snow disposal area to another site as it is currently operating unapproved and may be contributing to off-site impacts. The City must also initiate the process of acquiring lands/groundwater rights to the west to resolve non-compliance with Guideline B-7.

Appendix A: Amended ECA No. A471203.

<u>Appendix B</u>: Ministry's Technical Support Section surface water unit comments on the 2012, 2013, 2014 and 2015 Annual Operations Monitoring Reports, dated August 26, 2016.

<u>Appendix C</u>: Ministry's Technical Support Section groundwater unit comments on the 2016 annual monitoring report, dated May 4, 2017.

Appendix D: E-mail dated April 13, 2017 sent to WSP Engineering regarding requirement to amend ECA No. A471203.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):

Amended Waste ECA No. A471203 issued on October 21, 2009 revokes and replaces all previous ECAs.

Notice No. 1 was issued on September 9, 2015 approving site plan changes from a proposed landfill entrance reconfiguration. The proposed changes would impact the stormwater facility (additional flows) and therefore Condition 2 (17) was included in ECA No. A471203 to amend the stormwater and leachate-impacted groundwater industrial sewage works ECA No. 3362-6D7PL4 with the updated site and drainage plans.

Notice No. 2 was issued on August 19, 2016 to extend a deadline for the submission of an application to amend ECA No. 3362-6D7PL4.

In 2017, after two rounds of tenders to undertake the site reconfiguration, the City decided to simplify the plan such that there was no new entrance to the site, there was no net increase in impervious surfaces and all buildings proposed to be constructed were only to replace existing ones with the exception of a scale and scale house. As such, it was determined in a meeting held with the City's consultants (WSP) and the undersigned officer that an amendment to ECA No. 3362-6D7PL4 would not be required.

An amendment to ECA No. A471203 is however required to a) update site plan changes per current reconfiguration plan b) remove Condition 2(17) requiring an amendment to ECA No. 3362-6D7PL4 (industrial sewage works). See the e-mail dated April 13, 2017 sent to WSP outlining this requirement, included as Appendix D to this report.

Please refer to Section 5.0 'Actions Required' for more details.

2.1 FINANCIAL ASSURANCE:

Specifics:

Financial assurance is not required for municipally-owned sites.

2.2 APPROVED AREA OF THE SITE:

Specifics:

The total Site area (property size) is 50 hectares and the approved landfilling area is 12 hectares. The landfilling area is clearly demarcated at the Site. According to Mr. Longpré, wastes were previously placed outside of approved elevation contours in Cell 1. Landfilling is currently active in cell 3; in 2018, landfilling will resume in Cell 1 and contours will be corrected.

2.3 APPROVED CAPACITY:

Specifics:

In 2001, the Ministry issued amended ECA No. A471203 approving a landfill expansion by an additional 740,000 cubic metres.

Based on the 2016 Annual Operations Monitoring Report prepared by Jp2G on behalf of the City, the current capacity based on rates of filling is 567,000 cubic metres or an additional 40 years.

2.4 ACCESS CONTROL:

Specifics:

Access to the Site is controlled by a locked gate and an attendant when the Landfill is open to the public. There is also a sign erected at the entrance and at regular intervals on the fence along the road warning against trespassing.

Fencing secures much of the Site where the public might attempt to access (along Lalonde Road). Additional fencing is required to complete the perimeter of the site; this work is ongoing.

2.5 COVER MATERIAL:

Specifics:

Interim cover material currently consists of sand and wood chips (wood chips are primarily received from the Waste Transfer Station on Industrielle Street - ECA No. 1998-6QQ13K). According to the 2016 annual operations report, final cover in the active cell (3) will likely be placed in 2018 (when they move back into Cell 1).

In May 2017, heavy rainfall caused major flooding in the area impacting many properties along the Ottawa River, upstream tributaries and low lying areas. Following the flooding event, 130,000 sandbags were collected from impacted properties (mostly residential). The used sandbags were taken to the landfill and sand will be used as cover material.

A tree planting initiative was also recently undertaken by the City that involved the planting of approximately 320 hybrid poplar trees on the landfill contours (260 southeast and 60 west of the landfill footprint) to reduce exposure to precipitation, reduce runoff and erosion, intercept litter and treat leachate.

2.6 WASTE BURNING:

Specifics:

The burning of waste is prohibited at the landfill under Condition 2 (6) of the ECA. Wastes are not burned at the landfill Site.

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:

Surface Water

Local surface water drainage is to the north along the east of the Site via an on-site ditch that was realigned in 2009 around the current snow stockpile area. It converges with an existing roadside ditch (Labelle Road) which flows north into Cobb's Lake Creek, which in turn flows south/southeast into the South Nation River about 10 km downstream.

The landfill site also has an approved on-site wastewater pond (ECA No. 3362-6D7PL4) that receives surface water and leachate-impacted groundwater. Prior to approval in 2005, the pond also discharged to the northeast to Cobb's Lake Creek. The outlet has since been blocked and the contents infiltrate passively into groundwater.

The Ministry's Technical Support Section surface water unit reviewed and provided comments dated August 26, 2016 on the 2012, 2013, 2014 and 2015 Annual Operations Monitoring Reports. It is relevant to note that these annual reports were prepared by Stantec Consulting Ltd.; the City of Clarence-Rockland has since retained (effective 2016) Jp2G Consultants Inc. to carry out monitoring and reporting requirements of the ECA.

The surface water unit's comments indicate that there are a number of indicators that suggest leachate-impacted surface water is moving away from the landfill site via the east (realigned) ditch. This may be exacerbated/accelerated by the snow melt as the ditch is now realigned downgradient of the snow disposal area. When the ditch was realigned, the surface water monitoring stations that were being assessed in the previous ditch (GS20 and GS21) were lost. The surface water unit recommends they be reinstated. Jp2G also makes this recommendation in the 2016 annual monitoring report.

The surface water unit also proposed some changes to the surface water monitoring program's trigger mechanisms. Based on the current program, trigger concentration exceedances result in resampling at S2 rather than in all background locations. This may result in misrepresentation of actual impacts from the landfill site. As such, background stations GS17 and GS6 should also be assessed in a resample when triggered. Jp2G concurs with this recommendation in the 2016 annual performance report.

A copy of the Ministry's Technical Support Section surface water unit comments on the 2012, 2013, 2014 and 2015 Annual Operations Monitoring Reports, dated August 26, 2016 is included as Appendix B of this report.

Please refer to Section 5.0 'Actions Required' for more details.

Groundwater

Leachate-impacted groundwater appears to travel in two directions (east and west) due to a divide which transects the landfill site. There are reasonable use policy concentration exceedances reported for groundwater in both of these directions, however, the exceedances to the east appear to be related to other sources such as road de-icing. This determination is made by Jp2G in its 2016 annual monitoring report and is corroborated by the Ministry's Technical Support Section's groundwater unit's comments on the report dated May 4, 2017. The reasonable use policy concentration exceedances to the west are however more obviously caused by the landfill As such, both Jp2G and the Ministry's technical support section agree that efforts should be taken to resolve reasonable use non-compliance by acquiring lands or groundwater rights to the west. This is an action required of this inspection.

As described in the Ministry's Technical Support Section groundwater unit comments on the 2016 annual monitoring report, dated May 4, 2017, the reviewer indicates that wells 18-92, G26-94 and G29-97 are to be maintained as compliance trigger wells to assess groundwater as part of the contingency plan in addition to the existing wells G37-01, G12-92, G42-10 and G43-11 for a total of seven (7) compliance monitoring wells.

A copy of the Ministry's Technical Support Section groundwater unit comments on the 2016 annual monitoring report, dated May 4, 2017 are attached to this report as Appendix C.

Please refer to Section 5.0 'Actions Required' of this report for more details.

Snow disposal

The landfill has served as a snow disposal site for a number of years (since at least 2002). Snow is currently stockpiled in the southwest corner of the Site (near the intersection of Labelle and Lalonde Roads).

In 2010, the City of Clarence-Rockland undertook an Environmental Assessment (EA) to evaluate possible locations for a municipally-run snow disposal site. At the time, snow was already being disposed of at the landfill and the City was looking for a second location for snow generated in the urban area. The EA was submitted to the Ministry who provided general comments on the technical aspects of the sites being considered. The Ministry's position was that the landfill site was not a suitable location in terms of the possible influence that snow melt may have on the migration of leachate-impacted groundwater off-site. Following the 2010 EA, the City settled on a snow disposal site in the industrial park on leased land, however this lease expires in 2017. Snow disposal at the landfill site also continued after the EA was completed.

Snow disposal sites may be exempt from requiring an ECA (for an industrial sewage works under Section 53 of the OWRA) if they meet the criteria set out under under Section 3(2) of Ontario Regulation 525/98. A snow disposal site located on a landfill site is however not exempt under this section as a landfill site is considered industrial land. The City

of Clarence-Rockland did not seek an ECA for the landfill snow disposal site and it is unlikely an ECA would have been issued based on opposition from the Ministry's technical support section regarding the siting on the landfill site. As such, the current snow disposal site is being used without approval and without support from the Ministry. Further, in both the Ministry's technical support section surface water unit August 26, 2016 comments and Jp2G's 2016 annual monitoring report, it is identified that the snow stockpile is likely accelerating the migration of the leachate plume off-site and impacting surface water receivers. There is also potential for groundwater impacts. The City must relocate the snow disposal site for the 2017-2018 season (i.e. no longer use site for snow disposal).

Please refer to Section 5.0 'Actions Required' for more details.

Other ECA Conditions

Condition 8 (9) of the ECA requires that temporary berms and ditches be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

Based on the findings of this inspection and interviews with City staff, berms and ditches are not constructed on site for this purpose. Please commence this practice in landfilling operations.

Please refer to Section 5.0 'Actions Required' for more details.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:

A vertical cut off wall is located south of the landfilling area redirects leachate-impacted groundwater away from the northern property line (at Lalonde Road).

A wastewater pond located on the landfill site, east of waste filling area, passively collects stormwater and some leachate-impacted groundwater. The pond is approved under ECA No. 3362-6D7PL4.

Compliance with the wastewater pond ECA was evaluated during this inspection; the findings are detailed in a separate Industrial Sewage Works inspection report.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:

There is no methane gas control system at the site. Gas vents passively from the landfill and monitors are installed inside buildings to ensure it does not collect in confined areas.

2.10 OTHER WASTES:

Specifics:

Diverted wastes

The landfill accepts wastes other than solid non-hazardous domestic and commercial wastes that are segregated for off-site management rather than landfilled:

- refrigeration equipment (refrigerants removed by certified technician)
- metal
- wood
- leaf and yard waste (most of it collected at the transfer station located at
- waste electronics
- concrete
- tires

These materials are segregated at the surface of the landfilling area (in boxes or designated areas, away from working face) and removed for off-site recycling/disposal, as described in the annual design and operations manual. The only exception is chipped wood which is primarily brought to the landfill site from the leaf and yard waste transfer station owned by the City in Rockland (ECA No. 1998-6QQ13K); chipped wood is mixed with sand and used as cover material at the landfill.

Household hazardous wastes

A household hazardous waste depot is also located at the entrance to the landfill. It is open to the public for regular operating hours between April and October each year. All wastes are removed by Drain-All (approved hazardous waste hauler). The household hazardous waste depot is a gated, secured area with various drums for the collection of liquid wastes as well as a refurbished sea can equipped with secondary containment, for smaller items such as paint cans. There are no records of issues with the function of this depot.

Currently, site changes are underway (construction or a new entrance, installation of a scale and new buildings) that also involves the construction of a new household hazardous waste depot

Wastes generated during May 2017 flooding event

As a result of the May 2017 flooding event, the City held special collection days in May and June 2017 for household non-hazardous and demolition wastes. Residents were asked to bring household hazardous wastes directly to the landfill site for disposal at their depot. There were also permits issued to any residents who wished to bring wastes immediately to the landfill site during regular operating hours.

As described in the section above about cover material, a total of 130,000 sandbags used in the flooded areas were collected by the City and taken to the landfill site for use in cover material.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

Previous inspection report (2014)

The previous inspection report identified the following non-compliance issues/environmental concerns:

- landfill gas odours on-site;
- leachate breakout in the west discharge ditch and;

- mixed wastes and soil (from excavation of the former Notre Dame Landfill) were being placed at the top of the mound for future screening to recover some soil.

Cell 2 was capped and the Ministry provided guidance in the inspection report to review landfill operations to reduce landfill leachate runoff and advised of the Ministry's expectation to ensure wastes mixed with soil are incorporated into the landfill and capped by December of 2014.

These matters were not identified as issues in the current inspection with the exception of a leachate breakout found during the site visit on the east side of the mound, almost at ground level. It was corrected by the City in the weeks following the inspection with the excavation of the area, placement of bentonite mats and backfilling. The matter is considered resolved.

Incidents (2014-2017)

Three fire incidents at the landfill site were reported in the last two years. On all occasions, the fires did not result in significant or off-site environmental impact. The source of the fires were ignitable wastes unseen by operator in the domestic wastes accepted at the site (in garbage bags) and on one occasion, it is believed the wood chip pile may have reached a high temperature and combusted.

Following the first fire incident (May 2015), efforts were made to improve emergency response and report the incidents in accordance with the ECA and the EPA. The details to be included in an emergency response procedure are not specifically listed in the ECA, however, the ECA does require personnel to be trained in emergency response procedures and a report must be submitted to the ministry following an emergency situation at the landfill site, such as a fire. A landfill site emergency plan was developed in November 2015 and submitted to the Ministry. It details the actions that will be taken under various emergencies; with respect to fires, there are details to promptly report to the Ministry and allow for the incident to immediately be taken over by the fire department (as opposed to having on-site staff managing fire incidents). This matter is considered addressed.

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate? No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ? No

Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?

Yes

Specifics:

The City is using an area of the landfill site for snow disposal without approval. Based on information contained in the 2016 annual monitoring report and recent Ministry technical support section comments received by the undersigned officer, the use of the snow disposal may be contributing to off-site environmental impacts. The City must relocate the snow disposal site by the 2017-2018 season.

The current surface water monitoring program lacks precision as the surface water condition to the east is not well described. Since the realignment of the ditch in 2009, sampling points downgradient of the landfilling area were lost. The City's consultant and the Ministry agree that eliminated surface water sampling points GS20 and GS21 should be reinstated.

The surface water monitoring program fails to accurately identify the source of surface water trigger concentration exceedances by only resampling one background surface water station when an exceedance is observed As such, the City's consultant and the Ministry agree that when a surface water trigger concentration exceedance is observed, resampling should occur in surface water background monitoring stations GS17 and GS6, in addition to S2 which is the only background station currently part of the program.

Reasonable use criteria exceedances are consistently being observed west of the landfill site at the property boundary. As such, the City is in non-compliance with the reasonable use policy and must take steps to resolve this matter by extending the contaminant attenuation zone. Lands or groundwater rights must be acquired and registered on title.

Based on comments received by the Ministry technical support section's groundwater unit, the four wells used to assess compliance for contingency purposes are insufficient to properly assess the groundwater condition of the entire site, as it continues to develop. As such, the groundwater monitoring program must monitor the following seven wells for compliance in the trigger mechanism program:18-92, G26-94, G29-97, G37-01, G12-92, G42-10 and G43-11.

The City has not been installing temporary berms and ditches around the active waste disposal area to prevent extraneous surface water from contacting the working face in accordance with Condition 8 (9) of the ECA. This should be implemented to ensure that the working face is not shedding stormwater that has come into contact with wastes, thereby possibly increasing the contaminant loading on the natural environment.

Was there any indication of minor administrative non-compliance?

Yes

Specifics:

Due to recent site plan changes made resulting from the new landfill entrance reconfiguration, ECA No. A471203 must be amended to a) update site plan and b) remove Condition 2(17) requiring an amendment to ECA No. 3362-6D7PL4 (industrial sewage works).

5.0 ACTION(S) REQUIRED

1. By no later than August 31, 2017, please provide the undersigned officer with a response to this inspection report which details the efforts that will be taken to:

- amend ECA No. A471203 to a) update site plan changes per current reconfiguration plan and b) remove Condition 2(17) requiring an amendment to ECA No. 3362-6D7PL4 (industrial sewage works).
- discontinue snow disposal at the landfill site and provide an alternative site locations for the 2017-2018 winter season and beyond.

- modify the current surface water monitoring program such that a) surface water sampling points GS20 and GS21 are reinstated to track surface water impacts east of the landfill site and b) GS17 and GS6 (in addition to S2) are all assessed in a resample when surface water trigger concentrations are exceeded as part of the contingency plan.

- extend the contaminant attenuation zone (CAZ) at the west property boundary where reasonable use policy concentration exceedances have consistently been observed.

- modify the current groundwater monitoring program such that wells 18-92, G26-94 and G29-97 are maintained as compliance trigger wells in addition to wells G37-01, G12-92, G42-10 and G43-11 for a total of seven (7) compliance monitoring wells.

- install temporary berms and ditches around the active waste disposal area to prevent extraneous surface water from contacting the active working face.

6.0 OTHER INSPECTION FINDINGS

7.0 INCIDENT REPORT

Applicable 2007-ALMQBJ

8.0 ATTACHMENTS

PREPARED BY: Environmental Officer: Name: District Office: Date: Signature

Melissa Lee Cornwall Area Office 2017/06/29

liss

REVIEWED BY: District Supervisor: Name: District Office: Date:

Michael Seguin Cornwall Area Office 2017/06/30

Signature:

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File Storage Number:

SI RU CR C4 610

Note:

"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory

requirements"



VIA email

August 29th, 2017

Mrs. Melissa Lee Senior Environmental Officer Ministry of the Environment, Cornwall Area Office 113 Amelia Street Cornwall ON K6H 3P1

RE: Solid Non-Hazardous Waste Disposal Site Inspection Report Clarence-Rockland Landfill Site Reference Number: 0440-AKURUK

Madam:

Further to your report dated June 30th, 2017 please find herein our response to address the noted deficiencies in order to bring our facility into compliance as per our ECA #A471203:

5.0 Action(s) Required

1. Amend ECA No. A471203 to:

a) Update site plan changes per current reconfiguration plan and;

b) Remove condition 2(17) requiring an amendment to ECA No.3362-6D7PL4 (industrial sewage works).

i. The amendment to ECA No. A471203 to update site plan changes and remove condition 2(17) requiring an amendment to ECA No.3362-6D7PL4 is currently in progress. The project manager from the firm Colliers Project Manager currently overseeing the project is mandated to complete this amendment. The application for this amendment has been submitted in the week of August 14^{th} , 2017.

2. Discontinue snow disposal at the landfill site and provide an alternative site locations for the 2017-2018 winter season and beyond.

The City agrees to discontinue the snow disposal at the landfill site and is committed in finding a new location. We would like to meet with you in the next upcoming days to discuss the implementation timelines.

- **3. Modify the current surface water monitoring program such that:**
 - a) surface water sampling points GS20 and GS21 are reinstated to track surface water impacts east of the landfill site, and;

b) GS17 and GS6 (in addition to S2) are all assessed in a resample when surface water trigger concentrations are exceeded as part of the contingency plan.

1. Reinstatement of surface water sampling points GS20 and GS21 have been recommended by Jp2g and will be implemented with the 2017 fall sampling program. Jp2g have been made aware of the MOECC analysis of the 2012-2015 annual operations reports and annual monitoring reports for groundwater and surface water programs. Resampling of GS17, GS6 and S2 when surface water trigger concentrations are exceeded is already in place and should be reflected in the 2017 annual report if this situation is encountered.

4. Extend the contaminant attenuation zone (CAZ) at the west property boundary where reasonable use policy concentration exceedances have consistently been observed.

1. Almost immediately upon receiving the monitoring report from Jp2g, the City began discussions regarding the recommendation of extending the contamination attenuation zone (CAZ) at the westerly property line. It should be noted that the exact size of land required to be added has not been determined and we are currently not able to proceed with either land purchase or ground contamination rights without this vital information.

Following our dialogue with Jp2g in the weeks following publication of the 2016 annual monitoring report, it has been agreed that sampling will be continue in 2018 for confirmation purposes. As you can appreciate, land acquisition for landfills can be a complex legal matter and publicly sensitive subject. The next step will be to, using 2017 and previous years sampling data, have Jp2g recommended both the type and size of the additional CAZ required on the west property boundary limit of the landfill site.

- 5. Modify the current groundwater monitoring program such that wells 18-92, GS26-94 and G29-97 are maintained as compliance trigger wells in addition to wells G37-01, G12-92, G42-10 and G43-11 for a total of seven (7) compliance monitoring wells.
 - 1. Jp2g has been advised to modify the groundwater monitoring program to include all following seven monitoring well as compliance trigger wells: 18-92, GS26-94, G29-97, G37-01, G12-92 and G42-10. This should be effective in the fall 2017 sampling.

6. Install temporary berms and ditches around the active waste disposal area to prevent extraneous surface water from contacting the active working face.

1. The City will construct a berm located at the northern final toe of waste by December 31st 2017.

Denis Longpré Environment Manager

c.c. Mr. Dave Darch, P. Eng., Interim-Director, Infrastructure and Planning department, City of Clarence-Rockland
 Mr. Jocelyn Chabot, Environmental Technician, City of Clarence-Rockland
 Mr. Andrew Buzza, P. Geo., Project Manager, Jp2g Consultants Inc.

APPENDIX D

Site Stratigraphy and Monitoring Well Construction

LIST OF ABBREVIATIONS

The abbreviations commonly employed on Records of Borcholes, on figures and in the text of the report are as follows:

I.	SAMPLE TYPE	Ш.	SOIL DES	CRIPTION	<i>.</i>	
AS	Auger sample	-	(a)		Cohesionless S	ails
BS	Block sample		N N			
CS ·	Chunk sample	Density I	ndex		N	
·DO	Drive open	Relative	Density)		· Blowe/20)
DS ·	Denison type sample	(<i>beasingy</i>		Or Plan	-(0
FS	Foil sample	Very loos	P	• • •	O to 7	<u>synt</u> . ,
RC	Rock core	Loose	~		0.104	n
SC	Soil core	Commact	•		- 4 (0)	0 0
ST	Slotted tube	Dense		-	10 10 2	-0
TO	Thin-walled, onen	Vendens	5 6		50 10 5	Ψ D
TP	Thin-walled niston	TOLY SIGNE			overs	U .
WS	Wash sample	•	. (h)		Columbia Colu	
	a una cumpro	Concleton	(U)		Conesive Sou	S .
Π.	PENETRATION DESISTANCE	COMMENT	icy	. Wana	C_23=	
ALC:	TRANSING RESISTANCE		• *	<u>Kpa</u>		<u>Pst</u>
Standar	Penetration Desistance (SPT) No.	Vely Solt		0012		0 to 250
· ····································	The number of blows by a 62 S kg (140 B)	501		12 10 25		250 to 500
	hammer dronned 760 mm (20 in) moving	- Drug		25 to 50	· · ·	500 to 1;000
	to drive a S0 mm (2 in) drive over	SBH Vorm miff	· · ·	50.to 100		1,000 to 2,000
	Sympler for a distance of 200 cm (12 in)	very suir	-	100 to 200		2,000 to 4,000
•	Sample for a distance of 500 mm (12 m.)	Haro	•	Over 200	-	Over 4,000
Dynamic	Penetration Resistance; Nd:	IV.	SOIL TESTS			
	The number of blows by a 63.5 kg (140 lb.)	-	,			•
	hammer dropped 760 mm (30 in.) to drive	w	water content	-		
	Uncased a 50 mm (2 in.) diameter, 60° cone	Wn	plastic limited	• •		-
•	attached to "A" size drill rods for a distance	w	liquid limit			
	of 300 mm (12 in.).	С	consolidation (ocdometer) t	est	-
		CHEM	chemical analy	sis (refer to t	ext)	
PH:	Sampler advanced by hydraulic pressure	CID	consolidated is	b vifesinorita	nained triavial to	-et ¹
PM:	Sampler advanced by manual pressure	CIU	consolidated is	otropically n	ndrained triavia	test
WH:	Sampler advanced by static weight of hammer		with porewater	Diessure me	summent ¹	
WR:	Sampler advanced by weight of sampler and	D_{R}	relative density	(snecific.org	wity G)	
	rod	DŜ	direct shear tes	t		-
		М	sieve analysis	 for narticle si		
Peizo-Co	me Penetration Test (CPT):	MH	combined siev	e and hydrom	eter (H) analuci	e
	An electronic cone penetrometer with	MPC	modified Proc	or compactio	n fest	
-	a 60 ⁰ conical tip and a projected end area	SPC	standard Prost	or compaction	n test	
· .	of 10 cm ² pushed through ground	OC	organic conten	t test		
	at a penetration rate of 2 cm/s. Measurements	SO.	concentration	of water-solul	le subbatec	
. .	of tip resistance (O.), porewater pressure	UC	unconfined on	mpecion too	t sultingers	
• :	(PWP) and friction along a sleeve are recorded	Ĩ	upropeolidated	undrained -	in the second	· .
	Electronically at 25 mm penetration intervals	v .	Tield vane test	r wywanich u It V_lahame	IGALIZI (CSL	
·	Ind Table .	· •	mit weight	(rv i stannisto)	y vanc test)	· -
		Ĩ,	ant weight		•	

Note:

1. Tests which are anisotropically consolidated prior shear are shown as CAD, CAU.

Golder Associates
LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows: I. GENERAL (a) Index Properties (cont'd.)

	= 3.1416	w ·	water content
n x, natural	l logarithm of x	Wı	liquid limit
og _{to} x or lo	og x logarithm of x to base 10	: .W.	plastic limit
1	Acceleration due to gravity	ູ່	plasticity Index=(w1-w2)
	time.	W.	shrinkage limit
;	factor of safety	I.	liquidity index=(w-w_)/L
1	volume	Ļ	consistency index=(w,-w)/L
V .	weight	- e _{max}	void ratio in loosest state
•		Cmin	void ratio in densest state
I.	STRESS AND STRAIN	I _D	density index-(e _{max} -e)/(e _{max} -e _{min})
•	· · · ·	-	(formerly relative density)
,	shear strain		
7	change in, e.g. in stress; $\Delta \sigma'$		(b) Hydraulic Properties
· ·	linear strain	•	··· ·
ĥv .	volumetric strain	h	hydraulic head or potential
1 .	coefficient of viscosity	Ġ	rate of flow
,	Poisson's ratio	· v	velocity of flow
5	total stress	i	hydraulic gradient
5	effective stress $(\sigma' = \sigma'' \cdot n)$	k	hydraulic conductivity (coefficient of permeability)
- 5 ¹	initial effective overburden stress	. i	seenage force per unit volume
~ ¥U 5407-07-	principal stresses (major, intermediate		
	pinor)		(c) Consolidation (one-dimensional)
•	mean stress or octahedral stress		(of consentation for child statistic
-02	$=(\alpha + \alpha + \alpha + \beta)/3$	Ċ.	commession index (normally consolidated range)
-	shear stress	· Č	recompression index (overconsolidated range)
r 1 · ·	norewater messure	· Č	swelling index
 E	modulus of deformation	· C.	coefficient of secondary consolidation
 G: -	shear modulus of deformation		coefficient of volume change
κ.	bulk modulus of compressibility	6.	coefficient of consolidation
• •		T.	time factor (vertical direction)
UĨ.	SOIL PROPERTIES	บ	degree of consolidation
		·0'_	pre-consolidation pressure
	(a) Index Properties	O CR	Overconsolidation ratio=or./or
ofin)	bulk density (bulk unit weight*)		(d) Shear Strength
ວສ໌ ນ ລັ	dry density (dry unit weight)	-	(-)
$n_{1}(x_{1})$	density (unit weight) of water	. T.T.	neak and residual shear strength
	density (unit weight) of solid narticles	4' 4'	effective angle of internal friction
PSUS/	unit weight of submerged soil (var.v.)	• •	angle of interface friction
n i	Telative density (specific arouty) of		coefficient of Fristian-ten S
UK.	colid norticles ($D_{-} = n \ln \lambda$) formedu (G)	μ 	effective cohering
·	sold patio		underived observation (A=0 exclusio)
	nonocity	~u,ou ~	monanica siten sicilgin (p=0 analysis)
u. C	dermo of continution	P r1	mean total stress (01+03)/2
a ,	netter of samanon	p.	mean effective stress (0'1+0'3)/2
	ул	q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma_1 - \sigma_3)/2$
÷	Density symbol is p. Unit weight	· · · ·	compressive strength $(\sigma_1 - \sigma_3)$
	symbol is γ where γ -pg(i.e. mass	St	sensitivity
	density x acceleration due to gravity)	-	
			Notes: 1. v=c'o' tan

2. Shear strength=(Compressive strength)/2

Golder Associates

LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

WEATHERING STATE

Fresh: no visible sign of weathering

Faintly Weathered: weathering limited to the surface of major discontinuities.

Slightly weathered: penetrative weathering developed on open discontinuity surfaces but only slight weathering of rock material.

Moderately weathered: weathering extends throughout the rock mass but the rock material is not friable

Highly weathered: weathering extends throughout rock mass and the rock material is partly friable.

Completely weathered: rock is wholly decomposed and in a friable condition but the rock texture and structure are preserved.

BEDDING THICKNESS

Bedding Plane <u>Spacing</u>
>2 m
0.6 m to 2m
0.2 m to 0.6 m
60 mm to 0.2 m
20 mm to 60 mm
6 mm to 20 mm
<б mm

JOINT OR FOLIATION SPACING

Description	<u>Spacing</u>
Very wide	>3 m
Wide	1 – 3 m
Moderately close	0.3 – 1 m
Close	50 - 300 mm
Very close	-<50 mm

CORE CONDITION

Total Core Recovery

The percentage of solid drill core recovered regardless of quality or length, measured relative to the length of the total core run.

Solid Core Recovery (SCR)

The percentage of solid drill core, regardless of length, recovered at full diameter, measured relative to the length of the total core run.

Rock Quality Designation (RQD)

The percentage of solid drill core, greater than 100 mm length, recovered at full diameter, measured relative to the length of the total core run. RQD varies from 0% for completely broken core 100% for core in solid sticks.

DISCONTINUITY DATA

Fracture Index

A count of the number of discontinuities (physical separations) in the rock core, including both naturally occurring fractures and mechanically induced breaks caused by drilling.

Dip with Respect to (W.R.T.) Core Axis

The angle of the discontinuity relative to the axis (length) of the core. In a vertical borehole a discontinuity with a 90° angle is horizontal.

Description and Notes

An abbreviated description of the discontinuities, whether naturally occurring separations such as fractures, bedding planes and foliation planes or mechanically induced features caused by drilling such as ground or shattered core and mechanically separated bedding or foliation surfaces. Additional information concerning the nature information concerning the nature of fracture surfaces and infillings are also noted.

GRAIN SIZE

Term	<u>Size*</u>	Abbre	viations		
		В-	Bedding	Ca-	Calcite
Very Coarse Grained	>60 mm	FO-	Foliation/Schistosity	P-	Polished
Coarse Grained	2 – 60 mm	CL -	Cleavage	S	Slickensided
Medium Grained	60 microns - 2mm	SĤ -	Shear Plane/Zone	SM-	Smooth
Fine Grained Very Fine Grained	2 – 60 microns <2 microns	VN- F -	Vein Fault	R- ST-	Ridged/Rough Stepped
Note: *Grains >60 microns diameter are visible to the naked eye.		CO- J - FR-	Contact Joint Fracture	PL- FL- UE-	Planar Flexured Uneven
	-	MF -	Mechanical	W-	Wavy
O:\ Templates\Rock Description	· •	A- BP-	Angular Bedding Plane	С- Н-	Hackly
i erminology		BL	Blast Induced Parallel To	SL- TCA-	Sludge Coated

Perpendicular To

STR-

Stress Induced

WELL LOG AND PIEZOMETER CONSTRUCTION DETAIL

CLARENCE TOWNSHIP P1 P1-90



P 1

and the second sec

Angeler († 1975) Sterner († 1975)

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CLARENCE TOWNSHIP P2

P2-90





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STANCON FILE 90-72 (Alice Control of Cont PI-91 inp of Clarence Landfill Site Etometer - as built velevations to 700=55. -Refer to orginal 1990 PI 5WL= 53.88 u 17 AUG /91) \hat{w} ASING TOC = Top of plastic well casing, not cap! BOC = Bottom of casing (screen > SWL = Static well kevel.

PANCON FLE 90-72 P5A-91 of Clarence Landfill Site 1070meter - as built velevations for: P5-1-70C = 59.28 - Red boun sand 0-1.53m SWL= 55.94 Gry brown ned 1.53 - 1.98m Sand Red brown ned 1.98-4-BBry Sand Red grey clay 4.88-5.80m ASIN TOC = Top of plastic well casing, not cap! BOC = Bottom of cusing (screen > SWL = Static water kevel.

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FANCON FILE 90-72 P58-91 isp of Clarence handfill Site Fomeler - as built relevations for: P5-2 <u> 70C = 58.6</u> Red boun sand 0-1.53m SWL= 55.2 Gry brown med sand 1,53 - 1.83m Red brown ned sand 1.83-3.95, (AUC AI い ふ 5.1 FOC = Top of plastic well casing, not cap! BOC = Bottom of casing (screen > SWL - Static water kiel.

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STANCON FILE 90-72 P6-91 Two of Clarence Landfill Site Pézometer - as built velevations for: PG $\pi c = 55.67$ Grey med sand 0-1.53m Grey coorsesand 1.53-2.44 SWL= 53.9.7 Grey red clag @ 2.44 (AUG/91) Gy red clag @ 2.44m ? Ю TOC = Top of plastic well casing, not cap! BOC = Bottom of casing (screen > SWL = Static works kevel.

STANCON FILE 90-72 P7-91 inp of Clarence Landfill Site 1270meter - as built velevations for: 70C = 58.74HE- 57. Red brown mich sand O-1.22m SWL= 5/0.30 Brown sand, coarser 1.22-2.44m (AUG-AI with depth 244-3.05 Red gray clay Crey člag 3.05m 00 N M ASING TOC = Top of plastic well casing, not cap! OC = Bottom of casing (screen > SWL = Static water level.

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	DEPTH SCALE METRES		BORING METHOU	SOIL PROFILE	STRATA PLOT	Elev. Depth (m)	NUMBER 8	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	BLOWS/D.3m 8	DTNAM REBIST SHEAF Cu, 169 2	ANCE, IANCE, ISTREM a	ELOWS	(2014 40.3m 10.12 10	+ 0 + 0 80	-0	ITUHA WA WA					ADDITTONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
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	1	Power Aucer	m Diam. (Holiow Bian)	Gray brown SILTY CLAY, occasional red brown layer (Weathered Crust)											-				-	=		5 - 2 5 - 2
	2		2000	Gray SILTY CLAY, occasional red brown layer		61.46	•	88	WH											•		5775575575 57755755 1
	3			End of Hole									-			-						W.L. in Screen 45 eizr, 52.07m Oct. 12, 1982
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	70 100	6J	EC D	F. 941-2729 N. See Ban P		F	(E)	<u> </u>	DR	D	OF	(G.).	OF	REF	(O) iiy 2	E L 105 SA	C 4 MPL	621 ERM	-94 AM3	IER	63	SHEED DATUM 5kg: DROP: 77	OF1 Geodeli Ørinns	-	G	ð
щ	T	g	T	SOIL PROFILE			8	AM	PLES	3	C	AS CA	ONCE	NTRA)	TICH	6 ⁴	YDRA		COND STV	UGTA	Ţ.		-		-	
DEPTH SCAI	Malhes	BORING METH	·	DESCRIPTION	STRATA PLOT	ELEV, DEPTH (m)	NUMBER	TYPE	ME BANDIB	HECOVENT %			l .	-].	•	l Vàtei W	 RCON /PI	IENT	PERC -IW	T TMB		INSTAL	LATIONS	- - -	
-	•	-	1	Trans Artice	5	55.1e	ſ		T	T	T	T	Ī		•			-			-	Ì			-	
				Dark brown sandy TOPSOIL		54.80 0.30								-			·					Bentonile Sasi Granular	Ę			
	1	Augel	Hotov Blem)	Loosa brown to grey fine SAND			•	88 88	6	-									•	•		Film Somm PVC				
	2.	Picker	EDGrum Diain (Brey SILTY CLAY, occasional		<u>53)5</u> 1.6	2	80	1				-				•	• •				Somen		;-	•	
				red brown seam		52:4	9	80 00	t	-				-					•					-		
	3			End of Hole		27					·								•			W.L in Screen at Ecv.54.08m Sect 5 1994			•	- -
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	 D 1	L DEF to	<u>।</u> ग। 5 5	I SCALE (ALONG HOLE) 0	I.		_1.	1				Ŀ	Gol	de	r As	so	_l_ ciat	les		<u>L</u>	1			LOGGE	:D: 0.J	ls AM

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	ę	RCJEC YCATIC D) - 911-27 2 9 N: Seo Plan P	F	EC		O C BOR	FB	ORI MATE:	EH(D1 E. 26. 9	904 AMP	G23	-94 (AMI)	IER	63.5	SHEET 1 OF 1 DATUM Sector INC. 789 June		- D
	41	8	SOIL PROFILE		EAM	APLES		GAS C	OHCEN	FATRO	N @	HYDI	WUC	COND COND	VCTIN	<u>ř</u>		•	· · ·
	DEPTH SCAU METRES	BORING METH	DESCRIPTION	STRATA PLOT	NUMBER	el.OW8/0,5m	LAB. TESTING	LEL %	l			WAT	11 ER CON Wp	TENT,	PERCI	L INT	INSTAL	LATIONS	
· •	- 0		Ground Surface Dark brown silty TOPSOIL	81.00						-	$\left \right $						Bentonile Seal		•
• •			Brown SANDY SILT		7588									-				• •	
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			· ,		H		ŀ						ŀ	 					• .
			Very loose to compact brown stratified fine SAND		2 č	8 <mark>6</mark> .													
	F	ter Auger ni Noscieu Et			•	20					•								. •
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						50 90 ⁹ 2												••••••••••••••••••••••••••••••••••••••	•••
	ŀ	6	Grey SILTY CLAY, occasional red brown seam		6.88	10										╁╴		• •	·
•			End of Hole	_	4.31 6.71	DOP							ŀ					• ,	• .
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-	Dfak 18, 8.L															; ;		-	
•		-10		-	-														
	١٧٥	DEP	TH SCALE (ALONG HOLE)								1_		1	I	<u></u>			LOGGE	D: D.J.S
-		1 to	50						Go	lde	As	SOC	iate	s		-		CHECKE	D: KA



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i i	HO. XCA	ies Tici Oi	5 97 1 2610 2: Sen Pluit 6		R	EC	OF	RD I BC	BC	DR TE	EHQ May	29.1 29.1	BG7 SAM	G2 PLTR	7-9 IIAM	7 MER	63 1 <u>1117</u>	SHEED+ OF1 DATUM: See 5 SHO: CROP, 790 and	tun (CA)
SBATBM SAME		BOHING MELHON	SOIL PROFILE DESCRIPTION	BTRATA PLOT	ELĘV. DEPTH	NUMBER 1	BLOW8/6-6m	RECOVERY % (210-T¢	(;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	} 	<u></u> I	, WA	i TER Ci Wp I-	k, or L DNTEN	fa 1 11, PES 1 Vi		INST.	ALLATIONS B C
	wer Autoer	m (Hollow Stem)	Ground Surface Brown SILTY fine SAND Loose brown to grey fine to medium SAND		53,87 0.00 53,76 0.21													Bernorita Basi Concrete Granular Filor	
		200mm Dia	Grey SILTY CLAY End of Hole	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	52.66 1.31 52.45 1.52											+		Screen	
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DATA INPUT: OF	á	EPT	H SCALE (ALONG HOLE)																LOGGED: D.J.S

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P	iou CA	HC HO D	- 97/1-2839 N. Seo Plan P		RE	COF	SD C	DF BC	DREH TE Ma	OLE v 24 17	G28 97 AMPLERA	-97 IAMMER 6	SHEETT (DATUM 3 LANG: DHOP: 780	y 1 24 Plan Gun
DEPTH BCALE METHES	SOBING METHOD		BOIL PROFILE	BTRÁTA PLOT	NUMBER AT	BLOWS/0.3m	RECOVERY % 0	Micro-Tip	()		WATER CO	K, envis t YTENT, PERCEN O ^W t Wi	r A	NSTALLATIONS B C
- 0	Power Auget	m Diam (Holtow Blam)	Brown to grey fine SAND		<u>53,70</u> 9.00					-			Bentonite Seal Concrete Granular Fiber 38mm FVC 1 #10 Stot	
		zoôm	End of Hole		<u>52,18</u> 1.52									
	4												•	
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ŀ	0 1	EP to	TH SCALE (ALONG HOLE) 40	· ·					Golde		ociate	\$		Logged: D.LS Checked: BCS

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		ŀ	Soil Profile	E T		6A4 1	VPUE	3	DYNAMI RESIST/	ic pene Nicé, B	TRADO	X Jm	<u>ک</u> ا	HYDRAL	AUC COI k, cm/a	NUCIT	VITY,	I	INN.	PIEZOA	AETER
METRO	Boring ME	ŀ	DESCRIPTION	STRATA PLO	elev. Depth (m)	NUMBER	TYPE	BLOWSIDA	1 SHEAR Cu, kPa 20	STRENK	<u>. 1</u> 5174 п А	L #.¥·+ #1.¥•€0	0.0 U-0	WA Wy	1001 1001 1001	ITENT, I	PERCEN	л м	ADDITION U.R. TEST	STANE RISTAL	A A A DO
-	Ī		Ground Surface		<u>63.5</u> 9			1	· .]						1						
,			Brown fitte SAND		52.11				<u></u>			. ·	•	·	·					Bentanite. Seal	
2		ſ			1.29				9 0		+		·							Native Backfill	
5			Firm red brown and grey SiLTY CLAY occasional sandy silt seam												· · ·					•	
•					49.58 3.81					•		- -	•								
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						-			њ				•			-					
7	UCAL	ollow Btam)	Fine to still grey SILTY CLAY, trace black organic matter						9	 	*	ļ				-		<u> </u>		Bentonita	
٠	PowerA	mits Diem (H							¢ •		+	. 	•				ļ			Soui	•
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19													 					 		Constan	
11				-	- 1 2	11			¢ •	<u> </u>	+	+	 -				<u> </u>		4	Fitter 50min PV #10 Stot Screen	0
12			Still grey SILTY CLAY, trace black organic matter						€ ⊕							 			-	Bentonita Best	
T J			Compact dark grey sandy slit,		32.1	29 11	- 50			-	+				 .				-	Native Backšii	
- 15			some graver and clay, occasional cobbie and fine sand layer (GLACIAL TILL)			ľ		Ϊ	ŀ	+		+			 		<u> </u>				
- 70			End of Hole	¥	16.	ž.		ŀ								<u> </u>		- 	-	•	12
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	BORING METH	DESCRIPTION	STRATA PLOT	elev. Deptih (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAN Cu. KP	L AGTREN	I	u.sm 1 nat,V-∔ nám.V-@ k0 t	1 0-0 1-0 1-0	W			PERCE		ADOTTIONAL LAB. TEBITING	PIEZOMET OR STANDPI INSTALLAT
Ī	Ī	GROUND SURFACE Dark brown TOPSOIL Red-brown, fine SAND, some sit.		53.30															
		Very loose to loose, brown to oney stratified SHITY free SAMD		0,43		80	7		-	-			•,					-	
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				49.79 3.51		50 00	2					-		•	-				
	CAVER AUGER	Very loose to loose, brown to grey fine SAND, trace sit			- - -	88 88	7 3					-	: 			· · · ·			
	TORMALD, KOL			•	- , ,	88	5	-		-						• •			GROUT
ŀ	·			48.90 6.40	6	58 28	• •							-	C	-	. <u> </u>		
		Very stiff to stiff, grey, occ. red-brown layer SILTY CLAY, trace block provide stiff				-					-	+	ж						
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I	HOD .		SOIL PROFILE	· ·		SA	VPU	ES	0 R	YNAMI Esista	C PEN NCE,	ETRAT	10N S/0.3n		Ì	HYDFV		ONDUC	EWIY,	T	79	PIEZOWETE	
MEINEB	OPING MET		DESCRIPTION	RATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.6m	s	HEAR (STREN	I KGTH	net.V rem.3	·+ -⊕	0-0 U-0	W/	ATERICA	MTENI	, PERCEI	 vr	ADDITIONU LAB. TESTIN	OR STANDPIPI INSTALLATIO	E DNI
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• •	WER AU	W BTEN	Very stiff, grey layered SILTY		13.29						_	+-	-		÷	6	1						
	E.65 PO	N HOLLY	CLAY and CLAVEY SILT.			┢		-						·									
14 -	Ċ	6mm LL			39.13	13	160 160	2		-			·					•					
		ž	Loose, grey sampy sr.t.					ŀ										· ·				BENTONITE SEAL	
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	ŀ					-		ŀ		÷			-	•			 	· ·	<u> </u>				
			Danse, dark grey sandy silt, some gravel, trace clay, occ. cobble &			14	80	2 s	3	•				•	-	0		·			MH	NATIVE	
16			DOINI DOUBL (MENVINE ISEL)	NY.		1	1															PILITER 38mm PVC	
	ŀ			N.		ļ	·	•				+	-ł	· ·	<u> .</u>		<u> </u>		<u> </u>		1	SCREEN S	
		•		NY.		L	_			-							• .						
17	Ц				38,1	7		8	ы	T.C	R-	70%		•	-	0					.		
			Fresh to fairly weathered, dark			"	18	č	20	- 50 HJ	9.K ≊ 207≇	0%	-		1.	·		<u> </u>	·			DEMONDE	
			some clayey material along fracture some clayey material along fracture surfaces.	E			, N	10 20	50	T.(S.)	R =	8 % 21%		•								SEAL	
18		ľ		E		-				, 1 %	Ĩ								1. "				
	NDUIT	BEOC			- <u>34:8</u> - 18.4	0 P						·											
	Rothing	ĝ					,			Ţ		85%							-				
46			Fresh dark grey SHALE, occ. fracture.	E		1	8] f	NG	00	R	6.D	- 65%		<u>. </u>								GRANULAR FILTER	
				E		I									-							32mm PVC	
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Reservation of

	.E) (C SA	HO CJ MI	16 日 近	CH. 9812726 20. REFERIOFIAN INTAMMERISSISKI DHEF, 70060		В	ĒC	:0)	RD	OF	BOF DATE	REH(APP	DLE 9 1.740/1	G31- M ENETR	98 Ation	ÆSÞI	IAMNE	SHEET DATOI Ry 833	s des A des No. DR	s défic CP, 76	kren
. 1		Ş		SOIL PROFILE	T	r	6/	WPL	EB	DYNA RESIS	HC PEN TANCE,	IETFIAT: BLOWS	DN 10.3m	Ì	HYDR		ONDUC /3	HVILY,	Ţ	وبر	
OB NTRAC	METRO			DESCRIPTION	STRATA PLO	ELEV. DEPTH (m)	NUMBER	1796	BLOWEAD.3n	SHEAI Ca, 12	1 ISTREA a a	1 KGT1+1 40	1; nat.V- + rom.V- @ 60 (u+● U+0 ∞	 W	ATER Ci	DNTENT	I PERCE	_⊥_ ± №1 ₩1	ADDITION/ LAB. TEBTIN	Prezioneter Or Standpipe Installation
	80	SPTARY DRILL	HIG CORE	CONTINUED FROM PREVIOUS PAGE		32.76	12	33	DO-	T.C 5.C Rut	R = 1 R = 1	0% 57% 55%									
	ณ			End of Borehole	۰ ۱	,20.64									2-				· .		
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HICA DICA AMP		9012220 N. GEFERTOPLAN HAMMERICS OKG DROF 700nm					שר ד	ORR ORR	0.0		APRE	13/08 13/08	NETRA	6 tion1	төтт	E SMMEJ	HEEF IATOM: U 63.6	Geox Geox g: DR	166c 57.70		Ð
BORING METHOD		Soil Profile Description	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	туре В	BLOWB/0.8m W	BHE Cu,	IAMIC ISTAI IARIS IARIS IARIS IARIS		THARO LOWS/0 1 37H n 57H n 6	N ,3m 	a.e u-0	HYDHAN WA WA 20	TER CO		 PERCE 	Т лт м	ADDITIONAL LAB. TESTING	Piez St/ INSI	ometer Or NDPIPE WLLATION
		GROUND SURFACE Dark brown TOPSOIL Loose, brown SILTY fine SAND,		60.87 0.00 0.15		~			-	-					-						
		000, prio 5400 5600 L		• •	1	53 DO	7	-		÷		-			•						
				<u>59:04</u> 1.63	ž	88 60	5	 						•					-	•	
					а	- 88	8										÷			•	•
3		Loose to very loose, brown, fine SAND, trace silt, stratified, occ. thin silty sand layer.			4	59 D	8							-		•					
•	WOERS				5	80											-			-	
SS ROWER AUGE	HOLLOW STEM A				• • •	28	*		 											GROUT	
CME	108mm LD.				7	88 1		-	-				. ·	· · · · ·						• • •	
		Very stiff, grey SILTY CLAY.		53.0	2 -	82	1						· .	-						· · .	
7			1	6.9	5			, i	•				- +	7 5 76						- - -	
8		Loose, grey SILTY fine SAND.		- -	• ·	30	2 P	H I					-						c		
9				51.6 8.0	10	, a			• _ ·										· .		
		Firm to stiff, grey SILTY CLAY, occ. red-brown layer, stratified, bace black organic matter.			-										o ·						
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P LC S	RG. XA	ECT. HON:	BITZ726 HETER TOPPLAN IAMAER ISO SKG THROP, 760mm		R	EC	OR	D 80	OF BING	BOI	15) 	tOL mit i	E G 5/00 (6	32+ NETF	88 (ATIO	N:TE:	T HA	si D/ MMER	ilet 2 Itum: 163.6k	01.3 640 1.08	100 c DP: 78	Quan (Ð
		1	SOLPROFILE			SAI	VIPLE	,	DYNA		NETR	ATION WS/D 3		<u>}</u>	HYC	JULARK K	C CON	DUCTIV	11Y,	T	-10		
DEPTH SCALE METREB	Contro Metho		DESCRIPTION	STRATA PLOT	elev. Depth (m)	NUMBER	TYPE	BLOWSIOLAR	SHEA Cu, ki	L R STRE Pa 20	. <u>1</u> NGTH	I nat i nat rem .60	 ∀-`+ №- ⊕ ₽¢	4.0 U-0		WATE WP 1 20	A CON	TENT, P	1 ERCEN W 00	π.	ADDITIONA LAB. TESTIN	9162 . ST7 1NST	ORIENER ORI NIDPIPE ALLATION
- 10			NTINUED FROM PREVIOUS PAGE	R.R.						-	++												
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		EH AUGERS	Firm to stiff, grey SILTY CLAY, occ. red-brown layer, stratified,				- 100				-	•					-						
	¥۵	DALE 35 POWER	READ DISIN CORRECT STORAGE				द्र म वा	P	9													GROU	л
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udadagiyahadaginda							·		e	₽					F								
	18						17	73 12	e FH						·								
JUNE 2/98	19		Stiff, grey layered SILTY CLAY and CLAYEY SILT.			1 <u>.97</u> (8.90								+			 -		-				
8				-			10	50	2					_									

PDC/IEC LOCATR SAMPLE	ST (SPR12726 SN: REFER TO PLAN R HAMMER: 63 6kg; EROP, 763ann		RE	co	RI	D C BOI	DE B	ORI MTE	EHQ Aphil	LE G 1398 -PE	32-9 NC18/	8 BON	nest A	C	HEETS ATUM: 1, 69.88	i of a Geor g. Det	ielic SP, 780	auri (CA)	
METRES BORING METHOD	SOIL PAOFILE DESCRIPTION	STRATA PLOT	elev. Xepth (m)	SAMP -	ES TROUGHO IS		HEARS	O PENE INCE, E STREN	THATIO LOWS/C	N L3m atV-+ mV-9 0 80	a.● u-O	HYDRA LL W/ 2					ADDITIONAL .	PIEZOMETER OR STANDPIPE INSTALLATION	
C C C C C C C C C C C C C C C C C C C	CONTINUED FROM PREVIOUS PAGE		40.30 20.57 33.53 21.34	16 D 19 SC 20	20 00 20	•	T.C	R = 2		· · · · · · · · · · · · · · · · · · ·								BENTONITE	
JAAY DAILL WY CABRO	Dense, dark grey sandy silt, some gravel, frace clay, occ. cobble & boulder, (GLACIAL TILL)			21	35 35 35	00	Ť.C Ŧ.C Ŧ.C	£1.=3 ;R.=4	4%									NATIVE BACKFILL 25mm PVC 25mm PVC	
26 27	Fresh to fairly weathered dark grey SHALE; fractured. 8 9 9 9 9 9 9		<u>35,46</u> 25,39 33,96 26,85	24 25 26 27 28 29	<u> </u>	20 60 60 60	T.C. BR: SR: SR: T.S. R. T.S. R. T.S. R.	HARD RAD RAD RAD	27 38 58 58 58 58 58 58 58 58 58 5	F. = 633 F. = 03 10 = 07				-			-	GRANULAR	
23	fracture.		- - - - - - - - - - - - - - - - - - -	5	35 25	GD	T.S.R	0.9. = <u>0.9. =</u> 0.0. =	B6% 80% 53%							•		25mm PVC 25mm PVC 4 10 SLOT SCREEN A	
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	9 10 5/	RCLIE CATI MPL1	CTT BH 12726 QN: BEFERTO PLAN FF HAMMER, 63 OQ, DROP; 750mm;		B	ECC	DR	D ec	OF E RING I	BORI IATE:	E HO APINI	LE C 36-17/ PI	133-9 28 NETH	98 ATION T	est W	s E MMET	(HEET (ATUM) 1, 83 (5)	1.0F3 Geo 9.DR	ietic 2P. 780		Ð
		9	SOIL PROFILE		· [SAM	PLE	s	DYNAM	IC PENE	TRATIO	N L3m	<u>}</u>	HYDRAU		NDUCT	MITY,	T			
	DEPTH SCALL METRES	BORING METH	DESCRIPTION	STRATA PLOT	ELEV. DEPTH	NUMBER	TYPE	BLOWS/0.3m	SHEAR Cu, kPa 20	STRENG] ЭПН о т		a.e. u.e.				PERCE	<u>Т</u> чт м.	ADDITIONA LAB, TESTIN	PIEZO STAI INST/	XUETER OR NDPIPE VILATION
	- 0		GROUND SURFACE Dark brown sendy TOPSOIL	Į.	53.68 9.00				· ·									-		·	
		ŀ			<u>53,34</u> 0.24												•			-	
			Brown and dark brown, stratified fine SAND, some silt and silty sand seams.																		
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VET IN BUAL			DESCRIPTION	STRATA PLOT	elev. Depth (ra)	NUMBER	3d/T	BLOWS/0.3th	SHEAP Cu, KP	ISTREN a 0 4	i j GTH n 0 6		,	W/ W/ 2	ATER CC	NTENT,	PERCE		ADDITIONAL	PIEZOMS OR STANDF INSTALLA	TER PE JION
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12			Stiff, grey, occ. red-brown layer SRTY CLAY, trace black organic matter.				73	PH	•	-					 1	. 0			C/eg 2.89	GROUT	
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14	/ER AUGER	W BITEM AUGEN				10	. 88	PM				*	• <u>•</u> •••								
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. 16	-			11111111	15.5	- -	۲ ۲	6									` .	 - -	-	BENTONITE SEAL	
		-	Loose to compact, dark grey sandy slit, some gravel, clay and cobbles. (SLACIAL TILL)	111111						. 	. 	-		. 		. 	·		, , ,	•	
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PBC LOC SAM	XJEX ATK IPLE	R, 981-2726) NC, REFERITO PLAN R NAMMER, GJORLYDROP, 730444,		B	EC	OI	RD B	OFE	BOR	EHO	DLE 10.16-1	G33- 798 PENETI	98 Mation	FSTÅ	S D MMCF	HEET C Atom C 85 da	OF 3 Geo: g. DRC	e tic (P. 76)	nur (CD)
DEPTH SOALE METRES	BORING METHOD	Sorl Profile Description	STRATA PLOT	ELEV. DEFTH (m)	NUMBER 88	TRE	BLOWSIOLSM	DYNAM RESIST SHEAR Cu, KP2 20	KC PENI ANCE, I STREN	ETHAT BLOWE GTH QTH	ON /0.3m nat,V- nm.V- 60	1	HYDRA WA W					ADDITIONAL LAB. TEBTING	PIEZOMETER OR STANDPIPE INSTALLATION
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212	cati Mfli	CN REFER TO PLAN R HAMMER, 53 640; DROP, 760mm					BO	RUNG	DATE	APRI	20/96 P	INETR	ATION	iest H	i Ammej	MTUM RUKS 8	. Geo kg. DR	detic DP. 76	, 100	
щ	Q	SOIL PROFILE			SAN	IPLE	s I) YNAN TESIST	AIC PEN	TRATIC LOWEA	N Sm	<u>}</u>	HYDR	AULIC CC K, cniv	NDUGT	IVITY,	T	- 9		
DEPTH SCAI METRES	TEM ENINOB	DESCRIPTION	STRATA PLOT	elev. Depth . (m)	NUMBER	E C	BLOWBAG	SHEAF Cu, KP 2	1	1 1000 m 1000 m 1000 m	at.V-+ m.V-⊕	0-0 U+0	W I	ATER CC	мпемг, •••••••₩	PERCE	 NT WI	ADDITION	ST INS	OR ANDPIPE TALLATION
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RECORD OF BOREHOLE G35-98 RORING DATE: ADDIC 2109

SHEET 1 OF 1 DATUM: Geogen

PENETRATION TEST HAMMER (SSER) DR

PROJECT SH12726 COCATION SHEFEN TO PLAN SAMPLER HAMMER SHORE, DROP, 760mm

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			SQL PROFILE			SA	MeLi	ES	DYNA	AC PEN	TRATK			HYDRA		NUCT				, oung; Distor, 760	
DEPTH SCALE METRES		ORING METHO	DESCRIPTION	RATA PLOF	ELEV. DEFTH	NUMBER	∃d,L]	LOWS/0.3m	RESIS 2 SHEAI CU, KP	TANCE, 1 0 4 R STREN a	BLOWS	0.3m 10 8 10 8 10 1	0 0-0	1(W. Wr	k, cm/s 7 ⁴ 10 ATER O	2* 10 2NTENT	PERCEI	м лі ²³ Т	ADDITIONAL LAB, TESTING	. PIEZOMET OR STANDP#P INSTALLAT	ir E On
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Concernant Section 199

AMP	LER	HAMMER, 64kg; DROF, 760mm										•		PENE	TRATI	ON TES	T HAM	mer,	64kg; DROP, 760m
		Soil profile	5		SAI 65		13 ms.0	OYNAMIC RESISTA 20	PENE NCE, 8 40	IRATION LOW/S/0 60	1 3m 80		HYDRAU 10	111C CO 4. cm/4 -10 ⁻⁴	10	/TTY.	, I	TICNAL	PEZOMETER OR STANDPIPE
	BUKING	DESCRIPTION	BTRATA	DEPTH (m)	NUMB	34 74	BLOWSA	SHEAR S Cu, kPa 20	STRENG	571 nz 161 60	1V. + nV.⊕ 8(ų-0	WA Wo 10	TER CO			т а		INSTALLATION
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\$/	MPLE	R HAMMER, 64kg; DROP, 760mm		-			TYNAN	IC PEN	TRATIC		<u>\</u>	HYORA	FEI	NDUCT		SI HA	MME	(, 64kg; UKUP, 760mm
B No S S S	ETHO0	SOIL PROFILE	15		SAMP	E	RESIST 20	IANCE,	BLOWSA 0 6).3m) 8	, . ,	16	ik,cmuis r⁰ 10	r ^a 10	r" 10	, I	STING	PIEZOMETER
DEPTHS	BORING-MI	DESCRIPTION	STRAŤA PU	ELEV. DEPTH (m)	NUMBER	BLOWSADE	SHEAR Cu, KPa	STREN	GTH a	 atV.+ mV.⊕	0-0 U-0	Wp	ATER CC		PERCEN	417 Mi A	ADDITIC LAB, TE:	STANDPIPE INSTALLATION
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E.		End-of Borehole		43	ĺŀ													Water level in
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Constant Section

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PROJECT: 07-1122-0124-5000 LOCATION: See Site Plan

RECORD OF BOREHOLE: G39-07

SHEET 1 OF 1 DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

ų į	8	SOIL PROFILE		<u> </u>	SA	MPL	ES	DYNA		NETRAT	10N S/0.3m	<u>```</u>	HYDR	AULIC	ONDUC	TIVITY,			· · · · · · · · · · · · · · · · · · ·	
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PROJE	ECI	F: 07-1122-0124-5000		REC	:0	RE) (of Boi	REHO	.E:	G4	10-07	,				SH	IEET 1 OF 1
locat Sampi	tioi Lef	N: See Site Plan R HAMMER, 64kg; DROP, 760mm						BORING	GDATE: M	ay 23, 2	2007		PÉI	NETRAT	ION TE	ST HAI	DA MMER,	44kg; DROP, 760mm
ETRES IG METHOD			A PLOT	ELEV.	SA	MPLI 관	S/0.3m 5	DYNAMIC P RESISTANC 20 SHEAR STR	ENETRATION E, BLOWS/0 40 60 ENGTH na	3m 80 1V. +) q-●	HYDRAU 10 ⁴ WA	JLIC C k, cm/s 1 TER C	ONDUCT	IVITY, p ⁴ 10 PERCEI	11 11	DITIONAL 3. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
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Concession of

Page 521 of 661

PROJECT:	10-1127-0065

RECORD OF BOREHOLE: G41-10

SHEET 1 OF 1

DATUM:

LOCATION: . See Site Plan SAMPLER HAMMER, 64kg; DROP, 760mm

BORING DATE: May 5, 2010

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

HOD	SOIL PROFILE	1-	T	SA	MPL	ES	DYNA RESIS	MIC PEI	NETRA	10N S/0.3m	2	HYDF	AULIC (k, cm/s		TIVITY	,	μų	DIEZOMETE
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Power Auger Diam, (Hollow Stern)				2	50 DO	wn						-				-		
аннос 2004н				3	50 DO	WH		-										50mm Diam, PVC #10 Slot Screen
6	Firm grey SILTY CLAY, trace sand		2.13	4	59 DO f	РМ				-								Cave
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1:25								EGo Asso	ldei ocia	tes							LO CHE	gged: r.i. cked: <u>LEB</u>

SAMF		R HAMMER, 64kg; DROP, 760mm SOIL PROFILE			SA	MPLE	s	DYNAM RESIST	IIC PEN ANCE,	ETRATI	ON /0.3m	\mathbf{X}	HYDRA	PE ULIC CO		ST HAI	MMER,	64kg; DROP, 760 PIEZOMETE	mm iR
METRES	BORING METH	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20 SHEAR Cu, kPa 20	D 4	0 IGTH 10	60 8 nat V. + rem V. ⊕ 60 8	0 Q- ● U- O	10 WA Wp 20	6 10 TER CO 1) 10 PERCEN 	יז זו עו געו	ADDITION LAB. TEST	OR STANDPIP INSTALLATI	E DN
0		GROUND SURFACE Very loose black to dark brown organic matter (PEAT)		0.00	1	50 DO	WH		-	· · ·								Bentonite Seal Silica Sand	205.0 205.0
1	Auger (Holtow Stem)	Very stiff grey brown SILTY CLAY, trace sand and rootlets (Weathered Crust)		0.59	2	58 DO	7	-											
	Power 200mm Dlam.	Very stiff grey SILTY CLAY, trace sand		1.6	3	50 DO	6											50mm Diam, PVC #10 Slot Screen	
2		and red brown silty clay bands		2.4	4	50 DO	7											Cave	
3																			-
4																			
- 5																			
- s	EPTH	ISCALE						Ĝ		Gold	ler.							LOGGED: R.I.	

Page 523 of 661

PROJECT: 11-1127-0064

RECORD OF BOREHOLE: G43-11

LOCATION: See Site Plan

BORING DATE: July 21, 2011

SHEET 1 OF 1

DATUM: Geodetic

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Ŧ	NG NG	DESCRIPTION	14	ELEV.	MBM	ΡE	WS/0	SHEAR STR	ENGTH	nat V. + rem V. @	Q- 🔴	WA	TER CO	ONTENT	PERCE	NT		STANDPIPE INSTALLATION
	Ř		STR/	(m)	Z.	[BLO		40			Wp	<u>ب</u>	- 0¹¹	<u> </u>	Wi	₹₹	
		GROUND SURFACE	<u> </u>	A7 77	┢			20	40 1						<u> </u>			
0		Dark brown to black organic matter, trace sand and silt (PEAT)		0.00	1	50 DO												Bentonite Seal 又 것 것
2	Geoprobe	Grey brown SILTY CLAY, some organic matter Grey brown SILTY CLAY, trace organic matter and fresh roots		1.12	2	50 DO							-					Silica Sand
3		End of Perobolo		44.67	3	50 DO												32 mm Diam. PVC
4																		W.L. at 0.75 m depth on August 22, 2011 -
3																		-
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 DEF 1:{	- - - TH- 50	I SCALE	1	L	I	P:			iolde:	r Ites		<u> </u>				I	L L(CH) DGGED: C.H.M ECKED: L.E.B.

APPENDIX E

Sampling Protocol

STANDARD SAMPLING PROTOCOL

The following is a description of the monitoring procedures and protocols used for groundwater and surface water monitoring for landfill sites.

Equipment Cleaning and Calibration

Regardless of matrix, prior to traveling to the site to be sampled, all equipment such as water level indicators and multi-parameter meters must be cleaned and calibrated as specified by the equipment manufacturer. Details of the cleaning and calibration should be recorded in the field notes.

GROUNDWATER

Monitoring Well Assessment

- provide an assessment of the status of all monitoring wells at the site;
- note any changes to the well and/or protective casing and record the physical condition of the well; and
- label all observation wells clearly and accurately on both the protective casing and well pipe.

Groundwater Monitoring

- maintain and use an accurate, up-to-date list of all observation wells to be monitored;
- check all field equipment for cleanliness; and
- wear personnel protective equipment (i.e. gloves, protective glasses, splash guards) during all phases of work, and follow any appropriate health and safety plan procedures.

Gas Detection in Wells (Prior to Measuring Water Levels)

- turn on gas meter and prepare for sampling atmospheric condition inside monitoring well;
- remove protective casing cover and well cap avoiding introduction of foreign materials into the well;
- immediately insert the probe attached to the gas meter into the well and wait for readings to stabilize;
- record the measurement in the appropriate column on the field data sheet or field book.

Water Level Measurements (Prior to Purging)

- always take water level measurements prior to purging or sampling;
- do not move dedicated sampling devices such as the "Waterra" inertial pump prior to measuring the water level; reference the measurement from the same location each time (marked location or lowest point on pipe);
- lower the tape/probe into the wells record the depth to water when the indicator (audible/visual) shows the water level has been reached;
- measure the water level twice by raising and lowering the tape/probe; and
- record the measurement to the nearest cm (0.5 cm) in the appropriate column on the field data sheet or field book.

Well Purging (Prior to Sampling)

The purpose of purging is to remove the stagnant water from within a monitor (removal of 3 to 5 standing volumes) so that a representative water sample may be collected. The procedures for purging are as follows:

- purge the well only after water levels have been confirmed;
- lift the tubing off the bottom of the well and "pump" stagnant water from the well into a graduated container such as a bucket, pail or cylinder so that the purged volume can be measured and recorded;
- for low-yield wells, it is expected that either "no purge sampling techniques or low flow purging will be utilized (avoid purging well dry);
- under normal circumstances purged water may be discarded on the ground, away from the well to avoid the potential of water seeping back into the well; and
- allow a sufficient recovery period before sampling (not more than 48 hours).

Field Measurements

Field measurements are to be collected and recorded as outlined in the Certificate of Approval or the approved monitoring program.

Well Sampling

- collect the water sample as soon as practical (not more than 48 hours) after purging starting at the least contaminated and proceeding to the most contaminated;
- lift tubing and check valve off bottom of well to avoid introducing unnecessary sediment into the sample and transfer some representative sample water into a clean, well rinsed container to conduct measurements of field parameters;
- lift the tubing and gently transfer a sample into a clean container and thoroughly mix to form a single representative sample;
- transfer the sample into a pre-labelled sample bottle;
- for samples that require filtering, attach the disposable filter onto the end of the tubing (a 0.45 micron membrane filter should be used);
- attempt to keep sample agitation to a minimum during sample transfer;
- store samples in a cooler, with ice packs to keep cool;
- conduct field measurements (these typically include: temperature, pH and conductivity; and
- transport samples to laboratory within the maximum hold time established by the laboratory (typically within a 48 hour period).

Volatile Organic Compound (VOC) Sampling

Volatile Organic Compounds (VOC) can be easily lost during sample collection, storage, and transportation. The following sampling and handling protocols are adhered to.

VOC samples are to be collected in special containers provided by the laboratory. These typically include: glass vials, preferably amber, with a minimum capacity of 20 ml and sealed with Septum tops.

• vials must be filled just to overflowing in such a manner that no air bubbles pass through the vial as it is being filled (this is easier to accomplish by inserting a 4' length of ¼ " poly tubing into the existing wattera tubing and filling the vial from the ¼" tubing);

- vials must then be sealed with the cap so that no air bubbles are entrapped within it; the septum is placed with the Teflon side face down toward the inside of the bottle;
- check for the presence of air bubbles by inverting the vial and tapping on hard surface; if air bubbles are present, discard the sample and re-sample;
- all VOC samples must be preserved as specified by the laboratory (typically with 1 to 2 drops of Hydrochloric Acid (HCI)) and refrigerated or stored on ice until analysed; and
- VOC samples should be submitted in duplicate.

SURFACE WATER SAMPLING (GENERAL)

Surface water samples should be collected at the same designated location during each sample event (*do not* collect samples from any station which is frozen, stagnant or otherwise not representative of normal conditions).

- if you must stand in the stream, position yourself downstream of the sample location to avoid contaminating the sample with sediment, debris, and other floating materials;
- all equipment must be thoroughly rinsed with distilled water at the beginning of each station to avoid cross-contamination;
- wear gloves to handle the sample bottles;
- fill all bottles using an unpreserved transfer bottle (to avoid overflowing pre-preserved bottles);
- when sampling for dissolved metals, the sample must be filtered and placed in a separate metals bottle, while sampling for total metals, the sample is placed in a common bottle for metals that is provided by the laboratory;
- label and store all samples in the same manner as for groundwater samples; and
- conduct field measurements (these typically include: temperature, pH, conductivity, Dissolved Oxygen and Flow).

Flow Measurements (General)

• Discharge flow measurements must be taken at designated stations.

QA/QC Water Samples

A field quality assurance and quality control program for all monitoring events will be established as follows:

- where groundwater or surface water samples are taken, a field blank in which a set of sample bottles is filled with distilled water at a known site or monitoring station is submitted to the laboratory for analysis along with the samples;
- where VOC samples are taken, a trip blank, in which 1 set of VOC vials are filled with distilled water (at the laboratory or office) prior to going to the field and accompanies the sample bottles until they are returned to the lab; and
- duplicate of at least one sample set per sampling event or 1 duplicate for every 10 groundwater samples (do not identify the well number to the laboratory, but have it recorded in the field notes) use the sampling technique as for observation wells.

SAMPLING

Station Sampling Order

The stations will be sampled beginning with those wells exhibiting the lowest chemical concentrations and then moving on to wells with greater chemical concentrations.

Monitoring Periods

The monitoring periods are as recommended in either the annual report or the Certificate of Approval.:

Analytical Parameters

Analysis will be as recommended in either the annual report or the Certificate of Approval.

GAS DETECTION OF ON-SITE BUILDINGS

As part of a monitoring event,

APPENDIX F

Laboratory Certificate of Analysis

							TES	STING	REQUIRE	MENTS	5						RE	ORINUN	ERNIE	Use)
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C	ADUC	E	N	Surfac	e Soil	Sub Surface	e Soil	n	(O.Reg 153	s)).Reg 55	8 Leachat	e Analysi	S				-	•
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				Sewer	Use By-Law:		_				0)ther:			-	0	7-	10	IV	
Are	any samples to be submitted in	tended for Human C	onsumption	under any D	Prinking Water R	egulations?		Yes	No	(If ye	s, subm	it all D	rinking V	later Sar	nples or	n a Drir	nking Wate	r Chain of	Custody)	
	Indicate Lab	oratory Samples a	are submitte	ed to:	King	ston	Ottav	va		chmon	d Hill		Winds	or [Bai	rrie		ndon	ND OFPU	105
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Lab	* San	nple Matrix Legend: W	W=Waste Wat	er, SW=Surfa Sample	Date Collected	Time	Iquid S	ludge,	SS=Solid S	Sludge, Indicate	S=Soil,	Each S	diment, P ample	C=Paint C	hips, F=	Filter,	Oil = Oil Fi	eld	# Bottles/	Field
No:	Sample Identifica	tion	S.P.L.	Matrix *	(yy-mm-dd)	Collected			By Usir	ng A Ch	eck Mark	In The E	Box Provid	led		~	pH	Temp.	Sample	Filtered(Y/N)
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Sign:	Junifor	France	~	Drop Off		# of Pieces	Invoi	ce by l	Email	V	Labora	tory Pr	epared E	lottles:	R	Yes		No		
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CADUCE N'

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QUOTATION FOR ANALYTICAL SERVICES

Quote # :	L16_ClarenceRockland	
Organization:	JP2G	
Contact:	Perry Larochelle	
Telephone:	613-735-2507	
Facsimile:	613-735-4513	
Email:	perryl@jp2g.com	
Project #:	Clarence-Rockland Landfill - 2166270A	
Address:	12 International Drive, Pembroke ON K8A 6W5	
Additional Info:	QUOTE # ('S) MUST BE ON C OF C TO APPLY if notsted, General pricing will be applied.	
Additional Info:	Laboratory detection limit should be to ODWS or PWQO - whichever is lowest	
Date:	31-Mar-16 Valid Until:	31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
		Spring, Summer & Fall Sampling			
1	10	General Chemistry: Alkalinity, CI, DOC, TDS, Nutrients: NH3, TP, PO4 Metals: B, Na, Fe, Mn, Co + Hardness	GW	70.00	700.00
2	12	General Chemistry: Alkalinity, CI, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phanols Nutrients: NH3, TP/TKN, PO4 Metals: Ag, Al, B, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, Ti, TI, V, Zn + Hardness	GW	100.00	1200.00
3	28	General Chemistry: Alkalinity, Cl, DOC, TDS Nutrients: NH3, TP, PO4 Metals: B, Fe, Mn, Na + Hardness	GW	70.00	1960.00
4	8	VOC (624 Scan)	GW	40.00	320.'00
5	7	General Chemistry: Alkalinity, Cl, DOC, TDS Nutrients: NH3, U-NH3, TP Metals: B, Fe, Mn, Na + Hardness	SW	70.00	490.00
6	18	General Chemistry: Alkalinity, CI, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, U-NH3, TP/TKN Metals: Ag, Al (total & dissolved), B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, TI, Ti, V, Zn + Hardness	SW	100.00	1800.00
Prices do not include shippin	g unless otherwise stated.			Subtotal	6,470.00

Environmental disposal fees included in pricing

Rebecca Marshall Customer Service Representative Caduceon Environmental Laboratories 613-526-0123

Laboratory Locations

HST

Total Cost

841.10

7,311.10

Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770 Ottawa - 2378 Holly Lane Ottawa, ON K1V 7P1 Tel: (613) 526-0123 Fax: (613) 526-1244 Richmond Hill - 110 West Beaver Creek Road (Unit 14), Richmond Hill, ON 44B 1J9 Tel: (289) 475-5442 Fax: (866) 562-1963 Windsor - #5-3201 Marentette Ave. Windsor, ON N8X 4G3 Tel: (519) 966-9541 Fax: (519) 966-9567

Sign: Print: Email: Fax: Tel: Organization Contact: S Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? White: Lab Copy / Yellow: Invoicing Copy / Pink: Client Copy Date \triangleright EMVIRONME SAMPLE SUBMISSION INFORMATION Sampled by: \bigcirc ddy Time: Sample Identification Indicate Laboratory Samples are submitted to: C Sample Marty Legend: WW=Waste Water, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soli, Sed=Sediment, PC=Paint Chips, F=Filter, Oil = Oil Surface Water, Sample Date Collected Time Indicate Test For Each Sample ()P.O. No.: Quote No.: Address and Invoicing Address (if different) Date (yy-mm 1-8 m 200 2.7 Submitted by: こんちょうこう 2000 500 510 Caduceon (Pick-up) Drop Off Client's Courier Caduceon's Courier Project Name: Additional Info: Matrix * Ottació Surface Soit Sewer Use By-Law: **Provincial Water Quality Objectives O.Reg 153** ひち SHIPPING INFORMATION (yy-mm-dd) Π Kingston R # of Pieces **Record of Site Condition** Table Me Collected Invoice 3 Ottawa Report by Fax Medium/Fine Coarse Invoice by Mail Invoice by Emai Report by Email **REPORTING / INVOICING** Yes No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custody) 1 km th (O.Reg 153) (O.Reg 153) By Using A Check Mark in The Box Provided Richmond Hill ANALYSES REQUESTED (Print Test in Boxes) R Laboratory Prepared Bottles; Date Received (yy-mm-dd): Received By (print): Sample Temperature °C: MISA Guidelines 0.Reg 558 Leachate Analysis Other: Disposal Site: SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY) Windsor Barrie **冈** 188 < Suspected Highly Contaminated G Labeled by: Time Received: < Signature: Gold Silver Bronze X Specific Date: London F 0 5 5 REQUESTED (see back page) No Field TURNAROUND SERVICE 1 1 remp. 5 r UN ſ 9 5-7 days 25% Surcharge 50% Surcharge 200% Surcharge* 100% Surcharge Sample Bottles 1 Ĵ +1 1 5 Filtered() Field

CofC, Feb. 2018, Revision No: 21

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	CADUCE ENVIRONMENTAL LABOR CHERT CAMP	ATO RES nitted Quality assured	O.Reg Surfac Yes Provin Sewer n under any E	153 & Soil No with Water Quality Use By-Law: Drinking Water F	Table Sub Surfa: Record of Site C Objectives Regulations?	Ce Soil	on Yes	Fine (0.Reg 153 (0.Reg 153	Coarse 3) 3) (If y	es, sub	MISA (O.Reg Dispos Landfil Other: mit all	Guideline 558 Leac sal Site: _ Il Monitor Drinking	s thate Anal	lysis	on a Dri	nking Wat	er Chain of	Custodu	
-	Indicate Laborator	y Samples are submit	ted to:	🗌 King	ston 🗖	Otta	wa	Ric	chmo	nd Hill	E] Win	dsor		Barrie		ndon	oustouy	
Contact: Senn Furcess Tel:							2	ANALY	SES I	REQUE	STED (I	Print Te	st in Box	(es)	taminated	RE	URNAROU QUESTED (inum	ND SERV see back 200% Sur	ICE page) charge**
Fax: Ema	ar: Quote No.: Project Name: Imail: P.O.No.: Additional Info:						Hreist 1	Herrit							pected Highly Cor	Gold Silv Bro Star	d er nze ndard	100% Sur 50% Sur 25% Sur 5-7 days	rcharge :harge :harge
-30	* Sample Mat	Tix Legend: WW=Waste Wa	ter SW=Surfa	co Water GW=Gr	aundwater Sal	Invid C	ludes	00-0-1140							Sus	Spec	ific Date:		
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Sign:	Frant Brall In	a mag	Drop Off		# of Pieces	ieces Invoice by Email Laboratory Prepared Botties: Yes No													
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Lab	* San	npie Matrix Legend: W	W=Waste Wa	iter, SW=Surfa	ice Water, GW=Gi	oundwater, LS=	Liquid	Siudge	, SS=S	lid Slud	ge, S	⇒Soil, S	ied=Se	liment,	PC=Pa	int Chi	ps, F=F	ilter.	Oil = OII	inc bate:		
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CofC, Feb. 2018, Revision No: 21



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G26-94	P4-90	G8-92C	G29-97
			Sample I.D.		B19-10970-1	B19-10970-2	B19-10970-3	B19-10970-4
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	26	91	177	496
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	26	80	157	454
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	36	98	167	570
Chloride	mg/L	0.5	SM4110C	01-May-19/O	1.9	2.8	2.1	20.3
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O	< 0.05	< 0.05		< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O	0.23	0.43		0.33
Sulphate	mg/L	1	SM4110C	01-May-19/O	5	9		63
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	6.84	29.4	51.0	136
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	2.25	4.25	12.0	38.0
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	3.2	3.0	3.2	34.9
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O	0.7	1.6		2.2
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O	< 0.01	0.02		0.07
Barium	mg/L	0.001	SM 3120	26-Apr-19/O	0.005	0.019		0.078
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	< 0.0001		< 0.0001
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.006	0.013	0.013	0.062
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O	< 0.000015	< 0.000015		0.000139
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O	0.086	< 0.001		< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	< 0.0001	0.0001	0.0067
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0007	0.0030		0.0065
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	< 0.005	< 0.005	< 0.005	< 0.005
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O	0.00006	0.00015		0.00004
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	0.013	< 0.001	< 0.001	3.48
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O	< 0.00002	< 0.00002		< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	0.0002		0.0003
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0009	0.0008	0.0006	0.0092
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O	2.64	2.92		6.15
Silver	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	< 0.0001		< 0.0001

Greg Clarkin , BSc., C. Chem

Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories. Page 536 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G26-94	P4-90	G8-92C	G29-97
			Sample I.D.		B19-10970-1	B19-10970-2	B19-10970-3	B19-10970-4
			Date Collecte	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Strontium	mg/L	0.001	SM 3120	26-Apr-19/O	0.080	0.148		0.912
Sulphur	mg/L	0.1	SM 3120	26-Apr-19/O	1.6	2.8		17.5
Thallium	mg/L	0.00005	EPA 200.8	30-Apr-19/O	< 0.00005	< 0.00005		< 0.00005
Titanium	mg/L	0.005	SM 3120	26-Apr-19/O	< 0.005	< 0.005		< 0.005
Vanadium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0001	0.0007	0.0003	0.0013
Zinc	mg/L	0.005	SM 3120	26-Apr-19/O	< 0.005	< 0.005		< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	0.06	0.06	0.10	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	02-May-19/K	0.9	0.8		1.4
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Apr-19/K	0.696	0.186	1.03	0.041
Phosphorus-Total	mg/L	0.01	E3199A.1	02-May-19/K	0.94	0.35	1.63	13.9
Phenolics	mg/L	0.002	MOEE 3179	01-May-19/K	< 0.002	< 0.002		< 0.002
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-19/K	< 3	< 3		< 3
COD	mg/L	5	SM 5220D	06-May-19/O	35	24		84
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-May-19/O	3.2	13.2	0.3	19.9
Anion Sum	meq/L		Calc.	02-May-19/O	0.700	1.89		11.0
Cation Sum	meq/L		Calc.	02-May-19/O	0.688	1.99		11.6
% Difference	%		Calc.	02-May-19/O	0.846	2.55		2.91
Ion Ratio	AS/CS		Calc.	02-May-19/O	1.02	0.950		0.943
Sodium Adsorption Ratio	-		Calc.	02-May-19/O	0.273	0.138		0.682
Conductivity (calc.)	µmho/cm		Calc.	02-May-19/O	71	192		978

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Greg Clarkin, BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an *

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories Page 537 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G38-03	P2-90	G36-01	G37-01
			Sample I.D.		B19-10970-5	B19-10970-6	B19-10970-7	B19-10970-8
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	182	18	688	136
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	150	104	288	36
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	232	128	774	379
Chloride	mg/L	0.5	SM4110C	01-May-19/O	7.6	4.8	37.2	178
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O				< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O				2.02
Sulphate	mg/L	1	SM4110C	01-May-19/O				38
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	60.2	4.41	205	33.9
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	7.76	1.68	42.6	12.4
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	12.9	50.0	24.5	94.3
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O				0.6
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O				0.02
Barium	mg/L	0.001	SM 3120	26-Apr-19/O				0.061
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O				< 0.0001
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.050	< 0.005	0.104	0.008
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O				0.000084
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O				0.001
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0024	< 0.0001	0.0024	0.0002
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O				0.0016
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	13.8	0.032	0.006	< 0.005
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O				0.00003
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	1.98	< 0.001	10.8	0.021
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O				< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O				< 0.0001
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0007	0.0013	0.0066	0.0043
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O				4.65
Silver	mg/L	0.0001	EPA 200.8	30-Apr-19/O				< 0.0001

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories Page 538 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO .: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G38-03	P2-90	G36-01	G37-01
			Sample I.D.		B19-10970-5	B19-10970-6	B19-10970-7	B19-10970-8
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Strontium	mg/L	0.001	SM 3120	26-Apr-19/O				0.419
Sulphur	mg/L	0.1	SM 3120	26-Apr-19/O				10.5
Thallium	mg/L	0.00005	EPA 200.8	30-Apr-19/O				< 0.00005
Titanium	mg/L	0.005	SM 3120	26-Apr-19/O				< 0.005
Vanadium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0024	0.0006	0.0007	0.0001
Zinc	mg/L	0.005	SM 3120	26-Apr-19/O				< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	0.18	0.08	0.11	0.04
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	02-May-19/K				0.3
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Apr-19/K	0.331	3.09	0.037	0.101
Phosphorus-Total	mg/L	0.01	E3199A.1	02-May-19/K	0.27	9.30	0.05	0.14
Phenolics	mg/L	0.002	MOEE 3179	01-May-19/K				< 0.002
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-19/K				< 3
COD	mg/L	5	SM 5220D	06-May-19/O				78
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-May-19/O	8.9	4.4	30.2	3.8
Anion Sum	meq/L		Calc.	02-May-19/O				6.69
Cation Sum	meq/L		Calc.	02-May-19/O				6.83
% Difference	%		Calc.	02-May-19/O				1.08
Ion Ratio	AS/CS		Calc.	02-May-19/O				0.979
Sodium Adsorption Ratio	-		Calc.	02-May-19/O				3.52
Conductivity (calc.)	µmho/cm		Calc.	02-May-19/O				751

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories Page 539 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: 17-6021C

WATERWORKS NO.

		Γ	Client I.D.		G20-92	G43-11	G42-10	G39-07
			Sample I.D.		B19-10970-9	B19-10970- 10	B19-10970- 11	B19-10970-12
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	383	172	196	279
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	358	278	193	287
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	465	353	496	456
Chloride	mg/L	0.5	SM4110C	01-May-19/O	14.9	35.7	172	82.2
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O		< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O		0.07	0.12	0.09
Sulphate	mg/L	1	SM4110C	01-May-19/O		6	25	24
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	124	42.0	41.1	58.6
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	17.7	16.4	22.7	32.3
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	31.0	73.5	114	75.0
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O		5.2	2.7	9.6
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O		0.14	0.36	0.04
Barium	mg/L	0.001	SM 3120	26-Apr-19/O		0.028	0.039	0.041
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O		< 0.0001	< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.663	0.276	0.116	0.737
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O		< 0.000015	0.000085	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O		0.001	0.003	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0035	0.0007	0.0016	0.0003
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O		0.0029	0.0087	0.0024
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	0.034	1.53	0.883	0.761
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O		0.00031	0.00077	0.00023
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	0.480	0.217	0.436	0.315
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O		< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O		0.0002	0.0005	0.0002
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0017	0.0041	0.0074	0.0035
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O		6.51	3.87	1.36
Silver	ma/l	0.0001	FPA 200 8	30-Apr-19/0		< 0.0001	< 0.0001	< 0.0001

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Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories Page 540 of 661


Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G20-92	G43-11	G42-10	G39-07
			Sample I.D.		B19-10970-9	B19-10970- 10	B19-10970- 11	B19-10970-12
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Strontium	mg/L	0.001	SM 3120	26-Apr-19/O		0.209	0.201	0.413
Sulphur	mg/L	0.1	SM 3120	26-Apr-19/O		2.8	7.1	7.6
Thallium	mg/L	0.00005	EPA 200.8	30-Apr-19/O		< 0.00005	< 0.00005	< 0.00005
Titanium	mg/L	0.005	SM 3120	26-Apr-19/O		< 0.005	0.016	< 0.005
Vanadium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0006	0.0018	0.0035	0.0006
Zinc	mg/L	0.005	SM 3120	26-Apr-19/O		0.005	0.007	0.005
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	3.19	4.08	0.46	0.86
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	02-May-19/K		19.2	3.4	3.5
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Apr-19/K	1.17	3.98	0.134	0.183
Phosphorus-Total	mg/L	0.01	E3199A.1	02-May-19/K	2.00	14.6	0.36	0.46
Phenolics	mg/L	0.002	MOEE 3179	01-May-19/K		< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-19/K		< 3	< 3	4
COD	mg/L	5	SM 5220D	06-May-19/O		500	155	125
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-May-19/O	22.5	47.8	45.8	21.7
Anion Sum	meq/L		Calc.	02-May-19/O		6.70	9.26	8.56
Cation Sum	meq/L		Calc.	02-May-19/O		7.15	9.04	9.20
% Difference	%		Calc.	02-May-19/O		3.29	1.16	3.63
Ion Ratio	AS/CS		Calc.	02-May-19/O		0.936	1.02	0.930
Sodium Adsorption Ratio	-		Calc.	02-May-19/O		2.44	3.54	1.95
Conductivity (calc.)	µmho/cm		Calc.	02-May-19/O		641	933	840

Greg Clarkin, BSc., C. Chem Lab Manager - Ottawa District

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Final Report

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DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G40-07	G28-97	G31-98A	G45-Dup
			Sample I.D.		B19-10970- 13	B19-10970- 14	B19-10970- 15	B19-10970-16
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	108	259	8	8
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	153	300	380	376
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	227	423	569	565
Chloride	mg/L	0.5	SM4110C	01-May-19/O	31.7	56.5	93.9	94.2
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O				
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O				
Sulphate	mg/L	1	SM4110C	01-May-19/O				
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	22.8	55.6	1.00	0.96
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	12.4	29.3	1.37	1.34
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	52.9	84.5	238	236
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O				
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O				
Barium	mg/L	0.001	SM 3120	26-Apr-19/O				
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O				
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.293	1.16	0.907	0.906
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O				
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O				
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0010	0.0020	< 0.0001	< 0.0001
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O				
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	0.923	0.182	0.007	0.006
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O				
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	0.354	0.137	0.004	0.003
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O				
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O				
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0039	0.0061	< 0.0002	< 0.0002
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O				
Silver	mg/L	0.0001	EPA 200.8	30-Apr-19/O				

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Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

C.O.C.: G76559, 76560, 76562

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DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G40-07	G28-97	G31-98A	G45-Dup
			Sample I.D.		B19-10970- 13	B19-10970- 14	B19-10970- 15	B19-10970-16
			Date Collect	əd	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Strontium	mg/L	0.001	SM 3120	26-Apr-19/O				
Sulphur	mg/L	0.1	SM 3120	26-Apr-19/O				
Thallium	mg/L	0.00005	EPA 200.8	30-Apr-19/O				
Titanium	mg/L	0.005	SM 3120	26-Apr-19/O				
Vanadium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0077	0.0063	0.0002	0.0002
Zinc	mg/L	0.005	SM 3120	26-Apr-19/O				
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	0.10	0.09	0.59	0.58
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	02-May-19/K				
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Apr-19/K	0.191	0.024	1.18	1.16
Phosphorus-Total	mg/L	0.01	E3199A.1	02-May-19/K	0.64	0.08	1.33	1.33
Phenolics	mg/L	0.002	MOEE 3179	01-May-19/K				
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-19/K				
COD	mg/L	5	SM 5220D	06-May-19/O				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-May-19/O	28.3	26.5	6.2	6.1
Anion Sum	meq/L		Calc.	02-May-19/O				
Cation Sum	meq/L		Calc.	02-May-19/O				
% Difference	%		Calc.	02-May-19/O				
Ion Ratio	AS/CS		Calc.	02-May-19/O				
Sodium Adsorption Ratio	-		Calc.	02-May-19/O				
Conductivity (calc.)	µmho/cm		Calc.	02-May-19/O				

Allerkin

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

C.O.C.: G76559, 76560, 76562

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DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G12-92	G21-94	G17-92	G18-92
			Sample I.D.		B19-10970- 17	B19-10970- 18	B19-10970- 19	B19-10970-20
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	81	60	165	163
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	94	109	147	50
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	149	140	215	106
Chloride	mg/L	0.5	SM4110C	01-May-19/O	20.6	8.9	33.4	2.3
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O	< 0.05			< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O	1.91			3.40
Sulphate	mg/L	1	SM4110C	01-May-19/O	10			7
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	19.5	21.7	48.9	45.6
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	7.96	1.40	10.3	12.0
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	33.2	37.7	15.4	4.3
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O	1.7			3.0
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O	0.03			0.03
Barium	mg/L	0.001	SM 3120	26-Apr-19/O	0.019			0.030
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001			< 0.0001
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.013	< 0.005	0.027	0.083
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O	< 0.000015			0.000022
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O	0.005			< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	< 0.0001	0.0007	0.0003
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0029			0.0006
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	0.028	0.013	0.620	0.387
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O	0.00014			< 0.00002
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	0.017	< 0.001	0.991	0.485
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O	< 0.00002			< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0001			< 0.0001
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0008	0.0006	0.0011	0.0012
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O	4.62			3.81
Silver	ma/l	0.0001	EPA 200 8	30-Apr-19/0	< 0.0001			< 0.0001

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Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories Page 544 of 661



Final Report

C.O.C.: G76559, 76560, 76562

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DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G12-92	G21-94	G17-92	G18-92
			Sample I.D.		B19-10970- 17	B19-10970- 18	B19-10970- 19	B19-10970-20
			Date Collecte	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			_	
Strontium	mg/L	0.001	SM 3120	26-Apr-19/O	0.092			0.234
Sulphur	mg/L	0.1	SM 3120	26-Apr-19/O	2.5			3.6
Thallium	mg/L	0.00005	EPA 200.8	30-Apr-19/O	< 0.00005			< 0.00005
Titanium	mg/L	0.005	SM 3120	26-Apr-19/O	< 0.005			< 0.005
Vanadium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	0.0001	0.0004	0.0001
Zinc	mg/L	0.005	SM 3120	26-Apr-19/O	< 0.005			< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	0.12	0.06	0.13	0.06
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	02-May-19/K	3.4			0.5
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Apr-19/K	0.390	1.48	0.141	0.071
Phosphorus-Total	mg/L	0.01	E3199A.1	02-May-19/K	1.25	1.75	0.48	0.15
Phenolics	mg/L	0.002	MOEE 3179	01-May-19/K	< 0.002			< 0.002
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-19/K	< 3			< 3
COD	mg/L	5	SM 5220D	06-May-19/O	1300			27
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-May-19/O	22.3	3.3	12.7	8.2
Anion Sum	meq/L		Calc.	02-May-19/O	2.80			1.46
Cation Sum	meq/L		Calc.	02-May-19/O	3.13			3.58
% Difference	%		Calc.	02-May-19/O	5.54			41.9
Ion Ratio	AS/CS		Calc.	02-May-19/O	0.895			0.409
Sodium Adsorption Ratio	-		Calc.	02-May-19/O	1.60			0.148
Conductivity (calc.)	µmho/cm		Calc.	02-May-19/O	288			241

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		G13-92	G27-97	P6-91	P1-91
			Sample I.D.		B19-10970- 21	B19-10970- 22	B19-10970- 23	B19-10970-24
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				·
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	193	665	1490	1300
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	173	522	1980	1310
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	218	844	2776	1717
Chloride	mg/L	0.5	SM4110C	01-May-19/O	14.3	94.0	453	216
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O			< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O			< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	01-May-19/O			14	1
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	47.7	180	405	338
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	17.9	52.4	115	110
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	15.4	71.5	408	217
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O			68.8	15.0
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O			0.12	0.13
Barium	mg/L	0.001	SM 3120	26-Apr-19/O			0.732	0.264
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O			< 0.0001	< 0.0001
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.064	0.479	4.50	1.65
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O			< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O			0.011	0.003
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0002	0.0015	0.0062	0.0026
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O			0.0054	0.0037
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	0.014	0.468	5.50	25.9
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O			0.00013	0.00016
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	0.029	0.428	13.3	4.91
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O			< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O			0.0005	0.0001
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0017	0.0061	0.0134	0.0098
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O			10.9	9.75
Silver	ma/l	0.0001	FPA 200 8	30-Apr-19/0			< 0.0001	< 0.0001

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories. Page 546 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

		Client I.D.		G13-92	G27-97	P6-91	P1-91
		Sample I.D.		B19-10970- 21	B19-10970- 22	B19-10970- 23	B19-10970-24
		Date Collecte	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Units	R.L.	Reference Method	Date/Site Analyzed				
mg/L	0.001	SM 3120	26-Apr-19/O			2.32	2.10
mg/L	0.1	SM 3120	26-Apr-19/O			8.6	6.6
mg/L	0.00005	EPA 200.8	30-Apr-19/O			< 0.00005	< 0.00005
mg/L	0.005	SM 3120	26-Apr-19/O			0.010	< 0.005
mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0005	0.0016	0.0200	0.0101
mg/L	0.005	SM 3120	26-Apr-19/O			0.009	0.005
mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	0.05	1.11	83.8	1.10
mg/L	0.1	E3199A.1	02-May-19/K			105	6.0
mg/L	0.002	PE4500-S	30-Apr-19/K	0.085	0.156	0.209	0.105
mg/L	0.01	E3199A.1	02-May-19/K	0.31	0.30	0.30	0.17
mg/L	0.002	MOEE 3179	01-May-19/K			0.003	< 0.002
mg/L	3	SM 5210B	29-Apr-19/K			13	< 3
mg/L	5	SM 5220D	06-May-19/O			404	212
mg/L	0.2	EPA 415.2	03-May-19/O	7.3	24.5	125	84.3
meq/L		Calc.	02-May-19/O			52.5	32.3
meq/L		Calc.	02-May-19/O			55.9	37.4
%		Calc.	02-May-19/O			3.11	7.30
AS/CS		Calc.	02-May-19/O			0.940	0.864
-		Calc.	02-May-19/O			4.61	2.62
µmho/cm		Calc.	02-May-19/O			4120	2649
	Units mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	Units R.L. mg/L 0.001 mg/L 0.1 mg/L 0.0005 mg/L 0.0005 mg/L 0.005 mg/L 0.001 mg/L 0.001 mg/L 0.001 mg/L 0.001 mg/L 0.01 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L 0.2 mg/L 5 mg/L 0.2 meq/L - % - AS/CS - µmho/cm -	Client I.D. Sample I.D. Sample I.D. Date Collecter Image: Date Collecter Mg/L 0.001 SM 3120 mg/L 0.1 SM 3120 mg/L 0.0005 EPA 200.8 mg/L 0.0005 SM 3120 mg/L 0.005 SM 3120 mg/L 0.005 SM 3120 mg/L 0.005 SM 3120 mg/L 0.005 SM 3120 mg/L 0.001 EPA 200.8 mg/L 0.001 SM4500- Mg/L 0.01 SM4500- mg/L 0.01 E3199A.1 mg/L 0.01 E3199A.1 mg/L 0.02 MOEE 3179 mg/L 3 SM 5210B mg/L 5 SM 5220D mg/L 0.2 EPA 415.2 meq/L Calc. Calc. % Calc. Calc. % Calc. Calc. µm	Client I.D. Sample I.D. Date Collected Date Collected mg/L 0.001 SM 3120 26-Apr-19/O mg/L 0.1 SM 3120 26-Apr-19/O mg/L 0.0005 EPA 200.8 30-Apr-19/O mg/L 0.0005 SM 3120 26-Apr-19/O mg/L 0.0005 SM 3120 26-Apr-19/O mg/L 0.0005 SM 3120 26-Apr-19/O mg/L 0.0001 EPA 200.8 30-Apr-19/O mg/L 0.001 SM 4500- 30-Apr-19/O mg/L 0.01 SM4500- 30-Apr-19/K mg/L 0.01 E3199A.1 02-May-19/K mg/L	Client I.D. G13-92 Sample I.D. B19-10970-21 Date Collected 25-Apr-19 Image: Method Reference Method Date/Site Analyzed mg/L 0.001 SM 3120 26-Apr-19/O mg/L 0.1 SM 3120 26-Apr-19/O mg/L 0.0005 EPA 200.8 30-Apr-19/O mg/L 0.0001 EPA 200.8 30-Apr-19/O mg/L 0.0001 EPA 200.8 30-Apr-19/O mg/L 0.005 SM 3120 26-Apr-19/O mg/L 0.001 SM4500- 30-Apr-19/K mg/L 0.01 E3199A.1 02-May-19/K mg/L 0.02 MOEE 3179 01-May-19/K mg/L	Client I.D. G13-92 G27-97 Sample I.D. B19-10970- 21 B19-10970- 22 Date Collected 25-Apr-19 25-Apr-19 mg/L 0.001 SM 3120 26-Apr-19/O mg/L 0.1 SM 3120 26-Apr-19/O mg/L 0.0005 EPA 200.8 30-Apr-19/O mg/L 0.0001 EPA 200.8 30-Apr-19/O mg/L 0.001 SM4500- NH3-H 0.0005 0.0016 mg/L 0.01 SM4500- NH3-H 30-Apr-19/K 0.05 1.11 mg/L 0.01 E3199A.1 02-May-19/K 0.031 0.30 mg/L 0.01 E3199A.1 02-May-19/K 0.31 0.30 mg/L 0.02 MOEE 3179 01-May-19/K 0.30 0.30 mg/L 0.2 EPA 415.2 03-M	Client I.D. G13-92 G27-97 P6-91 Sample I.D. B19-10970- 21 B19-10970- 22 B19-10970- 23 Date Collected 25-Apr-19 25-Apr-19 25-Apr-19 Mitts R.L. Reference Method Date/Site Analyzed 25-Apr-19 25-Apr-19 mg/L 0.001 SM 3120 26-Apr-19/O 8.6 mg/L 0.1005 SM 3120 26-Apr-19/O 8.6 mg/L 0.0005 EPA 200.8 30-Apr-19/O 0.010 mg/L 0.0005 SM 3120 26-Apr-19/O 0.001 mg/L 0.0005 SM 3120 26-Apr-19/O 0.010 mg/L 0.0005 SM 3120 26-Apr-19/O 0.010 mg/L 0.0001 EPA 200.8 30-Apr-19/O 0.0016 0.0200 mg/L 0.001 SM 4500- NH3-H 30-Apr-19/K 0.05 1.11 83.8 mg/L 0.1 E3199A.1 02-May-19/K 0.31 0.30 0.30 mg/L 0.002 MOEE

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories Page 547 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		P5B-91	G46	
			Sample I.D.		B19-10970- 25	B19-10970- 26	
			Date Collect	ed	25-Apr-19	25-Apr-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Apr-19/O	426	160	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-19/O	745	74	
TDS(ion sum calc.)	mg/L	1	Calc.	02-May-19/O	913	121	
Chloride	mg/L	0.5	SM4110C	01-May-19/O	33.2	2.9	
Nitrite (N)	mg/L	0.05	SM4110C	01-May-19/O	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	01-May-19/O	0.08	3.13	
Sulphate	mg/L	1	SM4110C	01-May-19/O	6	9	
Calcium	mg/L	0.02	SM 3120	26-Apr-19/O	132	44.8	
Magnesium	mg/L	0.02	SM 3120	26-Apr-19/O	23.3	11.8	
Sodium	mg/L	0.2	SM 3120	26-Apr-19/O	55.7	4.3	
Potassium	mg/L	0.1	SM 3120	26-Apr-19/O	75.6	3.0	
Aluminum	mg/L	0.01	SM 3120	26-Apr-19/O	0.07	0.02	
Barium	mg/L	0.001	SM 3120	26-Apr-19/O	0.306	0.030	
Beryllium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	< 0.0001	< 0.0001	
Boron	mg/L	0.005	SM 3120	26-Apr-19/O	0.902	0.087	
Cadmium	mg/L).000015	EPA 200.8	30-Apr-19/O	< 0.000015	0.000022	
Chromium	mg/L	0.001	EPA 200.8	30-Apr-19/O	0.003	< 0.001	
Cobalt	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0064	0.0003	
Copper	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0022	0.0028	
Iron	mg/L	0.005	SM 3120	26-Apr-19/O	40.2	0.433	
Lead	mg/L	0.00002	EPA 200.8	30-Apr-19/O	0.00019	0.00019	
Manganese	mg/L	0.001	SM 3120	26-Apr-19/O	1.83	0.470	
Mercury	mg/L	0.00002	SM 3112 B	02-May-19/O	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0004	< 0.0001	
Nickel	mg/L	0.0002	EPA 200.8	30-Apr-19/O	0.0075	0.0013	
Silicon	mg/L	0.01	SM 3120	26-Apr-19/O	5.76	3.80	
Silver	ma/l	0.0001	FPA 200 8	30-Apr-19/0	< 0.0001	< 0.0001	

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories. Page 548 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		P5B-91	G46	
			Sample I.D.		B19-10970- 25	B19-10970- 26	
			Date Collecte	əd	25-Apr-19	25-Apr-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Strontium	mg/L	0.001	SM 3120	26-Apr-19/O	0.823	0.230	
Sulphur	mg/L	0.1	SM 3120	26-Apr-19/O	3.1	3.6	
Thallium	mg/L	0.00005	EPA 200.8	30-Apr-19/O	< 0.00005	< 0.00005	
Titanium	mg/L	0.005	SM 3120	26-Apr-19/O	< 0.005	< 0.005	
Vanadium	mg/L	0.0001	EPA 200.8	30-Apr-19/O	0.0064	0.0001	
Zinc	mg/L	0.005	SM 3120	26-Apr-19/O	0.016	0.005	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Apr-19/K	75.9	0.06	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	02-May-19/K	80.8	0.7	
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Apr-19/K	2.41	0.103	
Phosphorus-Total	mg/L	0.01	E3199A.1	02-May-19/K	10.0	0.19	
Phenolics	mg/L	0.002	MOEE 3179	01-May-19/K	< 0.002	< 0.002	
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-19/K	< 3	< 3	
COD	mg/L	5	SM 5220D	06-May-19/O	115	18	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	03-May-19/O	45.3	14.9	
Anion Sum	meq/L		Calc.	02-May-19/O	16.0		
Cation Sum	meq/L		Calc.	02-May-19/O	20.4		
% Difference	%		Calc.	02-May-19/O	12.2		
Ion Ratio	AS/CS		Calc.	02-May-19/O	0.782		
Sodium Adsorption Ratio	-		Calc.	02-May-19/O	1.17		
Conductivity (calc.)	µmho/cm		Calc.	02-May-19/O	1562		

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (ii)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		P6-91	P1-91	P5B-91	Trip Blank
			Sample I.D.		B19-10970- 23	B19-10970- 24	B19-10970- 25	B19-10970-27
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	30-Apr-19/R	< 30	< 30	< 30	< 30
Benzene	µg/L	0.5	EPA 8260	30-Apr-19/R	1.8	1.3	0.8	< 0.5
Bromodichloromethane	µg/L	2	EPA 8260	30-Apr-19/R	< 2	< 2	< 2	< 2
Bromoform	µg/L	5	EPA 8260	30-Apr-19/R	< 5	< 5	< 5	< 5
Bromomethane	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	µg/L	0.2	EPA 8260	30-Apr-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	30-Apr-19/R	0.8	< 0.5	< 0.5	< 0.5
Chloroform	µg/L	1	EPA 8260	30-Apr-19/R	< 1	< 1	< 1	< 1
Dibromochloromethane	µg/L	2	EPA 8260	30-Apr-19/R	< 2	< 2	< 2	< 2
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	2	EPA 8260	30-Apr-19/R	< 2	< 2	< 2	< 2
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene 1,3- cis+trans	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	30-Apr-19/R	< 0.2	< 0.2	< 0.2	< 0.2

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Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories Page 550 of 661



Final Report

C.O.C.: G76559, 76560, 76562

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Apr-19 DATE REPORTED: 09-May-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-10970 (ii)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO .: Clarence Rockland WDS

P.O. NUMBER: 17-6021C

WATERWORKS NO.

			Client I.D.		P6-91	P1-91	P5B-91	Trip Blank
			Sample I.D.		B19-10970- 23	B19-10970- 24	B19-10970- 25	B19-10970-27
			Date Collect	ed	25-Apr-19	25-Apr-19	25-Apr-19	25-Apr-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hexane	µg/L	5	EPA 8260	30-Apr-19/R	< 5	< 5	< 5	< 5
Methyl Ethyl Ketone	µg/L	20	EPA 8260	30-Apr-19/R	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	30-Apr-19/R	< 20	< 20	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	30-Apr-19/R	< 2	< 2	< 2	< 2
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	30-Apr-19/R	< 5	< 5	< 5	< 5
Styrene	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	30-Apr-19/R	< 5	< 5	< 5	< 5
Vinyl Chloride	µg/L	0.2	EPA 8260	30-Apr-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Xylene, m,p-	µg/L	1.0	EPA 8260	30-Apr-19/R	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	30-Apr-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Xylene, m,p,o-	µg/L	1.1	EPA 8260	30-Apr-19/R	< 1.1	< 1.1	< 1.1	< 1.1
Dibromofluoromethane (SS)	% rec.		EPA 8260	30-Apr-19/R	73.2	94.4	90.0	78.4
Toluene-d8 (SS)	% rec.		EPA 8260	30-Apr-19/R	97.3	115	110	95.6
Bromofluorobenzene,4(SS)	% rec.		EPA 8260	30-Apr-19/R	117	105	106	115

Greg Clarkin, BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories. Page 551 of 661

		Table	TESTING REC	QUIREMENTS		Ser	REPORT NU	ILLER (Lab Use)
CADUCEZN		Agricultural	I (O.R	Reg 153)	MISA Guidelines O.Reg 558 Leachate Ana	lysis		
ENVIRONMENTAL LABORATORIES	Yes No	Record of Site C	ondition (O.R	Reg 153)	Disposal Site:	DI	2 21	COU
Chent committee. Quanty assured.	Sewer Use By-Law:	Objectives			Dther:	Dr	1- 26	1277
Are any samples to be submitted intended for Human Consumption	on under any Drinking Water F	Regulations?	🗌 Yes 📈	No (If yes, subr	nit all Drinking Water	Samples on a Dr	inking Water Chain of	f Custody)
Indicate Laboratory Samples are submi	tted to: King	gston 🗾	Ottawa	Richmond Hill	U Windsor	Barrie	London	
Organization: Address and Invoicing Address	s (if different)		A	ANALYSES REQUES	TED (Print Test in Bo	xes)	TURNAROL	JND SERVICE
Contact:	10		00			inate	1124040120	(ace back hage)
Ter SUIFER- TARREL SUITE 7	A AN K2H	\$59	m an			ontarr	Platinum	200% Surcharge
613-883-3770 OTTAW	H 1 010	()	# #			hly C	Silver	50% Surcharge
Fax: Quote No.:	Project Name:	NC. Picki.	En m			ed Hig	Bronze	25% Surcharge
Email: P.O. No.: DOCY (Frid)	Additional Info:	10+6 Con 4	12-			specte		5-7 days
Jennifer re. p	ater. SW=Surface Water. GW=G	roundwater, LS=L	iquid Sludge, SS=	Solid Sludge, S=Soil	Sed=Sediment PC=Pa	nt Chins F=Filter	Specific Date:	
Lab Development in the state	Sample Date Collected	Time		Indicate Test Fo	r Each Sample		Field	# Bottles/ Field
No: Sample Identification S.P.L.	Matrix (yy-mm-dd)	Collected		By Using A Check Mark	In The Box Provided		pH Temp.	Sample Filtered(Y/N)
63 8	200 19-9-29	M AM	/ //				1.15 15.	D N
50	/ /	10 pm	1				100 15.1	8 1
51 0	1 1	1100 Am	1				77 64	84
656	1 1	1230 pm	1				7.84 15.1	84
6511	1 -	130 pm	1			12	7.42 14.4	84
6512	1 1	230 om	/				9.00 200	84
6515		330 OM	1				9.40 19.0	84
6520	- /	436 pm	1				3.12 16.8	5 N
65 22	1 1	530 000					36, 16.5	5 N
65 21	1 /	1000 pm	/				7.90 14.2	5N
		4						
SAMPLE SUBMISSION INFORMATION	SHIPPING INFORM	ATION	REPORTING /	INVOICING	SAMPLE RECEN	ING INFORMATI	ON (LABORATORY U	SE ONLY)
Sampled by: Submitted by:	Client's Courier	Invoice	Report by Fax	Receiv	red By (print):	Sinc	Signature: C	~
Print: FARFEL HARFEL	Caduceon's Courier		Report by Emai	Date R	eceived (yy-mm-dd)	ept. 24.19	Time Received:	5:35
Sign: Jour June Jun Mail	Drop Off	# of Pieces	Invoice by Ema	il 🗾 Labora	atory Prepared Bottle	s: Aver	s No	
Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time:	Caduceon (Pick-up)		Invoice by Mail	Sampl	e Temperature °C:	15	Labeled by:	
Comments:	BUCS IDIE	e .		Hen #1	2 Reg, NP, M	, Doc ×4	Page	of
PLEASE USE LOWEST	possible !	Page 5	52 of 661	1tem#2	PETICO 2NE	M. HG. Ph. Doc	G90241	
White: Lab Copy / Yellow: Invoicing Copy / Pink: Client Co	ру	100		1	R	X6 Co	fC, May 2019, Revisio	on No: 22

CofC, May 2019, Revision No: 22

C A D U C E N' ENVIRONMENTAL LABORATORIES Client committed. Quality assured.

QUOTATION FOR ANALYTICAL SERVICES

Quote # :	L16_ClarenceRockland	
Organization:	JP2G	
Contact:	Perry Larochelle	
Telephone:	613-735-2507	
Facsimile:	613-735-4513	
Email:	perryl@jp2g.com	
Project #:	Clarence-Rockland Landfill - 2166270A	
Address:	12 International Drive, Pembroke ON K8A 6W5	
Additional Info:	QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.	
Additional Info:	Laboratory detection limit should be to ODWS or PWQO - whichever is lowest	
Date:	31-Mar-16 Valid Until:	31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	10	General Chemistry: Alkalinity, CI, DOC, TDS, Nutrients: NH3, TP, PO4 Metals: B, Na, Fe, Mn, Co + Hardness	GW	70.00	700.00
2	12	General Chemistry: Alkalinity, Cl, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, TP/TKN, PO4 Metals: Ag, Al, B, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, Ti, Tl, V, Zn + Hardness	GW	100.00	1200.00
3	28	General Chemistry: Alkalinity, CI, DOC, TDS Nutrients: NH3, TP, PO4 Metals: B, Fe, Mn, Na + Hardness	GW	70.00	1960.00
4	8	VOC (624 Scan)	GW	40.00	320.00
5	7	General Chemistry: Alkalinity, CI, DOC, TDS Nutrients: NH3, U-NH3, TP Metals: B, Fe, Mn, Na + Hardness	SW	70.00	490.00
6	18	General Chemistry: Alkalinity, CI, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, U-NH3, TP/TKN Metals: Ag, Al (total & dissolved), B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, TI, Ti, V, Zn + Hardness	SW	100.00	1800.00
Prices do not include shippin	g unless otherwise stated.			Subtotal	6,470.00
Environmental dispos	al fees included in p	ricing		HST	841.10

Rebecca Marshall Customer Service Representative Caduceon Environmental Laboratories 613-526-0123

Laboratory Locations

Total Cost

7,311.10

Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770 Ottawa - 2378 Holly Lane Ottawa, ON K1V 7P1 Tel: (613) 526-0123 Fax: (613) 526-1244 Richmond Hill - 110 West Beaver Creek Road (Unit 14), Richmond Hill, ON L4B 1J9 Tel: (289) 475-5442 Fax: (866) 562-1963 Windsor - #5-3201 Marentette Ave. Windsor Ottawa Ottawa Ottawa Ottawa Ottawa Ottawa Ottawa Ottawa Ottawa Ottawa



Final Report

C.O.C.: G90241

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 03-Oct-19 SAMPLE MATRIX: Surface Water

REPORT No. B19-30594

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		GS8	S2	S1	GS6
			Sample I.D.		B19-30594-1	B19-30594-2	B19-30594-3	B19-30594-4
			Date Collect	ed	24-Sep-19	24-Sep-19	24-Sep-19	24-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Sep-19/O	130	130	114	109
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	25-Sep-19/O	94	93	85	75
TDS(ion sum calc.)	mg/L	1	Calc.	30-Sep-19/O	170	165	151	124
Chloride	mg/L	0.5	SM4110C	27-Sep-19/O	19.4	17.2	16.2	7.5
Nitrite (N)	mg/L	0.05	SM4110C	27-Sep-19/O		< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	27-Sep-19/O		0.22	0.18	< 0.05
Sulphate	mg/L	1	SM4110C	27-Sep-19/O		23	23	24
Calcium	mg/L	0.02	SM 3120	26-Sep-19/O		37.5	32.7	31.7
Magnesium	mg/L	0.02	SM 3120	26-Sep-19/O		8.89	7.82	7.17
Sodium	mg/L	0.2	SM 3120	26-Sep-19/O	16.9	15.2	13.0	5.8
Potassium	mg/L	0.1	SM 3120	26-Sep-19/O		6.3	5.1	2.6
Aluminum	mg/L	0.01	SM 3120	01-Oct-19/O		0.60	0.52	0.24
Aluminum (total)	mg/L	0.01	SM 3120	26-Sep-19/O		0.89	0.68	0.24
Barium	mg/L	0.001	SM 3120	26-Sep-19/O		0.036	0.031	0.026
Boron	mg/L	0.005	SM 3120	26-Sep-19/O	0.056	0.030	0.020	0.014
Beryllium	mg/L	0.0001	EPA 200.8	27-Sep-19/O		< 0.0001	< 0.0001	< 0.0001
Cadmium	mg/L).000015	EPA 200.8	27-Sep-19/O		0.000048	0.000043	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	27-Sep-19/O		0.003	0.002	0.001
Cobalt	mg/L	0.0001	EPA 200.8	27-Sep-19/O		0.0008	0.0006	0.0003
Copper	mg/L	0.0001	EPA 200.8	27-Sep-19/O		0.0067	0.0059	0.0016
Iron	mg/L	0.005	SM 3120	26-Sep-19/O	2.03	1.53	1.23	0.554
Lead	mg/L	0.00002	EPA 200.8	27-Sep-19/O		0.00083	0.00075	0.00020
Manganese	mg/L	0.001	SM 3120	26-Sep-19/O	0.076	0.107	0.054	0.028
Mercury	mg/L	0.00002	SM 3112 B	01-Oct-19/O		< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	27-Sep-19/O		0.0005	0.0005	0.0003
Nickel	mg/L	0.0002	EPA 200.8	27-Sep-19/O		0.0033	0.0027	0.0008
Silicon	mg/L	0.01	SM 3120	26-Sep-19/O		6.01	5.60	5.21

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories. Page 554 of 661



Final Report

C.O.C.: G90241

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 25-Sep-19 DATE REPORTED: 03-Oct-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-30594

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		GS8	S2	S1	GS6
			Sample I.D.		B19-30594-1	B19-30594-2	B19-30594-3	B19-30594-4
			Date Collect	ed	24-Sep-19	24-Sep-19	24-Sep-19	24-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Silver	mg/L	0.0001	EPA 200.8	27-Sep-19/O		< 0.0001	< 0.0001	< 0.0001
Strontium	mg/L	0.001	SM 3120	26-Sep-19/O		0.141	0.113	0.106
Sulphur	mg/L	0.1	SM 3120	26-Sep-19/O		10.1	9.8	10.0
Thallium	mg/L	0.00005	EPA 200.8	27-Sep-19/O		< 0.00005	< 0.00005	< 0.00005
Titanium	mg/L	0.005	SM 3120	26-Sep-19/O		0.059	0.045	0.013
Vanadium	mg/L	0.0001	EPA 200.8	27-Sep-19/O		0.0042	0.0036	0.0022
Zinc	mg/L	0.005	SM 3120	26-Sep-19/O		0.012	0.013	0.006
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Sep-19/K	0.04	0.05	0.04	0.03
Ammonia (N)-unionized	mg/L	0.01	CALC	26-Sep-19/K	< 0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	26-Sep-19/K		1.0	0.9	0.5
Phosphorus-Total	mg/L	0.01	E3199A.1	26-Sep-19/K	0.34	0.27	0.22	0.06
Phenolics	mg/L	0.002	MOEE 3179	26-Sep-19/K		< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	26-Sep-19/K		< 3	< 3	< 3
COD	mg/L	5	SM 5220D	26-Sep-19/O		41	42	30
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	26-Sep-19/O	15.1	14.8	13.9	12.4
Anion Sum	meq/L		Calc.	30-Sep-19/O		2.83	2.66	2.21
Cation Sum	meq/L		Calc.	30-Sep-19/O		3.52	3.04	2.52
% Difference	%		Calc.	30-Sep-19/O		10.8 1	6.77	6.48
Ion Ratio	AS/CS		Calc.	30-Sep-19/O		0.804	0.873	0.878
Sodium Adsorption Ratio	-		Calc.	30-Sep-19/O		0.579	0.530	0.240
Conductivity (calc.)	µmho/cm		Calc.	30-Sep-19/O		318	289	241

1 Outside of 10% Acceptance Criteria, solids present

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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REPORT No. B19-30594

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		GS11	GS12	GS15	GS20
			Sample I.D.		B19-30594-5	B19-30594-6	B19-30594-7	B19-30594-8
			Date Collect	ed	24-Sep-19	24-Sep-19	24-Sep-19	24-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			1	1
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Sep-19/O	706	162	168	146
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	25-Sep-19/O	793	188	180	131
TDS(ion sum calc.)	mg/L	1	Calc.	30-Sep-19/O	1327	329	332	251
Chloride	mg/L	0.5	SM4110C	27-Sep-19/O	224	66.4	66.6	48.8
Nitrite (N)	mg/L	0.05	SM4110C	27-Sep-19/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	27-Sep-19/O	1.15	< 0.05	< 0.05	
Sulphate	mg/L	1	SM4110C	27-Sep-19/O	91	21	21	
Calcium	mg/L	0.02	SM 3120	26-Sep-19/O	179	20.0	19.0	
Magnesium	mg/L	0.02	SM 3120	26-Sep-19/O	62.8	27.3	29.4	
Sodium	mg/L	0.2	SM 3120	26-Sep-19/O	251	70.5	76.1	45.7
Potassium	mg/L	0.1	SM 3120	26-Sep-19/O	34.1	10.7	11.5	
Aluminum	mg/L	0.01	SM 3120	01-Oct-19/O	0.09	0.04	0.02	
Aluminum (total)	mg/L	0.01	SM 3120	26-Sep-19/O	0.09	0.05	0.03	
Barium	mg/L	0.001	SM 3120	26-Sep-19/O	0.190	0.020	0.019	
Boron	mg/L	0.005	SM 3120	26-Sep-19/O	2.46	0.820	0.872	0.381
Beryllium	mg/L	0.0001	EPA 200.8	27-Sep-19/O	< 0.0001	< 0.0001	< 0.0001	
Cadmium	mg/L).000015	EPA 200.8	27-Sep-19/O	0.000025	0.000021	0.000026	
Chromium	mg/L	0.001	EPA 200.8	27-Sep-19/O	0.004	0.001	< 0.001	
Cobalt	mg/L	0.0001	EPA 200.8	27-Sep-19/O	0.0034	0.0003	0.0003	
Copper	mg/L	0.0001	EPA 200.8	27-Sep-19/O	0.0037	0.0030	0.0027	
Iron	mg/L	0.005	SM 3120	26-Sep-19/O	1.21	0.088	0.035	5.43
Lead	mg/L	0.00002	EPA 200.8	27-Sep-19/O	0.00012	0.00055	0.00034	
Manganese	mg/L	0.001	SM 3120	26-Sep-19/O	1.11	0.089	0.086	0.294
Mercury	mg/L	0.00002	SM 3112 B	01-Oct-19/O	< 0.00002	0.00003	0.00003	
Molybdenum	mg/L	0.0001	EPA 200.8	27-Sep-19/O	0.0005	0.0004	0.0003	
Nickel	mg/L	0.0002	EPA 200.8	27-Sep-19/O	0.0144	0.0048	0.0049	
Silicon	mg/L	0.01	SM 3120	26-Sep-19/O	5.80	1.03	1.04	

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

C.O.C.: G90241

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Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 25-Sep-19 DATE REPORTED: 03-Oct-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-30594

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		GS11	GS12	GS15	GS20
			Sample I.D.		B19-30594-5	B19-30594-6	B19-30594-7	B19-30594-8
			Date Collecte	ed	24-Sep-19	24-Sep-19	24-Sep-19	24-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			•	
Silver	mg/L	0.0001	EPA 200.8	27-Sep-19/O	< 0.0001	< 0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	26-Sep-19/O	1.32	0.215	0.219	
Sulphur	mg/L	0.1	SM 3120	26-Sep-19/O	36.3	8.6	8.9	
Thallium	mg/L	0.00005	EPA 200.8	27-Sep-19/O	< 0.00005	< 0.00005	< 0.00005	
Titanium	mg/L	0.005	SM 3120	26-Sep-19/O	< 0.005	< 0.005	< 0.005	
Vanadium	mg/L	0.0001	EPA 200.8	27-Sep-19/O	0.0036	0.0028	0.0025	
Zinc	mg/L	0.005	SM 3120	26-Sep-19/O	0.015	0.006	0.006	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Sep-19/K	5.27	0.08	0.05	0.07
Ammonia (N)-unionized	mg/L	0.01	CALC	26-Sep-19/K	0.27	0.02	0.02	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	26-Sep-19/K	9.6	2.0	1.9	
Phosphorus-Total	mg/L	0.01	E3199A.1	26-Sep-19/K	0.03	0.07	0.05	0.15
Phenolics	mg/L	0.002	MOEE 3179	26-Sep-19/K	< 0.002	< 0.002	< 0.002	
BOD(5 day)	mg/L	3	SM 5210B	26-Sep-19/K	10	< 3	< 3	
COD	mg/L	5	SM 5220D	26-Sep-19/O	144	63	64	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	26-Sep-19/O	28.8	19.5	19.5	27.0
Anion Sum	meq/L		Calc.	30-Sep-19/O	24.1	6.07	5.91	
Cation Sum	meq/L		Calc.	30-Sep-19/O	26.4	6.60	6.98	
% Difference	%		Calc.	30-Sep-19/O	4.41	4.20	8.26	
Ion Ratio	AS/CS		Calc.	30-Sep-19/O	0.916	0.919	0.847	
Sodium Adsorption Ratio	-		Calc.	30-Sep-19/O	4.11	2.41	2.55	
Conductivity (calc.)	µmho/cm		Calc.	30-Sep-19/O	2148	621	632	

1 Outside of 10% Acceptance Criteria, solids present

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories Page 557 of 661



Final Report

C.O.C.: G90241

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 03-Oct-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-30594

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		GS22	GS21	
			Sample I.D.		B19-30594-9	B19-30594- 10	
			Date Collect	ed	24-Sep-19	24-Sep-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Sep-19/O	117	151	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	25-Sep-19/O	94	132	
TDS(ion sum calc.)	mg/L	1	Calc.	30-Sep-19/O	188	256	
Chloride	mg/L	0.5	SM4110C	27-Sep-19/O	29.9	49.6	
Nitrite (N)	mg/L	0.05	SM4110C	27-Sep-19/O			
Nitrate (N)	mg/L	0.05	SM4110C	27-Sep-19/O			
Sulphate	mg/L	1	SM4110C	27-Sep-19/O			
Calcium	mg/L	0.02	SM 3120	26-Sep-19/O			
Magnesium	mg/L	0.02	SM 3120	26-Sep-19/O			
Sodium	mg/L	0.2	SM 3120	26-Sep-19/O	29.9	47.1	
Potassium	mg/L	0.1	SM 3120	26-Sep-19/O			
Aluminum	mg/L	0.01	SM 3120	01-Oct-19/O			
Aluminum (total)	mg/L	0.01	SM 3120	26-Sep-19/O			
Barium	mg/L	0.001	SM 3120	26-Sep-19/O			
Boron	mg/L	0.005	SM 3120	26-Sep-19/O	0.059	0.390	
Beryllium	mg/L	0.0001	EPA 200.8	27-Sep-19/O			
Cadmium	mg/L).000015	EPA 200.8	27-Sep-19/O			
Chromium	mg/L	0.001	EPA 200.8	27-Sep-19/O			
Cobalt	mg/L	0.0001	EPA 200.8	27-Sep-19/O			
Copper	mg/L	0.0001	EPA 200.8	27-Sep-19/O			
Iron	mg/L	0.005	SM 3120	26-Sep-19/O	1.83	5.19	
Lead	mg/L	0.00002	EPA 200.8	27-Sep-19/O			
Manganese	mg/L	0.001	SM 3120	26-Sep-19/O	0.037	0.280	
Mercury	mg/L	0.00002	SM 3112 B	01-Oct-19/O			
Molybdenum	mg/L	0.0001	EPA 200.8	27-Sep-19/O			
Nickel	mg/L	0.0002	EPA 200.8	27-Sep-19/O			
Silicon	ma/l	0.01	SM 3120	26-Sep-19/0			

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories. Page 558 of 661



Final Report

C.O.C.: G90241

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 25-Sep-19 DATE REPORTED: 03-Oct-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-30594

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		GS22	GS21	
			Sample I.D.		B19-30594-9	B19-30594- 10	
			Date Collecte	ed	24-Sep-19	24-Sep-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		_	
Silver	mg/L	0.0001	EPA 200.8	27-Sep-19/O			
Strontium	mg/L	0.001	SM 3120	26-Sep-19/O			
Sulphur	mg/L	0.1	SM 3120	26-Sep-19/O			
Thallium	mg/L	0.00005	EPA 200.8	27-Sep-19/O			
Titanium	mg/L	0.005	SM 3120	26-Sep-19/O			
Vanadium	mg/L	0.0001	EPA 200.8	27-Sep-19/O			
Zinc	mg/L	0.005	SM 3120	26-Sep-19/O			
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Sep-19/K	0.04	0.08	
Ammonia (N)-unionized	mg/L	0.01	CALC	26-Sep-19/K	< 0.01	< 0.01	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	26-Sep-19/K			
Phosphorus-Total	mg/L	0.01	E3199A.1	26-Sep-19/K	0.10	0.14	
Phenolics	mg/L	0.002	MOEE 3179	26-Sep-19/K			
BOD(5 day)	mg/L	3	SM 5210B	26-Sep-19/K			
COD	mg/L	5	SM 5220D	26-Sep-19/O			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	26-Sep-19/O	6.5	15.9	
Anion Sum	meq/L		Calc.	30-Sep-19/O			
Cation Sum	meq/L		Calc.	30-Sep-19/O			
% Difference	%		Calc.	30-Sep-19/O			
Ion Ratio	AS/CS		Calc.	30-Sep-19/O			
Sodium Adsorption Ratio	-		Calc.	30-Sep-19/O			
Conductivity (calc.)	µmho/cm		Calc.	30-Sep-19/O			

1 Outside of 10% Acceptance Criteria, solids present

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specifie

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories Page 559 of 661

CADUCE ENVIRONMENTAL LABORATORIES Client committed. Quality assured.	O.Reg 153 O.Reg	Table ICC Agri No Record o Vater Quality Objective: By-Law: ing Water Regulation	TES	STING REC dium/Fine (0.R n (0.R	eg 153) No. (If	NTS se MIS O.R Dis Lan Oth Ves submit	A Guidelines leg 558 Leachate A posal Site: dfill Monitoring er:S all Drinking Wat	Analysis	Set T	319	Chain of	SO Custodul	use) 704
Indicate Laboratory Samples are submit	ed to:	Kingston	Ottaw	va [Richm	ond Hill	Windsor		Barrie		Idon	Justouy	
Organization: Address and Invoicing Address	(if different)	Star Starty		A	NALYSES	REQUESTE	D (Print Test in I	Boxes)		TL	RNAROUI	ID SERV	CE
JP2G CONSULTANTS 1150 MORRIGI	S PR.	SULTE 410							ted	REQ	UESTED (ee back	page)
Contact: OTTAWA	N KZ	4 850	T	07					mina	D Blatir		2009/ 5	abarra
Tel:		11 259	+	-4 -4					Conta	Gold	ium	100% Sun	charge
613-883-3770	1		74	+4 74					thiy C	Silve	r	50% Surc	harge
Fax: Quote No.:	Project Name:	CLAPT	W W	m	2				H li	Bron:	ze	25% Surch	harge
Email: P.O. No.: POUCLAND	Additional Info:	ROCKLA	TND Z	7					pecte	Jan Stan	laiu	5-7 days	
knniferte pz.cm									Sus	Spec	ific Date:		
Lab	Sample Da	ater, GW=Groundwate te Collected Tin	r, LS=Liquid S ne	ludge, SS=	Solid Sludg Indic	ie, S=Soil, Se ate Test For Ei	d=Sediment, PC= ach Sample	Paint Chips	, F=Filter, (Dil = Oil Fie	ld	# Bottles/	Field
No: Sample Identification S.P.L.	Matrix * ()	yy-mm-dd) Colle	cted	В	y Using A	Check Mark In	The Box Provided	1	~	pH	Temp.	Sample	Filtered(Y/N)
G26-94	GW A	1-9-25 goo	Phone	1						8:3	12.6	8	4
2 68-920	/	930	Am	12						74	13.3	4	/
3 629-92	/	/ 1000	bho	13						7.4	0.2	4	/
4 638-03	/	/ 1200	2001	Y						6.9	12.9	8	/
5 62-90	1	/ 1730	mel.	5						7.7	11.7	8	/
6 636-01	1	100	ome!	G						6.9	12.7	8	/
7 637-01	/	/ 115	pro	17						7.7	11.7	4	/
8 G47-10	/	1 25	Smp/	8						7.3	13.3	8	1
9 G 39-07	1	1 245	ong	9						7.3	17.5	8	/
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SAMPLE SUBMISSION INFORMATION	SHIPPI	NG INFORMATION	REP	PORTING /	INVOICIN	G	SAMPLE REC	EIVING INF	FORMATIO	N (LABOR	ATORY US	E ONLY)	
Sampled by: Submitted by:	Client's Courier	Invo	ice Repo	rt by Fax		Received	By (print):GL	age	in)	Signature:	Y	~	
Print: SFARPELL SFARPELLS	Caduceon's Cou	ırier	Repo	rt by Emai		Z Date Rec	eived (yy-mm-do	1): 19-C	XI-26	Time Rece	ived:	5300	h
Sign: Jude Joseful O	Drop Off	# of P	ieces Invoid	ce by Emai	il 🗾	Z Laborato	ry Prepared Bot	tles:	Yes		No	-	
Tq-q-26 Tq-q-26 Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time:	Caduceon (Pick-	-up) 🗆 🛛 🦻	J Invoid	ce by Mail		Sample T	emperature °C:	K.	4	Labeled by	: .		
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CofC, May 2019, Revision No: 22

			TESTING F	EQUIREN	MENTS					RE	PORT NUI	ABER (La	b Use)
	0.Reg 153	Table	Medium/Fir	ne 🗌 C	oarse	MISA Gu	lidelines						
CADUCLON		Agricultural	() andition	D.Reg 153)	l	O.Reg 5	58 Leachate An	alysis	1	> 1	20	11	
ENVIRONMENTAL LABORATORIES Client committed, Quality assured.	Provincial Water Quality	Objectives		J.Reg 155)	ſ	Landfill I	Monitoring		76		50	96	17
	Sewer Use By-Law:				_ [Other:	apus	V		4	~		
Are any samples to be submitted intended for Human Consumptio	n under any Drinking Water F	Regulations?	Yes [🖊 No	(If yes, s	submit all D	rinking Water	Samples o	n a Dri	nking Wate	r Chain of	Custody)
Indicate Laboratory Samples are submit	ted to:	gston 🖊	Ottawa	Ric	hmond I	Hill 🗌	Windsor	Ba	arrie		ndon		
Organization: Address and Invoicing Addres	s (if different)			ANALYS	SES REQ	UESTED (P	rint Test in Bo	oxes)		T	URNAROL	JND SERV	/ICE
JAZG CONSULTANTS 1150 MORREON	DR. SUITE	LID							ted	REC	QUESTED	(see back	page)
JENNIFER FARELL OTTAWA	ON VZU S	OF	nom:	7					tamina	D Plati	inum	200% Su	rcharge
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013-883-3770	Drain at Name		T T	*					ghly		ər	50% Surc	harge
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Jennifer FB p35 Cm				_					Sus	Spec	cific Date:		
* Sample Matrix Legend: WW=Waste W	Sample Date Collected	roundwater, LS=Li	iquid Sludge, S I	S=Solid SI	ludge, S=	Soil, Sed=Se st For Each S	diment, PC=Pa	int Chips, F	=Filter,	Oil = Oil	old	I# Bottles	Field
No: Sample Identification S.P.L.	Matrix * (yy-mm-dd)	Collected		By Using	g A Check	Mark In The I	Box Provided		V	pH	Temp.	Sample	Filtered(Y/N)
1212 629-97-31-964	GW 4-9-26	830 Am	1	h						9.3	9,9	4	V
B 645	11	930 Am	. /	13						9.3	9.9	4	/
14 617-92	11	10° pm	1	14						5.5	17.2	4	/
15 618-97	11	1100 Am	1	15						7.3	13.8	8	/
16 6 46	11	1130 AM	1	16						7.3	13.8	8	/
17 627-97	1 1.	130 pm	/	17						7.8	16.7	4	1
18 Pb -91	1 -	230 on	1	118	VISU	d par	hiculat	NN	DC	7.3	14.7	10	/
$\frac{19}{91-91}$	1 10	3°pm	1	19						7.2	12.5	10	/
\mathcal{W} $\mathcal{P}5B-91$	1-	400 pm		120	VIGU	al m	the ful	atelin	Voc	7.5	14.5	D	/
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Print: JEOPORTIC JEOPORTIC	Caduceon's Courier		Report by Er	nail		ate Received	d (vv-mm-dd)	19-04-	20	Time Reco	eived.	E-30	'IPM
Sign: Letterfull Tank Land	Drop Off	# of Pieces	Invoice by F	mail		boratory Pr	renared Bottle	· 17	5 Vac		No	- J-	
9-9-26 19-9-26	Caduceon (Pick-up)	21,	Invoice by M	ail		solutory PI	oparea Dottle	*	1 162		NO		
Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time:		PV			Sa	ample Temp	erature °C:	14.5		Labeled b	y:		
Comments:			Iten #	2			Ftcm#	3		Page	7	of	7
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CofC, May 2019, Revision No: 22

Hen #4 2 VOC

Δ ENVIRONMENTAL LABORATOR ES Client committed. Quality assured.

QUOTATION FOR ANALYTICAL SERVICES

Quote # :	L16_ClarenceRockland	
Organization:	JP2G	
Contact:	Perry Larochelle	
Telephone:	613-735-2507	
Facsimile:	613-735-4513	
Email:	perryl@jp2g.com	
Project #:	Clarence-Rockland Landfill - 2166270A	
Address:	12 International Drive, Pembroke ON K8A 6W5	
Additional Info:	QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.	
Additional Info:	Laboratory detection limit should be to ODWS or PWQO - whichever is lowest	
Date:	31-Mar-16 Valid Until:	31-Dec-19

ltem #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$				
Spring, Summer & Fall Sampling									
1	10	General Chemistry: Alkalinity, Cl, DOC, TDS, Nutrients: NH3, TP, PO4 Metals: B, Na, Fe, Mn, Co + Hardness	GW	70.00	700.00				
2	12	General Chemistry: Alkalinity, Cl, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, TP/TKN, PO4 Metals: Ag, Al, B, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, Ti, Tl, V, Zn + Hardness	GW	100.00	1200.00				
3	28	General Chemistry: Alkalinity, Cl, DOC, TDS Nutrients: NH3, TP, PO4 Metals: B, Fe, Mn, Na + Hardness	GW	70.00	1960.00				
4	8	VOC (624 Scan)	GW	40.00	320.00				
5	7	General Chemistry: Alkalinity, CI, DOC, TDS Nutrients: NH3, U-NH3, TP Metals: B, Fe, Mn, Na + Hardness	SW	70.00	490.00				
6	18	General Chemistry: Alkalinity, CI, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, U-NH3, TP/TKN Metals: Ag, AI (total & dissolved), B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, TI, Ti, V, Zn + Hardness	SW	100.00	1800.00				
Prices do not include shippin	g unless otherwise stated.			Subtotal	6,470.00				
Environmental dispos	al fees included in p	ricing		HST	841.10				

Environmental disposal fees included in pricing

Rebecca Marshall **Customer Service Representative** Caduceon Environmental Laboratories 613-526-0123

Laboratory Locations

Total Cost

7,311.10

Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770 Ottawa - 2378 Holly Lane Ottawa, ON K1V 7P1 Tel: (613) 526-0123 Fax: (613) 526-1244 Richmond Hill - 110 West Beaver Creek Road (Unit 14), Richmond Hill, ON L4B 1J9 Tel: (289) 475-5442 Fax: (866) 562-1963 Windsor - #5-3201 Marentette Ave. Windsor - #5-3201 Marentette Ave.



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		Γ	Client I.D.		G26-94	G8-92c	G29-97	G38-03
			Sample I.D.		B19-30904-1	B19-30904-2	B19-30904-3	B19-30904-4
			Date Collect	ed	25-Sep-19	25-Sep-19	25-Sep-19	25-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		, , , , , , , , , , , , , , , , , , ,		, ·
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Oct-19/O	27	258	440	577
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Sep-19/O	29	183	401	503
TDS(ion sum calc.)	mg/L	1	Calc.	06-Oct-19/O	35	235	456	595
Chloride	mg/L	0.5	SM4110C	03-Oct-19/O	< 0.5	16.4	4.4	29.2
Nitrite (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 0.05			< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 0.05			< 0.05
Sulphate	mg/L	1	SM4110C	03-Oct-19/O	1			5
Calcium	mg/L	0.02	SM 3120	04-Oct-19/O	7.07			193
Magnesium	mg/L	0.02	SM 3120	04-Oct-19/O	2.27			22.9
Sodium	mg/L	0.2	SM 3120	04-Oct-19/O	5.8	4.6	34.1	33.2
Potassium	mg/L	0.1	SM 3120	04-Oct-19/O	0.9			3.9
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01			0.10
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.008			0.019
Beryllium	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001			< 0.0001
Boron	mg/L	0.005	SM 3120	04-Oct-19/O	0.008	0.027	0.094	0.142
Cadmium	mg/L).000015	EPA 200.8	30-Sep-19/O	< 0.000015			< 0.000015
Chromium	mg/L	0.001	EPA 200.8	30-Sep-19/O	< 0.001			0.002
Cobalt	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001			0.0082
Copper	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0007			0.0003
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005	< 0.005	< 0.005	54.2
Lead	mg/L	0.00002	EPA 200.8	30-Sep-19/O	< 0.00002			< 0.00002
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.004	0.001	3.47	5.36
Mercury	mg/L	0.00002	SM 3112 B	02-Oct-19/O	< 0.00002			< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001			0.0003
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01			< 0.01
Silicon	mg/L	0.01	SM 3120	04-Oct-19/O	5.39			7.01
Silver	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001			< 0.0001

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories. Page 563 of 661



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		G26-94	G8-92c	G29-97	G38-03
			Sample I.D.		B19-30904-1	B19-30904-2	B19-30904-3	B19-30904-4
			Date Collecte	ed	25-Sep-19	25-Sep-19	25-Sep-19	25-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		_		-
Strontium	mg/L	0.001	SM 3120	04-Oct-19/O	0.080			0.763
Sulphur	mg/L	0.1	SM 3120	04-Oct-19/O	1.6			
Thallium	mg/L	0.00005	EPA 200.8	30-Sep-19/O	< 0.00005			< 0.00005
Titanium	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005			0.006
Vanadium	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0002			0.0056
Zinc	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005			< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	01-Oct-19/K	0.03	0.22	0.28	0.50
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Oct-19/K	0.6			1.3
o-Phosphate (P)	mg/L	0.002	PE4500-S	01-Oct-19/K	0.426	2.50	4.13	0.659
Phosphorus-Total	mg/L	0.01	E3199A.1	01-Oct-19/K	0.44	4.47	7.37	0.71
Phenolics	mg/L	0.002	MOEE 3179	01-Oct-19/K	< 0.002			< 0.002
BOD(5 day)	mg/L	3	SM 5210B	30-Sep-19/K	< 3			< 3
COD	mg/L	5	SM 5220D	09-Oct-19/O	6			59
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	03-Oct-19/O	1.3	4.4	12.0	21.2
Anion Sum	meq/L		Calc.	06-Oct-19/O	0.611			11.0
Cation Sum	meq/L		Calc.	06-Oct-19/O	0.817			13.3
% Difference	%		Calc.	06-Oct-19/O	14.5			9.64 1
Ion Ratio	AS/CS		Calc.	06-Oct-19/O	0.747			0.824
Sodium Adsorption Ratio	-		Calc.	06-Oct-19/O	0.489			0.602
Conductivity (calc.)	µmho/cm		Calc.	06-Oct-19/O	70			1058

1 Cations Run from unpreserved bottle

2 Fe not included in Ion Balance Calculations

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories Page 564 of 661



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244
JOB/PROJECT NO.: Clarence Rockland WDS
P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

	Client I.D.				G2-90	G36-01	G37-01	G42-10
			Sample I.D.		B19-30904-5	B19-30904-6	B19-30904-7	B19-30904-8
			Date Collect	ed	25-Sep-19	25-Sep-19	25-Sep-19	25-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Oct-19/O	15	500	250	290
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Sep-19/O	93	263	46	324
TDS(ion sum calc.)	mg/L	1	Calc.	06-Oct-19/O	112	579	687	691
Chloride	mg/L	0.5	SM4110C	03-Oct-19/O	< 0.5	27.2	361	210
Nitrite (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 0.05	0.09		< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	03-Oct-19/O	3.54	10.7		< 0.05
Sulphate	mg/L	1	SM4110C	03-Oct-19/O	< 1	176		9
Calcium	mg/L	0.02	SM 3120	04-Oct-19/O	3.68	150		63.2
Magnesium	mg/L	0.02	SM 3120	04-Oct-19/O	1.36	30.5		32.2
Sodium	mg/L	0.2	SM 3120	04-Oct-19/O	50.5	30.8	164	166
Potassium	mg/L	0.1	SM 3120	04-Oct-19/O	0.3	1.7		7.4
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01	0.07		0.10
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.008	0.057		0.036
Beryllium	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001	< 0.0001		< 0.0001
Boron	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005	0.116	0.008	0.362
Cadmium	mg/L).000015	EPA 200.8	30-Sep-19/O	< 0.000015	0.000095		< 0.000015
Chromium	mg/L	0.001	EPA 200.8	30-Sep-19/O	0.007	< 0.001		0.002
Cobalt	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001	0.0017		0.0010
Copper	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0016	0.0090		0.0018
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	0.010	< 0.005	< 0.005	5.38
Lead	mg/L	0.00002	EPA 200.8	30-Sep-19/O	< 0.00002	< 0.00002		0.00009
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.001	4.72	0.034	0.825
Mercury	mg/L	0.00002	SM 3112 B	02-Oct-19/O	< 0.00002	< 0.00002		< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0001	0.0012		0.0005
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01	< 0.01		< 0.01
Silicon	mg/L	0.01	SM 3120	04-Oct-19/O	5.11	3.57		9.31
Silver	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001	< 0.0001		< 0.0001

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories. Page 565 of 661



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

					G2-90	G36-01	G37-01	G42-10
			Sample I.D.		B19-30904-5	B19-30904-6	B19-30904-7	B19-30904-8
			Date Collecte	ed	25-Sep-19	25-Sep-19	25-Sep-19	25-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		•	•	
Strontium	mg/L	0.001	SM 3120	04-Oct-19/O	0.040	1.09		0.284
Sulphur	mg/L	0.1	SM 3120	04-Oct-19/O	1.0	49.4		4.4
Thallium	mg/L	0.00005	EPA 200.8	30-Sep-19/O	< 0.00005	< 0.00005		< 0.00005
Titanium	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005	< 0.005		0.007
Vanadium	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0006	0.0007		0.0040
Zinc	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005	< 0.005		< 0.005
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	01-Oct-19/K	0.16	0.07	0.03	2.25
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Oct-19/K	0.7	2.4		4.5
o-Phosphate (P)	mg/L	0.002	PE4500-S	01-Oct-19/K	3.71	0.040	0.090	0.134
Phosphorus-Total	mg/L	0.01	E3199A.1	01-Oct-19/K	5.84	0.05	0.07	0.19
Phenolics	mg/L	0.002	MOEE 3179	01-Oct-19/K	< 0.002	< 0.002		< 0.002
BOD(5 day)	mg/L	3	SM 5210B	30-Sep-19/K	< 3	< 3		9
COD	mg/L	5	SM 5220D	09-Oct-19/O	45	65		129
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	03-Oct-19/O	3.5	24.0	1.1	32.5
Anion Sum	meq/L		Calc.	06-Oct-19/O	2.10	10.5		12.6
Cation Sum	meq/L		Calc.	06-Oct-19/O	2.51	11.6		13.7
% Difference	%		Calc.	06-Oct-19/O	8.85	5.13		4.20
Ion Ratio	AS/CS		Calc.	06-Oct-19/O	0.837	0.902		0.919
Sodium Adsorption Ratio	-		Calc.	06-Oct-19/O	5.71	0.599		4.24
Conductivity (calc.)	µmho/cm		Calc.	06-Oct-19/O	200	959		1265

1 Cations Run from unpreserved bottle

2 Fe not included in Ion Balance Calculations

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		G39-07	G40-07	G31-98	G45
			Sample I.D.		B19-30904-9	B19-30904- 10	B19-30904- 12	B19-30904-13
			Date Collect	ed	25-Sep-19	25-Sep-19	26-Sep-19	26-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Oct-19/O	249	258	11	11
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Sep-19/O	258	257	409	419
TDS(ion sum calc.)	mg/L	1	Calc.	06-Oct-19/O	437	435	612	617
Chloride	mg/L	0.5	SM4110C	03-Oct-19/O	104	106	99.9	98.8
Nitrite (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 0.05			
Sulphate	mg/L	1	SM4110C	03-Oct-19/O	3			
Calcium	mg/L	0.02	SM 3120	04-Oct-19/O	55.7			
Magnesium	mg/L	0.02	SM 3120	04-Oct-19/O	26.6			
Sodium	mg/L	0.2	SM 3120	04-Oct-19/O	74.0	76.8	257	257
Potassium	mg/L	0.1	SM 3120	04-Oct-19/O	15.3			
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	0.03			
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.055			
Beryllium	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001			
Boron	mg/L	0.005	SM 3120	04-Oct-19/O	0.920	0.887	1.02	1.02
Cadmium	mg/L).000015	EPA 200.8	30-Sep-19/O	< 0.000015			
Chromium	mg/L	0.001	EPA 200.8	30-Sep-19/O	0.001			
Cobalt	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0002			
Copper	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0008			
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	0.788	3.60	0.029	0.031
Lead	mg/L	0.00002	EPA 200.8	30-Sep-19/O	< 0.00002			
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.334	0.793	0.005	0.005
Mercury	mg/L	0.00002	SM 3112 B	02-Oct-19/O	< 0.00002			
Molybdenum	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0001			
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01			
Silicon	mg/L	0.01	SM 3120	04-Oct-19/O	1.96			
Silver	ma/l	0.0001	FPA 200 8	30-Sep-19/0	< 0.0001			

R.L. = Reporting Limit

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Greg Clarkin, BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories Page 567 of 661



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19

DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		Client I.D.		G39-07	G40-07	G31-98	G45
		Sample I.D.		B19-30904-9	B19-30904- 10	B19-30904- 12	B19-30904-13
		Date Collecte	əd	25-Sep-19	25-Sep-19	26-Sep-19	26-Sep-19
Units	R.L.	Reference Method	Date/Site Analyzed				
mg/L	0.001	SM 3120	04-Oct-19/O	0.436			
mg/L	0.1	SM 3120	04-Oct-19/O	2.1			
mg/L	0.00005	EPA 200.8	30-Sep-19/O	< 0.00005			
mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005			
mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0013			
mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005			
mg/L	0.01	SM4500- NH3-H	01-Oct-19/K	2.00	0.13	1.02	1.04
mg/L	0.1	E3199A.1	01-Oct-19/K	4.4			
mg/L	0.002	PE4500-S	01-Oct-19/K	0.224	0.127	6.18	6.63
mg/L	0.01	E3199A.1	01-Oct-19/K	0.33	0.17	19.9	20.6
mg/L	0.002	MOEE 3179	01-Oct-19/K	< 0.002			
mg/L	3	SM 5210B	30-Sep-19/K	8			
mg/L	5	SM 5220D	09-Oct-19/O	164			
mg/L	0.2	EPA 415.1	03-Oct-19/O	15.7	16.1	7.0	6.9
meq/L		Calc.	06-Oct-19/O	8.16			
meq/L		Calc.	06-Oct-19/O	8.77			
%		Calc.	06-Oct-19/O	3.63			
AS/CS		Calc.	06-Oct-19/O	0.930			
-		Calc.	06-Oct-19/O	2.04			
µmho/cm		Calc.	06-Oct-19/O	827			
	Units mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	Units R.L. mg/L 0.001 mg/L 0.1 mg/L 0.0005 mg/L 0.0005 mg/L 0.005 mg/L 0.001 mg/L 0.005 mg/L 0.001 mg/L 0.001 mg/L 0.01 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.01 mg/L 0.002 mg/L 3 mg/L 5 mg/L 0.2 meq/L % AS/CS - µmho/cm -	Client I.D. Sample I.D. Sample I.D. Date Collector mg/L 0.001 Mg/L 0.001 Mg/L 0.1 SM 3120 mg/L 0.0005 mg/L 0.0005 Mg/L 0.0001 Mg/L 0.0005 Mg/L 0.0001 mg/L 0.0001 mg/L 0.0001 Mg/L 0.005 Mg/L 0.001 Mg/L 0.001 Mg/L 0.001 Mg/L 0.01 Mg/L 0.02 Mg/L 0.02 Mg/L 3 Mg/L 3 Mg/L 3 Mg/L 5 Mg/L 22 Mg/L	Client I.D. Sample I.D. Date Collected Date Collected Inits R.L. Reference Method Date/Site Analyzed mg/L 0.001 SM 3120 04-Oct-19/O mg/L 0.1 SM 3120 04-Oct-19/O mg/L 0.0005 EPA 200.8 30-Sep-19/O mg/L 0.0001 EPA 200.8 30-Sep-19/O mg/L 0.0001 EPA 200.8 30-Sep-19/O mg/L 0.001 SM 4500- 01-Oct-19/K mg/L 0.01 SM4500- 01-Oct-19/K mg/L 0.01 E3199A.1 01-Oct-19/K mg/L 0.02 MOEE 3179 01-Oct-19/K mg/L 0.2	Client I.D. G39-07 Sample I.D. B19-30904-9 Date Collected 25-Sep-19 Date Collected Date/Site Analyzed 25-Sep-19 mg/L 0.001 SM 3120 04-Oct-19/O 0.436 mg/L 0.1 SM 3120 04-Oct-19/O 2.1 mg/L 0.0005 EPA 200.8 30-Sep-19/O <0.0005 mg/L 0.005 SM 3120 04-Oct-19/O <0.0005 mg/L 0.0005 SM 3120 04-Oct-19/O <0.0005 mg/L 0.0001 EPA 200.8 30-Sep-19/O <0.0013 mg/L 0.005 SM 3120 04-Oct-19/O <0.005 mg/L 0.001 EPA 200.8 30-Sep-19/O <0.0013 mg/L 0.011 SM4500- NH3-H 01-Oct-19/K 2.00 mg/L 0.01 EPA 200.8 30-Sep-19/O 0.224 mg/L 0.01 E3199A.1 01-Oct-19/K 0.224 mg/L 0.02 MOEE 3179 01-Oct-19/K 0.33 <td>$\begin{tabular}{ c c c c c } \hline Client I.D. & G39-07 & G40-07 \\ \hline Sample I.D. & B19-30904-9 & B19-30904-10 \\ \hline Date Collecture & 25-Sep-19 & 25-Sep-19 \\ \hline Date Collecture & Date/Site & Analyzed \\ \hline mg/L & 0.001 & SM 3120 & 04-Oct-19/O & 0.436 \\ mg/L & 0.1 & SM 3120 & 04-Oct-19/O & 2.1 \\ \hline mg/L & 0.0005 & EPA 200.8 & 30-Sep-19/O & <0.0005 \\ \hline mg/L & 0.000 & EPA 200.8 & 30-Sep-19/O & <0.0005 \\ \hline mg/L & 0.0001 & EPA 200.8 & 30-Sep-19/O & <0.005 \\ \hline mg/L & 0.0001 & EPA 200.8 & 30-Sep-19/O & 0.0013 \\ \hline mg/L & 0.005 & SM 3120 & 04-Oct-19/O & <0.005 \\ \hline mg/L & 0.001 & EPA 200.8 & 30-Sep-19/O & 0.0013 \\ \hline mg/L & 0.001 & EPA 200.8 & 30-Sep-19/O & 0.0013 \\ \hline mg/L & 0.002 & SM 3120 & 04-Oct-19/K & 2.00 & 0.13 \\ \hline mg/L & 0.01 & SM4500- & 01-Oct-19/K & 2.00 & 0.13 \\ \hline mg/L & 0.01 & E3199A.1 & 01-Oct-19/K & 0.224 & 0.127 \\ mg/L & 0.01 & E3199A.1 & 01-Oct-19/K & 0.33 & 0.17 \\ \hline mg/L & 0.02 & MOEE 3179 & 01-Oct-19/K & 0.33 & 0.17 \\ \hline mg/L & 0.02 & MOEE 3179 & 01-Oct-19/K & 0.002 \\ \hline mg/L & 3 & SM 5210B & 30-Sep-19/K & 8 \\ \hline mg/L & 5 & SM 5220D & 09-Oct-19/O & 164 \\ \hline mg/L & 0.2 & EPA 415.1 & 03-Oct-19/O & 15.7 & 16.1 \\ \hline meq/L & Calc. & 06-Oct-19/O & 8.16 \\ \hline meq/L & Calc. & 06-Oct-19/O & 8.77 \\ \hline \% & Calc. & 06-Oct-19/O & 0.930 \\ \hline mmodel & Calc. & 06-Oct-19/O & 0.930 \\ \hline \end{tabular}$</td> <td>$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$</td>	$\begin{tabular}{ c c c c c } \hline Client I.D. & G39-07 & G40-07 \\ \hline Sample I.D. & B19-30904-9 & B19-30904-10 \\ \hline Date Collecture & 25-Sep-19 & 25-Sep-19 \\ \hline Date Collecture & Date/Site & Analyzed \\ \hline mg/L & 0.001 & SM 3120 & 04-Oct-19/O & 0.436 \\ mg/L & 0.1 & SM 3120 & 04-Oct-19/O & 2.1 \\ \hline mg/L & 0.0005 & EPA 200.8 & 30-Sep-19/O & <0.0005 \\ \hline mg/L & 0.000 & EPA 200.8 & 30-Sep-19/O & <0.0005 \\ \hline mg/L & 0.0001 & EPA 200.8 & 30-Sep-19/O & <0.005 \\ \hline mg/L & 0.0001 & EPA 200.8 & 30-Sep-19/O & 0.0013 \\ \hline mg/L & 0.005 & SM 3120 & 04-Oct-19/O & <0.005 \\ \hline mg/L & 0.001 & EPA 200.8 & 30-Sep-19/O & 0.0013 \\ \hline mg/L & 0.001 & EPA 200.8 & 30-Sep-19/O & 0.0013 \\ \hline mg/L & 0.002 & SM 3120 & 04-Oct-19/K & 2.00 & 0.13 \\ \hline mg/L & 0.01 & SM4500- & 01-Oct-19/K & 2.00 & 0.13 \\ \hline mg/L & 0.01 & E3199A.1 & 01-Oct-19/K & 0.224 & 0.127 \\ mg/L & 0.01 & E3199A.1 & 01-Oct-19/K & 0.33 & 0.17 \\ \hline mg/L & 0.02 & MOEE 3179 & 01-Oct-19/K & 0.33 & 0.17 \\ \hline mg/L & 0.02 & MOEE 3179 & 01-Oct-19/K & 0.002 \\ \hline mg/L & 3 & SM 5210B & 30-Sep-19/K & 8 \\ \hline mg/L & 5 & SM 5220D & 09-Oct-19/O & 164 \\ \hline mg/L & 0.2 & EPA 415.1 & 03-Oct-19/O & 15.7 & 16.1 \\ \hline meq/L & Calc. & 06-Oct-19/O & 8.16 \\ \hline meq/L & Calc. & 06-Oct-19/O & 8.77 \\ \hline \% & Calc. & 06-Oct-19/O & 0.930 \\ \hline mmodel & Calc. & 06-Oct-19/O & 0.930 \\ \hline \end{tabular}$	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$

1 Cations Run from unpreserved bottle

2 Fe not included in Ion Balance Calculations

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories Page 568 of 661



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19

DATE REPORTED: 12-Oct-19 SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		G17-92	G18-92	G46	G27-97
			Sample I.D.		B19-30904- 14	B19-30904- 15	B19-30904- 16	B19-30904-17
			Date Collect	ed	26-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Oct-19/O	298	782	788	717
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Sep-19/O	233	630	628	502
TDS(ion sum calc.)	mg/L	1	Calc.	06-Oct-19/O	320	741	742	924
Chloride	mg/L	0.5	SM4110C	03-Oct-19/O	24.7	47.7	47.7	95.0
Nitrite (N)	mg/L	0.05	SM4110C	03-Oct-19/O		< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	03-Oct-19/O		< 0.05	< 0.05	
Sulphate	mg/L	1	SM4110C	03-Oct-19/O		14	13	
Calcium	mg/L	0.02	SM 3120	04-Oct-19/O		230	232	
Magnesium	mg/L	0.02	SM 3120	04-Oct-19/O		50.4	50.7	
Sodium	mg/L	0.2	SM 3120	04-Oct-19/O	16.3	12.5	12.6	112
Potassium	mg/L	0.1	SM 3120	04-Oct-19/O		7.3	7.4	
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O		0.10	0.10	
Barium	mg/L	0.001	SM 3120	04-Oct-19/O		0.061	0.061	
Beryllium	mg/L	0.0001	EPA 200.8	30-Sep-19/O		< 0.0001	< 0.0001	
Boron	mg/L	0.005	SM 3120	04-Oct-19/O	0.045	0.321	0.323	0.804
Cadmium	mg/L).000015	EPA 200.8	30-Sep-19/O		0.000024	0.000028	
Chromium	mg/L	0.001	EPA 200.8	30-Sep-19/O		0.004	0.007	
Cobalt	mg/L	0.0001	EPA 200.8	30-Sep-19/O		0.0018	0.0017	
Copper	mg/L	0.0001	EPA 200.8	30-Sep-19/O		0.0054	0.0054	
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	0.736	0.137	0.154	0.033
Lead	mg/L	0.00002	EPA 200.8	30-Sep-19/O		< 0.00002	< 0.00002	
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.717	0.443	0.452	0.056
Mercury	mg/L	0.00002	SM 3112 B	02-Oct-19/O		< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	30-Sep-19/O		0.0004	0.0004	
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O		< 0.01	< 0.01	
Silicon	mg/L	0.01	SM 3120	04-Oct-19/O		7.66	7.69	
Silver	mg/L	0.0001	EPA 200.8	30-Sep-19/O		< 0.0001	< 0.0001	

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin, BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories Page 569 of 661



Final Report

C.O.C.: G90237, 90238

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 26-Sep-19

DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		G17-92	G18-92	G46	G27-97
			Sample I.D.		B19-30904- 14	B19-30904- 15	B19-30904- 16	B19-30904-17
			Date Collecte	əd	26-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Strontium	mg/L	0.001	SM 3120	04-Oct-19/O		0.905	0.917	
Sulphur	mg/L	0.1	SM 3120	04-Oct-19/O		4.8	4.8	
Thallium	mg/L	0.00005	EPA 200.8	30-Sep-19/O		< 0.00005	< 0.00005	
Titanium	mg/L	0.005	SM 3120	04-Oct-19/O		< 0.005	< 0.005	
Vanadium	mg/L	0.0001	EPA 200.8	30-Sep-19/O		0.0010	0.0010	
Zinc	mg/L	0.005	SM 3120	04-Oct-19/O		< 0.005	< 0.005	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	01-Oct-19/K	0.29	0.28	0.69	0.09
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-Oct-19/K		2.7	3.1	
o-Phosphate (P)	mg/L	0.002	PE4500-S	01-Oct-19/K	0.357	1.22	4.25	0.160
Phosphorus-Total	mg/L	0.01	E3199A.1	01-Oct-19/K	0.68	2.23	5.77	0.21
Phenolics	mg/L	0.002	MOEE 3179	01-Oct-19/K		< 0.002	< 0.002	
BOD(5 day)	mg/L	3	SM 5210B	30-Sep-19/K		5	3	
COD	mg/L	5	SM 5220D	09-Oct-19/O		144	217	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	03-Oct-19/O	10.3	26.7	26.4	16.8
Anion Sum	meq/L		Calc.	06-Oct-19/O		14.2	14.2	
Cation Sum	meq/L		Calc.	06-Oct-19/O		16.4	16.6	
% Difference	%		Calc.	06-Oct-19/O		7.10	7.81	
Ion Ratio	AS/CS		Calc.	06-Oct-19/O		0.867	0.855	
Sodium Adsorption Ratio	-		Calc.	06-Oct-19/O		0.195	0.195	
Conductivity (calc.)	µmho/cm		Calc.	06-Oct-19/O		1313	1318	

1 Cations Run from unpreserved bottle

2 Fe not included in Ion Balance Calculations

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

C.O.C.: G90237, 90238

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DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		P6-91	P1-91	P5B-91	
			Sample I.D.		B19-30904- 18	B19-30904- 19	B19-30904- 20	
			Date Collect	ed	26-Sep-19	26-Sep-19	26-Sep-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Oct-19/O	1030	1100	660	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Sep-19/O	2400	1140	1170	
TDS(ion sum calc.)	mg/L	1	Calc.	06-Oct-19/O	3407	1559	1334	
Chloride	mg/L	0.5	SM4110C	03-Oct-19/O	555	212	105	
Nitrite (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 1	< 0.5	< 0.5	
Nitrate (N)	mg/L	0.05	SM4110C	03-Oct-19/O	< 1	< 0.5	< 0.5	
Sulphate	mg/L	1	SM4110C	03-Oct-19/O	< 30	< 10	< 10	
Calcium	mg/L	0.02	SM 3120	04-Oct-19/O	274	275	207	
Magnesium	mg/L	0.02	SM 3120	04-Oct-19/O	82.8	101	34.6	
Sodium	mg/L	0.2	SM 3120	04-Oct-19/O	496	238	77.1	
Potassium	mg/L	0.1	SM 3120	04-Oct-19/O	192	16.1	98.7	
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	0.11	0.11	0.09	
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.996	0.225	0.422	
Beryllium	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0002	< 0.0001	< 0.0001	
Boron	mg/L	0.005	SM 3120	04-Oct-19/O	10.4	1.76	1.41	
Cadmium	mg/L).000015	EPA 200.8	30-Sep-19/O	< 0.000059	< 0.000029	< 0.000029	
Chromium	mg/L	0.001	EPA 200.8	30-Sep-19/O	0.021	0.003	0.003	
Cobalt	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0097	0.0022	0.0050	
Copper	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0031	0.0013	0.0008	
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	8.91	25.3	47.9	
Lead	mg/L	0.00002	EPA 200.8	30-Sep-19/O	< 0.0002	< 0.00009	< 0.00009	
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	5.71	4.29	3.52	
Mercury	mg/L	0.00002	SM 3112 B	02-Oct-19/O	< 0.00002	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0007	< 0.0002	0.0004	
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O	0.01	0.01	< 0.01	
Silicon	mg/L	0.01	SM 3120	04-Oct-19/O	11.7	11.9	9.87	
Silver	ma/l	0.0001	FPA 200.8	30-Sep-19/0	< 0.0002	< 0.0001	< 0.0001	

R.L. = Reporting Limit

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Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

C.O.C.: G90237, 90238

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DATE RECEIVED: 26-Sep-19

DATE REPORTED: 12-Oct-19 SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (i)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		Client I.D.		P6-91	P1-91	P5B-91	
		Sample I.D.		B19-30904- 18	B19-30904- 19	B19-30904- 20	
		Date Collecte	ed	26-Sep-19	26-Sep-19	26-Sep-19	
Units	R.L.	Reference Method	Date/Site Analyzed	·			
mg/L	0.001	SM 3120	04-Oct-19/O	2.28	1.42	1.27	
mg/L	0.1	SM 3120	04-Oct-19/O	7.5	5.3	4.2	
mg/L	0.00005	EPA 200.8	30-Sep-19/O	< 0.00005	< 0.00005	< 0.00005	
mg/L	0.005	SM 3120	04-Oct-19/O	0.018	< 0.005	< 0.005	
mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0483	0.0074	0.0066	
mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005	< 0.005	< 0.005	
mg/L	0.01	SM4500- NH3-H	01-Oct-19/K	275	1.15	83.7	
mg/L	0.1	E3199A.1	01-Oct-19/K	319	6.2	101	
mg/L	0.002	PE4500-S	01-Oct-19/K	0.315	0.091	1.80	
mg/L	0.01	E3199A.1	01-Oct-19/K	0.37	0.13	2.60	
mg/L	0.002	MOEE 3179	01-Oct-19/K	0.007	< 0.002	< 0.002	
mg/L	3	SM 5210B	30-Sep-19/K	18	6	46	
mg/L	5	SM 5220D	09-Oct-19/O	550	207	234	
mg/L	0.2	EPA 415.1	03-Oct-19/O	145	74.3	54.9	
meq/L		Calc.	06-Oct-19/O	63.6	28.8	26.3	
meq/L		Calc.	06-Oct-19/O	67.0	34.4	25.1	
%		Calc.	06-Oct-19/O	2.60	8.85	2.32 ²	
AS/CS		Calc.	06-Oct-19/O	0.949	0.837	1.05	
-		Calc.	06-Oct-19/O	6.74	3.12	1.31	
µmho/cm		Calc.	06-Oct-19/O	5306	2462	2234	
	Units mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	Units R.L. mg/L 0.001 mg/L 0.1 mg/L 0.0005 mg/L 0.0005 mg/L 0.0005 mg/L 0.001 mg/L 0.001 mg/L 0.001 mg/L 0.001 mg/L 0.001 mg/L 0.01 mg/L 0.1 mg/L 0.1 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L 0.01 mg/L 0.2 mg/L 5 mg/L 0.2 meq/L 0.2 meq/L - % - AS/CS - µmho/cm -	Client I.D. Sample I.D. Sample I.D. Date Collecter Units R.L. Method mg/L 0.001 SM 3120 mg/L 0.001 SM 3120 mg/L 0.0005 EPA 200.8 mg/L 0.0005 SM 3120 mg/L 0.0005 SM 3120 mg/L 0.0005 SM 3120 mg/L 0.001 EPA 200.8 mg/L 0.001 SM4500- mg/L 0.01 SM4500- mg/L 0.01 E3199A.1 mg/L 0.01 E3199A.1 mg/L 0.002 MCE13179 mg/L 0.01 E3199A.1 mg/L 0.01 E3199A.1 mg/L 3 SM 5210B mg/L 0.2 EPA 415.1 meq/L 5 SM 5220D mg/L 0.2 EPA 415.1 meq/L Calc. Calc. % Calc. <td>$\begin{tabular}{ c$</td> <td>$\begin{tabular}{ c c c c } \hline Client I.D. & P6-91 \\ \hline Sample I.D. & B19-30904-18 \\ \hline B19-3090-18 \\ \hline B19-300-18 \\ \hline$</td> <td>Client I.D. P6-91 P1-91 Sample I.D. B19-30904- 18 B19-30904- 19 Date Collect</td> <td>$\begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$</td>	$\begin{tabular}{ c $	$\begin{tabular}{ c c c c } \hline Client I.D. & P6-91 \\ \hline Sample I.D. & B19-30904-18 \\ \hline B19-3090-18 \\ \hline B19-300-18 \\ \hline $	Client I.D. P6-91 P1-91 Sample I.D. B19-30904- 18 B19-30904- 19 Date Collect	$\begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$

1 Cations Run from unpreserved bottle

2 Fe not included in Ion Balance Calculations

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Final Report

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DATE RECEIVED: 26-Sep-19 DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (ii)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Clarence Rockland WDS

P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		Trip Blank	P6-91	P1-91	P5B-91
			Sample I.D.		B19-30904- 11	B19-30904- 18	B19-30904- 19	B19-30904-20
			Date Collect	ed	25-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	02-Oct-19/R	< 30	< 30	< 30	< 30
Benzene	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	4.4	1.5	1.8
Bromodichloromethane	µg/L	2	EPA 8260	02-Oct-19/R	< 2	< 2	< 2	< 2
Bromoform	µg/L	5	EPA 8260	02-Oct-19/R	< 5	< 5	< 5	< 5
Bromomethane	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	µg/L	0.2	EPA 8260	02-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	2.4	< 0.5	< 0.5
Chloroform	µg/L	1	EPA 8260	02-Oct-19/R	< 1	< 1	< 1	< 1
Dibromochloromethane	µg/L	2	EPA 8260	02-Oct-19/R	< 2	< 2	< 2	< 2
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	2	EPA 8260	02-Oct-19/R	< 2	< 2	< 2	< 2
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene 1,3- cis+trans	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dibromoethane,1,2-	µg/L	0.2	EPA 8260	02-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2

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DATE REPORTED: 12-Oct-19

SAMPLE MATRIX: Groundwater

REPORT No. B19-30904 (ii)

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO .: Clarence Rockland WDS

P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		Trip Blank	P6-91	P1-91	P5B-91
			Sample I.D.		B19-30904- 11	B19-30904- 18	B19-30904- 19	B19-30904-20
			Date Collect	ed	25-Sep-19	26-Sep-19	26-Sep-19	26-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hexane	µg/L	5	EPA 8260	02-Oct-19/R	< 5	< 5	< 5	< 5
Methyl Ethyl Ketone	µg/L	20	EPA 8260	02-Oct-19/R	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	02-Oct-19/R	< 20	< 20	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	02-Oct-19/R	< 2	< 2	< 2	< 2
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	02-Oct-19/R	< 5	< 5	< 5	< 5
Styrene	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	0.6	< 0.5	< 0.5
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	02-Oct-19/R	< 5	< 5	< 5	< 5
Vinyl Chloride	µg/L	0.2	EPA 8260	02-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Xylene, m,p-	µg/L	1.0	EPA 8260	02-Oct-19/R	< 1.0	3.1	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	02-Oct-19/R	< 0.5	2.4	< 0.5	< 0.5
Xylene, m,p,o-	µg/L	1.1	EPA 8260	02-Oct-19/R	< 1.1	5.5	< 1.1	< 1.1

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories Page 574 of 661

0	ENVIRONMENTAL LI	ABORATORIES ent committed. Quality of	N [™]	O.Reg O.Reg RPI Yes Provin Sewer	153 ICC No cial Water Quality Use By-Law:	Table [Agricultural Record of Site Co Objectives	TE: Me	STING edium/F	REQU ine (O.Reg (O.Reg	Coar 153) 153)	se	MISA G O.Reg Dispos Landfill Other:	uidelines 558 Leach al Site: I Monitorin	ate Analys	is 31	р 9.		5	19 62	Use)
Are	e any samples to be submitted in	n under any E	Yes No (If yes, sub			submit all Drinking Water Samples on			on a Dri	Drinking Water Chain of Custody)										
Organi	Indicate Lab	oratory Samples a	are submit	(if different)		jston [Ottav	Na	ANI	RICHM		I L		SOF		Sarrie		ndon	IND SEDV	ICE
Organi					SUITE L	10		1	AN	ALIGEO	REQUI		-mit test	III DOXes	») 	9	REC	UESTED	(see back	page)
Contact:			Cal Solle he												ninate					
JEN Tel:	UNITER TARRELL	0.17	VIL	1 859				4								ontai	Gold	num 1	200% Sur 100% Sur	charge charge
61	3-883-3770		nar										hly C	Silver 50% Surcharge						
Fax:		Quote No.:		Project Nan	ne:			4								d Hig	Bror	ize	25% Surc	harge
Email		PO No: COC	LENCE	Additional	nfo:	LARENCE	5	10								pecte	Stan	dard	5-7 days	
Je	enniferfelpop.com	1.0.10. 1000	iccotha	Additional	nio. r		1							1		Susp	Spec	cific Date:		
Loh	· · · · · · · · · · · · · · · · · · ·	nple Matrix Legend: W	W=Waste Wa	ter, SW=Surfa	ce Water, GW=G	roundwater, LS=L	iquid S	Sludge,	SS=So	olid Slud	ge, S=So	il, Sed=S	ediment,	PC=Paint	Chips,	F=Filter,	Oil = Oil		1# Pottlaci	Field
No:	Sample Identifica	tion	S.P.L.	Matrix *	(yy-mm-dd)	Collected			By	Using A	Check M	ark in The	e Box Prov	rided		~	pH	Temp.	Sample	Filtered(Y/N)
	(55-8			SW	19-10-31	930 pm			F								8.6	12.4	9	YES
	5-2			/	1	1030 AM	1		Sr.								7,6	10.0	4	NO
	5-1			-	/	1130 AM	/	1	3								7.2	10.5	21	NO
	65-6			/	/	130 pm		/	4								7.4	10.5	×g	YES
	GS-11			/	1	230 pm		/	5							_	7.9	10.0	9	YES
	- GS-17			~	-	330 pm		/	6						19		7.2	11.5	9	YES
	65-15			1		400 pm		1	1					a.			7.0	11.3	9	YES
	65-2	0		/	/	430 pm	1		4								7.0	170	4	NO
	65-21			/	/	5° pm	/		9								7.0	7.7	4	NO
	65-2	} }		/	/	6° pm	/		10								7.0	7.7	4	NO
					1.1.1.1.1	,														
	Class of Section	1				and China														
	SAMPLE SUBMISSION	INFORMATION		SH	IIPPING INFORM	ATION	REI	PORTI	NG / IN	IVOICIN	G	5	SAMPLE	RECEIVIN	IG INF	ORMATI	ON (LABOR	ATORY U	SE ONLY)	
	Sampled by:	Submitted	by:	Client's Cou	urier	Invoice	Repo	ort by F	ax		Rec	eived By	(print):	Ta	lie	4	Signature: Ctathan			
Print:		JENNIFER F	ARRELL	Caduceon's	Courier		Repo	port by Email			Date	Date Received (yy-mm-dd): 19/11/04			104	Time Received: 10:00				
Sign:		Jonniber Fa	rrell	Drop Off	f # of Pieces		Invoi	Invoice by Email Laboratory Prepared Bottles:			1 6	Yes No								
-	2019-10-31			Caduceon (Pick-up)			Invoi	Invoice by Mail			Sam	Sample Temperature °C: 3.(-				Labeled by:				
Commer	its:	LOWEST	F Pos	SIBLE		Rend	H.	45	- R	NP,	MI	DOC			011	Le	Page	P	of	
	Page 575 of 6618, 2 MZ 2M HS, Ph. DOC G90772																			

White: Lab Copy / Yellow: Invoicing Copy / Pink: Client Copy

CofC, May 2019, Revision No: 22

CADUCE ENVIRONMENTAL LABORATORIES Client committed. Quality assured.

QUOTATION FOR ANALYTICAL SERVICES

Quote # :	L16_ClarenceRockland		
Organization:	JP2G		
Contact:	Perry Larochelle		10).
Telephone:	613-735-2507		
Facsimile:	613-735-4513		
Email:	perryl@jp2g.com		
Project #:	Clarence-Rockland Landfill - 2166270A		
Address:	12 International Drive, Pembroke ON K8A 6W5		
Additional Info:	QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be ap	plied.	
Additional Info:	Laboratory detection limit should be to ODWS or PWQO - whichever is lowest		
Date:	31-Mar-16 Valid Until:		31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$				
Spring, Summer & Fall Sampling									
1	10	General Chemistry: Alkalinity, Cl, DOC, TDS, Nutrients: NH3, TP, PO4 Metals: B, Na, Fe, Mn, Co + Hardness	GW	70.00	700.00				
2	12	General Chemistry: Alkalinity, Cl, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, TP/TKN, PO4 Metals: Ag, Al, B, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, Ti, Tl, V, Zn + Hardness	GW	100.00	1200.00				
3	28	General Chemistry: Alkalipit), Cl. Doe, TDS Nutrients: NH3, TP, PO4 Metals: B, Fe, Mn, Na + Hardness	GW	70.00	1960.00				
4	8	VOC (624 Scan)	GW	40.00	320.00				
5	7	General Chemistry: Alkalinity, CI, DOC, TDS Nutrients: NH3, U-NH3, TP Metals: B, Fe, Mn, Na + Hardness	SW	70.00	490.00				
6	18	General Chemistry: Alkalinity, CI, SO4, NO2/NO3, BOD, COD, DOC, TDS, Phenols Nutrients: NH3, U-NH3, TP/TKN Metals: Ag, AI (total & dissolved), B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, S, Si, Sr, TI, Ti, V, Zn + Hardness	SW	100.00	1800.00				
Prices do not include shippin Environmental dispos		Subtotal HST	6,470.00 841.10						

Rebecca Marshall Customer Service Representative Caduceon Environmental Laboratories 613-526-0123

Laboratory Locations

Total Cost

7,311.10

Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770 Ottawa - 2378 Holly Lane Ottawa, ON K1V 7P1 Tel: (613) 526-0123 Fax: (613) 526-1244 Richmond Hill - 110 West Beaver Creek Road (Unit 14), Richmond Hill OLLAB 1J9 Tel: (289) 475-5442 Fax: (866) 562-1963 Windsor - #5-3201 Marentette Ave. Windsor, ON N8X 4G3 Tel: (519) 966-9541 Fax: (519) 966-9567


Final Report

C.O.C.: G90772

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 04-Nov-19 DATE REPORTED: 03-Dec-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-35624

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		GS-8	S-2	S-1	GS-6
			Sample I.D.		B19-35624-1	B19-35624-2	B19-35624-3	B19-35624-4
			Date Collect	ed	31-Oct-19	31-Oct-19	31-Oct-19	31-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			1	
Hardness (as CaCO3)	mg/L	1	SM 3120	11-Nov-19/O	163	181	180	129
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Nov-19/O	116	116	113	96
TDS(ion sum calc.)	mg/L	1	Calc.	25-Nov-19/O	252	302	306	149
Chloride	mg/L	0.5	SM4110C	23-Nov-19/O	60.0	87.3	90.5	14.0
Nitrite (N)	mg/L	0.05	SM4110C	23-Nov-19/O	< 0.05			< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	23-Nov-19/O	0.66			0.45
Sulphate	mg/L	1	SM4110C	23-Nov-19/O	25			19
Calcium	mg/L	0.02	SM 3120	11-Nov-19/O	45.6	51.0	50.5	37.2
Magnesium	mg/L	0.02	SM 3120	11-Nov-19/O	12.6	13.0	13.0	9.64
Sodium	mg/L	0.2	SM 3120	11-Nov-19/O	34.4	48.4	49.5	9.4
Potassium	mg/L	0.1	SM 3120	11-Nov-19/O	3.5			2.0
Aluminum	mg/L	0.01	SM 3120	08-Nov-19/O	0.32			0.03
Aluminum (total)	mg/L	0.01	SM 3120	11-Nov-19/O	0.68			0.17
Barium	mg/L	0.001	SM 3120	11-Nov-19/O	0.036			0.028
Boron	mg/L	0.005	SM 3120	11-Nov-19/O	0.011	0.011	0.010	0.005
Beryllium	mg/L	0.0001	EPA 200.8	13-Nov-19/O	< 0.0001			< 0.0001
Cadmium	mg/L).000015	EPA 200.8	13-Nov-19/O	0.000015			0.000018
Chromium	mg/L	0.001	EPA 200.8	13-Nov-19/O	0.002			< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0004			0.0002
Copper	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0034			0.0011
Iron	mg/L	0.005	SM 3120	11-Nov-19/O	0.870	0.627	0.767	0.377
Lead	mg/L	0.00002	EPA 200.8	13-Nov-19/O	0.00057			0.00009
Manganese	mg/L	0.001	SM 3120	11-Nov-19/O	0.036	0.047	0.046	0.032
Mercury	mg/L	0.00002	SM 3112 B	07-Nov-19/O	< 0.00002			< 0.00002
Molybdenum	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0004			0.0003
Nickel	mg/L	0.0002	EPA 200.8	13-Nov-19/O	0.0021			0.0006
Silicon	mg/L	0.01	SM 3120	11-Nov-19/O	6.14			5.50

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories Page 577 of 661



Final Report

C.O.C.: G90772

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 04-Nov-19 DATE REPORTED: 03-Dec-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-35624

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		Client I.D.		GS-8	S-2	S-1	GS-6	
			Sample I.D.		B19-35624-1	B19-35624-2	B19-35624-3	B19-35624-4
			Date Collecte	ed	31-Oct-19	31-Oct-19	31-Oct-19	31-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		_		-
Silver	mg/L	0.0001	EPA 200.8	13-Nov-19/O	< 0.0001			< 0.0001
Strontium	mg/L	0.001	SM 3120	11-Nov-19/O	0.149			0.110
Sulphur	mg/L	0.1	SM 3120	11-Nov-19/O	8.4			6.4
Thallium	mg/L	0.00005	EPA 200.8	13-Nov-19/O	< 0.00005			< 0.00005
Titanium	mg/L	0.005	SM 3120	11-Nov-19/O	0.034			0.007
Vanadium	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0022			0.0009
Zinc	mg/L	0.005	SM 3120	11-Nov-19/O	0.020			0.013
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	14-Nov-19/K	0.04	0.03	0.03	0.02
Ammonia (N)-unionized	mg/L	0.01	CALC	14-Nov-19/K	< 0.01	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Nov-19/K	0.6			0.3
Phosphorus-Total	mg/L	0.01	E3199A.1	07-Nov-19/K	0.08	0.06	0.08	0.01
Phenolics	mg/L	0.001	MOEE 3179	07-Nov-19/K	< 0.001			< 0.001
BOD(5 day)	mg/L	3	SM 5210B	06-Nov-19/K	< 3			< 3
COD	mg/L	5	SM 5220D	18-Nov-19/O	20			17
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	02-Dec-19/O	8.5	7.6	7.7	8.3
Anion Sum	meq/L		Calc.	25-Nov-19/O	4.58			2.73
Cation Sum	meq/L		Calc.	25-Nov-19/O	4.95			3.14
% Difference	%		Calc.	25-Nov-19/O	3.90			6.92
Ion Ratio	AS/CS		Calc.	25-Nov-19/O	0.925			0.871
Sodium Adsorption Ratio	-		Calc.	25-Nov-19/O	1.16			0.357
Conductivity (calc.)	µmho/cm		Calc.	25-Nov-19/O	487			293

Allerkin

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Caduceon Environmental Laboratories. Page 578 of 661



Final Report

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Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 04-Nov-19 DATE REPORTED: 03-Dec-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-35624

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

		[Client I.D.		GS-11	GS-12	GS-15	GS-20
			Sample I.D.		B19-35624-5	B19-35624-6	B19-35624-7	B19-35624-8
			Date Collect	ed	31-Oct-19	31-Oct-19	31-Oct-19	31-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	11-Nov-19/O	674	220	203	163
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Nov-19/O	631	213	204	105
TDS(ion sum calc.)	mg/L	1	Calc.	25-Nov-19/O	1262	404	387	273
Chloride	mg/L	0.5	SM4110C	23-Nov-19/O	254	88.5	86.5	62.2
Nitrite (N)	mg/L	0.05	SM4110C	23-Nov-19/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	23-Nov-19/O	2.61	< 0.05	< 0.05	
Sulphate	mg/L	1	SM4110C	23-Nov-19/O	137	30	28	
Calcium	mg/L	0.02	SM 3120	11-Nov-19/O	170	36.4	32.5	37.3
Magnesium	mg/L	0.02	SM 3120	11-Nov-19/O	59.3	30.9	29.9	16.9
Sodium	mg/L	0.2	SM 3120	11-Nov-19/O	221	77.2	75.3	44.4
Potassium	mg/L	0.1	SM 3120	11-Nov-19/O	33.2	12.3	12.1	
Aluminum	mg/L	0.01	SM 3120	08-Nov-19/O	0.09	0.02	0.03	
Aluminum (total)	mg/L	0.01	SM 3120	11-Nov-19/O	0.16	0.04	0.05	
Barium	mg/L	0.001	SM 3120	11-Nov-19/O	0.167	0.032	0.029	
Boron	mg/L	0.005	SM 3120	11-Nov-19/O	2.37	0.852	0.823	0.096
Beryllium	mg/L	0.0001	EPA 200.8	13-Nov-19/O	< 0.0001	< 0.0001	< 0.0001	
Cadmium	mg/L).000015	EPA 200.8	13-Nov-19/O	0.000038	< 0.000015	< 0.000015	
Chromium	mg/L	0.001	EPA 200.8	13-Nov-19/O	0.003	< 0.001	< 0.001	
Cobalt	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0025	0.0003	0.0003	
Copper	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0070	0.0016	0.0015	
Iron	mg/L	0.005	SM 3120	11-Nov-19/O	1.12	0.121	0.089	2.50
Lead	mg/L	0.00002	EPA 200.8	13-Nov-19/O	0.00017	0.00011	0.00010	
Manganese	mg/L	0.001	SM 3120	11-Nov-19/O	0.727	0.110	0.091	0.081
Mercury	mg/L	0.00002	SM 3112 B	07-Nov-19/O	< 0.00002	0.00002	< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0007	0.0003	0.0003	
Nickel	mg/L	0.0002	EPA 200.8	13-Nov-19/O	0.0112	0.0035	0.0036	
Silicon	mg/L	0.01	SM 3120	11-Nov-19/O	4.47	0.98	0.95	

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

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Caduceon Environmental Laboratories Page 579 of 661



Final Report

C.O.C.: G90772

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Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 04-Nov-19 DATE REPORTED: 03-Dec-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-35624

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		GS-11	GS-12	GS-15	GS-20
			Sample I.D.		B19-35624-5	B19-35624-6	B19-35624-7	B19-35624-8
			Date Collecte	ed	31-Oct-19	31-Oct-19	31-Oct-19	31-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Silver	mg/L	0.0001	EPA 200.8	13-Nov-19/O	< 0.0001	< 0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	11-Nov-19/O	1.08	0.296	0.274	
Sulphur	mg/L	0.1	SM 3120	11-Nov-19/O	42.1	9.8	9.4	
Thallium	mg/L	0.00005	EPA 200.8	13-Nov-19/O	< 0.00005	< 0.00005	< 0.00005	
Titanium	mg/L	0.005	SM 3120	11-Nov-19/O	0.010	< 0.005	< 0.005	
Vanadium	mg/L	0.0001	EPA 200.8	13-Nov-19/O	0.0025	0.0013	0.0015	
Zinc	mg/L	0.005	SM 3120	11-Nov-19/O	0.013	0.011	0.009	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	14-Nov-19/K	5.51	0.10	0.06	0.04
Ammonia (N)-unionized	mg/L	0.01	CALC	14-Nov-19/K	0.43	< 0.01	< 0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Nov-19/K	9.3	2.4	1.8	
Phosphorus-Total	mg/L	0.01	E3199A.1	07-Nov-19/K	0.03	0.08	0.05	0.12
Phenolics	mg/L	0.001	MOEE 3179	07-Nov-19/K	< 0.001	< 0.001	< 0.001	
BOD(5 day)	mg/L	3	SM 5210B	06-Nov-19/K	9	3	< 3	
COD	mg/L	5	SM 5220D	18-Nov-19/O	118	68	60	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	02-Dec-19/O	23.8	17.8	17.7	8.5
Anion Sum	meq/L		Calc.	25-Nov-19/O	22.8	7.39	7.10	
Cation Sum	meq/L		Calc.	25-Nov-19/O	24.3	8.05	7.68	
% Difference	%		Calc.	25-Nov-19/O	3.15	4.29	3.94	
Ion Ratio	AS/CS		Calc.	25-Nov-19/O	0.939	0.918	0.924	
Sodium Adsorption Ratio	-		Calc.	25-Nov-19/O	3.72	2.27	2.29	
Conductivity (calc.)	µmho/cm		Calc.	25-Nov-19/O	2057	756	727	

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

Caduceon Environmental Laboratories Page 580 of 661



Final Report

C.O.C.: G90772

Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 04-Nov-19 DATE REPORTED: 03-Dec-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-35624

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		GS-21	GS-22	
			Sample I.D.		B19-35624-9	B19-35624- 10	
			Date Collect	ed	31-Oct-19	31-Oct-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Hardness (as CaCO3)	mg/L	1	SM 3120	11-Nov-19/O	155	147	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Nov-19/O	95	94	
TDS(ion sum calc.)	mg/L	1	Calc.	25-Nov-19/O	240	235	
Chloride	mg/L	0.5	SM4110C	23-Nov-19/O	45.6	45.7	
Nitrite (N)	mg/L	0.05	SM4110C	23-Nov-19/O			
Nitrate (N)	mg/L	0.05	SM4110C	23-Nov-19/O			
Sulphate	mg/L	1	SM4110C	23-Nov-19/O			
Calcium	mg/L	0.02	SM 3120	11-Nov-19/O	35.5	33.9	
Magnesium	mg/L	0.02	SM 3120	11-Nov-19/O	16.2	15.2	
Sodium	mg/L	0.2	SM 3120	11-Nov-19/O	35.9	33.8	
Potassium	mg/L	0.1	SM 3120	11-Nov-19/O			
Aluminum	mg/L	0.01	SM 3120	08-Nov-19/O			
Aluminum (total)	mg/L	0.01	SM 3120	11-Nov-19/O			
Barium	mg/L	0.001	SM 3120	11-Nov-19/O			
Boron	mg/L	0.005	SM 3120	11-Nov-19/O	0.044	0.040	
Beryllium	mg/L	0.0001	EPA 200.8	13-Nov-19/O			
Cadmium	mg/L).000015	EPA 200.8	13-Nov-19/O			
Chromium	mg/L	0.001	EPA 200.8	13-Nov-19/O			
Cobalt	mg/L	0.0001	EPA 200.8	13-Nov-19/O			
Copper	mg/L	0.0001	EPA 200.8	13-Nov-19/O			
Iron	mg/L	0.005	SM 3120	11-Nov-19/O	1.76	1.67	
Lead	mg/L	0.00002	EPA 200.8	13-Nov-19/O			
Manganese	mg/L	0.001	SM 3120	11-Nov-19/O	0.029	0.028	
Mercury	mg/L	0.00002	SM 3112 B	07-Nov-19/O			
Molybdenum	mg/L	0.0001	EPA 200.8	13-Nov-19/O			
Nickel	mg/L	0.0002	EPA 200.8	13-Nov-19/O			
Silicon	ma/L	0.01	SM 3120	11-Nov-19/O			

R.L. = Reporting Limit

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Greg Clarkin, BSc., C. Chem Lab Manager - Ottawa District

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Final Report

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Report To:

Jp2g Consultants Inc 1150 Morrison Dr., Ottawa ON. K2H 8S9 Canada <u>Attention:</u> Jennifer Farrell

DATE RECEIVED: 04-Nov-19 DATE REPORTED: 03-Dec-19

SAMPLE MATRIX: Surface Water

REPORT No. B19-35624

Caduceon Environmental Laboratories 2378 Holly Lane Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244 JOB/PROJECT NO.: Clarence Rockland WDS P.O. NUMBER: Job No. 17-6021C

WATERWORKS NO.

			Client I.D.		GS-21	GS-22	
			Sample I.D.	Sample I.D.		B19-35624- 10	
			Date Collected		31-Oct-19	31-Oct-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	13-Nov-19/O			
Strontium	mg/L	0.001	SM 3120	11-Nov-19/O			
Sulphur	mg/L	0.1	SM 3120	11-Nov-19/O			
Thallium	mg/L	0.00005	EPA 200.8	13-Nov-19/O			
Titanium	mg/L	0.005	SM 3120	11-Nov-19/O			
Vanadium	mg/L	0.0001	EPA 200.8	13-Nov-19/O			
Zinc	mg/L	0.005	SM 3120	11-Nov-19/O			
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	14-Nov-19/K	0.04	0.04	
Ammonia (N)-unionized	mg/L	0.01	CALC	14-Nov-19/K	< 0.01	< 0.01	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	07-Nov-19/K			
Phosphorus-Total	mg/L	0.01	E3199A.1	07-Nov-19/K	0.08	0.09	
Phenolics	mg/L	0.001	MOEE 3179	07-Nov-19/K			
BOD(5 day)	mg/L	3	SM 5210B	06-Nov-19/K			
COD	mg/L	5	SM 5220D	18-Nov-19/O			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	02-Dec-19/O	6.5	6.6	
Anion Sum	meq/L		Calc.	25-Nov-19/O			
Cation Sum	meq/L		Calc.	25-Nov-19/O			
% Difference	%		Calc.	25-Nov-19/O			
Ion Ratio	AS/CS		Calc.	25-Nov-19/O			
Sodium Adsorption Ratio	-		Calc.	25-Nov-19/O			
Conductivity (calc.)	µmho/cm		Calc.	25-Nov-19/O			

Greg Clarkin , BSc., C. Chem Lab Manager - Ottawa District

R.L. = Reporting Limit Test methods may be modified from specified reference method unless indicated by an * Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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APPENDIX G

2019 Monitoring Wells Observations

G-1 Monitoring Well Completion Details
2019 Annual Environmental Monitoring Program for the Clarence-Rockland Waste Disposal Site
City of Clarence-Rockland, Ontario

				,			
Well ID	Main Screened Unit	Top of Casing Elevation (mASL)	Well Depth	Bottom of	Depth to Top	Length of Screened	Top of
			(m Top of pipe)	Well (mASL)	of Screen (m)	Interval (m)	Screen (mASL)
P1-91	Sandy material	55.15	3.53	51.62	2.01	1.52	53.14
P2-90	Sandy material	61.22	5.55	55.67	4.03	1.52	57.19
P3-90	Sandy material	65.66	Decommissioned				
P4-90	Sandy material	60.35	3.92	56.43	2.40	1.52	57.95
P5A-91	Sandy material	59.28	5.69	53.59	4.17	1.52	55.11
P5B-91	Sandy material	58.61	3.41	55.20	2.65	0.76	55.96
P6-91	Sandy material	55.67	3.58	52.09	2.06	1.52	53.61
P7-91	Sandy material	58.24	3.68	54.56	2.16	1.52	56.08
G8A-92	Silty clay	59.99	12.86	47.13	11.34	1.52	48.65
G8B-92	Silty clay	59.98	7.44	52.54	5.92	1.52	54.06
G8C-92	Sandy material	59.99	3.58	56.41	2.06	1.52	57.93
G9A-92	Silty clay	56.85	5.52	51.33	4.00	1.52	52.85
G9B-92	Silty clay	56.84	1.14	55.70	-0.38	1.52	57.22
G9C-92	Sandy material	56.56	2.97	53.59	1.45	1.52	55.11
G10S-92			Decommissioned				
G10D-92			Decommissioned				
G11-92			Decommissioned				
G12-92	sand & Silty clay	54.83	3.10	51.73	1.58	1.52	53.25
G13-92	Silty clay	54.77	3.12	51.65	1.60	1.52	53.17
G14-92	Silty clay	60.28	6.07	54.21	4.55	1.52	55.73
G15-92	Sandy material	57.38	12.84	44.54	11.32	1.52	46.06
G17-92	Silty clay	54.57	2.94	51.63	1.42	1.52	53.15
G18-92	Sandy material	56.28	2.71	53.57	1.19	1.52	55.09
G19-92	Sandy material	-	Destroyed			1.52	
G20-92	Sandy material	60.50	2.42	58.08	0.90	1.52	59.60
G21-94	Sandy material	56.00	2.52	53.48	1.61	0.91	54.39
G23-94	Sandy material	61.86	5.60	56.26	4.08	1.52	57.78
G24-94	Sandy material		Destroyed				
G25-94	Sandy material	62.18	6.03	56.15	4.51	1.52	57.67
G26-94	Sandy material	59.82	3.38	56.44	1.86	1.52	57.96
G27-97	Sandy material	54.52	1.81	52.71	1.05	0.76	53.47
G28-97	Sandy material	54.46	2.15	52.31	1.39	0.76	53.07
G29-97	Sandy material	61.80	6.61	55.19	5.09	1.52	56.71
G30-97	Silty clay	54.18	13.51	40.67	11.99	1.52	42.19
G31A-98	Bedrock	54.12	17.50	36.62	15.98	1.52	38.14
G31B-98	Till	54.15	21.05	33.10	19.53	1.52	34.62
G32A-98	Bedrock	61.52	28.66	32.86	27.14	1.52	34.38
G32B-98	Till	61.53	25.81	35.72	24.29	1.52	37.24
G33A-98	Bedrock	54.28	22.69	31.59	21.17	1.52	33.11
G33B-98	Till	54.36	18.75	35.61	17.23	1.52	37.13
G36-01	Sandy material	59.83	4.31	55.52	2.79	1.52	57.04
G37-01	Sandy material	61.36	6.12	55.24	4.60	1.52	56.76
G38-03	Sandy material	59.66	3.61	56.05	2.09	1.52	57.57
G39-07	Sandy material	50.66	2.04	48.62	0.83	1.21	49.83
G40-07	Sandy material	50.55	2.43	48.12	1.22	1.21	49.33
G41-10	Peat		Destroyed				
G42-10	Peat	48.55	3.08	45.47	1.56	1.52	46.99
G43-11	Silty clay	48.57	3.98	44.59	2.46	1.52	46.11

G-2 Water Levels 2019 Annual Environmental Monitoring Program for the

	•
Clarence-Rockland Waste Disposal Site	City of Clarence-Rockland Ontario

	Too of Casing	Water Level Belo	ow Top of Casing	Potentiometric	Elevation (mASL)	Water Level Belo	ow Top of Casing	Potentiometric	Elevation (mASL)	Water Level Belo	ow Top of Casing	Potentiometric	Elevation (mASL)	Water Level Belo	ow Top of Casing	Potentiometric	Elevation (mASL)
	TOP OF Casing	(mB	TOC)			(mB	TOC)			(mB	TOC)			(mB		1	
	Elevation	(iiib	100)			(iiib	100			(iiib	100			(iiib	100		
Well ID	(mASL)	16-Jun-16	22-Aug-16	16-Jun-16	22-Aug-16	1-May-17	20-Sep-17	1-May-17	20-Sep-17	April 2018	August 2018	April 2018	August 2018	April 2019	Sept 2019	April 2019	Sept 2019
P1-91	55.15	1.51	1.43	53.64	53.72	1.23	1 44	53.92	53.71	1.27	1 44	53.88	53.71	1.26	1.48	53.89	53.67
P2 00	61.22	4.42	4 59	56 70	56.64	2.40	4.44	67.72	56.91	2 70	4.55	67.44	56.67	2.51	4 70	57.71	56.52
F2-90	01.22	4.43	4.50	30.79	30.04	3.49	4.41	51.15	30.01	3.70	4.55	57.44	50.07	3.51	4.70	57.71	30.32
P3-90	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned
P4-90	60.35	2.76	2.97	57.59	57.38	1.32	2.83	59.03	57.52	1.92	2.97	58.43	57.38	1.23	3.08	59.12	57.27
P5A-91	59.28	3.07	3.35	56.21	55.93	2.03	3.15	57.25	56.13	2.22	3.27	57.06	56.01	2.13	3.46	57.15	55.82
P5B-91	58.61	2.37	2.73	56.24	55.88	1 41	2.54	57.20	56.07	1.59	2.67	57.02	55.94	1 49	2.85	57.12	55.76
D6 01	55.67	1 75	1.67	E2 02	54.00	1.25	1.72	54.42	52.04	1.25	1.74	64.22	E2 02	1.29	1.71	54.20	52.06
P7.04	50.04	1.75	1.07	55.32	54.00	1.20	1.75	54.42	55.34	1.55	0.01	55.74	55.35	1.20	1.71	59.30	55.05
P7-91	58.24	2.56	2.57	55.68	55.67	2.46	2.57	55.78	55.67	2.50	2.61	55.74	55.63	1.52	2.59	56.72	55.65
G8A-92	59.99	4.56	4.69	55.43	55.30	4.36	4.53	55.63	55.46	4.22	4.41	55.77	55.58	3.90	3.28	56.09	56.71
G8B-92	59.98	3.18	3.35	56.80	56.63	0.81	3.01	59.17	56.97	2.99	3.19	56.99	56.79	2.92	3.21	57.06	56.77
G8C-92	59 99	2.33	2.53	57.66	57.46	2.98	2.39	57.01	57.60	1.57	2.52	58.42	57.47	0.72	2.64	59.27	57.35
G94-92	56.85	1.92	2.27	54.93	54.58	1 79	0.76	55.06	56.09	0.82	2 10	56.03	54.75	1.40	1 97	55.45	54.88
G0R-02	56.84	0.41	0.45	56.43	56.30	0.52	1.07	56.32	54.87	1.56	2.10	55.28	54.55	1.40	2.30	55.35	54.54
C0C 02	56.56	2.27	2.21	54.20	54.25	1.20	2.26	55.32	54.07	1.00	0.70	53.20	55.77	0.00	0.92	55.55	55.74
090-92	30.30	2.21	2.21	34.29	34.33	1.35	2.20	33.17	34.30	1.00	0.79	34.70	55.11	0.90	0.02	33.00	33.74
G10S-92	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned
G10D-92	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned
G11-92	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned	Decomissioned
G12-92	54.83	2.37	Dry	52.46	Dry	1.61	2.24	53.22	52.59	2.01	2.30	52.82	52.53	1.70	Dry	53.13	
G13-92	54.77	2.10	Drv	52.67	Drv	1.20	2.10	53.57	52.67	1.53	2.06	53.24	52.71	0.96	Drv	53.81	
G14-92	60.28	4 78	1 90	55.50	55 38	4.12	4 73	56.16	55 55	4.24	4 78	56.04	55.50	4 18	Decomissioned	56.10	Decomissioned
G15-92	57.38	6.13	7.08	51.25	49.40	3.70	8.18	53.68	49.20	6.15	6.12	51.23	51.26	4.10	/ 87	52.81	52 51
C17.02	54.57	0.10	7.50 Dp/	51.25 E1.9E	43.40 Dov	0.00	0.10	52.69	43.20	1.41	1.02	52.16	57.64	4.07	4.07	52.01	52.07
G17-92	54.57	2.12	Diy	51.65	DIY	0.99	2.11	53.56	52.40	1.41	1.93	53.10	52.64	1.20	1.70	55.57	52.67
G18-92	56.28	1.98	1.99	54.30	54.29	1.51	1.95	54.77	54.33	1.56	1.96	54.72	54.32	1.52	1.95	54.76	54.33
G19-92	Destoyed	Destroyed	Destroyed	Destroyed	Destroyed												
G20-92	60.50	2.16	Dry	58.34	Dry	0.78	2.25	59.72	58.25	1.23	Dry	59.27	Dry	0.82	Dry	59.68	
G21-94	56.00	2.11	1.86	53.89	54.14	1.34	2.04	54.66	53.96	1.73	2.00	54 27	54.00	1.52	Drv	54 48	
G23-04	61.86	4.90	5.05	56.96	56.81	4 30	4.03	57.47	56.03	4.55	5.05	57.31	56.81	4.21	5.08	57.65	56 78
023-34	01.00	4.30	5.05	30.30	30.01	4.00	4.35	51.41	30.35	4.00	5.05	57.51	30.01	7.21	5.00	51.05	30.70
G24-94	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
G25-94	62.18	4.68	4.90	57.50	57.28	3.69	4.73	58.49	57.45	4.10	4.87	58.08	57.31	1.21	5.06	60.97	57.12
G26-94	59.82	1.96	2.30	57.86	57.52	0.70	2.12	59.12	57.70	1.26	2.24	58.56	57.58	0.53	2.05	59.29	57.77
G27-97	54 52	1.13	1.01	53.39	53.51	0.65	1.10	53.87	53.42	0.83	1.06	53.69	53.46	0.71	0.95	53.81	53.57
G28-97	54.46	1.54	Dn/	52.02	Dry	0.74	1.46	53.72	53.00	0.87	1.31	53 50	53.15	0.84	Dny	53.62	
020-07	61.90	1.04	1.0C	52.32	50.04	4.00	1.40	57.54	55.00	4.47	1.01	57.00	50.15	4.02	5.00	57.57	56.00
G29-97	01.00	4.02	4.90	50.96	30.04	4.20	4.04	57.54	56.90	4.47	4.92	57.33	00.00	4.23	5.00	57.57	06.00
G30-97	54.18	4.38	4.47	49.80	49.71	4.31	4.41	49.87	49.77	4.29	4.36	49.89	49.82	4.63	4.98	49.55	49.20
G31A-98	54.12	5.02	5.20	49.10	48.92	4.69	5.03	49.43	49.09	4.82	4.94	49.30	49.18	4.58	5.30	49.54	48.82
G31B-98	54.15	4.96	5.13	49.19	49.02	4.64	5.07	49.51	49.08	4.85	4.98	49.30	49.17	4.57	2.48	49.58	51.67
G324-08	61.52	5 38	5.63	56.14	55.80	5.04	5 38	56.48	56.14	4.54	4 70	56.08	56 73	4.20	3 30	57.32	58.22
C22P.09	61.52	5.00	5.05	56.14	55.05	5.04	5.50	56.12	56.07	4.59	4.13	56.04	56.01	Not monourod	2.49	01.02	59.05
0320-90	01.33	5.09	5.03	30.14	33.00	3.40	5.00	30.13	30.07	4.05	4.02	30.94	30.91	Not measured	5.40	17.10	30.03
G33A-98	54.28	5.10	5.34	49.18	48.94	4.82	5.23	49.46	49.05	5.00	5.11	49.28	49.17	6.80	5.09	47.48	49.19
G33B-98	54.36	5.18	5.42	49.18	48.94	4.91	5.30	49.45	49.06	5.06	5.20	49.30	49.16	6.70	5.18	47.66	49.18
G36-01	59.83	1.75	1.95	58.08	57.88	0.79	1.74	59.04	58.09	0.95	1.93	58.88	57.90	0.69	2.07	59.14	57.76
G37-01	61.36	2.84	3.16	58.52	58.20	1.82	2.91	59.54	58.45	2.09	3.09	59.27	58.27	1.92	3.19	59.44	58.17
G38-03	59.66	1.85	2.08	57.81	57.58	0.68	1 91	58.98	57.75	1 10	2.04	58.56	57.62	0.35	2 20	59.31	57.46
000-03	50.00	1.00	2.00	40.07	10.00	0.00	1.01	10.00	40.00	1.10	2.07	10.00	10.02	0.00	2.20	40.40	10.00
G39-07	50.66	1.29	1.46	49.37	49.20	1.82	1.37	48.84	49.29	1.35	1.27	49.31	49.39	1.26	1.36	49.40	49.30
G40-07	50.55	1.49	1.55	49.06	49.00	1.32	1.46	49.23	49.09	1.31	1.46	49.24	49.09	1.32	1.50	49.23	49.05
G41-10	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
G42-10	48.55	1.46	1.43	47.09	47.12	0.88	1.47	47.67	47.08	1.14	1.52	47.41	47.03	0.85	1.44	47.70	47.11
G43-11	48.57	1.62	1.70	46.95	46.87	1.05	1 47	47.52	47.10	1.12	1.70	47.45	46.87	1.02	Drv	47.55	
0.0	10.01	1.02	1.10	10.00	10.01	1.00		11.02		1.14	1.10		10.01	1.02	5.,		

APPENDIX H

Groundwater Concentrations

H-1: 2019 Data H-2: VOC's H-3: Historical Data (PDF Only)

APPENDIX H-1

2019 Data

			_	Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Leachate Impacted	Leachate Impacted	Leachate Impacted	Leachate Impacted
		(2) (1)	(4) (3)	P1-91	P1-91	P5B-91	P5B-91
		ODWQS(169	ODWQS-	25-April-2019	26-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	P1-91	P1-91	P5B-91	P5B-91
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l		500	<u>1310</u>	<u>1140</u>	<u>745</u>	<u>1170</u>
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			1.1	1.15	75.9	83.7
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			< 3	6	< 3	46
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			212	207	115	234
Chloride	mg/l		250	216	212	33.2	105
Conductivity	µmho/c			2649	2462	1562	2234
Dissolved Organic Carbon	mg/l		5	<u>84.3</u>	<u>74.3</u>	<u>45.3</u>	<u>54.9</u>
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>1300</u>	<u>1100</u>	<u>426</u>	<u>660</u>
Nitrate as N	mg/l	10		< 0.05	< 0.05	0.08	< 0.5
Nitrite as N	mg/l	1		< 0.05	< 0.05	<0.5	< 0.5
Nitrogen, Total Kjeldahl	mg/l			6	6.2	80.8	101
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.105	0.091	2.41	1.8
Phosphorus	mg/l			0.17	0.13	10	2.6
Sulphate	mg/l		500 ⁽⁶⁾	1	< 10	6	
Total Dissolved Solids	mg/l		500	<u>1717</u>	<u>1559</u>	<u>913</u>	<u>1334</u>
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.13	0.11	0.07	0.09
Barium, dissolved	mg/l	1		0.264	0.225	0.306	0.422
Beryllium, dissolved	mg/l			< 0.0001	< 0.0001	< 0.0001	< 0.0001
Boron, dissolved	mg/l	5		1.65	1.76	0.902	1.41
Cadmium, dissolved	mg/l	0.005		< 0.000015	< 0.000029	< 0.000015	< 0.000029
Calcium, dissolved	mg/l			338	275	132	207
Chromium, dissolved	mg/l	0.05		0.003	0.003	0.003	0.003

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Leachate Impacted	Leachate Impacted	Leachate Impacted	Leachate Impacted
		(2) (1)	(4) (3)	P1-91	P1-91	P5B-91	P5B-91
		ODWQS(169	ODWQS-	25-April-2019	26-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	P1-91	P1-91	P5B-91	P5B-91
Cobalt, dissolved	mg/l			0.0026	0.0022	0.0064	0.005
Copper, dissolved	mg/l		1	0.0037	0.0013	0.0022	0.0008
Iron, dissolved	mg/l		0.3	<u>25.9</u>	<u>25.3</u>	<u>40.2</u>	<u>47.9</u>
Lead, dissolved	mg/l	0.01		0.00016	< 0.00009	0.00019	< 0.00009
Magnesium, dissolved	mg/l			110	101	23.3	34.6
Manganese, dissolved	mg/l		0.05	<u>4.91</u>	<u>4.29</u>	<u>1.83</u>	<u>3.52</u>
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum, dissolved	mg/l			0.0001	< 0.0002	0.0004	0.0004
Nickel, dissolved	mg/l			0.0098	0.01	0.0075	< 0.01
Potassium, dissolved	mg/l			15	16.1	75.6	98.7
Silicon, dissolved	mg/l			9.75	11.9	5.76	9.87
Silver, dissolved	mg/l			< 0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium, dissolved	mg/l		200 (7)	<u>217</u>	<u>238</u>	55.7	77.1
Strontium, dissolved	mg/l			2.1	1.42	0.823	1.27
Sulfur, dissolved	mg/l			6.6	5.3	3.1	4.2
Thallium, dissolved	mg/l			< 0.00005	< 0.00005	< 0.00005	< 0.00005
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			< 0.005	< 0.005	< 0.005	< 0.005
Vanadium, dissolved	mg/l			0.0101	0.0074	0.0064	0.0066
Zinc, dissolved	mg/l		5	0005	< 0.005	0.016	< 0.005
Phenols							
Phenolics, Total Recoverable	mg/l			< 0.002	< 0.002	< 0.002	< 0.002
Field Measurements							
Conductivity (Field)	uS/cm			3160	2480	1883	1114
Temperature (Field)	deg c		15	7.1	12.5	6.8	14.5
pH (Field)	-			6.0	7.2	6.0	7.5

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Leachate Impacted	Leachate Impacted	Moderate Impact	
		(2) (1)	(4) (3)	P6-91	P6-91	G20-92	G20-92
		ODWQS(169	ODWQS-	25-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	P6-91	P6-91	G20-92	G20-92
General Chemistry							DRY
Alkalinity (Total as CaCO3)	mg/l		500	<u>1980</u>	<u>2400</u>	358	
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			83.8	275	3.19	
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			13	18		
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			404	550		
Chloride	mg/l		250	<u>453</u>	<u>555</u>	14.9	
Conductivity	µmho/c			4120	5306		
Dissolved Organic Carbon	mg/l		5	<u>125</u>	<u>145</u>	<u>22.5</u>	
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>1490</u>	<u>1030</u>	<u>383</u>	
Nitrate as N	mg/l	10		< 0.05	< 1		
Nitrite as N	mg/l	1		< 0.05	< 1		
Nitrogen, Total Kjeldahl	mg/l			105	319		
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.209	0.315	1.17	
Phosphorus	mg/l			0.3	0.37	2	
Sulphate	mg/l		500 ⁽⁶⁾	14	< 30		
Total Dissolved Solids	mg/l		500	<u>2776</u>	<u>3407</u>	465	
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.12	0.11		
Barium, dissolved	mg/l	1		0.732	0.996		
Beryllium, dissolved	mg/l			< 0.0001	0.0002		
Boron, dissolved	mg/l	5		4.5	10.4	0.663	
Cadmium, dissolved	mg/l	0.005		< 0.000015	< 0.000059		
Calcium, dissolved	mg/l			405	274	124	
Chromium, dissolved	mg/l	0.05		0.011	0.021		

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Leachate Impacted	Leachate Impacted	Moderate Impact	
		(2) (1)	(4) (3)	P6-91	P6-91	G20-92	G20-92
		ODWQS(169	ODWQS-	25-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	P6-91	P6-91	G20-92	G20-92
Cobalt, dissolved	mg/l			0.0062	0.0097	0.0035	
Copper, dissolved	mg/l		1	0.0054	0.0031		
Iron, dissolved	mg/l		0.3	<u>5.5</u>	<u>8.91</u>	0.034	
Lead, dissolved	mg/l	0.01		0.00013	< 0.0002		
Magnesium, dissolved	mg/l			115	82.8	17.7	
Manganese, dissolved	mg/l		0.05	<u>13.3</u>	<u>5.71</u>	<u>0.48</u>	
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002	< 0.00002		
Molybdenum, dissolved	mg/l			0.0005	0.0007		
Nickel, dissolved	mg/l			0.0134	0.01	0.0017	
Potassium, dissolved	mg/l			68.8	192		
Silicon, dissolved	mg/l			10.9	11.7		
Silver, dissolved	mg/l			< 0.0001	< 0.0002		
Sodium, dissolved	mg/l		200 (7)	<u>408</u>	<u>496</u>	31	
Strontium, dissolved	mg/l			2.32	2.28		
Sulfur, dissolved	mg/l			8.6	7.5		
Thallium, dissolved	mg/l			< 0.00005	< 0.00005		
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			0.01	0.018		
Vanadium, dissolved	mg/l			0.02	0.0483	0.0006	
Zinc, dissolved	mg/l		5	0.009	< 0.005		
Phenols							
Phenolics, Total Recoverable	mg/l			0.003	0.007		
Field Measurements							
Conductivity (Field)	uS/cm			4950	3999	930	
Temperature (Field)	deg c		15	7.5	14.75	2.9	
pH (Field)	-			6.1	7.3	7.9	

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G27-97	G27-97	G28-97	G28-97
		ODWQS(169	ODWQS-	25-April-2019	26-Sept-2019	25-April-2019	25-April-2019
Parameter	Unit	/03)-Health	AO	27-97	27-97	28-97	28-97
General Chemistry							DRY
Alkalinity (Total as CaCO3)	mg/l		500	<u>522</u>	<u>502</u>	300	
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			1.11	0.09	0.09	
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l						
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l						
Chloride	mg/l		250	94	95	56.5	
Conductivity	µmho/c						
Dissolved Organic Carbon	mg/l		5	<u>24.5</u>	<u>16.8</u>	<u>26.5</u>	
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>665</u>	<u>717</u>	<u>259</u>	
Nitrate as N	mg/l	10					
Nitrite as N	mg/l	1					
Nitrogen, Total Kjeldahl	mg/l						
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.156	0.16	0.024	
Phosphorus	mg/l			0.3	0.21	0.08	
Sulphate	mg/l		500 ⁽⁶⁾				
Total Dissolved Solids	mg/l		500	<u>844</u>	<u>924</u>	423	
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1					
Barium, dissolved	mg/l	1					
Beryllium, dissolved	mg/l						
Boron, dissolved	mg/l	5		0.479	0.804	1.16	
Cadmium, dissolved	mg/l	0.005					
Calcium, dissolved	mg/l			180		55.6	
Chromium, dissolved	mg/l	0.05					

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G27-97	G27-97	G28-97	G28-97
		ODWQS(169	ODWQS-	25-April-2019	26-Sept-2019	25-April-2019	25-April-2019
Parameter	Unit	/03)-Health	AO	27-97	27-97	28-97	28-97
Cobalt, dissolved	mg/l			0.0015		0.002	
Copper, dissolved	mg/l		1				
Iron, dissolved	mg/l		0.3	<u>0.468</u>	0.033	0.182	
Lead, dissolved	mg/l	0.01					
Magnesium, dissolved	mg/l			52.4		29.3	
Manganese, dissolved	mg/l		0.05	<u>0.428</u>	<u>0.056</u>	<u>0.137</u>	
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001					
Molybdenum, dissolved	mg/l						
Nickel, dissolved	mg/l			0.0061		0.0061	
Potassium, dissolved	mg/l						
Silicon, dissolved	mg/l						
Silver, dissolved	mg/l						
Sodium, dissolved	mg/l		200 (7)	71.5	112	84.5	
Strontium, dissolved	mg/l						
Sulfur, dissolved	mg/l						
Thallium, dissolved	mg/l						
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l						
Vanadium, dissolved	mg/l			0.0016		0.0063	
Zinc, dissolved	mg/l		5				
Phenols							
Phenolics, Total Recoverable	mg/l						
Field Measurements							
Conductivity (Field)	uS/cm			1468	978	768	
Temperature (Field)	deg c		15	4.3	16.7	3.4	
pH (Field)	-			7.9	7.8	7.3	

				Sandy Unit	Sandy Unit	Bedrock	Bedrock
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G29-97	G29-97	G31A-98	G31A-98
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	29-97	29-97		
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l		500	454	401	380	409
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.05	0.28	0.59	1.02
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			< 3			
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			84			
Chloride	mg/l		250	20.3	4.4	93.9	99.9
Conductivity	µmho/c			978			
Dissolved Organic Carbon	mg/l		5	<u>19.9</u>	<u>12</u>	<u>6.2</u>	<u>7</u>
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>496</u>	<u>440</u>	8	11
Nitrate as N	mg/l	10		0.33			
Nitrite as N	mg/l	1		< 0.05			
Nitrogen, Total Kjeldahl	mg/l			1.4			
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.041	4.13	1.18	6.18
Phosphorus	mg/l			13.9	7.37	1.33	19.9
Sulphate	mg/l		500 ⁽⁶⁾	63			
Total Dissolved Solids	mg/l		500	<u>570</u>	456	<u>569</u>	<u>612</u>
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.07			
Barium, dissolved	mg/l	1		0.078			
Beryllium, dissolved	mg/l			< 0.0001			
Boron, dissolved	mg/l	5		0.062	0.094	0.907	1.02
Cadmium, dissolved	mg/l	0.005		0.000139			
Calcium, dissolved	mg/l			136		1	
Chromium, dissolved	mg/l	0.05		< 0.001			

				Sandy Unit	Sandy Unit	Bedrock	Bedrock
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G29-97	G29-97	G31A-98	G31A-98
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	29-97	29-97		
Cobalt, dissolved	mg/l			0.0067		< 0.0001	
Copper, dissolved	mg/l		1	0.0065			
Iron, dissolved	mg/l		0.3	< 0.005	< 0.005	0.007	0.029
Lead, dissolved	mg/l	0.01		0.00004			
Magnesium, dissolved	mg/l			38		1.37	
Manganese, dissolved	mg/l		0.05	<u>3.48</u>	<u>3.47</u>	0.004	0.005
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002			
Molybdenum, dissolved	mg/l			0.0003			
Nickel, dissolved	mg/l			0.0092		< 0.0002	
Potassium, dissolved	mg/l			2.2			
Silicon, dissolved	mg/l			6.15			
Silver, dissolved	mg/l			< 0.0001			
Sodium, dissolved	mg/l		200 (7)	34.9	34.1	<u>238</u>	<u>257</u>
Strontium, dissolved	mg/l			0.912			
Sulfur, dissolved	mg/l			17.5			
Thallium, dissolved	mg/l			< 0.00005			
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			< 0.005			
Vanadium, dissolved	mg/l			0.0013		0.0002	
Zinc, dissolved	mg/l		5	< 0.005			
Phenols							
Phenolics, Total Recoverable	mg/l			< 0.002			
Field Measurements							
Conductivity (Field)	uS/cm			1051	787	1126	907
Temperature (Field)	deg c		15	7.8	10.2	8.0	9.9
pH (Field)	-			6.1	7.4	8.6	9.3

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G40-07	G40-07	G36-01	G36-01
		ODWQS(169	ODWQS-	25-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	40-07	40-07	36-01	36-01
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l		500	153	257	288	263
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.1	0.13	0.11	0.07
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l						< 3
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l						65
Chloride	mg/l		250	31.7	106	37.2	27.2
Conductivity	µmho/c						959
Dissolved Organic Carbon	mg/l		5	<u>28.3</u>	<u>16.1</u>	<u>30.2</u>	<u>24</u>
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>108</u>	<u>258</u>	<u>688</u>	<u>500</u>
Nitrate as N	mg/l	10					10.7
Nitrite as N	mg/l	1					0.09
Nitrogen, Total Kjeldahl	mg/l						2.4
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.191	0.127	0.037	0.04
Phosphorus	mg/l			0.64	0.17	0.05	0.05
Sulphate	mg/l		500 ⁽⁶⁾				176
Total Dissolved Solids	mg/l		500	227	435	<u>774</u>	<u>579</u>
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1					0.007
Barium, dissolved	mg/l	1					0.057
Beryllium, dissolved	mg/l						< 0.0001
Boron, dissolved	mg/l	5		0.293	0.887	0.104	0.116
Cadmium, dissolved	mg/l	0.005					0.000095
Calcium, dissolved	mg/l			22.8		205	150
Chromium, dissolved	mg/l	0.05					< 0.001

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G40-07	G40-07	G36-01	G36-01
		ODWQS(169	ODWQS-	25-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	40-07	40-07	36-01	36-01
Cobalt, dissolved	mg/l			0.001		0.0024	0.0017
Copper, dissolved	mg/l		1				0.009
Iron, dissolved	mg/l		0.3	<u>0.923</u>	<u>3.6</u>	0.006	< 0.005
Lead, dissolved	mg/l	0.01					< 0.00002
Magnesium, dissolved	mg/l			12.4		42.6	30.5
Manganese, dissolved	mg/l		0.05	<u>0.354</u>	<u>0.793</u>	<u>10.8</u>	<u>4.72</u>
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001					< 0.00002
Molybdenum, dissolved	mg/l						0.0012
Nickel, dissolved	mg/l			0.0039		0.0066	< 0.01
Potassium, dissolved	mg/l						1.7
Silicon, dissolved	mg/l						3.57
Silver, dissolved	mg/l						< 0.0001
Sodium, dissolved	mg/l		200 (7)	52.9	76.8	24.5	30.8
Strontium, dissolved	mg/l						1.09
Sulfur, dissolved	mg/l						49.4
Thallium, dissolved	mg/l						< 0.00005
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l						< 0.0005
Vanadium, dissolved	mg/l			0.0077		0.0007	0.0007
Zinc, dissolved	mg/l		5				< 0.005
Phenols							
Phenolics, Total Recoverable	mg/l						< 0.002
Field Measurements							
Conductivity (Field)	uS/cm			485	761	1458	936
Temperature (Field)	deg c		15	2	14.6	4.1	12.7
pH (Field)	-			7.8	7.35	6.6	6.95

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G38-03	G38-03	G39-07	G39-07
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	38-03	38-03	39-07	39-07
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l		500	150	<u>503</u>	297	258
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.18	0.5	0.86	2
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l				< 3	4	8
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l				59	125	164
Chloride	mg/l		250	7.6	29.2	82.2	104
Conductivity	µmho/c				1058	840	827
Dissolved Organic Carbon	mg/l		5	<u>8.9</u>	<u>21.2</u>	<u>21.7</u>	<u>15.7</u>
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>182</u>	<u>577</u>	<u>279</u>	<u>249</u>
Nitrate as N	mg/l	10			< 0.05	0.09	< 0.05
Nitrite as N	mg/l	1			< 0.05	< 0.05	< 0.05
Nitrogen, Total Kjeldahl	mg/l				1.3	3.5	4.4
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.331	0.659	0.183	0.224
Phosphorus	mg/l			0.27	0.71	0.46	0.33
Sulphate	mg/l		500 ⁽⁶⁾		5	24	3
Total Dissolved Solids	mg/l		500	232	<u>595</u>	456	437
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1			0.1	0.04	0.03
Barium, dissolved	mg/l	1			0.019	0.041	0.055
Beryllium, dissolved	mg/l				< 0.0001	< 0.0001	< 0.0001
Boron, dissolved	mg/l	5		0.05	0.142	0.737	0.92
Cadmium, dissolved	mg/l	0.005			< 0.000015	< 0.000015	< 0.000015
Calcium, dissolved	mg/l			60.2	193	58.6	55.7
Chromium, dissolved	mg/l	0.05			0.002	< 0.001	0.001

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G38-03	G38-03	G39-07	G39-07
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	38-03	38-03	39-07	39-07
Cobalt, dissolved	mg/l			0.0024	0.0082	0.0003	0.0002
Copper, dissolved	mg/l		1		0.0003	0.0024	0.0008
Iron, dissolved	mg/l		0.3	13.8	<u>54.2</u>	<u>0.761</u>	<u>0.788</u>
Lead, dissolved	mg/l	0.01			< 0.00002	0.00023	< 0.00002
Magnesium, dissolved	mg/l			7.76	22.9	32.3	26.6
Manganese, dissolved	mg/l		0.05	<u>1.98</u>	<u>5.36</u>	<u>0.315</u>	<u>0.334</u>
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001			< 0.00002	< 0.00002	< 0.00002
Molybdenum, dissolved	mg/l				0.0003	0.0002	0.0001
Nickel, dissolved	mg/l			0.0007	< 0.01	0.0035	< 0.01
Potassium, dissolved	mg/l				3.9	9.6	15.3
Silicon, dissolved	mg/l				7.01	1.36	1.96
Silver, dissolved	mg/l				< 0.0001	< 0.0001	< 0.0001
Sodium, dissolved	mg/l		200 (7)	12.9	33.2	75	74
Strontium, dissolved	mg/l				0.763	0.413	0.436
Sulfur, dissolved	mg/l					7.6	2.1
Thallium, dissolved	mg/l				< 0.00005	< 0.00005	< 0.00005
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l				0.006	< 0.005	< 0.005
Vanadium, dissolved	mg/l			0.0024	0.0056	0.0006	0.0013
Zinc, dissolved	mg/l		5		< 0.005	0.005	< 0.005
Phenols							
Phenolics, Total Recoverable	mg/l				< 0.002	< 0.002	< 0.002
Field Measurements							
Conductivity (Field)	uS/cm			480	515	916	751
Temperature (Field)	deg c		15	4.4	12.9	5.6	17.5
pH (Field)	-			7.2	6.9	8.0	7.31

				Silty Clay Unit	Silty Clay Unit	Silty Clay Unit	Silty Clay Unit
				Moderate Impact	Moderate Impact	Moderate Impact	
		(2) (1)	(4) (3)	G42-10	G42-10	G43-11	G43-11
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	G42-11	G42-11	G43-11	G43-11
General Chemistry							DRY
Alkalinity (Total as CaCO3)	mg/l		500	193	324	278	
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.46	2.25	4.08	
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			< 3	9	< 3	
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			155	129	500	
Chloride	mg/l		250	172	210	35.7	
Conductivity	µmho/c			933	1265	641	
Dissolved Organic Carbon	mg/l		5	<u>45.8</u>	<u>32.5</u>	<u>47.8</u>	
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>196</u>	<u>290</u>	<u>172</u>	
Nitrate as N	mg/l	10		0.12	< 0.05	0.07	
Nitrite as N	mg/l	1		< 0.05	< 0.05	< 0.05	
Nitrogen, Total Kjeldahl	mg/l			3.4	4.5	19.2	
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.134	0.134	3.98	
Phosphorus	mg/l			0.36	0.19	14.6	
Sulphate	mg/l		500 ⁽⁶⁾	25	9	6	
Total Dissolved Solids	mg/l		500	496	<u>691</u>	353	
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.36	0.1	0.14	
Barium, dissolved	mg/l	1		0.039	0.036	0.028	
Beryllium, dissolved	mg/l			< 0.001	< 0.0001	< 0.0001	
Boron, dissolved	mg/l	5		0.116	0.362	0.276	
Cadmium, dissolved	mg/l	0.005		0.000085	< 0.000015	< 0.000015	
Calcium, dissolved	mg/l			41.1	63.2	42	
Chromium, dissolved	mg/l	0.05		0.003	0.002	0.001	

				Silty Clay Unit	Silty Clay Unit	Silty Clay Unit	Silty Clay Unit
				Moderate Impact	Moderate Impact	Moderate Impact	
		(2) (1)	(4) (3)	G42-10	G42-10	G43-11	G43-11
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	G42-11	G42-11	G43-11	G43-11
Cobalt, dissolved	mg/l			0.0016	0.001	0.0007	
Copper, dissolved	mg/l		1	0.0087	0.0018	0.0029	
Iron, dissolved	mg/l		0.3	<u>0.883</u>	<u>5.38</u>	<u>1.53</u>	
Lead, dissolved	mg/l	0.01		0.00077	0.00009	0.00031	
Magnesium, dissolved	mg/l			22.7	32.2	16.4	
Manganese, dissolved	mg/l		0.05	<u>0.436</u>	<u>0.825</u>	<u>0.217</u>	
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002	< 0.00002	< 0.00002	
Molybdenum, dissolved	mg/l			0.0005	0.0005	0.0002	
Nickel, dissolved	mg/l			0.0074	< 0.01	0.0041	
Potassium, dissolved	mg/l			2.7	7.4	5.2	
Silicon, dissolved	mg/l			3.87	9.31	6.51	
Silver, dissolved	mg/l			< 0.0001	< 0.0001	< 0.0001	
Sodium, dissolved	mg/l		200 (7)	114	166	73.5	
Strontium, dissolved	mg/l			0.201	0.284	0.209	
Sulfur, dissolved	mg/l			7.1	4.4	2.8	
Thallium, dissolved	mg/l			< 0.00005	< 0.00005	< 0.00005	
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			0.016	0.007	< 0.005	
Vanadium, dissolved	mg/l			0.0035	0.004	0.0018	
Zinc, dissolved	mg/l		5	0.007	< 0.005	0.005	
Phenols							
Phenolics, Total Recoverable	mg/l			< 0.002	< 0.002	< 0.002	
Field Measurements							
Conductivity (Field)	uS/cm			960	1126	862	
Temperature (Field)	deg c		15	7.1	13.3	5.5	
pH (Field)	-			6.5	7.3	7.3	

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Mild Impact	
		(2) (1)	(4) (3)	G37-01	G37-01	G21-94	G21-94
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	37-01	37-01	G21-94	G21-94
General Chemistry							DRY
Alkalinity (Total as CaCO3)	mg/l		500	36	46	109	
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.04	0.03	0.06	
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			< 3			
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			78			
Chloride	mg/l		250	178	<u>361</u>	8.9	
Conductivity	µmho/c			751			
Dissolved Organic Carbon	mg/l		5	3.8	1.1 3.3		
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>136</u>	<u>250</u> 60		
Nitrate as N	mg/l	10		2.02			
Nitrite as N	mg/l	1		< 0.05			
Nitrogen, Total Kjeldahl	mg/l			0.3			
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.101	0.09	1.48	
Phosphorus	mg/l			0.14	0.07	1.75	
Sulphate	mg/l		500 ⁽⁶⁾	38			
Total Dissolved Solids	mg/l		500	379	<u>687</u>	140	
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.02			
Barium, dissolved	mg/l	1		0.061			
Beryllium, dissolved	mg/l			< 0.0001			
Boron, dissolved	mg/l	5		0.008	0.008	< 0.005	
Cadmium, dissolved	mg/l	0.005		0.000084			
Calcium, dissolved	mg/l			33.9		21.7	
Chromium, dissolved	mg/l	0.05		0.001			

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Moderate Impact	Moderate Impact	Mild Impact	
		(2) (1)	(4) (3)	G37-01	G37-01	G21-94	G21-94
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	37-01	37-01	G21-94	G21-94
Cobalt dissolved	ma/l			0.0002		< 0.0001	
Copper dissolved	mg/l		1	0.0002		0.0001	
Iron, dissolved	mg/l		0.3	< 0.005	< 0.005	0.013	
Lead, dissolved	mg/l	0.01		0.00003			
Magnesium, dissolved	mg/l			12.4		1.4	
Manganese, dissolved	mg/l		0.05	0.021	0.034	< 0.001	
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002			
Molybdenum, dissolved	mg/l			< 0.0001			
Nickel, dissolved	mg/l			0.0043		0.0006	
Potassium, dissolved	mg/l			0.6			
Silicon, dissolved	mg/l			4.65			
Silver, dissolved	mg/l			< 0.0001			
Sodium, dissolved	mg/l		200 (7)	94.3	164	37.7	
Strontium, dissolved	mg/l			0.419			
Sulfur, dissolved	mg/l			10.5			
Thallium, dissolved	mg/l			< 0.00005			
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			< 0.005			
Vanadium, dissolved	mg/l			0.0001		0.0001	
Zinc, dissolved	mg/l		5	< 0.005			
Phenols							
Phenolics, Total Recoverable	mg/l			< 0.002			
Field Measurements							
Conductivity (Field)	uS/cm			767	1265	297	
Temperature (Field)	deg c		15	6.5	11.1	5.5	
pH (Field)	-			6.3	7.77	7.7	

				Sandy Unit	Sandy Unit	Silty Clay Unit	Silty Clay Unit
				Mild Impact	Mild Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G8C-92	G8C-92	G17-92	G17-92
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	8C-92	8C-92	G17-92	G17-92
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l		500	157	183	147	233
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.1	0.22	0.13	0.29
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l						
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l						
Chloride	mg/l		250	2.1	16.4	33.4	24.7
Conductivity	µmho/c						
Dissolved Organic Carbon	mg/l		5	0.3	4.4	<u>12.7</u>	<u>10.3</u>
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>177</u>	<u>258</u> <u>165</u>		<u>298</u>
Nitrate as N	mg/l	10					
Nitrite as N	mg/l	1					
Nitrogen, Total Kjeldahl	mg/l						
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			1.03	2.5	0.141	0.357
Phosphorus	mg/l			1.63	4.47	0.48	0.68
Sulphate	mg/l		500 ⁽⁶⁾				
Total Dissolved Solids	mg/l		500	167	235	215	320
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1					
Barium, dissolved	mg/l	1					
Beryllium, dissolved	mg/l						
Boron, dissolved	mg/l	5		0.013	0.027	0.027	0.045
Cadmium, dissolved	mg/l	0.005					
Calcium, dissolved	mg/l			51		48.9	
Chromium, dissolved	mg/l	0.05					

				Sandy Unit	Sandy Unit	Silty Clay Unit	Silty Clay Unit
				Mild Impact	Mild Impact	Moderate Impact	Moderate Impact
		(2) (1)	(4) (3)	G8C-92	G8C-92	G17-92	G17-92
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	8C-92	8C-92	G17-92	G17-92
Cobalt, dissolved	mg/l			0.0001		0.0007	
Copper, dissolved	mg/l		1				
Iron, dissolved	mg/l		0.3	< 0.005	< 0.005	<u>0.62</u>	<u>0.736</u>
Lead, dissolved	mg/l	0.01					
Magnesium, dissolved	mg/l			12		10.3	
Manganese, dissolved	mg/l		0.05	< 0.001	0.001	<u>0.991</u>	<u>0.717</u>
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001					
Molybdenum, dissolved	mg/l						
Nickel, dissolved	mg/l			0.0006		0.0011	
Potassium, dissolved	mg/l						
Silicon, dissolved	mg/l						
Silver, dissolved	mg/l						
Sodium, dissolved	mg/l		200 (7)	3.2	4.6	15.4	16.3
Strontium, dissolved	mg/l						
Sulfur, dissolved	mg/l						
Thallium, dissolved	mg/l						
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l						
Vanadium, dissolved	mg/l			0.0003		0.0004	
Zinc, dissolved	mg/l		5				
Phenols							
Phenolics, Total Recoverable	mg/l						
Field Measurements							
Conductivity (Field)	uS/cm			360	412	429	528
Temperature (Field)	deg c		15	3.9	13.3	5.9	17.2
pH (Field)	-			6.9	7.4	7.9	7.52

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Mild Impact	Mild Impact	Mild Impact	Mild Impact
		(2) (1)	(4) (3)	P2-90	P2-90	P4-90	P4-90
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	P2-90	P2-90	P4-90	P4-90
General Chemistry							DRY
Alkalinity (Total as CaCO3)	mg/l		500	104	93	80	
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.08	0.16	0.06	
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l				< 3	< 3	
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l				45	24	
Chloride	mg/l		250	4.8	< 0.5	2.8	
Conductivity	µmho/c				200	192	
Dissolved Organic Carbon	mg/l		5	4.4	3.5	<u>13.2</u>	
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	18	15	91	
Nitrate as N	mg/l	10			3.54	0.43	
Nitrite as N	mg/l	1			< 0.05	< 0.05	
Nitrogen, Total Kjeldahl	mg/l				0.7	0.8	
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			3.09	3.71	0.186	
Phosphorus	mg/l			9.3	5.84	0.35	
Sulphate	mg/l		500 ⁽⁶⁾		< 1	9	
Total Dissolved Solids	mg/l		500	128	112	98	
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1			< 0.01	0.02	
Barium, dissolved	mg/l	1			0.008	0.019	
Beryllium, dissolved	mg/l				< 0.0001	< 0.0001	
Boron, dissolved	mg/l	5		< 0.005	< 0.005	0.013	
Cadmium, dissolved	mg/l	0.005			< 0.000015	< 0.000015	
Calcium, dissolved	mg/l			4.41	3.68	29.4	
Chromium, dissolved	mg/l	0.05			0.007	< 0.001	

				Sandy Unit	Sandy Unit	Sandy Unit	Sandy Unit
				Mild Impact	Mild Impact	Mild Impact	Mild Impact
		(2) (1)	(4) (3)	P2-90	P2-90	P4-90	P4-90
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	P2-90	P2-90	P4-90	P4-90
Cobalt, dissolved	mg/l			< 0.0001	< 0.0001	< 0.0001	
Copper, dissolved	mg/l		1		0.0016	0.003	
Iron, dissolved	mg/l		0.3	0.032	0.01	< 0.005	
Lead, dissolved	mg/l	0.01			< 0.00002	0.00015	
Magnesium, dissolved	mg/l			1.68	1.36	4.25	
Manganese, dissolved	mg/l		0.05	< 0.001	0.001	< 0.001	
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001			< 0.00002	< 0.00002 < 0.00002	
Molybdenum, dissolved	mg/l				0.0001	0.0002	
Nickel, dissolved	mg/l			0.0013	< 0.01	0.0008	
Potassium, dissolved	mg/l				0.3	0.3 1.6	
Silicon, dissolved	mg/l				5.11	2.92	
Silver, dissolved	mg/l				< 0.0001	< 0.0001	
Sodium, dissolved	mg/l		200 (7)	50	50.5	3	
Strontium, dissolved	mg/l				0.04	0.148	
Sulfur, dissolved	mg/l				1	2.8	
Thallium, dissolved	mg/l				< 0.00005	< 0.00005	
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l				< 0.005	< 0.005	
Vanadium, dissolved	mg/l			0.0006	0.0006	0.0007	
Zinc, dissolved	mg/l		5		< 0.005	< 0.005	
Phenols							
Phenolics, Total Recoverable	mg/l				< 0.002	< 0.002	
Field Measurements							
Conductivity (Field)	uS/cm			263	225	220	
Temperature (Field)	deg c		15	7.1	7.7	6.9	
pH (Field)	-			6.1	11.7	2.3	

				Sand & Silty Clay Un	Silty Clay Unit	Silty Clay Unit	
				Mild Impact	Mild Impact	Mild Impact	
		(2) (1)	(4) (3)	G12-92	G12-92	G13-92	G13-92
		ODWQS(169	ODWQS-	24-April-2019	26-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	12-92	12-92	13-92	13-92
General Chemistry					DRY		DRY
Alkalinity (Total as CaCO3)	mg/l		500	94		173	
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.12		0.05	
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			< 3			
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			1300			
Chloride	mg/l		250	20.6		14.3	
Conductivity	µmho/c			288			
Dissolved Organic Carbon	mg/l		5	<u>22.3</u>		<u>7.3</u>	
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	81		193	
Nitrate as N	mg/l	10		1.91			
Nitrite as N	mg/l	1		< 0.05			
Nitrogen, Total Kjeldahl	mg/l			3.4			
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.39		0.085	
Phosphorus	mg/l			1.25		0.31	
Sulphate	mg/l		500 ⁽⁶⁾	10			
Total Dissolved Solids	mg/l		500	149		218	
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.03			
Barium, dissolved	mg/l	1		0.019			
Beryllium, dissolved	mg/l			< 0.0001			
Boron, dissolved	mg/l	5		0.013		0.064	
Cadmium, dissolved	mg/l	0.005		< 0.000015			
Calcium, dissolved	mg/l			19.5		47.7	
Chromium, dissolved	mg/l	0.05		0.005			

				Sand & Silty Clay Un	Band & Silty Clay Uni	Silty Clay Unit	Silty Clay Unit
				Mild Impact	Mild Impact	Mild Impact	
		(2) (1)	(4) (3)	G12-92	G12-92	G13-92	G13-92
		ODWQS(169	ODWQS-	24-April-2019	26-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	12-92	12-92	13-92	13-92
Cobalt, dissolved	mg/l			< 0.0001		0.0002	
Copper, dissolved	mg/l		1	0.0029			
Iron, dissolved	mg/l		0.3	0.028		0.014	
Lead, dissolved	mg/l	0.01		0.00014			
Magnesium, dissolved	mg/l			7.96		17.9	
Manganese, dissolved	mg/l		0.05	0.017		0.029	
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002			
Molybdenum, dissolved	mg/l			0.0001			
Nickel, dissolved	mg/l			0.0008		0.0017	
Potassium, dissolved	mg/l			1.7			
Silicon, dissolved	mg/l			4.62			
Silver, dissolved	mg/l			< 0.0001			
Sodium, dissolved	mg/l		200 (7)	33.2		15.4	
Strontium, dissolved	mg/l			0.092			
Sulfur, dissolved	mg/l			2.5			
Thallium, dissolved	mg/l			< 0.00005			
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			< 0.005			
Vanadium, dissolved	mg/l			< 0.0001		0.0005	
Zinc, dissolved	mg/l		5	< 0.005			
Phenols							
Phenolics, Total Recoverable	mg/l			< 0.002			
Field Measurements							
Conductivity (Field)	uS/cm			348		465	
Temperature (Field)	deg c		15	7.5		3.8	
pH (Field)	-			6.4		7.5	

				Sandy Unit	Sandy Unit	Till	Till
				Mild Impact	Moderate Impact		
		(2) (1)	(4) (3)	G18-92	G18-92	G31B-98	G31B-98
		ODWQS(169	ODWQS-	25-April-2019	26-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	G18-92	G18-92		
General Chemistry							
Alkalinity (Total as CaCO3)	mg/l		500	50	<u>630</u>		
Ammonia, unionized (Field)	mg/l						
Ammonia Nitrogen	mg/l			0.06	0.28		
Bicarbonate	mg/l						
Biochemical Oxygen Demand, 5 Day	mg/l			< 3	5		
Bromide	mg/l						
Carbonate (CO3)	mg/l						
Chemical Oxygen Demand	mg/l			27	144		
Chloride	mg/l		250	2.3	47.7		
Conductivity	µmho/c			241	1313		
Dissolved Organic Carbon	mg/l		5	<u>8.2</u>	<u>26.7</u>		
Fluoride	mg/l	1.5					
Hardness, Calcium Carbonate	mg/l		100	<u>163</u>	<u>782</u>		
Nitrate as N	mg/l	10		3.4	< 0.05		
Nitrite as N	mg/l	1		< 0.05	< 0.05		
Nitrogen, Total Kjeldahl	mg/l			0.5	2.7		
Nitrogen, Nitrate-Nitrite	mg/l	10					
Nitrogen, Organic	mg/l						
Phosphate	mg/l						
Phosphate, Ortho	mg/l			0.071	1.22		
Phosphorus	mg/l			0.15	2.23		
Sulphate	mg/l		500 ⁽⁶⁾	7	14		
Total Dissolved Solids	mg/l		500	106	<u>741</u>		
Total Organic Carbon	mg/l						
Metals							
Aluminum, total	mg/l	0.1					
Aluminum, dissolved	mg/l	0.1		0.03	0.1		
Barium, dissolved	mg/l	1		0.03	0.061	-	
Beryllium, dissolved	mg/l			< 0.0001	< 0.0001		
Boron, dissolved	mg/l	5		0.083	0.321		
Cadmium, dissolved	mg/l	0.005		0.000022	0.000024		
Calcium, dissolved	mg/l			45.6	230		
Chromium, dissolved	mg/l	0.05		< 0.001	0.004		

				Sandy Unit	Sandy Unit	Till	Till
				Mild Impact	Moderate Impact		
		(2) (1)	(4) (3)	G18-92	G18-92	G31B-98	G31B-98
		ODWQS(169	ODWQS-	25-April-2019	26-Sept-2019	25-April-2019	26-Sept-2019
Parameter	Unit	/03)-Health	AO	G18-92	G18-92		
Cobalt, dissolved	mg/l			0.0003	0.0018		
Copper, dissolved	mg/l		1	0.0006	0.0054		
Iron, dissolved	mg/l		0.3	<u>0.387</u>	0.137		
Lead, dissolved	mg/l	0.01		< 0.00002	< 0.00002		
Magnesium, dissolved	mg/l			12	50.4		
Manganese, dissolved	mg/l		0.05	<u>0.485</u>	0.443		
Mercury	mg/l						
Mercury, dissolved	mg/l	0.001		< 0.00002	< 0.00002		-
Molybdenum, dissolved	mg/l			< 0.0001	0.0004		-
Nickel, dissolved	mg/l			0.0012	< 0.01		-
Potassium, dissolved	mg/l			3	7.3		-
Silicon, dissolved	mg/l			3.81	7.66		-
Silver, dissolved	mg/l			< 0.0001	< 0.0001		-
Sodium, dissolved	mg/l		200 (7)	4.3	12.5		-
Strontium, dissolved	mg/l			0.234	0.905		-
Sulfur, dissolved	mg/l			3.6	4.8		-
Thallium, dissolved	mg/l			< 0.00005	< 0.00005		
Tin, dissolved	mg/l						
Titanium, dissolved	mg/l			< 0.005	< 0.005		
Vanadium, dissolved	mg/l			0.0001	0.001		
Zinc, dissolved	mg/l		5	< 0.005	< 0.005		
Phenols							
Phenolics, Total Recoverable	mg/l			< 0.002	< 0.002		
Field Measurements							
Conductivity (Field)	uS/cm			163			
Temperature (Field)	deg c		15	5.1			
pH (Field)	-			6.3			

				Sandy Unit	Sandy Unit
				Background	Background
		(2) (1)	(4) (3)	G26-94	G26-94
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	G26-94	G26-94
General Chemistry					
Alkalinity (Total as CaCO3)	mg/l		500	26	29
Ammonia, unionized (Field)	mg/l				
Ammonia Nitrogen	mg/l			0.06	0.03
Bicarbonate	mg/l				
Biochemical Oxygen Demand, 5 Day	mg/l			< 3	< 3
Bromide	mg/l				
Carbonate (CO3)	mg/l				
Chemical Oxygen Demand	mg/l			35	6
Chloride	mg/l		250	1.9	< 0.5
Conductivity	µmho/c			71	70
Dissolved Organic Carbon	mg/l		5	3.2	1.3
Fluoride	mg/l	1.5			
Hardness, Calcium Carbonate	mg/l		100	26	27
Nitrate as N	mg/l	10		0.23	< 0.05
Nitrite as N	mg/l	1		< 0.05	< 0.05
Nitrogen, Total Kjeldahl	mg/l			0.9	0.6
Nitrogen, Nitrate-Nitrite	mg/l	10			
Nitrogen, Organic	mg/l				
Phosphate	mg/l				
Phosphate, Ortho	mg/l			0.696	0.426
Phosphorus	mg/l			0.94	0.44
Sulphate	mg/l		500 ⁽⁶⁾	5	1
Total Dissolved Solids	mg/l		500	36	35
Total Organic Carbon	mg/l				
Metals					
Aluminum, total	mg/l	0.1			
Aluminum, dissolved	mg/l	0.1		< 0.01	< 0.01
Barium, dissolved	mg/l	1		0.005	0.008
Beryllium, dissolved	mg/l			< 0.0001	< 0.0001
Boron, dissolved	mg/l	5		0.006	0.008
Cadmium, dissolved	mg/l	0.005		< 0.000015	< 0.000015
Calcium, dissolved	mg/l			6.84	7.07
Chromium, dissolved	mg/l	0.05		0.086	< 0.001
				Sandy Unit	Sandy Unit
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				Background	Background
		(2) (1)	(4) (3)	G26-94	G26-94
		ODWQS(169	ODWQS-	24-April-2019	25-Sept-2019
Parameter	Unit	/03)-Health	AO	G26-94	G26-94
Cobalt, dissolved	mg/l			< 0.0001	< 0.0001
Copper, dissolved	mg/l		1	0.0007	0.0007
Iron, dissolved	mg/l		0.3	< 0.005	< 0.005
Lead, dissolved	mg/l	0.01		0.00006	< 0.00002
Magnesium, dissolved	mg/l			2.25	2.27
Manganese, dissolved	mg/l		0.05	0.013	0.004
Mercury	mg/l			< 0.00002	
Mercury, dissolved	mg/l	0.001			< 0.00002
Molybdenum, dissolved	mg/l			< 0.0001	<0.0001
Nickel, dissolved	mg/l			0.0009	< 0.01
Potassium, dissolved	mg/l			0.7	0.9
Silicon, dissolved	mg/l			2.64	5.39
Silver, dissolved	mg/l			< 0.0001	< 0.0001
Sodium, dissolved	mg/l		200 (7)	3.2	5.8
Strontium, dissolved	mg/l			0.08	0.08
Sulfur, dissolved	mg/l			1.6	1.6
Thallium, dissolved	mg/l			< 0.00005	< 0.00005
Tin, dissolved	mg/l				
Titanium, dissolved	mg/l			< 0.005	< 0.005
Vanadium, dissolved	mg/l			0.0001	0.0002
Zinc, dissolved	mg/l		5	< 0.005	< 0.005
Phenols					
Phenolics, Total Recoverable	mg/l			< 0.002	< 0.002
Field Measurements					
Conductivity (Field)	uS/cm			80	80
Temperature (Field)	deg c		15	3.4	12.6
pH (Field)	-			6.8	8.3

APPENDIX H-2

VOC's

		(2) (1)	(4) (3)	P1-91	P1-91	P1-91	P1-91	P1-91	P1-91	P1-91	P1-91
		ODWQS(169/0	ODWQS-	17-Jun-2016	23-Aug-2016	02-May-2017	21-Sep-2017	01-May-2018	26-Sept-2018	25-April-2019	25-Sept-2019
Parameter	Unit	3)-Health	AO	P1-91	P1-91	P1-91	P1-91	P1-91	P1-91	P1-91	
Semi-VOCs											
4-Methyl-2-pentanone	ug/l										
Hydroxide	ug/l							-			
Styrene	ug/l			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
VOCs											
1,1,1,2-Tetrachloroethane	ug/l			0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1,1-Trichloroethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 0.5	< 0.5
1,1,2-Trichloroethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1-Dichloroethane	ug/l			0.2	< 0.1	< 0.1	0.2	0.2		< 0.5	< 0.5
Trichloroethylene	ug/l	5		< 0.1	< 0.1	< 0.1		< 0.1		< 0.5	< 0.5
1.1-Dichloroethylene	ua/l	14								< 0.5	< 0.5
1.2-Dibromoethane	ua/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.2	< 0.2
1,2-Dichlorobenzene	ug/l	200	3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,2-Dichloroethane	ug/l	5		0.1	0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,2-Dichloropropane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3-Dichlorobenzene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3,5-Trimethylbenzene	ug/l										
Dichloropropene 1,3- cis+trans	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1.3-Dichloropropene, Total	ua/l										
1.4-Dichlorobenzene	ua/l	5	1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Methyl Ethyl Ketone	ug/l			<1	<1	2	< 1	< 1		< 20	< 20
2-Hexanone	ug/l										
Acetone	ug/l			8	12	14	8	< 2		< 30	< 30
Benzene	ug/l	5		1.3	1.5	< 0.5	1.6	1.2		1.3	1.5
Bromodichloromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Bromoform	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
Bromomethane	ug/l			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 0.5	< 0.5
Carbon Tetrachloride	ug/l	5		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2
Chlorobenzene	ug/l	80	30	0.2	0.3	< 0.2	0.3	0.3		< 0.5	< 0.5
Chloroform	ug/l	-		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		<1	< 1
Chloroethane	ug/l	-						-			
cis-1,2-Dichloroethene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
cis-1,3-Dichloropropene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Chloromethane	ug/l							-			
Dibromochloromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Dichlorodifluoromethane	ug/l			< 1	< 1	< 1	< 1	< 1		< 2	< 2
Ethylbenzene	ug/l		2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
Xylene, m,p,o-	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 1.1	< 1.1
m,p-Xylenes	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 1.0	< 1.0
Methyl tert-Butyl Ether	ug/l			< 1	< 1	1	< 1	2		< 2	< 2
Methyl Isobutyl Ketone	ug/l			< 1	< 1	< 1	< 1	< 1		< 20	< 20
Methylene Chloride	ug/l	50		< 0.3	< 0.3	< 0.3	0.4	< 0.3		< 5	< 5
n-Hexane	ug/l			< 1	< 1	< 1	< 1	< 1		<5	< 5
o-Xylene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Tetrachloroethylene	ug/l	30		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Toluene	ug/l		24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
Dichloroethene, 1,1-	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	
trans-1,2-Dichloroethene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
trans-1,3-Dichloropropene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Trichloroethene	ug/l	5					< 0.1				
Trichlorofluoromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
Vinyl Chloride	ug/l	2		0.2	0.3	< 0.2	0.4	0.2		< 0.2	< 0.2
Xylenes, Total	ug/l		300								
Surrogate Recovery (%)											
4-Bromoflourobenzene	%					99	105	108		105	
D4-1,2-Dichloroethane	%					95	99	67		94.4	
D8-Toluene	%					103	99	95		115	

		(2) (1)	(4) (3)	P5B-91	P5B-91	P5B-91	P5B-91	P5B-91	P5B-91	P5B-91	P5B-91
		ODWQS(169/0	ODWQS-	16-Jun-2016	23-Aug-2016	02-May-2017	21-Sep-2017	01-May-2018	26-Sept-2018	25-April-2019	25-Sept-2019
Parameter	Unit	3)-Health	AO								
Semi-VOCs											
4-Methyl-2-pentanone	ug/l										
Hydroxide	ug/l										
Styrene	ug/l			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
VOCs	Ŭ				0.0						
1 1 1 2-Tetrachloroethane	ua/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1.1.1-Trichloroethane	ua/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1 1 2 2-Tetrachloroethane	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 0.5	< 0.5
1,1,2-Trichloroethane	ua/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1 1-Dichloroethane	ug/l			0.1	0.2	< 0.1	0.2	01		< 0.5	< 0.5
Trichloroethylene	ug/l	5		< 0.1	< 0.1	< 0.1		< 0.1		< 0.5	< 0.5
1 1-Dichloroethylene	ug/l	14								< 0.5	< 0.5
1 2-Dibromoethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.2	< 0.2
1.2-Dichlorobenzene	ug/l	200	3	< 0.1	< 0.1	< 0.1	< 0.1	0.1		< 0.5	< 0.5
1.2-Dichloroethane	ug/l	5		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1.2-Dichloropropage	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1 3-Dichlorobenzene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1.3.5-Trimethylbenzene	ug/l			- 0.1			- 0.1	- 0.1		10.0	. 0.0
Dichloropropene 1.3. cis+trans	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1 3 Dichloropropene Total	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		× 0.5	× 0.5
1,3-Dichloroproperle, Total	ug/i	5				< 0.2				< 0.5	< 0.5
Nothyl Ethyl Kotopo	ug/i	5		0.3	0.3	< 0.2	0.4	0.5		< 20	< 0.5
	ug/i				2		2			< 20	< 20
	ug/i									< 20	< 20
Renzono	ug/i	5		14	20	0	19	12		< 30 0.8	18
Bromodichloromothano	ug/i	5		1.2	1.2	0.0	2.1	1.0		0.0	1.0
Bromoform	ug/i			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
Bromomothano	ug/i			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Carbon Totrachlorido	ug/i	5		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 0.2	< 0.3
	ug/l	5		< 0.2	< 0.2 0.2	< 0.2	< U.Z	< 0.2 0.2		< 0.2	< 0.2
Chloroform	ug/i	00	30	< 0.2	0.3	< 0.2	0.3	0.3		< 0.5	< 0.0
Chloroothana	ug/i			< 0.5	< 0.5	× 0.5	< 0.5	< 0.5			
	ug/i									< 0.5	< 0.5
cis 1.2 Dichloropropopo	ug/i			0.1	< 0.1	< 0.1	0.1	< 0.1		< 0.5	< 0.5
Chloromothano	ug/i			< 0.1	< 0.1	× 0.1	< 0.1	< U.1		× 0.5	× 0.5
Dibromochloromothono	ug/i					< 0.1				< 2	< 2
Diplomochioromethane	ug/I			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Ethylhonzono	ug/i			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
Zulene m.n.o.	ug/i		2.4	< 0.5	< 0.5	< 0.0	< 0.5	< 0.5		< 1.1	< 0.5
m n-Yylenes	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 1.1	< 1.0
Mothyl tort Butyl Ethor	ug/i			< 0.4	< 0.4	1	< 0.4	< 0.4		< 1.0	< 1.0
Methyl Isobutyl Ketope	ug/l			<1	<1	< 1	< 1	<1		< 20	< 20
Methylana Chlorida	ug/i			< 0.2	< 0.2	< 0.3	0.6	< 0.2		< 20	< 20
n Heyane	ug/l	50		< 0.5	< 0.5	< 1	0.0	< 0.5		<5	< 5
	ug/i			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
U-Aylene Totrachloroothylopo	ug/i			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
	ug/i			< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Dichloroothono 11	ug/i		24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
trans 1.2 Disbloresthene	ug/I			₹ 0.1	₹ 0.1	< 0.1	₹ 0.1	₹ 0.1		< 0.5	< 0.5
trans-1.3-Dichloropropopo	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Trichloroothono	ug/l			< U. I	× U. I	▼ 0.1	< 0.1	× 0.1		< 0.0	< 0.0
	ug/l	5					< 0.1			< 5	< F
	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< D 4 0 0	< D 4 0 0
Viriyi Chioride	ug/l	2		< 0.2	< 0.2	< 0.2	0.3	< 0.2		< 0.2	< 0.2
Aylenes, 10tal	ug/l		300								
Surrogate Recovery (%)			-			100	400	4.5.5		100	
4-Bromotlourobenzene	%					100	106	109		106	
D4-1,2-Dichloroethane	%					95	100	69		90	
D8-Toluene	%					103	99	95		110	

		(2) (1)	(4) (3)	P6-91	P6-91	P6-91	P6-91	P6-91	P6-91	P6-91	P6-91
		ODWQS(169/0	ODWQS-	17-Jun-2016	23-Aug-2016	02-May-2017	21-Sep-2017	01-May-2018	26-Sept-2019	25-April-2019	25-Sept-2019
Parameter	Unit	3)-Health	AO	P6-91	P6-91	P6-91	P6-91	P6-91	P6-91	P6-91	
Semi-VOCs											
4-Methyl-2-pentanone	ug/l										
Hydroxide	ug/l										
Styrene	ug/l			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
VOCs											
1,1,1,2-Tetrachloroethane	ug/l			0.3	0.2	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1,1-Trichloroethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 0.5	< 0.5
1,1,2-Trichloroethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1-Dichloroethane	ug/l			0.2	0.2	< 0.1	0.3	0.3		< 0.5	< 0.5
Trichloroethylene	ug/l	5		< 0.1	< 0.1	< 0.1		< 0.1		< 0.5	< 0.5
1,1-Dichloroethylene	ug/l	14								< 0.5	< 0.5
1,2-Dibromoethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.2	< 0.2
1,2-Dichlorobenzene	ug/l	200	3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,2-Dichloroethane	ug/l	5		14.9	5.1	7.3	4.8	2.2		< 0.5	< 0.5
1,2-Dichloropropane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3-Dichlorobenzene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3,5-Trimethylbenzene	ug/l										
Dichloropropene 1,3- cis+trans	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3-Dichloropropene, Total	ug/l										
1,4-Dichlorobenzene	ug/l	5	1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Methyl Ethyl Ketone	ug/l			< 1	< 1	6	<1	< 1		< 20	< 20
2-Hexanone	ug/l										
Acetone	ug/l			8	9	24	9	< 2		< 30	< 30
Benzene	ug/l	5		1.8	4.2	< 0.5	2.8	2.1		1.8	4.4
Bromodichloromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Bromoform	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
Bromomethane	ug/l			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 0.5	< 0.5
Carbon Tetrachloride	ug/l	5		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2
Chlorobenzene	ug/l	80	30	0.6	1	< 0.2	1.4	1.1		0.8	2.4
Chloroform	ug/l			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		<1	<1
Chloroethane	ug/l										
cis-1,2-Dichloroethene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
cis-1,3-Dichloropropene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Chloromethane	ug/I									10	10
Dibromocniorometnane	ug/I			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Dichlorodifiuoromethane	ug/I			< 1	< 1	< 1	< 1	< 1		< 2	< 2
Euryibenzene Xulono, m.n.o	ug/i		2.4	< 0.5	< 0.5	< 0.5	< 0.5 1 E	< 0.5		< 0.5	< 0.5 E E
m n Yulonoo	ug/I			< 0.4	0.7	< 0.4	1.0	< 0.4		< 1.1	3.1
Methyl tert Butyl Ether	ug/I			< 0.4	0.7	~ 0.4	2	- 0.4		< 1.0	5.1
Methyl Isobutyl Ketone	ug/I	t		~ 1	~ 1	2	2 < 1	ی د 1		< 20 < 20	< 20
Methylene Chloride	ug/I	50		< 0.3	< 0.3	< 0.3	0.5	< 0.3		< 5	< 5
n-Hexane	ug/I			< 1	< 1	< 1	< 1	< 1		<5	< 5
	ug/I			< 0.1	03	< 0.1	0.5	< 0.1		< 0.5	24
Tetrachloroethylene	ug/I	30		< 0.2	< 0.2	< 0.2	< 0.2	< 0.1		< 0.5	< 0.5
Toluene	ug/I		24	0.2	0.2	< 0.5	< 0.5	< 0.5		< 0.5	0.6
Dichloroethene, 1,1-	ug/l			< 0.0	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	0.0
trans-1 2-Dichloroethene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.5	< 0.5
trans-1.3-Dichloropropene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Trichloroethene	ug/l	5					< 0.1			0.0	
Trichlorofluoromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
Vinyl Chloride	ug/l	2		< 0.2	< 0.2	< 0.2	0.2	< 0.2		< 0.2	< 0.2
Xylenes, Total	ua/l		300	- 0.2		- 0.2				- 0.2	- 0.2
Surrogate Recovery (%)											
4-Bromoflourobenzene	%					100	106	108		117	
D4-1.2-Dichloroethane	%					95	102	66		72.3	
D8-Toluene	%					103	99	94		97.3	
20 10:0010	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1				50	5.		01.0	

		(2) (1)	(4) (3)	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank
		ODWQS(ODWQS-	17-Jun-2016	23-Aug-2016	02-May-2017	21-Sep-2017	01-May-2018	21-Aug-2018	26-Sept-2018	25-April-2019	25-Sept-2019
Parameter	Unit	169/03)-	AO				•	-	, , , , , , , , , , , , , , , , , , ,			í
Semi-VOCs												
4-Methyl-2-pentanone	ua/l											[
Hydroxide	ua/l											[
Styrene	ua/l			< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
VOCs	ug/i			- 0.0	- 0.0		- 0.5					
1 1 1 2-Tetrachloroethane	ua/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1 1 1 Trichloroothano	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1,2,2 Totrachloroothano	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,1,2,2-Tellacilloroethane	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 0.5	< 0.5
1,1,2-mchloroethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Trichloroothylono	ug/l	5		< 0.1	< 0.1	< 0.1	< U.1	< 0.1	< 0.1		< 0.5	< 0.5
	ug/i	5		< 0.1	< 0.1	< U.1		< 0.1	< 0.1		< 0.5	< 0.5
1, 1-Dichloroethylene	ug/i	14									₹0.5	< 0.5 < 0.2
1,2-Dibromoetnane	ug/i			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.2	< 0.2
1,2-Dichlorobenzene	ug/i	200	3	< 0.1	< 0.1	< 0.1	< 0.1	₹0.1	₹0.1		< 0.5	< 0.5
1,2-Dichloroethane	ug/i	5		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,2-Dichloropropane	ug/i			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3-Dichlorobenzene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3,5-Trimethylbenzene	ug/l											
Dichloropropene 1,3- cis+trans	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
1,3-Dichloropropene, Total	ug/l											
1,4-Dichlorobenzene	ug/l	5	1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Methyl Ethyl Ketone	ug/l			< 1	< 1	<1	< 1	<1	<1		< 20	< 20
2-Hexanone	ug/l											ļ
Acetone	ug/l			< 2	< 2	< 2	< 2	< 2	< 2		< 30	< 30
Benzene	ug/l	5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
Bromodichloromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Bromoform	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 5	< 5
Bromomethane	ug/l			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 0.5	< 0.5
Carbon Tetrachloride	ug/l	5		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.2	< 0.2
Chlorobenzene	ug/l	80	30	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Chloroform	ug/l			< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 1	< 1
Chloroethane	ug/l				-							ĺ
cis-1,2-Dichloroethene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
cis-1,3-Dichloropropene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Chloromethane	ug/l				-							l
Dibromochloromethane	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 2	< 2
Dichlorodifluoromethane	ug/l			< 1	< 1	< 1	< 1	<1	<1		< 2	< 2
Ethylbenzene	ug/l		2.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
Xylene, m.p.o-	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 1.1	< 1.1
m,p-Xylenes	ug/l			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4		< 1.0	< 1.0
Methyl tert-Butyl Ether	ug/l			<1	< 1	< 1	< 1	< 1	<1	İ	< 2	< 2
Methyl Isobutyl Ketone	ua/l			< 1	< 1	< 1	< 1	< 1	< 1		< 20	< 20
Methylene Chloride	ua/l	50		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3		< 5	< 5
n-Hexane	ua/l			< 1	< 1	< 1	< 1	<1	<1		<5	< 5
o-Xvlene	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Tetrachloroethylene	ug/l	30		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		< 0.5	< 0.5
Toluene	ug/l		24	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5
Dichloroethene 11-	ug/l	<u> </u>	-7	< 0.0	< 0.0	< 0.1	< 0.0	< 0.1	< 0.1			
trans 1.2 Dichloroothono	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
trans-1 3-Dichloropropono	ug/l			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		< 0.5	< 0.5
Trichloroothono	ug/I			× U. I	< U. I	▼0.1	< 0.1	× U. I	× 0.1		× 0.5	< 0.J
Trichlorofluoromethana	ug/I	5					× U.1				65	65
Vipul Chlorida	uy/I			< U.1 < 0.0	< U.1 < 0.2	< 0.1	< U.1	> 0.1	> 0.1		< 0.2	~ 0 0
	ug/I	2		S U.2	< U.Z	∨ 0.2	< U.Z	► 0.2	∨ 0.2		► U.Z	<u> </u>
	ug/I		300									
Surrogate Recovery (%)	0/					100	100	100	404		445	r
4-Bromoflourobenzene	%					100	106	108	104		115	ł
D4-1,2-Dichloroethane	%	-				95	101	69	104		78.4	
D8-Toluene	%					103	99	96	99	1	95.6	1

Footnotes:

Tables should be read in conjunction with the accompanying document.

< value = Indicates parameter not detected above laboratory method detection limit.

> value = Indicates parameter detected above equipment analytical range.
-- Chemical not analyzed or criteria not defined.

Grev background indicates exceedances.

Orby background indicates exceedances.
 (1) Ontario Drinking Water Quality Standards - Health Based Standards (June 2003, revised June 2006).

(2) Bold Font = Parameter concentration greater than ODWQS(169/03)-Health

(3) Ontario Drinking Water Quality Standards - Aesthetic Objectives. Aesthetic Objectives are established for parameters that may impair the taste, odour or colour of water or which may interfere with good water quality control practices. For certain parameters, both aesthetic objectives and health-related MACs have been derived (June 2003, revised June 2006).
 (4) Underlined Font = Parameter concentration greater than ODWQS-AO

(5) No sample was collected.

(6) Monitoring location has been destroyed and can no longer be sampled.

(7) Monitoring location was dry during this sampling event. No sample was collected.

(8) Insufficient water for sample collection or analysis at this monitoring location during sampling event.

(9) Insufficient sample volume was collected for analysis.

(10) Field Parameters were not measured

(11) Monitoring location was damaged and could not be sampled.

(12) Metals: Due to high concentration of the target analyte, sample required dilution. Detection limit was adjusted accordingly.

(13) Inoperable

(14) Metals: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

(15) Sample IDs for G42-10 and G43-11 were reversed.

(16) Nitrite/Nitrate: Due to the colour interferences, some sample required dilution. Detection limits were adjusted accordingly.

(17) Nitrite/Nitrate: Due to the colour interferences, sample required dilution. Detection limits were adjusted accordingly.

(18) Metals: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly. VOC Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

(19) VOC Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly. Metals: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

(20) VOC Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

(21) Metal Analysis: RDLs of Chromium and Nickel were adjusted due to high concentrations of Carbon and Calcium respectively.

(22) VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

(23) Metal Analysis: RDL of Nickel was adjusted due to high concentration of Calcium. VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

(24) Location of duplicate sample not noted in field notes. Field technician indicated that the duplicate was taken at either P4-90 or 29-97. Based on comparison of sampling data from the parent samples at these locations on the same day, it appears that the duplicate sample was taken at P4-90.

(25) Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

(26) VOC Analysis: Due to foaming sample required dilution. The DLs were adjusted accordingly

(27) VOC Analysis: The detection limits was raised due to decrease instrument sensitivity.

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(28) Metals: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.VOC Analysis: Due to high concentrations of target analytes, sample required dilution. Detection limits were adjusted accordingly.

(29) Metals: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.VOC Water Analysis: Due to foaming, sample required dilution. The detection limits were adjusted accordingly.

(30) VOC Analysis: Due to high concentrations of target analytes, sample required dilution. Detection limits were adjusted accordingly.

Historical data and table format courtesy fo GAL.

APPENDIX H-3

Historical Data

(PDF Only)

APPENDIX I

Surface Water Concentrations

I-1: 2019 Data I-2: Historical Data (PDF Only)

APPENDIX I-1

2019 Data

					Slightly Impacted	Slightly Impacted	Slightly Impacted
	11		l lució		Western Stream	Western Stream	Western Stream
	Unit		Unit			GS6	GS6
Baramatar	(< June 2016)		(June 2016+)		25-April-2019	24-Sept-2019	31-Oct-2019
Farameter	2010)	on PWQU	2010+)		63-0	63-0	63-0
General Chemistry							
Alkalinity (Total as CaCO3)	ua/l	(5)	ma/l	(5)	39	75	96
Ammonia unionized (Field)	ug/l	20	mg/L	0.02	< 0.01	< 0.01	< 0.01
Ammonia Nitrogen	ug/l		mg/L		0.09	0.03	0.02
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L		12	< 3	< 3
Chemical Oxygen Demand	ug/l		mg/L		84	30	17
Chloride	ug/l		mg/L	120-640 (CWQG FW)	7.1	7.5	14
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ug/l		mg/L		35.9	12.4	8.3
Hardness, Calcium Carbonate	ug/l		mg/L		50	109	129
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)	0.8	< 0.05	0.45
Nitrite as N	ug/I		mg/L	0.06 (CWQG FW)	< 0.05	< 0.05	< 0.05
Nitrogen, Total Kjeldahl	ug/l		mg/L		0.8	0.5	0.3
Nitrogen, Nitrate-Nitrite	ug/i		mg/L				
Phosphorus	ug/l	 10_30(7)	mg/L	 0.010_0.030@	0 14	0.06	0.01
Sulphate	ug/l		mg/L	128-429 (BC FW/)	5	24	10
Total Dissolved Solids	ug/l		mg/L		59	124	149
Total Organic Carbon	ug/l		mg/L				
Total Suspended Solids	ua/l		ma/L				
Turbidity	ntu	(9)	ntu	(9)			
Metals							
Aluminum	ug/l	75	mg/L	0.075	1.31	0.24	0.17
Aluminum, dissolved	ug/l	15-75 ⁽¹⁰⁾	mg/L	0.015-0.075 (10)	0.3	0.240	0.03
Barium	ug/l		mg/L		0.023	0.026	0.028
Beryllium	ug/l	11-1100 (11)	mg/L	0.011-1.1 ⁽¹¹⁾	< 0.0001	< 0.0001	< 0.0001
Boron	ug/l	200 (12)	mg/L	0.2(12)	0.009	0.014	0.005
Cadmium	ug/l	0.2(13)	mg/L	0.0002 (13)	0.000044	< 0.000015	0.000018
Calcium	ug/l		mg/L		14.9	31.7	37.2
Chromium	ug/l	(14)	mg/L	14	0.004	0.001	< 0.001
Cobalt	ug/l	0.9	mg/L	0.0009	0.001	0.0003	0.0002
Copper	ug/l	5	mg/L	0.005	0.0036	0.0016	0.0011
Iron	ug/l	300	mg/L	0.3	1.85	0.554	0.377
Lead	ug/i	5-25 (13)	mg/L	0.005-0.025	0.00108	0.0002	0.00009
Magnesium	ug/i		mg/L		0.066	0.028	0.032
Manganese Mercury dissolved	ug/l	0 2 (16)	mg/L	0 0002 (16)	< 0.000	< 0.020	< 0.002
Molybdenum	ug/l	40	mg/L	0.0002	0.0003	0.0003	0.0003
Nickel	ug/l	25	mg/L	0.025	0.0025	0.0008	0.0006
Potassium	ug/l		mg/L		1.1	2.6	2
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L		4.15	5.21	5.5
Silver	ug/l	0.1	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	ug/l		mg/L		4.5	5.8	9.4
Strontium	ug/l		mg/L		0.048	0.106	0.11
Sulfur	ug/l		mg/L		1.7	10	6.4
	ug/i	0.3(")	mg/L	0.0003(17)	< 0.00005	< 0.00005	< 0.00005
Titanium	ug/i		mg/L		0.08	0.013	0.007
Vanadium	ug/i	6	ma/l	0.006	0.0039	0 0022	0 0009
Zinc	ug/l	30 (13)	ma/l	0.03(13)	0.019	0.006	0.013
Phenols	~g/i			0.00			
Phenolics. Total Recoverable	ua/l	1 (18)	ma/L	0.001 (18)	< 0.002	< 0.002	< 0.001
Field Measurements			·				
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)	9.8	8.3	9.4
Conductivity (Field)	uS/cm		uS/cm		138	252	290
pH (Field)	-	8.5	-	8.5	7.8	7.84	7.4
Temperature (Field)	deg c	(8)	deg c	(8)	6.3	15.1	10.5

					Not impacted	Not impacted	Not impacted
					Western Ditch	Western Ditch	Western Ditch
	Unit		Unit		GS17	GS17	GS17
	(< June		(June	-	24-Apr-19	24-Sep-19	31-Oct-19
Parameter	2016)	(2) (1) PWQO	2016+)	(2) (1) PWQO	GS-17	GS-17	GS-17
			/				
General Chemistry					DRY	DRY	DRY
Alkalinity (Total as CaCO3)	ua/l	(5)	ma/L	(5)			
Ammonia, unionized (Field)	ua/l	20	ma/L	0.02			
Ammonia Nitrogen	ua/l		ma/L				
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L				
Chemical Oxygen Demand	ug/l		mg/L				
Chloride	ug/l		mg/L	120-640 (CWQG FW)			
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ug/l		mg/L				
Hardness, Calcium Carbonate	ug/l		mg/L				
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)			
Nitrite as N	ug/l		mg/L	0.06 (CWQG FW)			
Nitrogen, Total Kjeldahl	ug/l		mg/L				
Nitrogen, Nitrate-Nitrite	ug/l		mg/L				
Nitrogen, Organic	ug/l		mg/L				
Phosphorus	ug/l	10-30(7)	mg/L	0.010 -0.030 ⁽⁷⁾			
Sulphate	ug/l		mg/L	128-429 (BC FW)			
Total Dissolved Solids	ug/l		mg/L				
Total Organic Carbon	ug/l		mg/L				
Total Suspended Solids	ug/l		mg/L				
Turbidity	ntu	(9)	ntu	⁽⁹⁾			
Metals		75		0.075			
Aluminum	ug/l	75	mg/L	0.075			
Aluminum, dissolved	ug/l	15-75 ⁽¹⁰⁾	mg/L	0.015-0.075 ⁽¹⁰⁾			
Barium	ug/l		mg/L				
Beryllium	ug/l	11-1100 (11)	mg/L	0.011-1.1(11)			
Boron	ug/l	200 (12)	mg/L	0.2 ⁽¹²⁾			
Cadmium	ug/l	0.2(13)	mg/L	0.0002 (13)			
Calcium	ug/l		mg/L				
Chromium	ug/l	(14)	mg/L	14			
	ug/i	0.9	mg/L	0.0009			
Copper	ug/i	5	mg/L	0.005			
Iron	ug/i	300	mg/L				
Lead	ug/i	5-25 (13)	mg/L	0.005-0.025			
Magapaga	ug/l		mg/L				
Manyanese Morouny, dissolved	ug/l	0.2(16)	mg/L	 0 0002 (16)			
Molybdenum	ug/i	40	mg/L	0.0002(**)			
Nickel		25	mg/L	0.04			<u> </u>
Potassium			mg/L				
Selenium	ug/l	100	mg/L	0.1			
Silicon	ua/l		ma/L				
Silver	ug/l	0.1	mg/L	0.0001			
Sodium	ug/l		mg/L				
Strontium	ug/l		mg/L				
Sulfur	ug/l		mg/L				
Thallium	ug/l	0.3(17)	mg/L	0.0003 (17)			
Tin	ug/l		mg/L				
Titanium	ug/l		mg/L				
Vanadium	ug/l	6	mg/L	0.006			
Zinc	ug/l	30 (13)	mg/L	0.03 (13)			
Phenols							
Phenolics, Total Recoverable	ug/l	1 ⁽¹⁸⁾	mg/L	0.001 (18)			
Field Measurements							
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)			
Conductivity (Field)	uS/cm		uS/cm				
pH (Field)	-	8.5	-	8.5			
Temperature (Field)	deg c	(8)	deg c	(8)			l

					Slightly Impacted	Slightly Impacted	Slightly Impacted
		1			Western Stream	Western Stream	Western Stream
	Unit		Unit		<u>\$1</u>	S1	S1
Demonstern	(< June		(June		25-Apr-2019	24-Sept-2019	31-Oct-2019
Parameter	2016)		2016+)		S-1	S-1	S-1
General Chemistry							
Alkalinity (Total as CaCO3)	ua/l	(5)	ma/l	(5)	38	85	113
Ammonia unionized (Field)	ug/l	20	mg/L	0.02	< 0.01	< 0.01	< 0.01
Ammonia, unionized (Field)	ug/l		mg/L	0.02	0.12	0.01	0.03
Biochemical Oxygen Demand 5 Day	ug/l		mg/L		0.12	< 3	0.00
Chemical Oxygen Demand	ug/l		mg/L			42	
Chloride	ug/l		mg/L	120-640 (CWQG FW)	17.3	16.2	90.5
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ug/l		mg/L		16.2	13.9	7.7
Hardness, Calcium Carbonate	ug/l		mg/L		58	114	180
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)		0.18	
Nitrite as N	ug/l		mg/L	0.06 (CWQG FW)		< 0.05	
Nitrogen, I otal Kjeldahl	ug/l		mg/L			0.9	
Nitrogen, Nitrate-Nitrite	ug/i		mg/L				
Phosphorus	ug/i	 10.300	mg/L mg/l	 0.010_0.030@	0.26	0.22	0.090
Sulphate	ug/l	10-30 (7	mg/L mg/l	128-429 (BC FW)	0.20	23	0.000
Total Dissolved Solids	ug/l		mg/L	120-425 (BOT W)	80	151	306
Total Organic Carbon	ug/l		mg/L			101	000
Total Suspended Solids	ug/l		mg/L				
Turbidity	ntu	(9)	ntu	(9)			
Metals							
Aluminum	ug/l	75	mg/L	0.075		0.68	
Aluminum, dissolved	ug/l	15-75 (10)	mg/L	0.015-0.075 (10)		0.52	
Barium	ug/l		mg/L			0.031	
Beryllium	ug/l	11-1100 (11)	mg/L	0.011-1.1 ⁽¹¹⁾		< 0.0001	
Boron	ug/l	200 (12)	mg/L	0.2(12)	0.011	0.02	0.01
Cadmium	ug/l	0.2(13)	mg/L	0.0002 (13)		0.000043	
Calcium	ug/l		mg/L			32.7	50.5
Chromium	ug/l	(14)	mg/L	14		0.002	
Cobalt	ug/l	0.9	mg/L	0.0009		0.0006	
Copper	ug/l	5	mg/L	0.005		0.0059	
Iron	ug/l	300	mg/L	0.3	2.18	1.23	0.767
Lead	ug/l	5-25 (15)	mg/L	0.005-0.025 (15)		0.00075	40
Magnesium	ug/i		mg/L mg/l		0.067	7.82	13
Manyanese Mercury dissolved	ug/i	 0 2 (16)	mg/L mg/l	 0 0002 (16)	0.007	< 0.0002	0.040
Molybdenum	ug/l	40	mg/L mg/l	0.0002		0.0005	
Nickel	ug/l	25	mg/L	0.025		0.0027	
Potassium	ug/l		mg/L			5.1	
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L			5.6	
Silver	ug/l	0.1	mg/L	0.0001		< 0.0001	
Sodium	ug/l		mg/L		10.2	13	49.5
Strontium	ug/l		mg/L			0.113	
Sulfur	ug/l		mg/L			9.8	
	ug/i	0.3(11)	mg/L	0.0003(17)		< 0.00005	
Titanium	ug/i		mg/L			0.045	
Vanadium	ug/i	6	ma/L	0.006		0.045	
Zinc	ug/i	30 (13)	ma/l	0.03(13)		0.013	
Phenois	ug/i	00	y/L	0.00		0.010	
Phenolics. Total Recoverable	ua/l	1 (18)	ma/L	0.001 (18)		< 0.002	
Field Measurements	<u>J</u> .		<u> </u>				
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)		8.2	11.9
Conductivity (Field)	uS/cm		uS/cm		181	306	180
pH (Field)	-	8.5	-	8.5	8.4	7.75	7.2
Temperature (Field)	deg c	(8)	deg c	(8)	5.7	15.4	10.5

					Slightly Impacted	Slightly Impacted	Slightly Impacted
					Western Stream	Western Stream	Western Stream
	Unit		Unit		S2	S2	S2
	(< June		(June		25-April-2019	24-Sept-2019	31-Oct-2019
Parameter	2016)	(2) (1) PWQO	2016+)	^{(2) (1)} PWQO	S-2	S-2	S-2
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	(5)	45	93	116
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	0.002	< 0.01	< 0.01
Ammonia Nitrogen	ug/l		mg/L		0.12	0.05	0.03
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L		< 3	< 3	
Chemical Oxygen Demand	ug/l		mg/L		47	41	
Chloride	ug/l		mg/L	120-640 (CWQG FW)	16.9	17.2	87.3
Color	color unit		color unit				
Conductivity	umno/cm		umno/cm		15	14.0	7.6
Lissolved Organic Carbon	ug/I		mg/L		51	14.0	1.0
Nitrate as N	ug/l		mg/L	 3-124 (CWOG EW)	0.78	0.22	101
Nitrite as N	ug/l		mg/L	0.06 (CWQG FW)	< 0.05	< 0.05	
Nitrogen Total Kieldahl	ug/l		mg/L		1	1	
Nitrogen, Nitrate-Nitrite	ua/l		ma/L				
Nitrogen, Organic	ug/l		mg/L				
Phosphorus	ug/l	10-30(7)	mg/L	0.010 -0.030 (7)	0.25	0.27	0.060
Sulphate	ug/l		mg/L	128-429 (BC FW)	5	23	
Total Dissolved Solids	ug/l		mg/L		79	165	302
Total Organic Carbon	ug/l		mg/L				
Total Suspended Solids	ug/l		mg/L				
Turbidity	ntu	(9)	ntu	(9)			
Metals							
Aluminum	ug/l	75	mg/L	0.075	2.41	0.89	
Aluminum, dissolved	ug/l	15-75 ⁽¹⁰⁾	mg/L	0.015-0.075(10)	0.18	0.60	
Barium	ug/l		mg/L		0.033	0.036	
Beryllium	ug/l	11-1100 (11)	mg/L	0.011-1.1(11)	< 0.0001	< 0.0001	0.044
Boron	ug/l	200 (12)	mg/L	0.2 ⁽¹²⁾	0.011	0.03	0.011
Cadmium	ug/l	0.2(13)	mg/L	0.0002 (13)	0.000081	0.000048	= 1
Calcium	ug/l		mg/L		16	37.5	51
Chromium	ug/i	(14)	mg/L	14	0.006	0.003	
Copper	ug/i	0.9	mg/L	0.0009	0.0014	0.0000	
Iron	ug/i	200	mg/L	0.005	3 13	1 53	0.627
lead	ug/i	5_25 (15)	mg/L		0.0014	0.00083	0.027
Magnesium	ug/l		mg/L	0.003-0.023	16	8.89	13
Manganese	ug/l		mg/L		0.079	0.107	0.047
Mercury, dissolved	ua/l	0.2 (16)	ma/L	0.0002 (16)	< 0.00002	< 0.00002	
Molybdenum	ug/l	40	mg/L	0.04	0.0003	0.0005	
Nickel	ug/l	25	mg/L	0.025	0.004	0.0033	
Potassium	ug/l		mg/L		2.1	6.3	
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L		5.91	6.01	
Silver	ug/l	0.1	mg/L	0.0001	< 0.0001	< 0.0001	10.1
Sodium	ug/l		mg/L		10.2	15.2	48.4
Strontium	ug/l		mg/L		0.057	0.141	
Sullur	ug/i	 0 2 (17)	mg/L	 0 0002 (17)	1.0	10.1	
	ug/i	0.3(**)	mg/L	0.0003(***	< 0.00003	< 0.00005	
Titanium	ug/i		mg/L		0 167	0.059	
Vanadium	ua/l	6	ma/l	0.006	0.0053	0.0042	
Zinc		30 (13)	ma/l	0.03 ⁽¹³⁾	0.021	0.012	
Phenols	~.g/ ·		g/=	0.00			
Phenolics, Total Recoverable	ug/l	1 (18)	mg/L	0.001 (18)	< 0.002	< 0.002	
Field Measurements	J.		<u> </u>				
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)	7.0	9.1	11.1
Conductivity (Field)	uS/cm		uS/cm		175	326	240
pH (Field)	-	8.5	-	8.5	8.0	7.88	7.6
Temperature (Field)	deg c	(8)	deg c	(8)	5.4	15.1	10.0

					Slightly Impacted	Slightly Impacted	Slightly Impacted
					Western Ditch	Western Ditch	Western Ditch
	Unit		Unit		S8	S8	S8
	(< June		(June		25-April-2019	24-Sept-2019	31-Oct-2019
Parameter	2016)	(2) (1) PWQO	2016+)	^{(2) (1)} PWQO	S-8	S-8	S-8
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	(5)	43	94	116
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	< 0.01	< 0.01	< 0.01
Ammonia Nitrogen	ug/l		mg/L		0.15	0.04	0.04
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L				< 3
Chemical Oxygen Demand	ug/l		mg/L				20
Chloride	ug/l		mg/L	120-640 (CWQG FW)	15.9	19.4	60
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ug/l		mg/L		14.6	15.1	8.5
Hardness, Calcium Carbonate	ug/l		mg/L		66	130	163
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)			0.66
Nitrite as N	ug/l		mg/L	0.06 (CWQG FW)			< 0.05
Nitrogen, Total Kjeldani	ug/i		mg/L				0.6
Nitrogen, Nitrate-Nitrite	ug/i		mg/L				
Nitrogen, Organic	ug/i	 10 20 (7)	mg/L		0 34	0.240	0.090
Priospriorus	ug/l	10-30	mg/L	0.010-0.030 ⁽ⁱ⁾	0.34	0.340	0.080
Supriate	ug/I		mg/L	120-429 (DC FVV)	05	170	20
Total Organia Carbon	ug/i		mg/L		00	170	202
Total Suspended Solids	ug/i		mg/L				
	ug/i	(9)	ntu	(9)			
Metals	ntu	()	niu				
Aluminum	ua/l	75	ma/l	0.075			0.680
	ug/l	15 75 ⁽¹⁰⁾	mg/L	0.015.0.075(10)			0.000
Radinindin, dissolved	ug/l	15-75	mg/L	0.015-0.075			0.036
Bandlium	ug/I	 11 1100 (11)	mg/L	0.011.1.1(11)			< 0.0001
Berghulli	ug/i	200(12)	mg/L	0.011-1.1	0.015	0.056	< 0.0001
Codmium	ug/l	200 (12)	mg/L	0.2(12)	0.015	0.050	0.011
Calaium	ug/l	0.2	mg/L	0.0002(**)			0.000015
Chromium	ug/i	(14)	mg/L				45.0
Cobalt	ug/l	0.9	mg/L	0 0000			0.002
Copper	ug/l	5	mg/L	0.0009			0.0004
Iron	ug/l	300	mg/L	0.000	3 93	2.03	0.0034
Lead	ug/l	5_25 (15)	mg/L	0.0	0.00	2.05	0.00
Magnesium	ug/l		mg/L	0.003-0.023			12.6
Manganese			mg/L		0.092	0.076	0.036
Mercury dissolved		0 2 (16)	mg/L	0 0002 (16)	0.002	0.070	< 0.0002
Molybdenum	ug/l	40	ma/L	0.04			0.0004
Nickel	ua/l	25	ma/L	0.025			0.0021
Potassium	ug/l		mg/L				3.5
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L				6.14
Silver	ug/l	0.1	mg/L	0.0001			< 0.0001
Sodium	ug/l		mg/L		9.2	16.9	34.4
Strontium	ug/l		mg/L				0.149
Sulfur	ug/l		mg/L				8.4
Thallium	ug/l	0.3(17)	mg/L	0.0003 (17)			< 0.00005
Tin	ug/l		mg/L				
Titanium	ug/l		mg/L				0.034
Vanadium	ug/l	6	mg/L	0.006			0.0022
Zinc	ug/l	30 (13)	mg/L	0.03(13)			0.02
Phenois		4 (10)					
Phenolics, Total Recoverable	ug/l	1 (18)	mg/L	U.UU1 ⁽¹⁸⁾			< 0.001
Field Measurements							
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)	11.6	8.5	7.5
Conductivity (Field)	uS/cm		uS/cm		180	335	421
pH (Field)	-	8.5	-	8.5	8.3	7.95	8.6
Temperature (Field)	deg c	(8)	deg c	(8)	5.3	15.2	12.4

Nome Nome Nome Nome Nome Sa Sa Sa Parameter Parameter <t< th=""><th></th><th></th><th></th><th></th><th></th><th>Not impacted</th><th>Not impacted</th><th>Not impacted</th></t<>						Not impacted	Not impacted	Not impacted
Unit (F. June 2016) Unit (June pWOQ S3 25.49(-120) S						Northern Toe	Northern Toe	Northern Toe
Parameter (June 2016) (June 2016) (June 2016) (June 2016) (June 2016) 2.5 April 2019		Unit		Unit		S3	S3	S3
Parameter 2119 PPWQQ S-3 S-3 S-3 General Chemistry - - - DRY DRY DRY General Chemistry up] - mgL 0.02 Annoneia Nicogen up] up] - mgL 0.02 Biochemical Oxygen Demand up] - mgL Disolverol Organic Carbon up] - mgL 120440 (CNUG FW)		(< June		(June		25-April-2019	24-Sept-2019	31-Oct-2019
General Chamistry Image: Second	Parameter	2016)	(2) (1) PWQO	2016+)	^{(2) (1)} PWQO	S-3	S-3	S-3
General Chemistry up1 m mpd. mm m mpd. m mpd. mpd. m Anmonia Nicogan up1 20 mpd. 0.02 Biochemical Oxygen Demand up1 mpd. Choride up1 mpd. Choride up1 mpd. Choride up1 mpd. <td< td=""><td></td><td></td><td></td><td></td><td></td><td>DRY</td><td>DRY</td><td>DRY</td></td<>						DRY	DRY	DRY
Akalini (Total as CaCO3) ugit ** mgl. ** Ammonia, uninota (Field) ugit - mgl. Chemical Oxygen Demand, Dugit - mgl. Chemical Oxygen Demand, Dugit - mgl. Corr color unit - mgl. Condictivity unithoom - mgl. Dissolved Chaino unithoom - mgl. Dissolved Chaino ugit - mgl.	General Chemistry							
Annonia, unionizad (Field) ug/l 20 mg/l	Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	(5)			
Annone Nitrogen ugit	Ammonia, unionized (Field)	ug/l	20	mg/L	0.02			
Biochemical Oxygen Demand, 5 Day ug/l - mg/L -	Ammonia Nitrogen	ug/l		mg/L				
Chemical Daygen Demand ugfl mg/L Color color unit color unit <t< td=""><td>Biochemical Oxygen Demand, 5 Day</td><td>ug/l</td><td></td><td>mg/L</td><td></td><td></td><td></td><td></td></t<>	Biochemical Oxygen Demand, 5 Day	ug/l		mg/L				
	Chemical Oxygen Demand	ug/l		mg/L				
Color color unit Dissolved Organic Carbon ugfl mg/L Hardness, Galutin Carbonale ugfl mg/L Nitrate as N ugfl mg/L 0.06 (CWOG FW) Nitrogen, Nitrate N ugfl mg/L Nitrogen, Nitrate, Nitre ugfl mg/L	Chloride	ug/l		mg/L	120-640 (CWQG FW)			
	Color	color unit		color unit				
Dissolved Organic Carbon ug/l mg/L <	Conductivity	umho/cm		umho/cm				
Hardness, Calcium Cathonate ug/l mgL	Dissolved Organic Carbon	ug/l		mg/L				
Nirdie as N ug/l mgL 3:124 (CWQG FW) Nirogen, Nirake-Nithe ug/l mgL Nirogen, Nirake-Nithe ug/l mgL 0.00 Nirogen, Organic ug/l 10-300 mgL 0.100.0300 Sulphate ug/l 10-300 mgL 0.100.0300 <td>Hardness, Calcium Carbonate</td> <td>ug/l</td> <td></td> <td>mg/L</td> <td></td> <td></td> <td></td> <td></td>	Hardness, Calcium Carbonate	ug/l		mg/L				
Ninte as N Ug1 mgL	Nitrate as N	ug/I		mg/L	3-124 (CWQG FW)			
$\begin{split} \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Nitrite as N	ug/i		mg/L	0.06 (CWQG FW)			
	Nitrogen, Total Kjeldani	ug/i		mg/L				
Induction Imple 0.010 - 0.030 ° Suphate ug/l mg/L 128442 (8CFW) Total Dissolved Solids ug/l mg/L Total Organic Carbon ug/l mg/L	Nitrogen, Organic	ug/l		mg/L				
Inservice Op/En	Phosphorus	ug/i	 10_30(7)	mg/L	 0 010 -0 030 0			
Obspin Opp Description Description <thdescription< th=""> Description <thdescription< th=""> Description</thdescription<></thdescription<>	Sulphate	ug/i	10-30 **	mg/L	128-129 (BC EW)			
Total Organic Carbon Ug/l mg/L	Total Dissolved Solids	ug/l		mg/L mg/l	120-429 (DC 1 W)			
Late optime during the solution of the	Total Organic Carbon	ug/l		mg/L mg/l				
Turbidity Intu 0 Intu 0 Intu 0 Intu 0 Intu Intu 0 Intu Intu Intu 0 Intu Intu <thi< td=""><td>Total Suspended Solids</td><td>ug/l</td><td></td><td>mg/L mg/l</td><td></td><td></td><td></td><td></td></thi<>	Total Suspended Solids	ug/l		mg/L mg/l				
Metals Metals	Turbidity	ntu	(9)	ntu	(9)			
Aluminum ug/l 75 mg/l 0.075 Aluminum, dissolved ug/l 15-75 (**) mg/l 0.015-0.075 (**) Barlum ug/l 11-110 (**) mg/l 0.011-1, 1(*) Beryllium ug/l 0.2 (**) mg/l 0.2 (**) Cadmium ug/l -2 (**) mg/l 0.0002 (**) Cadmium ug/l (**) mg/l 14 Cadmium ug/l 0.9 mg/l 0.0009 Cobalt ug/l 0.9 mg/l 0.005 Iron ug/l 5-25 (**) mg/l 0.005-0.025 (**) Magnesium ug/l mg/l Mercury, dissolved	Metals	inter		nta				
Aluminum, dissolved ug/l $16-75^{(m)}$ mg/L $0.015-0.075^{(m)}$ $$ <th< td=""><td>Aluminum</td><td>ua/l</td><td>75</td><td>ma/l</td><td>0.075</td><td></td><td></td><td></td></th<>	Aluminum	ua/l	75	ma/l	0.075			
Barlum Loss of the second of th	Aluminum dissolved	ug/l	15-75 (10)	mg/L	0.015-0.075 ⁽¹⁰⁾			
Baryllium ug/l 11-1100 mg/L 0.011-1.1 ⁽¹¹⁾ Boron ug/l 200 ⁽ⁿ⁾ mg/L 0.2 ⁽ⁿ⁾ Calcium ug/l mg/L 0.0002 ⁽ⁿ⁾ Calcium ug/l mg/L 1.44 Cobat ug/l 0.9 mg/L 0.0009 Copper ug/l 300 mg/L 0.005 <td>Barium</td> <td>ug/l</td> <td></td> <td>mg/L</td> <td></td> <td></td> <td></td> <td></td>	Barium	ug/l		mg/L				
Description Ug/l 200 ^{na} mg/L 0.01111	Beryllium	ug/l	11-1100 (11)	ma/l	0.011-1.1 ⁽¹¹⁾			
Dots Login Login <thlogin< th=""> <thl< td=""><td>Boron</td><td>ug/l</td><td>200 (12)</td><td>mg/L</td><td>0.011-1.1</td><td></td><td></td><td></td></thl<></thlogin<>	Boron	ug/l	200 (12)	mg/L	0.011-1.1			
Calcium Light Tight Occur (Might) Tight Occur (Might) Tight Tight <thtight< th=""> <thtight< th=""> <thtight<< td=""><td>Cadmium</td><td>ug/l</td><td>0.2⁽¹³⁾</td><td>mg/L</td><td>0.0002 (13)</td><td></td><td></td><td></td></thtight<<></thtight<></thtight<>	Cadmium	ug/l	0.2 ⁽¹³⁾	mg/L	0.0002 (13)			
Chromium ug/l (**) mg/L 14 Cobalt ug/l 0.9 mg/L 0.0009 Copper ug/l 300 mg/L 0.005 Iron ug/l 5-25 (**) mg/L 0.03 Magnesium ug/l 5-25 (**) mg/L 0.005-025 (**) Magnesium ug/l 5-25 (**) mg/L 0.0025 (**) Magnesium ug/l 0.2 (**) mg/L 0.0025 (**) Molybdenum ug/l 25 mg/L 0.025 Potassium ug/l 100 mg/L 0.1 <td>Calcium</td> <td>ug/l</td> <td></td> <td>mg/L</td> <td></td> <td></td> <td></td> <td></td>	Calcium	ug/l		mg/L				
Cobalt ug/l 0.9 mg/L 0.0009 Copper ug/l 5 mg/L 0.005 Iron ug/l 300 mg/L 0.33 Lead ug/l 5-25 (m) mg/L 0.005-0.025 (m) Magnese ug/l mg/L Marganese ug/l 0.2 (m) mg/L 0.002 (m) Molydenum ug/l 40 mg/L 0.004 Nickel ug/l 100 mg/L 0.1 Selenium ug/l mg/L	Chromium	ug/l	(14)	ma/L	14			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Cobalt	ug/l	0.9	mg/L	0.0009			
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Copper	ug/l	5	mg/L	0.005			
Lead ug/l $5-25^{(m)}$ mg/L $0.005-0.025^{(m)}$ $$ <	Iron	ug/l	300	mg/L	0.3			
Magnesium ug/l mg/L	Lead	ug/l	5-25 ⁽¹⁵⁾	mg/L	0.005-0.025 (15)			
Manganese ug/l mg/L Mercury, dissolved ug/l $0.2^{(16)}$ mg/L $0.0002^{(16)}$ Molybdenum ug/l 40 mg/L 0.04 Nickel ug/l 25 mg/L 0.025 Potassium ug/l mg/L Selenium ug/l 100 mg/L Silicon ug/l 0.1 mg/L 0.0001	Magnesium	ug/l		mg/L				
Mercury, dissolved ug/l $0.2^{(10)}$ mg/L $0.0002^{(10)}$ Molybdenum ug/l 40 mg/L 0.004 Nickel ug/l 25 mg/L 0.025 Potassium ug/l 100 mg/L Selenium ug/l 100 mg/L 0.1 Selenium ug/l mg/L 0.0001	Manganese	ug/l		mg/L				
Molybdenum ug/l 40 mg/L 0.04 Nickel ug/l 25 mg/L 0.025 Potassium ug/l 100 mg/L 0.11 Selenium ug/l 100 mg/L 0.1 Silicon ug/l mg/L Solium ug/l mg/L <td< td=""><td>Mercury, dissolved</td><td>ug/l</td><td>0.2 (16)</td><td>mg/L</td><td>0.0002 (16)</td><td></td><td></td><td></td></td<>	Mercury, dissolved	ug/l	0.2 (16)	mg/L	0.0002 (16)			
Nickel ug/l 25 mg/L 0.025	Molybdenum	ug/l	40	mg/L	0.04			
Potassium ug/l mg/L <th< td=""><td>Nickel</td><td>ug/l</td><td>25</td><td>mg/L</td><td>0.025</td><td></td><td></td><td></td></th<>	Nickel	ug/l	25	mg/L	0.025			
Selenium ug/l 100 mg/L 0.1	Potassium	ug/l		mg/L				
Silicon ug/l mg/L Silver ug/l 0.1 mg/L 0.0001	Selenium	ug/l	100	mg/L	0.1			
Silver ug/l 0.1 mg/L 0.0001 Solition ug/l mg/L	Silicon	ug/l		mg/L				
Sodium Ug/l Img/L -	Silver	ug/l	0.1	mg/L	0.0001			
Strontum ug/l mg/L	Soaium Straatium	ug/i		mg/L				
Sulful Ug/l Ing/L -	Strontium	ug/i		mg/L				
Triandrift Ug/l 0.0.5% Ing/L 0.0005% Ing	Thallium	ug/I	 0 3 (17)	mg/L	 0 0003 (17)			
Titanium ug/l mg/L Vanadium ug/l 6 mg/L 0.006 Zinc ug/l 30 (15) mg/L 0.03 (15) Phenols	Tin	ug/i	0.3	mg/L mg/l	0.0003			
Internation Log/L Internation Log/L Internation In	Titanium	ug/l		mg/L mg/l				
Zinc ug/l 30 (13) mg/L 0.03 (13) Phenols mg/L 0.001 (18) Phenolics, Total Recoverable ug/l 1 (18) mg/L 0.001 (18) Field Measurements mg/L Dissolved Oxygen (Field) ug/l mg/L Ph (Field) us/cm us/cm pH (Field) - 8.5 - 8.5 Temperature (Field) deg c (6)	Vanadium	ug/l	6	ma/l	0.006			
Phenols Image: Constraint of the second	Zinc	ua/l	30 (13)	ma/l	0.03 ⁽¹³⁾			
Phenolics, Total Recoverable ug/l 1 ⁽¹⁸⁾ mg/L 0.001 ⁽¹⁸⁾ Field Measurements mg/L 0.001 ⁽¹⁸⁾ Dissolved Oxygen (Field) ug/l mg/L Conductivity (Field) uS/cm uS/cm pH (Field) 8.5 8.5 Temperature (Field) deg c etc.	Phenols	~9/1			0.00			
Field Measurements ug/l (ii) mg/L (iii)	Phenolics. Total Recoverable	ua/l	1 (18)	ma/L	0.001 (18)			
Dissolved Oxygen (Field) ug/l (*) mg/L (*) <th< td=""><td>Field Measurements</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	Field Measurements							
Conductivity (Field) uS/cm uS/cm <th< td=""><td>Dissolved Oxygen (Field)</td><td>ua/l</td><td> (6)</td><td>ma/l</td><td>(6)</td><td></td><td></td><td></td></th<>	Dissolved Oxygen (Field)	ua/l	(6)	ma/l	(6)			
pH (Field) - 8.5 - 8.5 Temperature (Field) deg c 0	Conductivity (Field)	uS/cm		uS/cm				
Temperature (Field) deg c (® deg c (®	pH (Field)	-	8.5	-	8.5			
	Temperature (Field)	deg c	(8)	deg c	(8)			

					Moderate Impact	Moderate Impact	Moderate Impact
					On-site pond	On-site pond	On-site pond
	Unit		Unit		GS11	GS11	GS11
	(< June		(June		24-Apr-2019	24-Sept-2019	31-Oct-2019
Parameter	2016)	(2) (1) PWQO	2016+)	^{(2) (1)} PWQO	GS11	GS-11	GS-11
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	⁽⁵⁾	392	793	631
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	0.12	0.036	0.080
Ammonia Nitrogen	ug/l		mg/L		14	5.27	5.51
Biochemical Oxygen Demand, 5 Day	ug/i		mg/L		< 3	10	9
Chlorido	ug/i		mg/L	 120 640 (CWOG EW)	72.3	144	254
Color	color unit		nny/∟ color unit	120-040 (CWQGTW)	12.5	224	204
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ua/l		ma/l		31.5	28.8	23.8
Hardness, Calcium Carbonate	ua/l		ma/L		347	706	674
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)	1.56	1.15	2.61
Nitrite as N	ug/l		mg/L	0.06 (CWQG FW)	< 0.05	< 0.05	< 0.05
Nitrogen, Total Kjeldahl	ug/l		mg/L		18.1	9.6	9.3
Nitrogen, Nitrate-Nitrite	ug/l		mg/L				
Nitrogen, Organic	ug/l		mg/L				
Phosphorus	ug/l	10-30 (7)	mg/L	0.010 -0.030 ⁽⁷⁾	0.07	0.030	0.03
Sulphate	ug/l		mg/L	128-429 (BC FW)	45	91	137
Total Dissolved Solids	ug/l		mg/L		588	1327	1262
Total Organic Carbon	ug/l		mg/L				
Total Suspended Solids	ug/i		mg/L				
Motals	กเน	(0)	ทเน	(5)			
	ua/l	75	ma/l	0.075	0.1	0.00	0.160
Aluminum dissolved	ug/i	15 75 (10)	mg/L	0.015 0.075 (10)	0.06	0.09	0.160
Barium	ug/i	15-75	mg/L	0.015-0.075	0.00	0.090	0.090
Benyllium	ug/l	11_1100 (11)	mg/L	0.011.1.1(11)	< 0.0001	< 0.0001	< 0.0001
Boron	ug/l	200 (12)	mg/L	0.011-1.1	1 19	2.46	2 37
Cadmium	ug/l	0.2(13)	mg/L	0.2 (13)	0.000022	0.00025	0.000038
Calcium	ug/l		mg/L		99.9	179	170
Chromium	ug/l	(14)	ma/L	14	0.002	0.004	0.003
Cobalt	ug/l	0.9	mg/L	0.0009	0.0015	0.0034	0.0025
Copper	ug/l	5	mg/L	0.005	0.0032	0.0037	0.007
Iron	ug/l	300	mg/L	0.3	0.679	1.21	1.12
Lead	ug/l	5-25 (15)	mg/L	0.005-0.025 (15)	0.00013	0.00012	0.00017
Magnesium	ug/l		mg/L		24.2	62.8	59.3
Manganese	ug/l		mg/L		0.501	1.11	0.727
Mercury, dissolved	ug/l	0.2(16)	mg/L	0.0002 (16)	< 0.00002	< 0.00002	< 0.00002
Molybdenum	ug/l	40	mg/L	0.04	0.0007	0.0005	0.0007
Nickel	ug/i	25	mg/L	0.025	0.0047	0.0144	0.0112
Solonium	ug/i		mg/L		22.2	34.1	33.2
Silicon	ug/l	100	mg/L	0.1	3.85	5.8	<i>A A</i> 7
Silver	ug/l	0.1	mg/L	0.0001	< 0.0001	< 0.001	< 0.0001
Sodium	ua/l		ma/L		69.5	251	221
Strontium	ug/l		mg/L		0.599	1.32	1.08
Sulfur	ug/l		mg/L		14.6	36.3	42.1
Thallium	ug/l	0.3(17)	mg/L	0.0003 (17)	< 0.00005	< 0.00005	< 0.00005
Tin	ug/l		mg/L				
Titanium	ug/l		mg/L		0.005	< 0.005	0.01
Vanadium	ug/l	6	mg/L	0.006	0.0011	0.0036	0.0025
Zinc	ug/l	30 (13)	mg/L	0.03(13)	< 0.005	0.015	0.013
Phenois		4 (18)		0 004 (10)	< 0.000	< 0.000	< 0.004
	ug/I	1,139	mg/L	0.001(%)	< 0.002	< 0.002	< 0.001
		(8)	ma m //	(8)	7.00	40.0	0.5
Dissolved Oxygen (Field)	ug/I	(0)	mg/L	(0)	1204	12.6	ö.5
	us/cm		uS/CM	 9 E	1204	Z4UU 7 40	2001
Temperature (Field)	- deg c	0.0	- den c	0.3	1.0	1.42	1.9
	uey c		uey u		0.2	14.4	10.0

					Moderate Impact	Moderate Impact	Moderate Impact
					On-site pond	On-site pond	On-site pond
	Unit		Unit		GS12	GS12	GS12
	(< June		(June		24-Apr-2019	24-Sept-2019	31-Oct-2019
Parameter	2016)	^{(2) (1)} PWQO	2016+)	^{(2) (1)} PWQO	GS-12	GS-12	GS-12
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	⁽⁵⁾	206	188	213
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	0.057	0.025	< 0.01
Ammonia Nitrogen	ug/l		mg/L		2.76	0.08	0.1
Biochemical Oxygen Demand, 5 Day	ug/i		mg/L		< 3	< 3	3
Chemical Oxygen Demand	ug/i		mg/L		49	03	00
Color	ug/i		nig/L	120-040 (CVVQG FVV)	JU. I	00.4	00.0
Conductivity	umbo/cm		umbo/cm				
Dissolved Organic Carbon	unno/cm		ma/l		22.7	19.5	17.8
Hardness Calcium Carbonate	ug/l		mg/L		209	162	220
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)	0.37	< 0.05	< 0.05
Nitrite as N	ug/l		mg/L	0.06 (CWQG FW)	< 0.05	< 0.05	< 0.05
Nitrogen, Total Kjeldahl	ug/l		mg/L		4.3	2	2.4
Nitrogen, Nitrate-Nitrite	ug/l		mg/L				
Nitrogen, Organic	ug/l		mg/L				
Phosphorus	ug/l	10-30(7)	mg/L	0.010 -0.030 ⁽⁷⁾	0.1	0.070	0.080
Sulphate	ug/l		mg/L	128-429 (BC FW)	24	21	30
Total Dissolved Solids	ug/l		mg/L		323	329	404
Total Organic Carbon	ug/l		mg/L				
Total Suspended Solids	ug/l		mg/L				
Turbidity	ntu	(9)	ntu	(9)			
Metals		75		0.075			
Aluminum	ug/l	75	mg/L	0.075	0.16	0.05	0.04
Aluminum, dissolved	ug/l	15-75 ⁽¹⁰⁾	mg/L	0.015-0.075 ⁽¹⁰⁾	0.03	0.04	0.02
Barium	ug/I		mg/L		0.049	0.02	0.032
Beryllium	ug/I	11-1100 (11)	mg/L	0.011-1.1	< 0.0001	< 0.0001	< 0.0001
Boron	ug/l	200 ⁽¹²⁾	mg/L	0.2 ⁽¹²⁾	0.456	0.82	0.852
	ug/i	0.2	mg/L	0.0002(13)	0.000029	0.000021	< 0.000015
Chromium	ug/I	(14)	mg/L		54.7	20	30.4
Cabalt	ug/i	0.0	mg/L	0.0000	0.002	0.001	< 0.001
Copper	ug/l	0.9	mg/L	0.0009	0.0000	0.0003	0.0003
Iron	ug/l	300	mg/L	0.000	0.002	0.000	0.0010
Lead	ug/l	5-25 ⁽¹⁵⁾	mg/L	0.005-0.025 (15)	0.00015	0.00055	0.0011
Magnesium	ug/l		mg/L		19.4	27.3	30.9
Manganese	ua/l		ma/L		0.155	0.089	0.11
Mercury, dissolved	ug/l	0.2 (16)	mg/L	0.0002 (16)	< 0.00002	0.00003	0.00002
Molybdenum	ug/l	40	mg/L	0.04	0.0002	0.0004	0.0003
Nickel	ug/l	25	mg/L	0.025	0.0032	0.0048	0.0035
Potassium	ug/l		mg/L		8.4	10.7	12.3
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L		2.36	1.03	0.98
Silver	ug/l	0.1	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	ug/I		mg/L		42.1	70.5	//.2
Strontium	ug/i		mg/L		0.307	0.215	0.296
Thallium	ug/i	 0 3 (17)	mg/L	 0 0003 (17)	0 00005	0.0	9.0
Tin	ug/l	0.3	mg/L mg/l	0.0003 (/	< 0.00005	< 0.00005	< 0.00005
Titanium	ug/l		mg/L		0.008	< 0.005	< 0.005
Vanadium	ua/l	6	ma/l	0.006	0.0007	0.0028	0.0013
Zinc	ua/l	30 (13)	ma/L	0.03 (13)	< 0.005	0.006	0.011
Phenols	3 [.]			•			
Phenolics, Total Recoverable	ug/l	1 (18)	mg/L	0.001 (18)	0.002	< 0.002	< 0.001
Field Measurements	Ĭ						
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)	9.29	11.0	11.2
Conductivity (Field)	uS/cm		uS/cm		676	686	722
pH (Field)	-	8.5	-	8.5	8.1	9.06	7.2
Temperature (Field)	deg c	(8)	deg c	(8)	8.7	20	11.5

					Moderate Impact	Moderate Impact	Moderate Impact
					On-site pond	On-site pond	On-site pond
	Unit		Unit		GS15	GS15	GS15
	(< June		(June		24-Apr-19	24-Sept-2019	31-Oct-2019
Parameter	2016)	^{(2) (1)} PWQO	2016+)	^{(2) (1)} PWQO	GS-15	GS-15	GS-15
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	 ⁽⁵⁾	238	180	204
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	0.047	0.025	< 0.01
Ammonia Nitrogen	ug/l		mg/L		3.8	0.05	0.06
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L		< 3	< 3	< 3
Chemical Oxygen Demand	ug/l		mg/L		117	64	60
Chloride	ug/l		mg/L	120-640 (CWQG FW)	58.1	66.6	86.5
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ug/l		mg/L		24.2	19.5	17.7
Hardness, Calcium Carbonate	ug/l		mg/L		239	168	203
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)	0.4	< 0.05	< 0.05
Nitrite as N	ug/i		mg/L	0.06 (CWQG FW)	< 0.05	< 0.05	< 0.05
Nitrogen, I otal Kjeldani	ug/i		mg/L		5.5	1.9	1.8
Nitrogen, Nitrate-Nitrite	ug/i		mg/L				
Dhoophorup	ug/i	 10 20 (7)	mg/L	 0.010.0.020(7)	0.060	0.050	0.050
Sulphoto	ug/i	10-30	mg/L	129 420 (BC EW/)	0.060	0.050	0.050
Suprate	ug/i		mg/L	120-429 (DC FVV)	20	21	20
Total Organic Carbon	ug/i		mg/L		3/3	332	307
Total Suspended Solids	ug/l		mg/L mg/l				
Turbidity	ntu	(9)	ntu	(9)			
Metals	nto		nta				
Aluminum	ua/l	75	ma/l	0.075	0.500	0.03	0.05
Aluminum dissolved	ug/l	15-75 ⁽¹⁰⁾	mg/L	0.015-0.075 (10)	0.000	0.00	0.03
Barium	ug/l		mg/L	0.013-0.073	0.053	0.02	0.03
Bendlium	ug/l	11_1100 (11)	mg/L	0 011 1 1(11)	< 0.0001	< 0.0001	< 0.020
Boron	ug/l	200 (12)	mg/L	0.011-1.1	0.535	0.0001	0.0001
Cadmium	ug/l	0.2(13)	mg/L mg/l	0.2 (13)	0.000/1	0.00026	< 0.020
Calcium	ug/l	0.2	mg/L	0.0002	61.2	19	32.5
Chromium	ug/l	(14)	mg/L	14	0.002	< 0.001	< 0.001
Cobalt	ug/l	0.9	mg/L	0.0009	0.0008	0.0003	0.0003
Copper	ua/l	5	ma/L	0.005	0.0022	0.0027	0.0015
Iron	ua/l	300	ma/l	0.3	0.56	0.035	0.089
Lead	ua/l	5-25 ⁽¹⁵⁾	ma/L	0.005-0.025 (15)	0.00061	0.00034	0.0001
Magnesium	ua/l		ma/L		21.8	29.4	29.9
Manganese	ug/l		mg/L		0.45	0.086	0.091
Mercury, dissolved	ug/l	0.2(16)	mg/L	0.0002 (16)	< 0.00002	0.00003	< 0.00002
Molybdenum	ug/l	40	mg/L	0.04	0.0002	0.0003	0.0003
Nickel	ug/l	25	mg/L	0.025	0.0036	0.0049	0.0036
Potassium	ug/l		mg/L		9.2	11.5	12.1
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L		2.11	1.04	0.95
Silver	ug/l	0.1	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001
Sodium	ug/l		mg/L		48	76.1	75.3
Strontium	ug/l		mg/L		0.358	0.219	0.274
Sulfur	ug/I		mg/L		8.9	8.9	9.4
Tinallium	ug/i	0.3(17)	mg/L	0.0003(17)	< 0.00005	< 0.00005	< 0.00005
Titanium	ug/i		mg/L		0.017	< 0.005	< 0.005
Vapadium	ug/I	 6	mg/L		0.011	< 0.000 0.0005	< 0.005 0.0015
Zipo	ug/i	0 20 (13)	mg/L			0.0020	0.0015
Phonois	ug/I	30	rrig/L	0.03	< 0.005	0.000	0.009
Phonolics Total Passyarable	ua/l	1 (18)	ma/l	0 001 (18)	< 0.002	< 0 002	< () ()()1
Field Moasuremente	uy/i		mg/∟	0.001	- 0.00Z	- 0.002	- 0.001
Dissolved Oxygon (Field)	ug/I	(6)	ma/l	(6)	0.24	14 4	11 7
Conductivity (Field)	ug/i	(*)	IIIY/L	(9)	9.24	14.4	11.7
	uo/cm	 8 F	u3/0/11	 9.5	709	0 /	76
рп (гіеіа) Tomporaturo (Field)	- doc o	C.O (8)	- doc o	C.O (8)	1.9 7 0	७.4 10.0	1.0
remperature (Field)	ueyu	\./	ueyu		1.0	19.0	11.3

					Slightly Impacted	Slightly Impacted	Slightly Impacted
					Eastern ditch	Eastern ditch	Eastern ditch
	Unit		Unit		GS20	GS20	GS20
	(< June		(June		24-Apr-19	24-Sep-19	31-Oct-19
Parameter	2016)	(2) (1) PWQO	2016+)	^{(2) (1)} PWQO	GS-20	GS-20	GS-20
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	(5)	69	131	105
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	< 0.01	< 0.01	< 0.01
Ammonia Nitrogen	ug/l		mg/L		0.13	0.07	0.04
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L				
Chemical Oxygen Demand	ug/l		mg/L				
Chloride	ug/l		mg/L	120-640 (CWQG FW)	28.4	48.8	62.2
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm				
Dissolved Organic Carbon	ug/l		mg/L		9.8	27	8.5
Hardness, Calcium Carbonate	ug/l		mg/L		84	146	163
Nitrate as N	ug/l		mg/L	3-124 (CWQG FW)			
Nitrite as N	ug/I		mg/L	0.06 (CWQG FW)			
Nitrogen, Total Kjeldahl	ug/l		mg/L				
Nitrogen, Nitrate-Nitrite	ug/i		mg/L				
Decemberue	ug/i	 10.20(7)	mg/L	 0.010.0.020(7)	0.11	0 15	0 120
Priospriorus	ug/l	10-30 %	mg/L	0.010 -0.030 ⁽⁰⁾	0.11	0.15	0.120
Suprate	ug/i		mg/L	120-429 (DC FVV)	125	251	070
Total Dissolved Solids	ug/l		mg/L		155	201	213
Total Suspended Solids	ug/i		mg/L				
	ug/i	(9)	ntu	(9)			
Metals	ntu	(7	niu				
Aluminum	ua/l	75	ma/l	0.075			
	ug/l	15 75 (10)	mg/L	0.015.0.075 (10)			
Barium	ug/l	15-75	mg/L	0.015-0.075			
Bandlium	ug/l		mg/L	 0.011.1.1 ⁽¹¹⁾			
Beren	ug/i	200(12)	mg/L	0.011-1.1	0.044	0 381	0.096
Boron	ug/i	200 (12)	mg/L	0.2(12)	0.044	0.301	0.090
Calaium	ug/l	0.2	mg/L	0.0002(**)			27.2
Chromium	ug/l	(14)	mg/L				57.5
Cobalt		0.9	mg/L	0 0000			
Copper	ug/i	0.9	mg/L	0.0009			
Iron	ug/l	300	mg/L	0.000	1 43	5 43	2.5
Lead		5_25 (15)	mg/L	0.0		0.10	2.0
Magnesium			mg/L mg/l	0.003-0.023			16.9
Manganese	ug/l		mg/L		0.048	0 294	0.081
Mercury dissolved	ug/l	0 2 (16)	mg/L	0 0002 (16)	01010	01201	01001
Molybdenum	ug/l	40	mg/L	0.04			
Nickel	ug/l	25	ma/L	0.025			
Potassium	ua/l		ma/L				
Selenium	ug/l	100	mg/L	0.1			
Silicon	ug/l		mg/L				
Silver	ug/l	0.1	mg/L	0.0001			
Sodium	ug/l		mg/L		20.8	45.7	44.4
Strontium	ug/l		mg/L				
Sulfur	ug/l		mg/L	-			
Thallium	ug/l	0.3(17)	mg/L	0.0003 (17)			
Tin	ug/l		mg/L				
Titanium	ug/l		mg/L				
Vanadium	ug/l	6	mg/L	0.006			
Zinc	ug/l	30 (13)	mg/L	0.03(13)			
Phenois							
Phenolics, Total Recoverable	ug/l	1 ⁽¹⁸⁾	mg/L	0.001 (18)			
Field Measurements							
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)	6.75	8.5	11
Conductivity (Field)	uS/cm		uS/cm		332	512	515
pH (Field)	-	8.5	-	8.5	8.2	8.12	7.5
Temperature (Field)	deg c	(8)	deg c	(8)	6.9	16.8	11.0

					Slightly Impacted	Slightly Impacted	Slightly Impacted
					Eastern ditch	Eastern ditch	Eastern ditch
	Unit		Unit		GS21	GS21	GS21
	(< June		(June		24-Apr-19	24-Sep-19	31-Oct-19
Parameter	2016)	(2) (1) PWQO	2016+)	^{(2) (1)} PWQO	GS-21	GS-21	GS-21
General Chemistry							
Alkalinity (Total as CaCO3)	ug/l	(5)	mg/L	(5)	81	132	95
Ammonia, unionized (Field)	ug/l	20	mg/L	0.02	< 0.01	< 0.01	< 0.01
Ammonia Nitrogen	ug/l		mg/L	-	0.08	0.08	0.04
Biochemical Oxygen Demand, 5 Day	ug/l		mg/L				
Chemical Oxygen Demand	ug/l		mg/L				
Chloride	ug/l		mg/L	120-640 (CWQG FW)	20	49.6	45.6
Color	color unit		color unit				
Conductivity	umho/cm		umho/cm		<u> </u>	15.0	
Dissolved Organic Carbon	ug/l		mg/L		9.1	15.9	6.5
Hardness, Calcium Carbonate	ug/I		mg/L		79	151	155
Nitrite as N	ug/i		mg/L	3-124 (CWQG FW)			
Nitrogon, Total Kieldehl	ug/i		mg/L				
Nitrogen, Nitrate-Nitrite	ug/l		mg/L				
Nitrogen, Organic	ug/l		mg/L				
Phosphorus	ug/l	10-30 ⁽⁷⁾	mg/L	0 010 -0 030	0.11	0.140	0.080
Sulphate	ug/l		mg/L	128-429 (BC FW)			
Total Dissolved Solids	ug/l		mg/L		126	256	240
Total Organic Carbon	ug/l		mg/L		120	200	240
Total Suspended Solids	ug/l		mg/L				
Turbidity	ntu	(9)	ntu	(9)			
Metals							
Aluminum	ug/l	75	mg/L	0.075			
Aluminum, dissolved	ug/l	15-75 (10)	mg/L	0.015-0.075 (10)			
Barium	ug/l		mg/L				
Bervllium	ua/l	11-1100 (11)	ma/L	0 011-1 1 ⁽¹¹⁾			
Boron	ua/l	200 (12)	ma/L	0.2 ⁽¹²⁾	0.021	0.39	0.044
Cadmium	ua/l	0.2 (13)	ma/L	0.0002 (13)	0.021	0.00	01011
Calcium	ug/l		mg/L				35.5
Chromium	ug/l	(14)	mg/L	14			
Cobalt	ug/l	0.9	mg/L	0.0009			
Copper	ug/l	5	mg/L	0.005			
Iron	ug/l	300	mg/L	0.3	1.51	5.19	1.76
Lead	ug/l	5-25 (15)	mg/L	0.005-0.025 (15)			
Magnesium	ug/l		mg/L				16.2
Manganese	ug/l		mg/L		0.044	0.28	0.029
Mercury, dissolved	ug/l	0.2 (16)	mg/L	0.0002 (16)			
Molybdenum	ug/l	40	mg/L	0.04			
Nickel	ug/l	25	mg/L	0.025			
Potassium	ug/I		mg/L				
Selenium	ug/i	100	mg/L	0.1			
Silicon	ug/i		mg/L				
Sodium	ug/i	0.1	mg/L mg/l	0.0001	14.7	/7 1	35.0
Strontium	ug/l		mg/L		14.7	47.1	55.5
Sulfur	ug/l		mg/L				
Thallium	ug/l	0.3(17)	mg/L	0.0003 (17)			
Tin	ua/l		ma/L				
Titanium	ua/l		ma/L				
Vanadium	uq/l	6	mg/L	0.006			
Zinc	ug/l	30 (13)	mg/L	0.03 (13)			
Phenols							
Phenolics, Total Recoverable	ug/l	1 ⁽¹⁸⁾	mg/L	0.001 (18)			
Field Measurements							
Dissolved Oxygen (Field)	ug/l	(6)	mg/L	(6)	8.24	12.2	11.2
Conductivity (Field)	uS/cm		uS/cm		258	556	455
pH (Field)	-	8.5	-	8.5	7.7	7.9	7.4
Temperature (Field)	deg c	(8)	deg c	(8)	7	14.2	11.1

APPENDIX I-2 Historical Data

(PDF Only)

APPENDIX J

Graphs of Concentration Trend at Selected Trigger Wells



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APPENDIX K

Graphs of Concentrations Trend at Selected Surface Water Locations





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APPENDIX L

Photo Album



S1













GS 8



S2

Clarence-Rockland Landfill

2019 Surface Water Monitoring Locations















GS 15







GS 17

GS 21



Clarence-Rockland Landfill

2019 Surface Water Monitoring Locations



Staff Guage

DATE	Feb-20
PROJECT	17-6021C
PLATE	2











P2-90





P5A-91

Note: Photos are from 2018



Clarence-Rockland Landfill

2019 Groundwater Monitoring Locations



P7-91



G9 Deep & Shallow





G8-92





G9 Medium

Note: Photos are from 2018



Clarence-Rockland Landfill

2019 Groundwater Monitoring Locations

G10-92

G12-92

DATE 1-Feb-20 PROJECT 17-6021C PLATE 4







G15-92



G14-92

Note: Photos are from 2018





G17-92



Clarence-Rockland Landfill

2019 Groundwater Monitoring Locations



G18-94



G20-94

1-Feb-20

PLATE

PROJECT

DATE

17-6021C

5





G21-94





G23-94

Note: Photos are from 2018









Clarence-Rockland Landfill

2019 Groundwater Monitoring Locations



G27-97

G28-97

DATE

1-Feb-20

PROJECT

17-6021C

PLATE

6



G29-97



G31-98 (D&S)



G30-97

Note: Photos are from 2018



G32-98 (D&S)



Clarence-Rockland Landfill

2019 Groundwater Monitoring Locations



DATE

1-Feb-20

PROJECT

17-6021C

PLATE

7





G40-07

G42-10

Note: Photos are from 2018



Clarence-Rockland Landfill

2019 Groundwater Monitoring Locations



APPENDIX M

Surface Water Compliance Evaluation

		Western Stream	Western Stream	Western Stream	Western Ditch	On-site pond	On-site pond	On-site pond	Eastern ditch	Eastern ditch
	2019	GS6	S1	S2	S8	GS11	GS12	GS15	GS20	GS21
	Trigger									
Parameter (mg/L)	Concentration	25-April-2019	25-Apr-2019	25-April-2019	25-April-2019	24-Apr-2019	24-Apr-2019	24-Apr-19	24-Apr-19	24-Apr-19
Ammonia, unionized (Field)	0.87	< 0.01	< 0.01	0.002	< 0.01	0.12	0.057	0.047	< 0.01	< 0.01
Phosphorus	0.08	0.14	0.26	0.25	0.340	0.07	0.1	0.060	0.11	0.11
Boron	0.2	0.009	0.011	0.011	0.015	1.19	0.456	0.535	0.044	0.021
Iron	1.5	1.85	2.18	3.13	3.93	0.679	0.306	0.56	1.43	1.51

		Western Stream	Western Stream	Western Stream	Western Ditch	On-site pond	On-site pond	On-site pond	Eastern ditch	Eastern ditch
	2019	GS6	S1	S2	S8	GS11	GS12	GS15	GS20	GS21
	Trigger									
Parameter (mg/L)	Concentration	24-Sept-2019	24-Sept-2019	24-Sept-2019	24-Sept-2019	24-Sept-2019	24-Sept-2019	24-Sept-2019	24-Sep-19	24-Sep-19
Ammonia, unionized (Field)	0.87	< 0.01	< 0.01	< 0.01	< 0.01	0.036	0.025	0.025	< 0.01	< 0.01
Phosphorus	0.08	0.06	0.22	0.27	0.340	0.030	0.070	0.050	0.15	0.140
Boron	0.2	0.014	0.02	0.03	0.056	2.46	0.82	0.872	0.381	0.39
Iron	1.5	0.554	1.23	1.53	2.03	1.21	0.088	0.035	5.43	5.19

		Western Stream	Western Stream	Western Stream	Western Ditch	On-site pond	On-site pond	On-site pond	Eastern ditch	Eastern ditch
	2019	GS6	S1	S2	S8	GS11	GS12	GS15	GS20	GS21
	Trigger									
Parameter (mg/L)	Concentration	31-Oct-2019	31-Oct-2019	31-Oct-2019	31-Oct-2019	31-Oct-2019	31-Oct-2019	31-Oct-2019	31-Oct-19	31-Oct-19
Ammonia, unionized (Field)	0.87	< 0.01	< 0.01	< 0.01	< 0.01	0.080	< 0.01	< 0.01	< 0.01	< 0.01
Phosphorus	0.08	0.01	0.080	0.060	0.080	0.03	0.080	0.050	0.120	0.080
Boron	0.2	0.005	0.01	0.011	0.011	2.37	0.852	0.823	0.096	0.044
Iron	1.5	0.377	0.767	0.627	0.87	1.12	0.121	0.089	2.5	1.76

Concentration exceed the trigger value