

# APPENDIX K

## Summary of Comments on Draft EA

## Appendix K-1

### Comment Received from the Public

**Table K-1: Summary of Comments from Public on Draft EA**

Location of Original Comment/Response (if provided)	Commenter Identifier	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
Appendix K-1-1	Individual 10	June 10, 2014	Taggart, get out of town and take your garbage with you!!!	No written response issued.	No change to EA.
Appendix K-1-2	Individual 12	June 10, 2014	Is the draft EA up on the CRRRC website? I don't see anything newer than Dec, 2013.	The draft EA went on the CRRRC website in the early morning on June 11, 2014.	No change to EA.
Appendix K-1-3	Individual 6	June 10, 2014	Merci	No written response issued.	No change to EA.
Appendix K-1-4	Individual 20	June 10, 2014	Received Taggart Miller's notification that the CRRRC Environmental Assessment Reports have been submitted today.  The notification says: "Le rapport principal de l'ébauche d'évaluation environnementale - Volume 1 et son résumé seront également disponibles en français."  Why is only volume one of these reports available in French?	Please review the draft EA. It has not been submitted; it is being made available for public review prior to being submitted.  The main EA report is in both English and French, as we committed in the Terms of Reference. If you have any questions or comments after reviewing the draft, please let me know.	No change to EA.
		June 10, 2014	Vol 1 of 6 large volumes is translated into French!  How is that helpful to our Francophone neighbours that deserve to review the report in their language of choice?	Volume 1 is the main EA report and summarizes all of the relevant information. The other documents are technical appendices and consultation records.  The submission deals almost entirely with the Boundary Road site as you will see when you review it, as the Russell site is no longer under active consideration.	No change to EA.
		June 11, 2014	Can we now assure the concerned citizens of Russell Township that Taggart Miller has abandoned all plans to put a waste landfill at the North Russell Quarry site, or do you still consider it as an option for the future?	Assuming the EA for the Boundary Road site is approved, Taggart Miller has no plans for the North Russell site and intends to dispose of the site when market conditions are favorable.	No change to EA.
		June 12, 2014	What are your plans for the North Russell Site if the Boundary Rd. Site is not approved by the MOE?	While the EA permits Taggart Miller to revisit the North Russell site in this circumstance, Taggart Miller has no plans to do so should the EA for the Boundary Road site not be approved.	No change to EA.
		June 20, 2014	Thank you Mr. Bourque. We will see you at Open House #6!	No written response issued.	No change to EA.
		June 10, 2014	Just finishes watching the video that you have prepared. I want to know why is it that you are showing all this diversion taking place, since we all know that less than 12% of the waste going to go to this location will actually be recycled. And why did you not include a picture of what this site will look like in 5 years after it is opened and all we can see from the highway will be a mountain of garbage, rats and birds all around the area  you should be ashamed	We are in fact projecting diversion rates of between 43 and 57 per cent at the CRRRC.  Re visibility, please review the visual assessment in the draft EA or come to our upcoming open house. You will see that the facility can be effectively screened to minimize any visual impact.	No change to EA.
Appendix K-1-6	Individual 26	June 12, 2014	Many difficulties trying to view Draft EA. Most items load but do not display.	We are not receiving any other comments about difficulties in displaying the reports. I just tried downloading a number to be sure and they all downloaded and displayed properly. I suggest you check your security settings on your computer and ensure that you have the updated Adobe software for viewing.	No change to EA. As commented by the MOECC, EA documents loaded on the website will be screened to ensure they all download correctly.
		June 18, 2014	Thanks	No written response issued.	No change to EA.
Appendix K-1-7	Individual 23	June 13, 2014	Is this draft the only time we have to comment? Will we have the same time to comment on the final version?  The local impacted residents are wondering why we would comment now...the final version could be significantly different. Please advise.  Also, the last email I sent you in early January took you over 5 months to respond.....a response within a week would be more appropriate.	There is a 7 week review period on the final EA, once submitted. We do not anticipate that the final EA will be materially different from the draft, however that will depend on the comments received on the draft.	No change to EA.



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			permission to proceed is denied. Perhaps these suggestions will allow the final environmental assessment to be more complete and scholarly, despite the overall implausibility of the project.		<div>Apr 21</div> <div>Apr 21, June 6, June 26, July 13, Aug 29, Sept 13, Sept 20, Sept 21</div> <div>May 16</div> <div>June 6, June 26</div> <div>June 14</div> <div>June 14</div> <div>June 14, June 26, Aug 29, Sept 13, Sept 20, Sept 21, Oct 15</div> <div>July 3</div> <div>July 13</div> <div>Aug 26</div> <div>Sept 6</div> <div>Sept 13</div> <div>Sept 20</div> <div>Oct 15</div> <div>Oct 18</div>	<div>Raptor nesting survey</div> <div>Ecological Land Classification and vegetation survey</div> <div>Aquatic (fish habitat) survey DD1, DD2, and Simpson Drain.</div> <div>Breeding bird and marsh bird playback survey</div> <div>Mobilization of bat detectors BAT1 and BAT2</div> <div>Bat habitat survey</div> <div>Area search/visual encounter survey for all wildlife, including butterflies and dragonflies</div> <div>Mobilization of bat detector BAT3</div> <div>Demobilization of bat detectors</div> <div>Fish habitat mapping at DD1, DD2 and Simpson Drain</div> <div>Fish community inventory survey at DD1, DD2 and Simpson Drain</div> <div>Fish habitat mapping at DD3</div> <div>Fish community survey at DD3</div> <div>Benthic survey at DD3</div> <div>Benthic survey at off-Site reference stations (B7 and B8 on Figure 2)</div>	
Appendix K-1-9	Individual 1	June 26, 2014	<p>Comment to Taggart Miller: Without going into detail I just want you to know that the draft EA available for downloading from your website is very poorly organized. For example: there is an important section 8.5 which must be an integral part of the main geological report, yet it is not. It appears separately. Autrement dit il faut que cette partie soit incorporé dans le rapport, non a part. Please have that report re-organized.</p> <p>As you and the direction at Golder Associates must know that form of presentation, i.e. dispersing relevant information rather than concentrating it, is extremely frustrating to the reviewer and may lead many to just "throw in the towel" and not devote their attention to the EA that it, the EA, deserves. As concerned citizens you should want an honest and effective review from the regulators and the community.</p> <p>The final EA must be organized to facilitate review, meaning that all parts of any component are together in a single volume. By way of illustration the entire geological presentation, including all illustrations, tables and text MUST be in the same volume. The same applies to each and every other component that</p>	<p>The main Environmental Assessment Study Report (EASR) and the Geology, Hydrogeology and Geotechnical Report (Volume III) have been organized in a manner similar to other approved EA's and hydrogeology reports supporting waste EA's and waste management applications in the province of Ontario. The organization and format is not unique to the CRRRC project. Components of geology and hydrogeology within the main EASR are summaries of the full details provided in the Geology, Hydrogeology and Geotechnical Report. There is no geology or hydrogeology content within the EASR that is not in the Geology, Hydrogeology and Geotechnical Report (Volume III). We encourage you to read the Geology, Hydrogeology and Geotechnical Report (Volume III) fully as we anticipate this is likely where your interest lies.</p>			No change to EA.



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			<p>makes up the mountainous document.</p> <p>Comment to Ms. Garcia-Wright (MOE): This is being sent to you in order that you may see that I have addressed the proponent directly. Now let's see what good it does. Proponents have an obligation to submit an EA report, but I am not aware that MOE has any requirements regarding organization of the report. As a person who has lots of experience reading and evaluating similar reports I could provide you with requirements, free of charge. Those requirements would oblige Taggart-Miller Environmental Services (TMES) to submit an EA that facilitates review by MOE staff, your Government Review Team (GRT) and concerned people. The reason for my not submitting any now is because you have, thus far, ignored my recommendations. My recommendations are not from a NIMBY perspective because I am NOT NIMBY. They would apply to anyone wishing to develop a landfill anywhere in Ontario.</p> <p>I realize that TMES would have to dictate to Golder that the report must be reorganized, which would take additional time. If, however, you really do care about protecting the environment, then you would require a reorganization of that report for the official submission. To see how the draft report is organized go to: <a href="http://www.crrrc.ca/whatsnew.htm">http://www.crrrc.ca/whatsnew.htm</a></p> <p>Il faudrait, également, que le rapport entier soit soumis en français aussi bien qu'en anglais. The entire report must be bilingual.</p>		
Appendix K-1-10	Individual 20	June 25, 2014	<p>Images and partial articles were provided by this individual at Open House #6 in relation to his review of the draft EA.</p> <p>1. The first attachment is the recent airborne geophysical magnetic survey map of the basement Precambrian geology in the area prepared by the OGS and published.</p> <p>2. The second map is the seismic site class map of the Ottawa area prepared by the GSC.</p> <p>3. The 3rd reference is about the big earthquake that this area could experience.</p> <p>4. The 4th reference is the paper from Brooks about the dating of large historic earthquakes that caused landsliding in the Quyon area, with the new information being that this occurred as recent as ~1,000 years ago. It builds on the work done east of the City by the GSC about the large historic quakes around 4500 and 7000 years ago.</p>	<p>No written response issued.</p> <p>1. The preliminary airborne total field magnetic survey was reviewed. The magnetic trends shown are consistent with the northeast-southwest structural trend of the Grenville age Precambrian basement that underlies the area. The Gloucester Fault is also indicated by offset magnetic patterns in the basement structure that approximately coincide with the known position of this structure.</p> <p>2. During the EA, site specific VSP testing was completed, the results of which show the Boundary Road Site to be Class E. This agrees with the GSC seismic site class map.</p> <p>3. Taggart Miller used M6 to M7 earthquakes in assessment of the CRRRC, so this reference does not add any new considerations for the assessment.</p> <p>4. The Brooks paper was reviewed. The location is over 100 km from the CRRRC Site and does not affect the relevant conclusions of this part of the assessment.</p>	<p>2. A reference to the seismic site class map of the Ottawa area was added to the EASR and it includes a statement that the map agrees with the results of Site specific testing.</p>

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Appendix K-1-11	Individual 9	June 24, 2014	<p>Ms. Zappone: Based on your knowledge of prior applications for EA review, can you characterize how precise factual summaries are expected (by MoE officials) to be?</p> <p>This question is prompted by the Draft EA document published this month by the Miller-Taggart consortium promoting the CRRRC near Ottawa -- specifically how it describes on p 255-6 (para. 13.2.4) "the area of the site" viz. "Mainly properties/facilities/ yard areas... Some existing residences fronting on Boundary Road."</p> <p>1. This description does not describe "the area of the site" but merely the roads round the site, possibly even just one side of these roads. By contrast, only a dozen pages away in the Draft EA the area of the site is (for the proposed Property Value Protection Plan, p.268) described as a circle of radius 5 km. i.e. including the villages of Carlsbad Springs and Edwards.</p> <p>The Draft EA was obviously written by many hands but it constitutes a single document submitted by a single commercial entity: only no editor has attempted to co-ordinate the various components of the EA so that they fit together. The same vague phrases, e.g. "the area of the site" are used to mean different things on different pages.</p> <p>Do MoE officials normally expect applicants to be consistent in these respects, or does the MoE usually accept documents as ambiguous and imprecise as this?</p> <p>2. It takes less than one man-hour to make an exact inventory of the geography actually described in para. 13.2.4. The peripheral roads of the dump site contain 13 business premises and 12 residences (3 already bought by M-T for demolition in 2015).</p> <p>The Draft EA provides no such numbers. Readers cannot know whether the drafter of this paragraph never bothered to count the businesses and residences, or had the figures before him and could not be bothered to put them before local residents and MoE examiners. Readers are equally unaware why para. 13.2.4 omits the most obvious single business establishment directly opposite the dump site, a Petro-Canada gas station, also the only food vendor currently open for business adjacent to the site. (The paragraph specifies a gas bar with three gas pumps -- which means the Luso Garage, not Petro-Canada which has four double-sided pumps, i.e. countable as either 4 or 8.)</p> <p>Readers who know the geography cannot know why so much was left out. Readers who do not know the geography cannot know that so much was left out. Is this normal for planning documents placed before the MoE?</p>	<p>No written response issued.</p> <p>1. In the context of Section 13.2.4 of Volume I of the main EA, the "area of the Site" being discussed is the Site-vicinity, which is described in Section 2.3 as 500 metres around the Site. The proposed Property Value Protection Plan area is described as a 5 kilometre radius as noted. The description of these areas is for entirely different purposes.</p> <p>2. Taggart Miller did inventory all land within the Site-vicinity regarding land usage. Residential land use was quantified in Section 8.4.1 of the draft EA. Within 500 metres of the Site there are 9 residences recorded, not including the residences owned by Taggart Miller that would be removed as a result of developing the property. The general nature of businesses in the Site-vicinity was provided.</p>	<p>1. Section 13.2.4 of Volume I, 1<sup>st</sup> paragraph term "area of the Site" changed to Site-vicinity to avoid confusion.</p>



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Appendix K-1-12	Sue Langlois, President CRCCPE	July 31, 2014	<p>The Capital Region Citizens Coalition for the Protection of the Environment (CRCCPE) actively represents the concerned residents of Carlsbad Springs, Edwards and Vars, the unwilling host community for the proposed CRRRC landfill and diversion project. Since the announcement that the Boundary Road site was being considered for the private landfill project, CRCCPE has stated dissatisfaction with the planning, consultation, and lack of due diligence displayed by Taggart--Miller. The draft Terms of Reference (TOR) did not mention the Boundary Road site, but the final version of the Terms included it as an unlikely alternative to a North Russell property. At this point a draft EA report focusing exclusively on the Boundary Rd property has been put forward. Given the past experience on this project and the enormous deviation in content, between the draft and final TOR documents, CRCCPE will reserve our detailed review and analysis for the final EA, once all information has been included.</p> <p>In general, CRCCPE notes that Taggart--Miller has not referenced ALL published technical information on topics including biology, geology and engineering which are pertinent to properly assessing the foreseeable environmental impacts of the proposed CRRRC project at the Boundary Road location. The fact that Taggart-- Miller has not made use of all the relevant studies of the property available from the City of Ottawa's own planning department, such as the GEOCON report for example, highlights the concerning lack of rigour with which they are approaching the risk assessment of this project.</p> <p>Taggart--Miller informed the public that the draft EA report would require review between January and March 2014 and CRCCPE retained experts for that task in that time frame. The unexplained delay of the draft EA review period until high summer conflicts with the scheduled field work of several technical reviewers. Nonetheless, two of CRCCPE's technical experts have provided comment on this draft EA to Taggart--Miller, independently noting the lack of thoroughness. That Taggart--Miller's biologists failed to report beavers and other large fauna inhabiting the site is especially revealing. As recognized in the NCC's recently adopted Greenbelt plan, the proposed landfill site is a key wildlife corridor between protected green areas. The site is also the headwaters for Shaw's creek, the main artery through the protected Cumberland Forest and associated habitats. Of additional concern is the downplayed likely impact on local agriculture, the watershed, and ground water, as stated by another CRCCPE technical] reviewer: "There are issues with the reliability and calibration of the groundwater flow model used, which by Taggart--Miller's own admission is not up to par."</p> <p>Geologists reviewing the draft EA mention: "The report is missing published relevant information on past seismic events (&gt; M6.1, Brookes, 2013), that according to the National Building Code of Canada are to be used to design structures with an earthquake ground motion having a 2% in 50 years probability of exceedance (return period of 1 in 2475 yrs). We also note a continued refusal to recognize and study local faults in the immediate area that could activate future seismic events at a much closer distance to the site. One of these faults is clearly evident on the east--west cross--section Golder Associates prepared for the site and showed at Open Houses #5 and #6."</p>	<p>No written response issued.</p> <p>A draft Terms of Reference was never issued for the CRRRC project. The Terms of Reference never referred to the Boundary Road Site as an "unlikely alternative" to the North Russell Road Site.</p> <p>References identified by others have been considered in other comment responses above. In a few cases, additional material that has been identified could be noted as appropriate in the EA. With respect to the GEOCON report, Taggart Miller is aware of this report and requested this report from the City of Ottawa. We were told that the City does not have a copy. In any event the geotechnical assessments outlined within the TOR and completed as part of the EA were extensive to ensure that the assessment completed now contains current and more complete information than could ever be gained from review of the now 25 year old GEOCON preliminary work and report.</p> <p>Beaver activity is discussed in Section 8.7.6 of Volume I of the draft EA and further details are provided in TSD 4. Potential for impact to wildlife corridors and Shaw's Creek were considered by the discipline experts and described in Section 11.5.2. Taggart Miller is uncertain what is meant about the reliability and calibration of the groundwater flow model.</p> <p>As already noted, references identified by others have been considered in other comment responses above. A response regarding the Brooks paper is provided above. Local faults were considered and studied as part of the assessment and described in Section 11.3.1 of Volume I of the EASR.</p>	No change to EA.



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			In numerous ways, Taggart—Miller fails to demonstrate the precautionary principle in their design. The resultant proposal lacks industry standard containment elements like a dual landfill liner system, instead suggesting an old--fashioned hole in the ground full of trash. Unlike Taggart--Miller, progressive waste management operators in the immediate CRRRC area are creating large diversion facilities WITHOUT building new landfills because the Ottawa region has ample waste disposal capacity to last a reasonable, multi—decadal planning window. Impacted residents have found the proponents to be evasive and lacking in good faith throughout this EA process and remain staunchly opposed to this destructive mega- project. We ask the Minister of the Environment to reject this EA and the flawed CRRRC project.	Regulatory preference in Ontario is to use natural materials as liners when they are available, as is the case at the Boundary Road Site. The opportunity for a new and innovative integrated facility to help improve IC&I waste diversion in the Capital Region and Eastern Ontario was analyzed in the approved TOR.	

**Edmond, Trish**

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**From: "**

**Subject: RE: Open House #6 for Capital Region Resource Recovery Centre/Sixième journée portes ouvertes au Centre de récupération des ressources de la région de la Capitale**

**Date:** June 10, 2014 at 4:06:28 PM GMT-4

**To: "Hubert Bourque"** <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>, <[ian.taggart@taggart.com](mailto:ian.taggart@taggart.com)>

Taggart, get out of our town and take your garbage with you!!!

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**From:** Hubert Bourque [<mailto:hjbouque@crrrc.ca>]

**Sent:** June-10-14 4:01 PM

**To:**

**Subject:** Open House #6 for Capital Region Resource Recovery Centre/Sixième journée portes ouvertes au Centre de récupération des ressources de la région de la Capitale

[SVP faites défiler vers le bas pour la version française.](#)

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Taggart Miller Environmental Services (Taggart Miller) has completed the draft environmental assessment for a proposed integrated waste management project to be known as the Capital Region Resource Recovery Centre (CRRRC), to be located near the Boundary Road/Highway 417 interchange. Taggart Miller is now making its draft environmental assessment available for public comment prior to finalization and submission of the final environmental assessment to the Ministry of the Environment.

Public participation by local residents and other interested parties is an important part of the environmental assessment process. You may review the draft environmental assessment on the project website ([www.crrrc.ca](http://www.crrrc.ca)) or during normal business hours at the following locations:

Taggart Miller Environmental Services Taggart Realty 225 Metcalfe Street, Suite 708 Ottawa, Ontario	Carlsbad Springs Community Centre 6020 Piperville Road Carlsbad Springs, Ontario (call for access)
Township of Russell Public Library 1053 Concession Street Russell, Ontario	City of Ottawa Public Library, Blackburn Hamlet Branch 199 Glen Park Drive Ottawa, Ontario
Ministry of the Environment Ottawa District Office 2430 Don Reid Drive Ottawa, Ontario	

Comments on the draft environmental assessment should be provided in writing to Taggart Miller by **July 31, 2014**. All comments should be submitted to:

Mr. Hubert Bourque, Project Manager  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Open House #6 will present an overview of the draft EA.

**Open House # 6**

**Wednesday, June 25, 2014  
4:00 to 9:00 pm  
Carlsbad Springs Community Centre  
6020 Piperville Road (Eighth Line), Ottawa**

You are receiving this message because you signed up for the mailing list at one of our Open Houses or at [crrrc.ca](http://crrrc.ca). You may click here to [Unsubscribe](#).

Taggart Miller Environmental Services (Taggart Miller) a terminé l'ébauche de l'évaluation environnementale pour une proposition de projet de gestion intégrée des déchets connu sous le nom de Centre de récupération des ressources de la région de la capitale (CRRRC). Ce centre sera situé près de l'échangeur du chemin Boundary et de l'autoroute 417. Taggart Miller met maintenant l'ébauche de son évaluation environnementale à la disposition du public afin que ce dernier puisse le commenter avant l'achèvement et la présentation de la version définitive au ministère de l'Environnement.

La participation publique de résidents locaux et d'autres parties concernées est une étape importante du processus d'évaluation environnementale. Vous pouvez examiner l'ébauche de l'évaluation environnementale sur le site Web du projet ([www.crrrc.ca](http://www.crrrc.ca)) ou au cours des heures normales d'ouverture aux endroits suivants :

Taggart Miller Environmental Services Taggart Realty 225, rue Metcalfe, bureau 708 Ottawa (Ontario)	Centre communautaire de Carlsbad Springs 6020, chemin Piperville Carlsbad Springs (Ontario) (appelez pour obtenir l'accès)
Bibliothèque publique du canton de Russell 1053, rue Concession Russell (Ontario)	Bibliothèque publique d'Ottawa, succursale de Blackburn Hamlet 199, promenade Glen Park Ottawa (Ontario)
Ministère de l'Environnement Bureau de district d'Ottawa 2430, promenade Don Reid Ottawa (Ontario)	

*Le rapport principal de l'ébauche d'évaluation environnementale - Volume 1 et son résumé seront également disponibles en français.*

Vous devez fournir vos commentaires sur l'ébauche de l'évaluation environnementale par écrit à Taggart Miller d'ici le **31 juillet 2014**. Tous les commentaires doivent être envoyés à la personne suivante :

M. Hubert Bourque, directeur de projet  
Taggart Miller Environmental Services  
a/s 225, rue Metcalfe, bureau 708  
Ottawa (Ontario) K2P 1P9  
Téléphone : 6134545580  
Télécopieur : 6134545581  
Courriel : [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Au cours de la sixième journée porte ouverte, nous présenterons un aperçu de l'ébauche de l'EE.

**Sixième journée portes ouvertes**

**Mercredi 25 juin 2014  
De 16 h à 21 h  
Centre communautaire de Carlsbad Springs  
6020, chemin Piperville (chemin Eighth Line), Ottawa**

Vous recevez ce message parce que vous vous êtes inscrits à la liste de diffusion à l'une de nos journées portes ouvertes ou au [crrrc.ca](http://crrrc.ca). Veuillez cliquer [Unsubscribe](#) pour vous désabonner.

**Edmond, Trish**

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**From:** Hubert Bourque [mailto:hjbouque@crrrc.ca]

**Sent:** June 12, 2014 10:15 AM

**To:**

**Subject:** Re: Open House #6 for Capital Region Resource Recovery Centre/Sixième journée portes ouvertes au Centre de récupération des ressources de la région de la Capitale

The draft EA went on the CRRRC website in the early morning on June 11, 2014.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 10, 2014, at 4:11 PM, wrote:

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Taggart Miller Environmental Services Taggart Realty 225, rue Metcalfe, bureau 708 Ottawa (Ontario)	Centre communautaire de Carlsbad Springs 6020, chemin Piperville Carlsbad Springs (Ontario) (appelez pour obtenir l'accès)
Bibliothèque publique du canton de Russell 1053, rue Concession Russell (Ontario)	Bibliothèque publique d'Ottawa, succursale de Blackburn Hamlet 199, promenade Glen Park Ottawa (Ontario)
Ministère de l'Environnement Bureau de district d'Ottawa 2430, promenade Don Reid Ottawa (Ontario)	

*Le rapport principal de l'ébauche d'évaluation environnementale - Volume 1 et son résumé seront également disponibles en français.*



Vous devez fournir vos commentaires sur l'ébauche de l'évaluation environnementale par écrit à Taggart Miller d'ici le **31 juillet 2014**. Tous les commentaires doivent être envoyés à la personne suivante :

M. Hubert Bourque, directeur de projet  
Taggart Miller Environmental Services  
a/s 225, rue Metcalfe, bureau 708  
Ottawa (Ontario) K2P 1P9  
Téléphone : 6134545580  
Télécopieur : 6134545581  
Courriel : [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Au cours de la sixième journée porte ouverte, nous présenterons un aperçu de l'ébauche de l'EE.

**Sixième journée portes ouvertes**

**Mercredi 25 juin 2014  
De 16 h à 21 h  
Centre communautaire de Carlsbad Springs  
6020, chemin Piperville (chemin Eighth Line), Ottawa**

*Vous recevez ce message parce que vous vous êtes inscrits à la liste de diffusion à l'une de nos journées portes ouvertes ou au [crrrc.ca](http://crrrc.ca). Veuillez cliquer*

**Edmond, Trish**

---

**From:**

**Subject: Re: Open House #6 for Capital Region Resource Recovery Centre/Sixième journée portes ouvertes au Centre de récupération des ressources de la région de la Capitale**

**Date:** June 10, 2014 at 4:14:53 PM GMT-4

**To:** Hubert Bourque <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>

merci

2014-06-10 16:01 GMT-04:00 Hubert Bourque <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>:

[SVP faites défiler vers le bas pour la version française.](#)

---

Taggart Miller Environmental Services (Taggart Miller) has completed the draft environmental assessment for a proposed integrated waste management project to be known as the Capital Region Resource Recovery Centre (CRRRC), to be located near the Boundary Road/Highway 417 interchange. Taggart Miller is now making its draft environmental assessment available for public comment prior to finalization and submission of the final environmental assessment to the Ministry of the Environment.

Public participation by local residents and other interested parties is an important part of the environmental assessment process. You may review the draft environmental assessment on the project website ([www.crrrc.ca](http://www.crrrc.ca)) or during normal business hours at the following locations:

Taggart Miller Environmental Services Taggart Realty 225 Metcalfe Street, Suite 708 Ottawa, Ontario	Carlsbad Springs Community Centre 6020 Piperville Road Carlsbad Springs, Ontario (call for access)
Township of Russell Public Library 1053 Concession Street Russell, Ontario	
City of Ottawa Public Library, Blackburn Hamlet Branch 199 Glen Park Drive Ottawa, Ontario	
Ministry of the Environment Ottawa District Office 2430 Don Reid Drive Ottawa, Ontario	

Comments on the draft environmental assessment should be provided in writing to Taggart Miller by **July 31, 2014**. All comments should be submitted to:

Mr. Hubert Bourque, Project Manager  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Open House #6 will present an overview of the draft EA.

**Open House # 6**

**Wednesday, June 25, 2014  
4:00 to 9:00 pm**

**Carlsbad Springs Community Centre  
6020 Piperville Road (Eighth Line), Ottawa**

You are receiving this message because you signed up for the mailing list at one of our Open Houses or at [crrrc.ca](http://crrrc.ca). You may click here to [Unsubscribe](#).

Taggart Miller Environmental Services (Taggart Miller) a terminé l'ébauche de l'évaluation environnementale pour une proposition de projet de gestion intégrée des déchets connu sous le nom de Centre de récupération des ressources de la région de la capitale (CRRRC). Ce centre sera situé près de l'échangeur du chemin Boundary et de l'autoroute 417. Taggart Miller met maintenant l'ébauche de son évaluation environnementale à la disposition du public afin que ce dernier puisse le commenter avant l'achèvement et la présentation de la version définitive au ministère de l'Environnement.

La participation publique de résidents locaux et d'autres parties concernées est une étape importante du processus d'évaluation environnementale. Vous pouvez examiner l'ébauche de l'évaluation environnementale sur le site Web du projet ([www.crrrc.ca](http://www.crrrc.ca)) ou au cours des heures normales d'ouverture aux endroits suivants :

Taggart Miller Environmental Services Taggart Realty 225, rue Metcalfe, bureau 708 Ottawa (Ontario)	Centre communautaire de Carlsbad Springs 6020, chemin Piperville Carlsbad Springs (Ontario) (appelez pour obtenir l'accès)
Bibliothèque publique du canton de Russell 1053, rue Concession Russell (Ontario)	
Bibliothèque publique d'Ottawa, succursale de Blackburn Hamlet 199, promenade Glen Park Ottawa (Ontario)	
Ministère de l'Environnement Bureau de district d'Ottawa 2430, promenade Don Reid Ottawa (Ontario)	

*Le rapport principal de l'ébauche d'évaluation environnementale - Volume 1 et son résumé seront également disponibles en français.*

Vous devez fournir vos commentaires sur l'ébauche de l'évaluation environnementale par écrit à Taggart Miller d'ici le **31 juillet 2014**. Tous les commentaires doivent être envoyés à la personne suivante :

M. Hubert Bourque, directeur de projet  
Taggart Miller Environmental Services  
a/s 225, rue Metcalfe, bureau 708  
Ottawa (Ontario) K2P 1P9  
Téléphone : 6134545580  
Télécopieur : 6134545581  
Courriel : [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Au cours de la sixième journée porte ouverte, nous présenterons un aperçu de l'ébauche de l'EE.

**Sixième journée portes ouvertes**

**Mercredi 25 juin 2014**

**De 16 h à 21 h**

**Centre communautaire de Carlsbad Springs  
6020, chemin Piperville (chemin Eighth Line), Ottawa**

Vous recevez ce message parce que vous vous êtes inscrits à la liste de diffusion à l'une de nos journées portes ouvertes ou au [crrrc.ca](http://crrrc.ca). Veuillez cliquer [Unsubscribe](#) pour vous désabonner.

**Edmond, Trish**

---

**Subject:** CRRRC Environmental Assessment Reports

**From:**

**Subject: RE: CRRRC Environmental Assessment Reports**

**Date:** June 20, 2014 at 9:44:45 AM GMT-4

**To:** Hubert Bourque <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>

**Cc:** "Lorna Zappone (MOE CRRRC Project)" <[lorna.zappone@ontario.ca](mailto:lorna.zappone@ontario.ca)>, "Grant Crack (MPP)" <[gcrack.mpp@liberal.ola.org](mailto:gcrack.mpp@liberal.ola.org)>

Thank you Mr. Bourque. We will see you at Open House #6!

---

Subject: Re: CRRRC Environmental Assessment Reports

From: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Date: Fri, 20 Jun 2014 09:24:46 -0400

CC: [lorna.zappone@ontario.ca](mailto:lorna.zappone@ontario.ca); [gcrack.mpp@liberal.ola.org](mailto:gcrack.mpp@liberal.ola.org)

To:

While the EA permits Taggart Miller to revisit the North Russell site in those circumstance, Taggart Miller have no plans to do so should the EA for the Boundary Road site not be approved.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 12, 2014, at 3:15 PM,

wrote:

Mr. Bourque

What are your plans for the North Russell Site if the Boundary Rd. Site is not approved by the MOE?

Sent from Samsung tablet

----- Original message -----

From Hubert Bourque <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>

Date: 06-12-2014 8:55 AM (GMT-05:00)

To

Cc "Lorna Zappone (MOE CRRRC Project)" <[lorna.zappone@ontario.ca](mailto:lorna.zappone@ontario.ca)>, "Grant Crack (MPP)" <[gcrack.mpp@liberal.ola.org](mailto:gcrack.mpp@liberal.ola.org)>

Subject Re: CRRRC Environmental Assessment Reports

*Resending as previous messages were returned by the server.*

Assuming the EA for the Boundary Road site is approved, Taggart Miller has no plans for the North Russell site and intends to dispose of the site when market conditions are favorable.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 11, 2014, at 10:08 AM,

wrote:

Mr. Bourque

Can we now assure the concerned citizens of Russell Township that Taggart Miller has abandoned all plans to put a waste landfill at the North Russell Quarry site, or do you still consider it as an option for the future?



---

Subject: Re: CRRRC Environmental Assessment Reports  
From: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)  
Date: Wed, 11 Jun 2014 09:49:55 -0400  
CC: [lorna.zappone@ontario.ca](mailto:lorna.zappone@ontario.ca); [gcrack.mpp@liberal.ola.org](mailto:gcrack.mpp@liberal.ola.org)  
To:

Volume 1 is the main EA report and summarizes all of the relevant information.  
The other documents are technical appendices and consultation records.

The submission deals almost entirely with the Boundary Road site as you will see when you review it, as the Russell site is no longer under active consideration.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 10, 2014, at 10:32 PM,  
wrote:

Mr. Bourque

Vol 1 of 6 large volumes is translated into French!

How is that helpful to our Francophone neighbours that deserve to review the report in their language of choice?

---

Subject: Re: CRRRC Environmental Assessment Reports  
From: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)  
Date: Tue, 10 Jun 2014 19:53:42 -0400  
CC: [lorna.zappone@ontario.ca](mailto:lorna.zappone@ontario.ca); [gcrack.mpp@liberal.ola.org](mailto:gcrack.mpp@liberal.ola.org)  
To:

Please review the draft EA. It has not been submitted; it is being made available for public review prior to being submitted. The main EA report is in both English and French, as we committed in the Terms of Reference. If you have any questions or comments after reviewing the draft, please let me know.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 10, 2014, at 4:36 PM,

wrote:

Received Taggart Miller's notification that the CRRRC Environmental Assessment Reports have been submitted today.

The notification says: "Le rapport principal de l'ébauche d'évaluation environnementale - Volume 1 et son résumé seront également disponibles en français."

Why is only volume one of the these reports available in French?

**Edmond, Trish**

---

-----Original Message-----

From: Hubert Bourque [<mailto:hjbouque@crrrc.ca>]

Sent: June 10, 2014 7:56 PM

To:

Subject: Re: dump site in Carlsbad Springs

we are in fact projecting diversion rates of between 43 and 57 per cent at the CRRRC.

Re visibility, please review the visual assessment in the draft EA or come to our upcoming open house. You will see that the facility can be effectively screened to minimize any visual impact.

Regards,

Hubert Bourque.

Project Manager/Directeur de projet

Taggart Miller Environmental Services

c/o 225 Metcalfe Street, Suite 708

Ottawa, Ontario K2P 1P9

Tel: 613-454-5580

Fax: 613-454-5581

Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 10, 2014, at 7:01 PM,

wrote:

> Hi  
>  
> Just finishes watching the video that you have prepared. I want to know why is it that you are showing all this diversion taking place, since we all know taht less than 12% of the waste going to go to this location will actually be recycled. And why did you not include a picture of what this site will look like in5 years after it is opened and all we can see from the highway will be a mountain of garbage, rats and birds all around the area  
>  
> you should be ashamed  
>  
>

**Edmond, Trish**

---

**Subject:** Many difficulties trying to view Draft EA

**From:**

**Subject: RE: Many difficulties trying to view Draft EA**

**Date:** June 18, 2014 at 10:59:11 AM GMT-4

**To:** Hubert Bourque <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>

Thanks Hubert

---

**From:** Hubert Bourque [<mailto:hjbouque@crrrc.ca>]

**Sent:** Wednesday, June 18, 2014 10:58 AM

**To:**

**Subject:** Re: Many difficulties trying to view Draft EA

Hello ,

We are not receiving any other comments about difficulties in displaying the reports. I just tried downloading a number to be sure and they all downloaded and displayed properly. I suggest you check your security settings on your computer and ensure that you have the updated Adobe software for viewing.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 12, 2014, at 3:36 PM,

wrote:

Most items load but do not display.

This e-mail message (including attachments, if any) is confidential and may be privileged. Any unauthorized distribution or disclosure is prohibited. Disclosure to anyone other than the intended recipient does not constitute waiver of privilege. If you have received this e-mail in error, please notify us and delete it and any attachments from your computer system and records.

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**Edmond, Trish**

---

**Subject:** timeline

-----Original Message-----

From: Hubert Bourque [<mailto:hjbouque@crrrc.ca>]

Sent: June 16, 2014 11:41 AM

To:

Subject: Re: timeline

There is a 7 week review period on the final EA, once submitted.

We do not anticipate that the final EA will be materially different from the draft, however that will depend on the comments received on the draft.

Please let me know if you have further questions.

Regards,

Hubert Bourque  
Project Manager/Directeur de projet  
Taggart Miller Environmental Services  
c/o 225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9  
Tel: 613-454-5580  
Fax: 613-454-5581  
Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 13, 2014, at 4:55 PM,

wrote:

> Mr. Bourque,

>

> Is this draft the only time we have to comment? Will we have the same time to comment on the final version?

>

> The local impacted residents are wondering why we would comment now...the final version could be significantly different. Please advise.

>

> Also, the last email I sent you in early January took you over 5 months to respond.....a response within a week would be more appropriate.

>

> Regards,

>

>

**Edmond, Trish**

---

**Subject:** review of Ecosystem Setting section of the Taggart Miller Environmental Services draft environmental assessment for the proposed Capital Region Resource Recovery Centre (CRRRC).

**Attachments:** ecosystem\_review.pdf; ATT00001.htm

**From:** Fred Schueler <[bckcdb@istar.ca](mailto:bckcdb@istar.ca)>

**Date:** June 25, 2014 at 5:58:07 PM EDT

**To:** Hubert Bourque <[hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)>

**Subject:** review of Ecosystem Setting section of the Taggart Miller Environmental Services draft environmental assessment for the proposed Capital Region Resource Recovery Centre (CRRRC).

Dear Mr Bourque:

Attached find my review of this document. I hope you find this useful in progressing with the assessment of the Boundary Road site.

sincerely,

Frederick W. Schueler, Ph.D.  
Research Curator

-----  
Frederick W. Schueler & Aleta Karstad  
Daily Paintings - <http://karstaddailypaintings.blogspot.com/>  
Vulnerable Watersheds - <http://vulnerablewaters.blogspot.ca/>  
study our books - <http://pinicola.ca/books/index.htm>  
RR#2 Bishops Mills, Ontario, Canada K0G 1T0  
on the Smiths Falls Limestone Plain 44° 52'N 75° 42'W  
(613)258-3107 <bckcdb at [istar.ca](mailto:istar.ca)> <http://pinicola.ca/>  
-----



6 St Lawrence St.  
Bishops Mills,  
RR#2 Oxford Station,  
Ontario K0G 1T0  
<http://pinicola.ca>

25 June 2014

*Mr. Hubert Bourque, Project Manager*  
*Taggart Miller Environmental Services*  
*c/o 225 Metcalfe Street, Suite 708*  
*Ottawa, Ontario K2P 1P9*  
[<hjbouque@crrrc.ca>](mailto:hjbouque@crrrc.ca)

Dear Mr Bourque:

I've been asked by the Capital Region Citizens Coalition for the Protection of the Environment (CRCCPE) to comment on the Ecosystem Setting section of the Taggart Miller Environmental Services draft environmental assessment for the proposed Capital Region Resource Recovery Centre (CRRRC).

As you may realize, as a scientist with a museum background, I find many of these environmental assessments prepared by industry and government hard to understand, in part because of their failure to integrate the findings into a cohesive picture, and in large part because of their consistent neglect of the standard sources of knowledge about biota and natural history: museum collections and the scientific literature.

I notice that no peer-reviewed, or other, scientific literature is cited in the assessment, and that no searches of museum collections, nor of provincial databases of occurrence, are referenced. Even my recent publication of the first record of a species of vascular plant for eastern Ontario from the site (Schueler 2014, which was published in part to give Taggart Miller the opportunity to say they'd minimize the chances of this potentially invasive species spreading), isn't mentioned.

Since so much of these environmental assessments (EA's) focus on detecting Species at Risk (SAR), the finding of which would argue against the proposed project, a scientific approach to the EA would require that opponents of the project perform the search for SAR, since the proponent has no motive for finding these rare or elusive creatures.

In fact, the CRCCPE has undertaken some investigation of the biota, to the extent that it is observable from the periphery of the site, and has asked me to be involved, and since my primary expertise is in herpetology, I'll just deal with the herpetofauna section in my further review.

I have appended the unedited output of herp records from my database to this review. You'll see that in just about 10 hours of work on 4 dates, on the periphery of the site, we found the same 5 common amphibians that your observers found, plus the expectedly most common SAR: the "Western" Chorus Frog, and the Snapping Turtle.

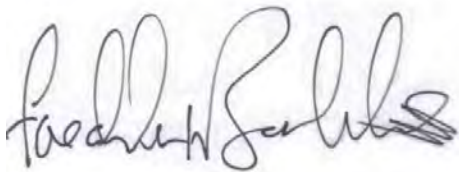
This suggests a bias on the part of your observers, since the Chorus Frog's call can be heard for 500 metres, we had previously published an account of finding Chorus Frogs just south of the site (Karstad, *et al.*, 2012), and inquiry would have advised you that a peer-reviewed account of this population is now in press (Seburn, *et al.*, 2014).

I think the failure to find Milk Snakes is due to their non-occurrence in the area (Schueler 2007), and I think that the Salamanders expected in the area (*Ambystoma laterale* and associated hybrids) would only be found by sampling ponds for larvae, since the adults are inconspicuous. Any assessment of the herpetofauna of an Ontario site should request records of previous observations and specimens from the Ontario Reptile and Amphibian Atlas Program.<sup>1</sup>

I'll say also that it's disappointing to see Mollusca completely neglected: we are presently studying a sample of drifted shells washed out of the site by Shaw Creek, and will publicize the results as they become available.

I know it must be hard working on a project with such defective premises. It can be suggested that the only worthwhile outcome of such an enterprise is the use of proponents' resources to document the conditions on the site before permission to proceed is denied. Perhaps these suggestions will allow the final environmental assessment to be more complete and scholarly, despite the overall implausibility of the project.

sincerely,



Frederick W. Schueler, Ph.D.  
Research Curator

### Literature Cited

Karstad, Aleta, Frederick W. Schueler, & Candice Vetter. 2012. **Island of Biodiversity: A natural history of the North Russell Red Shale Hill**. Library of One Thing and Another, Bishops Mills, Ontario. paperback, 94 pages. <http://www.lulu.com/shop/aleta-karstad-and-frederick-w-schueler-and-candice-vetter/island-of-biodiversity/paperback/product-20231924.html>

Schueler Frederick W. 2007, "**Concerns have been raised about the effect a proposed renovation and addition to the Garage at the Ministry of Transportation (Ontario) Patrol Yard in Kanata would have on Milk Snakes (*Lampropeltis triangulum*) which are suspected to occur there...**" Unpublished report to the Ontario Realty Corporation, 6 August 2007. 6 pp.

Schueler, Frederick W. 2014. *Trifolium fragiferum (Strawberry Clover): new to eastern Ontario*. Trail & Landscape 48 (2):68-70.

<sup>1</sup>[http://www.ontarionature.org/protect/species/herpetofaunal\\_atlas.php](http://www.ontarionature.org/protect/species/herpetofaunal_atlas.php)

Seburn, David C., Kari Gunson, and Frederick W. Schueler. 2014 (in press). *Apparent widespread decline of the Chorus Frog (Pseudacris maculata) in eastern Ottawa*. Canadian Field-Naturalist 127(0):000-000.

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**Field notes of Frederick W. Schueler** - filtered by RTOD(ACOS(COS(DTOR(LATITUDE-45.34045))\*COS(DTOR(LONGITUDE—75.43140)\*COS(DTOR(45.34045)))))\*111.2<=2  
 .AND.CLASS="aH"

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23 March 2012

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Canada: Ontario: Ottawa-Carleton Region: **Highway 417/Co Road 41, 2.7 km SSE Carlsbad Springs**. (25m waypoint), 31G/6, 45.34675N 75.44415W TIME: 2211:37. AIR TEMP: 13, overcast. HABITAT: roadside wetland. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler. FWS12Mar232211/a, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard, driveby. WAYPT/085, chorus some distance SE of intersection. - listened carefully all along Highway 417 E of Ottawa without hearing any driveby-audible calling.

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27 August 2013

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*moved 1.19 km SSE.*

Canada: Ontario: Prescott & Russell County: Russell: **Horticare, Entrepreneur Cres., 3.9 km SSE Carlsbad Sp'gs**. (100m site), 45.33707N 75.43764W TIME: 1015-. AIR TEMP: 23, light overcast, calm. HABITAT: ditch-surrounded gravel parkinglot on clay in brushy open parkland. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler. FWS13Aug271015/e, *Pseudacris crucifer* (Spring Peeper) (herp). present call, heard. sporadic calling thruout visit.

*moved 0.11 km E.*

**Entrepreneur Crescent, 3.9 km SSE Carlsbad Springs**. (150m ditch), 45.33721N 75.43622W TIME: 1514-1700. AIR TEMP: 28, cloudy, hazy, Beaufort gentle breeze. HABITAT: shallow clay ditch in brushy Aspen/White Birch parkland, water 27 C. OBSERVER: Frederick W. Schueler, Owen Clarkin, Aleta Karstad Schueler. 2013/176/b, *Pseudacris crucifer* (Spring Peeper) (herp). present call, heard. irregular bouts of calling.

(same location) 2013/176/d, *Hyla versicolor* (Tetraploid Gray Treefrog) (herp). 1 call, heard. a single call.

(same location) 2013/176/e, *Rana pipiens* (Leopard Frog) (herp). 1 juvenile, seen. ca 30 mm SVL, green, on bank of ditch. A brown one seen poorly.

(same location) 2013/176/i, *Rana clamitans* (Green Frog) (herp). several larva,



dipnetted, specimen. by dipnet, in formalin.

*moved 0.33 km SSW.*

**Co Road 41(Boundary Rd), 4.2 km SSE Carlsbad Springs.** (25m waypoint), 45.33432N 75.43737W TIME: 1718. AIR TEMP: 27, sunny, Beaufort light air. HABITAT: Typha-dominated roadside ditch/lawn/brushy woods. OBSERVER: Frederick W. Schueler. 2013/175a/c, *Chelydra serpentina* (Snapping Turtle) (herp). 1 adult, DOR, seen. WAYPT/041, posterior shell hindlegs & tail, medium size. . . . long dead & dried out on edge of road. *Typha latifolia* (Broad-leaved Cattail) - one head here. Typha regrown from having been mowed down.

*moved 0.13 km SSE.*

**Co Road 41(Boundary Rd), 4.3 km SSE Carlsbad Springs.** (25m waypoint), 45.33321N 75.43689W TIME: 1721. AIR TEMP: 27, sunny, Beaufort light air. HABITAT: lawn-mowed roadside ditch/lawn/brushy woods. 2013/175a/d, *Bufo americanus* (American Toad) (herp). 1 juvenile, DOR, seen. WAYPT/042, ca 30 mm SVL, dried out but fairly fresh.

*moved 1.39 km ENE.*

**Frontier Road, 4.5 km SE Carlsbad Springs.** (25m waypoint), 45.33817N 75.42053W TIME: 1809. AIR TEMP: 26, sunny, Beaufort light air. HABITAT: grassy roadside/Aspen-Rhamnus frangula brushy woods/tilled Soy-field. 2013/176a/b, *Rana sylvatica* (Wood Frog) (herp). 1 adult, seen. WAYPT/053, ca 30 mm, in roadside grass. - first metamorphosed *Lithobates* seen here today.

27 April 2014

*moved 0.40 km NNW.*

Canada: Ontario: Ottawa-Carleton Region: **Frontier Rd/Shaws Creek, 4.1 km SE Carlsbad Springs.** (25m waypoint), 45.34150N 75.42233W TIME: 1927. AIR TEMP: 10, light overcast, calm. HABITAT: flowing brownwater ditch in clay from brushy woods to tilled fields. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler, Laurie McCannell. 2014/063/b, *Pseudacris crucifer* (Spring Peeper) (herp). index2 call, heard. onset of calling by small chorus.

*moved 1.08 km S.*

**Devine Road, 5.0 km SE Carlsbad Springs.** (25m waypoint), 45.33188N 75.42012W TIME: 2004-2008. AIR TEMP: 10, light overcast, calm. HABITAT: roadside Beaver-influenced White Birch/Typha wetland. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler. 2014/063/da, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard. WAYPT/151, chorus with some trills N of road, loud Traffic noise.

*moved 2.2 km NW.*

**2.9 km SSE Carlsbad Springs.** (25m waypoint), 45.34612N 75.44022W TIME: 2017-2047. AIR TEMP: 9, light overcast, calm. HABITAT: communication tower's gravel pad in swampy/brushy woods near areas of bulldozed gr. 2014/063/ea, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard. WAYPT/152, chorus with some trills, Id.

Highway 417 noise.

(same location) 2014/063/ec, *Rana sylvatica* (Wood Frog) (herp). index1 call, heard. few calling, first at 20h31, loud Highway 417 noise.

(same location) 2014/063/ed, *Bufo americanus* (American Toad) (herp). index1 call, heard. few calling, first at 20h32, loud Highway 417 noise.

*moved 1.06 km SSE.*

**E end Enterprise Lane, 3.9 km SSE Carlsbad Springs.** (25m waypoint), 45.33696N 75.43627W TIME: 2053-2055. AIR TEMP: 8, light overcast, calm. HABITAT: drained ditch/disturbed ground/Red Maple brushy area. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler, Laurie McCannell. FWS14Apr272053/a, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard. big chorus N of site, loud Highway 417 noise.

*moved 0.19 km WSW.*

**Boundary/Enterprise rds, 3.9 km SSE Carlsbad Springs.** (25m waypoint), 45.33653N 75.43856W TIME: 2056-2058. AIR TEMP: 8, light overcast, calm. HABITAT: swampy/brushy woods near arterial road. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler. FWS14Apr272056/a, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard. WAYPT/153, chorus W of site, loud Highway 417 noise.

*moved 1.5 km ESE.*

**Devine Road, 5.0 km SE Carlsbad Springs.** (25m waypoint), 45.33188N 75.42012W TIME: 2103-2107. AIR TEMP: 8, light overcast, calm. HABITAT: roadside Beaver-influenced White Birch/Typha wetland. FWS14Apr272103/a, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard. big chorus N of road, highway noise.

(same location) FWS14Apr272103/b, *Rana sylvatica* (Wood Frog) (herp). index1 call, heard. few calling over wide angle N of road, highway noise.

(same location) FWS14Apr272103/c, *Rana pipiens* (Leopard Frog) (herp). 1 call, heard. 1 call from N of road, highway noise.

*moved 0.32 km NNE.*

**W of Frontier Road, 4.9 km SE Carlsbad Springs.** (25m waypoint), 45.33461N 75.41885W TIME: 2109. AIR TEMP: 8, light overcast, calm. HABITAT: grassy flat field with ditches. FWS14Apr272109/a, *Pseudacris 'brown-maculata'* (Great Lakes-St Lawrence Chorus Frog) (herp). index1 call, heard. WAYPT/154, few calling nearby in ditches of aircraft field. There's loud Highway 417 noise. The only area of open ground around is this aircraft area, so it makes sense that this species would be only here.

(same location) FWS14Apr272109/b, *Rana sylvatica* (Wood Frog) (herp). index1-2 call, heard. few calling, loud Highway 417 noise.

(same location) FWS14Apr272109/c, *Bufo americanus* (American Toad) (herp). index?

call, heard. distant calling, loud Highway 417 noise.

(same location) FWS14Apr272109/d, *Pseudacris crucifer* (Spring Peeper) (herp). index3 call, heard. surrounding chorus, loud Highway 417 noise.

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19 June 2014

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*moved 0.81 km NNW.*

::: **Frontier Road, 4.1 km SE Carlsbad Springs.** (25m waypoint), 45.34148N 75.42226W TIME: 2313-2319. AIR TEMP: 14, clear, breezy. HABITAT: grassy/marshy area. OBSERVER: Frederick W. Schueler, Aleta Karstad Schueler. 2014/150/j, *Pseudacris crucifer* (Spring Peeper) (herp). index1 call, heard. WAYPT/425, a widely separated few calling in field W of road. - with a moderate number of trills. As ever in these parts - loud highway noise.

*moved 1.09 km S.*

**Devine Road, 5.0 km SE Carlsbad Springs.** (25m waypoint), 45.33170N 75.42102W TIME: 2322-2326. AIR TEMP: 14, clear, breezy. HABITAT: roadside Beaver-influenced White Birch/Typha wetland. 2014/150/ka, *Pseudacris crucifer* (Spring Peeper) (herp). index1 call, heard. WAYPT/427, widely separated few calling N of road. Airplane & loud highway noise.

(same location) 2014/150/kb, *Bufo americanus* (American Toad) (herp). 1 call, heard. 1 call from NE of site, airplane & loud highway noise.

**Edmond, Trish**

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**Subject:** Re: Draft EA Report

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**From:** Hubert Bourque [<mailto:hjbouque@crrrc.ca>]  
**Sent:** July 11, 2014 9:24 AM  
**To:**  
**Cc:** Lorna Zappone (MOE CRRRC Project); [Agatha.garciawright@ontario.ca](mailto:Agatha.garciawright@ontario.ca)  
**Subject:** Re: Draft EA Report

Hello ,

The main Environmental Assessment Study Report (EASR) and the Geology, Hydrogeology and Geotechnical Report (Volume III) have been organized in a manner similar to other EA's and hydrogeology reports supporting waste EA's and waste applications in the province of Ontario. The organization and format is not unique to the CRRRC project. Components of geology and hydrogeology within the main EASR are summaries of the full details provided in the Geology, Hydrogeology and Geotechnical Report. There is no geology or hydrogeology content within the EASR that is not in the Geology, Hydrogeology and Geotechnical Report (Volume III). We encourage you to read the Geology, Hydrogeology and Geotechnical Report (Volume III) fully as we anticipate this is likely where your interest lies.

Regards,

Hubert Bourque, P.Eng.  
 Project Manager/Directeur de projet  
 Taggart Miller Environmental Services  
 c/o 225 Metcalfe Street, Suite 708  
 Ottawa, Ontario K2P 1P9  
 Tel: 613-454-5580  
 Fax: 613-454-5581  
 Email: [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

On Jun 26, 2014, at 9:22 AM, wrote:

M. Bourque,

Without going into detail I just want you to know that the draft EA available for downloading from your website is very poorly organized. For example: there is an important section 8.5 which must be an integral part of the main geological report, yet it is not. It appears separately. *Autrement dit il faut que cette partie soit incorporé dans le rapport, non a part.* Please have that report re-organized.

As you and the direction at Golder Associates must know that form of presentation, i.e. dispersing relevant information rather than concentrating it, is extremely frustrating to the reviewer and may lead many to just "throw in the towel" and not devote their attention to the EA that it, the EA, deserves. As concerned citizens

you should want an honest and effective review from the regulators and the community.

The final EA must be organized to facilitate review, meaning that **all parts of any component are together** in a single volume. By way of illustration the entire geological presentation, including all illustrations, tables and text **MUST** be in the same volume. The same applies to each and every other component that makes up the mountainous document (See attached photo).

Ms Garcia-Wright,

This is being sent to you in order that you may see that I have addressed the proponent directly. Now let's see what good it does. Proponents have an obligation to submit an EA report, but I am not aware that MOE has any requirements regarding organization of the report. As a person who has lots of experience reading and evaluating similar reports I could provide you with requirements, free of charge. Those requirements would oblige Taggart-Miller Environmental Services (TMES) to submit an EA that facilitates review by MOE staff, your Government Review Team (GRT) and concerned people. The reason for my not submitting any now is because you have, thus far, ignored my recommendations. My recommendations are not from a NIMBY perspective because I am NOT NIMBY. They would apply to anyone wishing to develop a landfill anywhere in Ontario.

I realize that TMES would have to dictate to Golder that the report must be reorganized, which would take additional time. If, however, you really do care about protecting the environment, then you would require a reorganization of that report for the official submission. To see how the draft report is organized go to:

<http://www.crrrc.ca/whatsnew.htm>

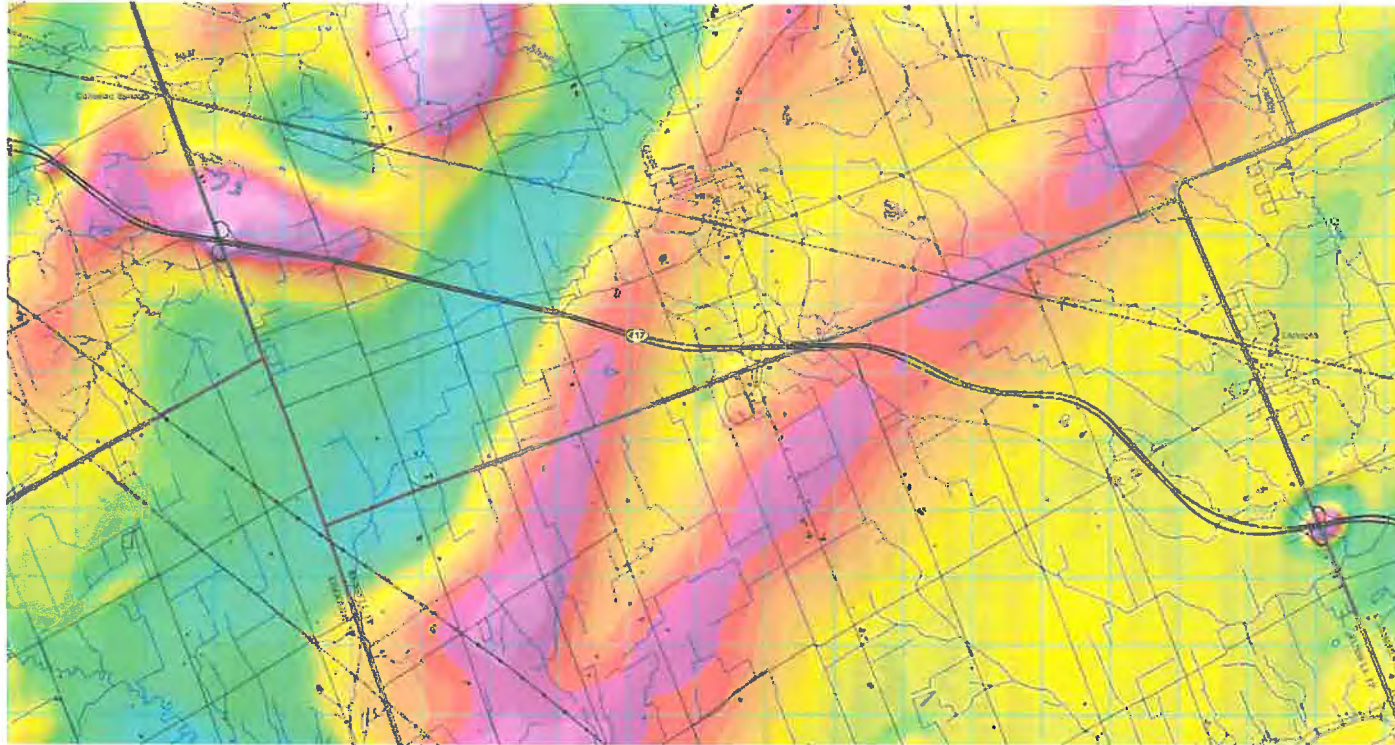
Il faudrait, également, que le rapport entier soit soumis en français aussi bien qu'en anglais. The entire report must be bilingual.

Sincerely,

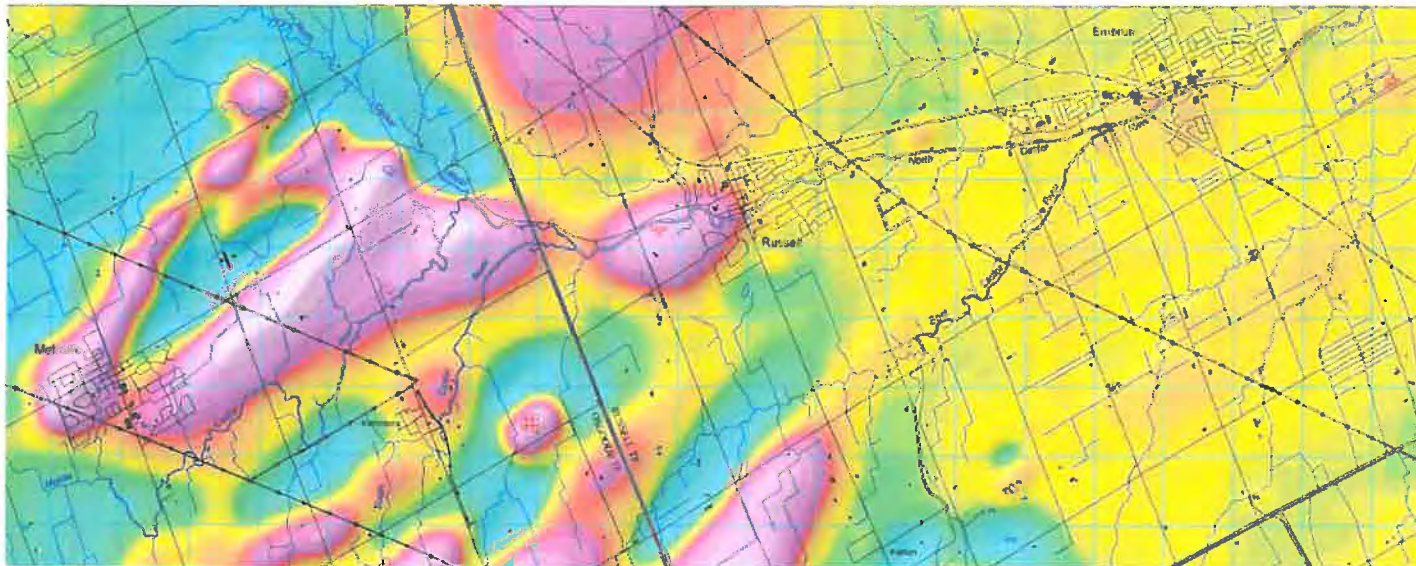
<Draft EA report.JPG>



Ontario Geological Survey - Airborne Magnetic Survey - Eastern Ontario Area 2014 First vertical derivative of the magnetic field grid

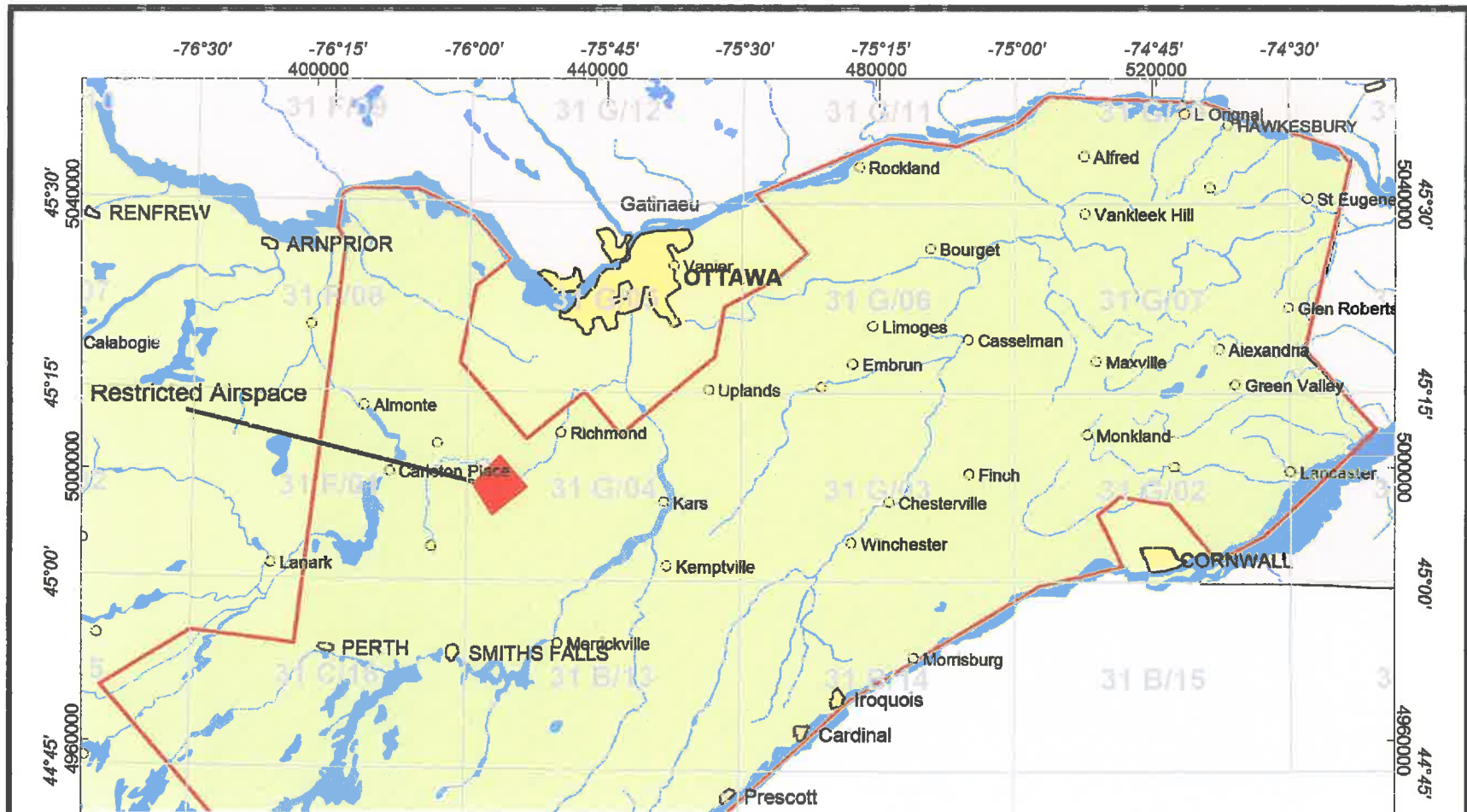


Map 82 625

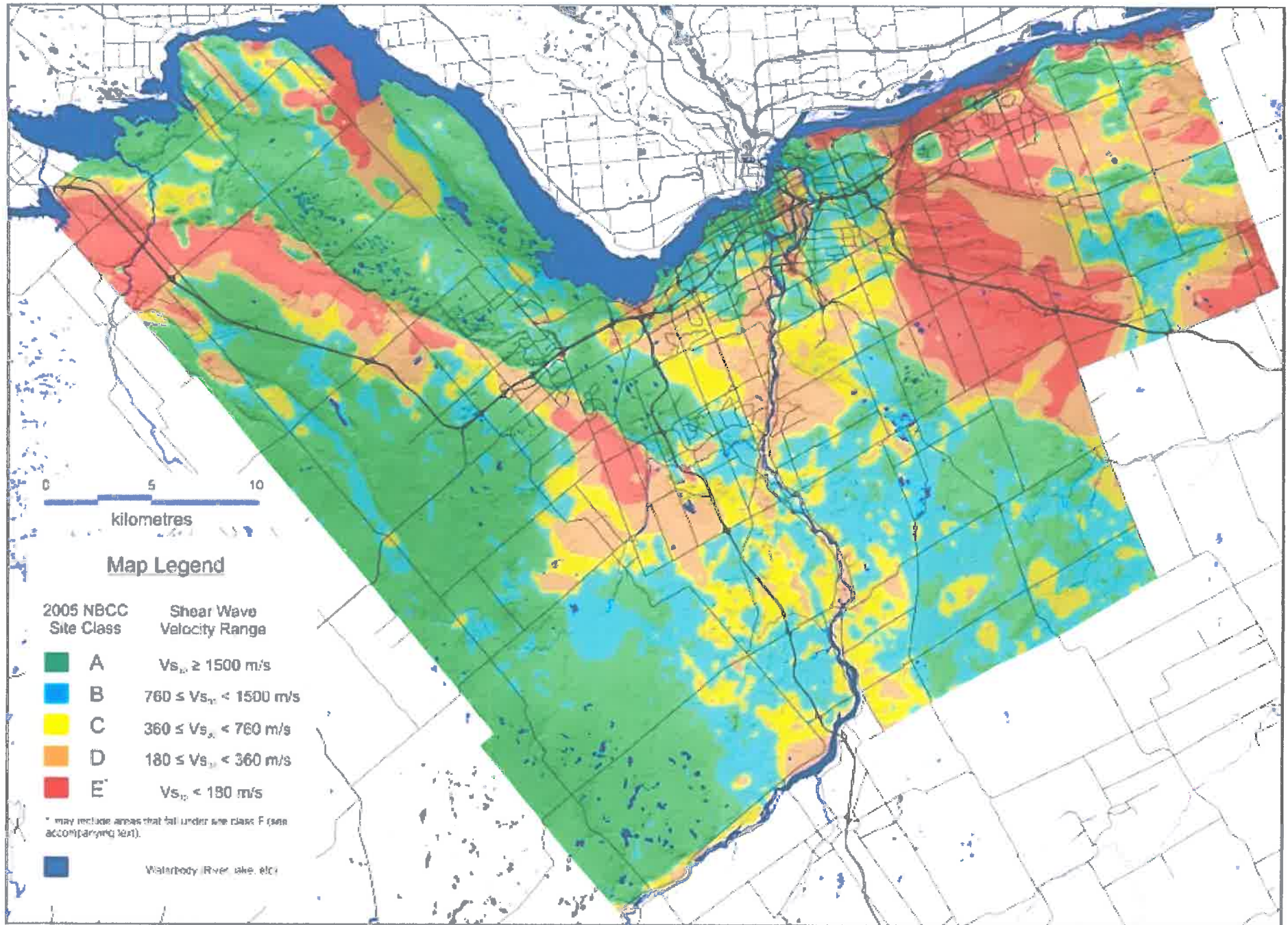


Map 82 628

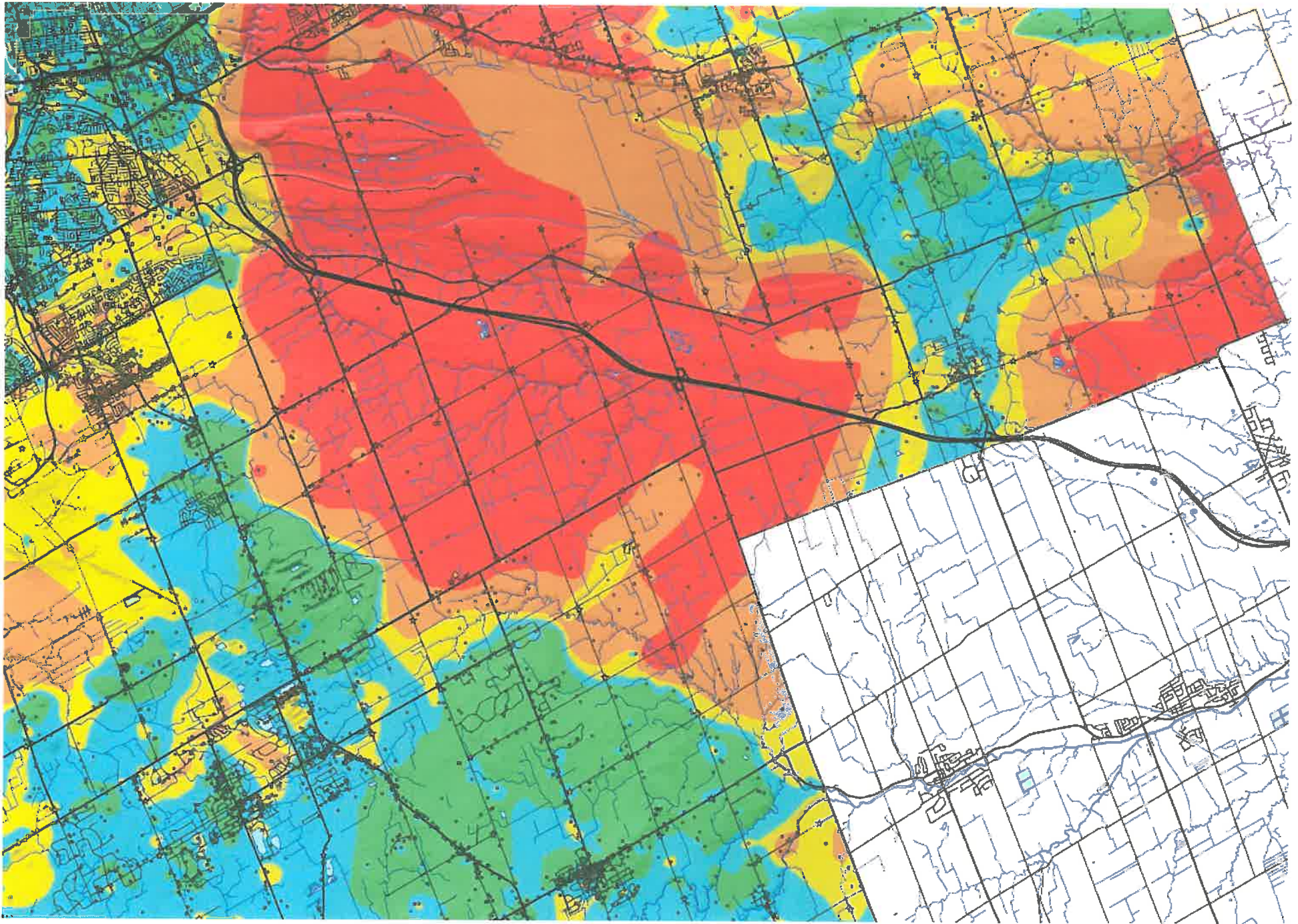
2014/06/25

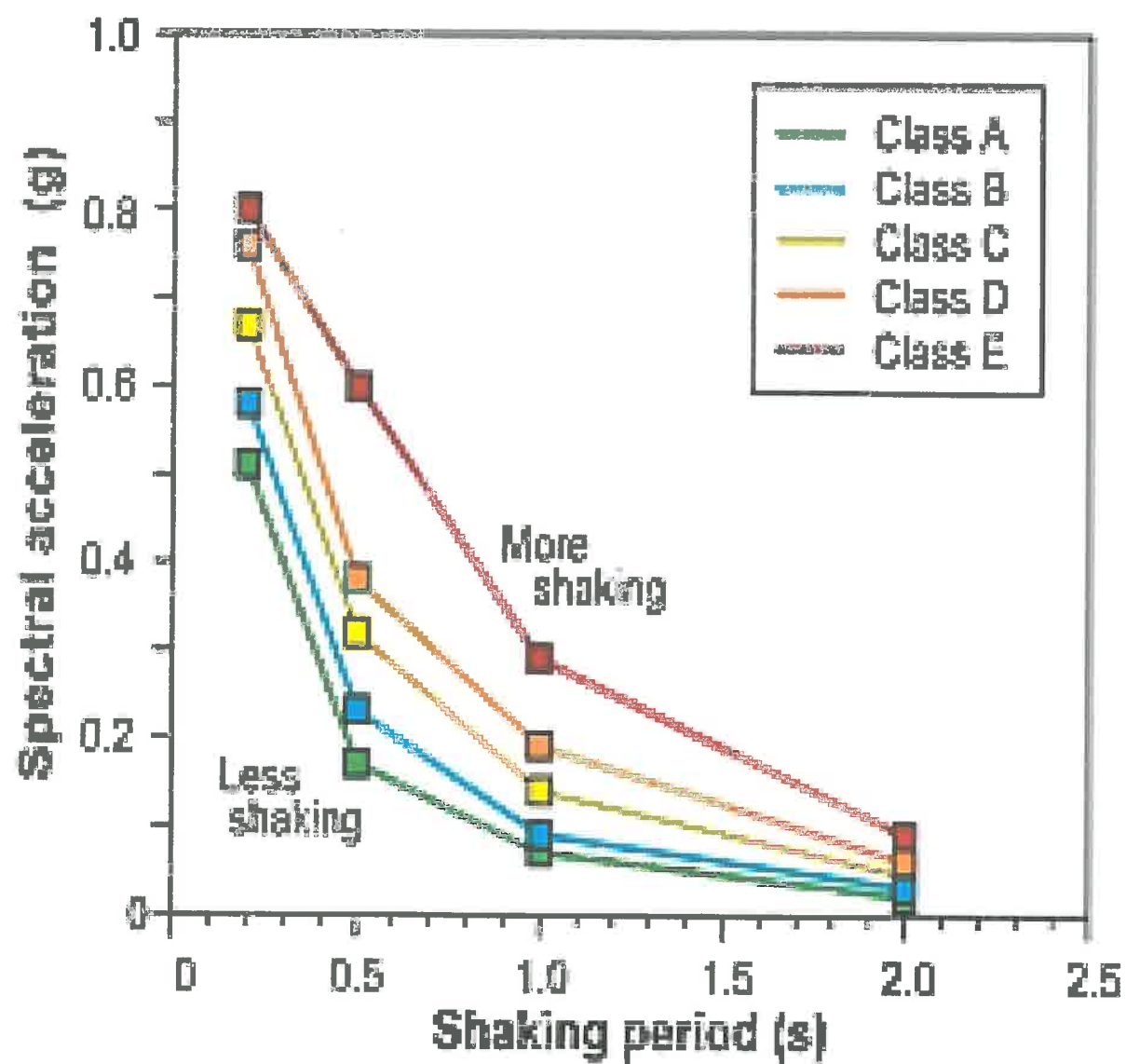














## **Ottawa - Gatineau Seismic Site Classification Map From Combined Geological/Geophysical Data By Geological Survey of Canada and Carleton University**

GSC people: Hunter, J.A., Crow, H.L., Brooks, G.R., Pyne, M., Lamontagne, M., Pugin, A.J.-M., Pullan, S.E., Cartwright, T., Douma, M., Burns, R.A., Good, R.L., Oliver, J.

Carleton University people: Motazedian, D., Khareshi-Banab, K., Caron, R., Dion, K., Dixon, L., Duxbury, A., Folahan, I., Jones, A., Kolaj, M., Landriault, A., Muir, D., Plastow, K., Ter-Emmanuil, V.

**GSC OFR 7067 (2012) Map can be downloaded for free from GeoPub (<http://geopub.nrcan.gc.ca/>).**

The influence of local geological materials on seismically -induced ground motions is recognized in the 2010 National Building Code of Canada (NBCC 2010; NRC, 2010) which introduced seismic site classifications to characterize site conditions based on the average stiffness of the upper 30 m of the ground surface (Finn and Wightman, 2003). Five of the six seismic site classes defined in NBCC2010 correspond approximately to: hard rock (class A), rock (class B), soft rock or very dense soil (class C), stiff soil (class D) and soft soil (class E); the sixth site, class (F), is discussed below. The classes are defined in terms of shear wave velocity for classes A-E (Table 4.1.8.4.A in NRC, 2010; see also the map legend), though standard penetration resistance or undrained shear strength can be used instead for classes C, D and E. For building design, NBCC2010 provides amplification factors (Tables 4.1.8.4B and 4.1.8.4C in NRC, 2010) for each site class in order to compute the spectral accelerations of the design ground motion at a specific site. The amplification factors are functions of ground motion intensity, and take non-linear effects into account.

Site class F, the sixth NBCC seismic site class, defines a special case of soil conditions, including liquefiable soils, quick and highly sensitive clays, >3 m of peat, >8 m of highly plastic clays and >30 m of soft to medium stiff clays (Table 4.1.8.4.A in NRC, 2010). At a class F site, site-specific geotechnical evaluation is required to assess amplification of the firm-ground seismic hazard values.

The map of seismic site classes for the cities of Ottawa and Gatineau presented here was compiled jointly by staff of the Earth Sciences Department of Carleton University and the Geological Survey of Canada. The map depicts the spatial distribution of class A to E site conditions within the municipal boundaries of the two cities and demonstrates the application of geophysical techniques for compiling seismic classification maps. Where measurements were made in the field by the GSC, the site classes were defined by using the travel-time averaged shear wave velocity over the upper 30 m of the ground. It should be noted that it is possible that class F site conditions may be found within the areas mapped as C through E, as  $V_{s30}$  alone does not allow class F conditions to be identified. Similarly, some areas mapped as classes A and B may instead be class C if more than 3 m of soil underlies the bottom of a spread footing or mat foundation (see Commentary J, item 100 in NRC, 2006).

The map was compiled using subsurface geological data obtained from borehole records and measurements of shear wave velocities using shallow geophysical techniques. The borehole data consist of 21,800 water well and engineering records that were compiled from the Urban Geology of Canada's National Capital area, Geological Survey of Canada (Belanger, 1998), and from the Ontario Ministry of Environment water well database. Based on our interpretation of the borehole unit descriptors, the borehole records were classified into three generalized stratigraphic units which have distinct shear wave velocity ( $V_s$ ) characteristics. These three units (from surface downwards) are: (1) deglacial/post-glacial deposits (consisting of glaciomarine, deltaic, and fluvial deposits);

(2) glacial deposits (till, diamicton and glaciofluvial deposits); and  
 (3) bedrock. The interpretation of the borehole stratigraphy considered the surficial geology mapped nearby, the vertical ordering of the deposits, proximally-located boreholes and/or geophysical data, and knowledge of the general stratigraphy of the Ottawa area.

The resulting borehole database provides the thicknesses of deglacial/post-glacial deposits and glacial units (units 1 and 2), and the depths to the two seismic impedance boundaries (top of glacial sediments and bedrock surface). Bedrock at a given location was classified into Paleozoic and Precambrian rock types and further subdivided into lithologies using local geology maps (Carson, 1982; Belanger, 1998).

The generalized stratigraphic units of the waterwell and engineering logs, from surface down to and including bedrock, were converted into unique time-averaged Vs profiles using average observed Vs refraction velocities for glacial deposits and bedrock types and functions that relate average Vs to depth for the deglacial/post-glacial deposits (Hunter et al., 2010, see also Hunter et al., 2007; Motazedian and Hunter, 2008; Benjumea et al., 2008; Motazedian et al. 2011). These velocity-depth functions and refraction velocities are based on direct measurements of shear wave velocities at 750 surface reflection/refraction shear wave survey locations, 25 line-km of landstreamer shear wave reflection profiling (see Pugin et al., 2007), and nine downhole shear wave velocity surveys. Each of these Vs profiles was then used to determine the travel-time-averaged Vs for the upper 30 m of the ground surface (Vs30) allowing an NBCC seismic site class to be assigned to each borehole and geophysical site. To supplement the borehole data within Gatineau, fundamental site period was measured at 61 point locations using a Tromino® microseismograph and the horizontal to vertical spectral ratio method of Nakamura (1989). The fundamental site period data were converted to estimates of soft soil thickness using an empirical equation derived from reflection/refraction seismic site data collected in the greater Ottawa-Gatineau region.

The 21,800 determinations of Vs30 were contoured using a “natural neighbors” interpolation technique. The final mapped boundaries between site classes were edited to respect borehole and surface geophysics data points as well as known surficial geological boundaries. The boundaries between site classes are subject to uncertainty in position, especially where few data points occur. To reflect the uncertainty in the contouring, the variability in data density, and to show the complexity of local geology, data points are displayed on the map and keyed by a symbol for the data type and by the colour of the associated seismic site class. In some areas where data density is high, these seismic site classification boundaries are accurate to within a few hundred meters. In other areas, where data are sparse, the uncertainty in the mapped boundary might be 2 km or larger.

All five of the NBCC seismic site classes A to E are present within the cities of Ottawa and Gatineau. In particular, the map reveals that class D and E areas are present beneath the urban and suburban parts of the city, mainly due to the presence of thick deposits of ‘soft’ glaciomarine sediments (or Leda clay). In some places Leda clay reaches thicknesses up to 100 m, infilling buried bedrock valleys. Locally, the transitions from classes A to E can occur over distances of less than 500 m (e.g. Motazedian and Hunter, 2008), reflecting the steeply-sloped margins of the buried valleys.

### **Relationship between Site Class and Amplification**

The 2010 NBCC provides tables of amplification factors (Tables 4.1.8.4.B and 4.1.8.4.C, NRC, 2010) which modify the firm-ground spectrum (shaking with a 1:2475 year return period) to the design ground motion spectrum. The current factors indicate that the expected level of ground shaking increases up to four times between classes A to E due to the decreasing soil stiffness, and suggest that soft soils (D and E) will experience greater shaking during an earthquake than stiffer soils or bedrock. The amplification factors, when used for building design, do take frequency content into account even though shaking frequency is not considered in the definition of site class.

- It is recognized that the NBCC amplification factors have some limitations, may have considerable uncertainty (for details see Finn and Wightman, 2003), and may not take into account the complexity of local site effects (Boore, 2004; CFEM, 2006; Benjumea et al., 2008). For example, seismic shaking can be amplified or attenuated by factors that may act in combination with the geological materials immediately underlying a site. These include: shear wave velocity and/or density contrasts between rock and overlying soil layers (impedance contrast amplification); internal reflection of seismic energy within a soil layer (resonance amplification); focusing or defocusing caused by topography or by subsurface geometry (buried bedrock topography effects); basin-edge effects (e.g. Cassidy and Rogers, 2004); and generation of Rayleigh and Love waves across the surface of a sediment-filled basin (basin effects).

There is a strong need to measure seismic shaking on soils in the Ottawa and Gatineau areas in order to assess the amplification factors of the NBCC and to better understand ground motion response. To date, only limited such measurements have been conducted, as reported by Al-Khoubbi and Adams (2004), Adams (2007), and Hunter et al., (2010).

**This seismic site classification map is presented as one element of a regional framework for further assessment of seismic hazards in the Ottawa-Gatineau area, and as a guide for the local geotechnical engineering community as to the general distribution of seismic site conditions across the two cities. The data on the map, however, show regional trends and are neither suitable, nor are intended, for building design. This map does not replace the need for site-specific geotechnical studies, as required by the 2010 NBCC, Ontario's 2006 Building Code, and Québec's 2008 Building Code.**

The authors gratefully acknowledge financial support from the Geological Survey of Canada, Natural Resources Canada, through the Eastern Canada Geohazards Assessment Project, Reducing Risk from Natural Hazards Program, and from an NSERC Discovery Grant, the Ontario Research and Development Challenge Fund (ORDCF) awarded to D. Motazedian. As well, we would like to acknowledge and recognize technical support received from the Portable Observatories for Lithospheric Analysis and Research Investigating Seismicity (POLARIS). Editorial review comments by Dr. John Adams and Dr. John Cassidy of GSC, as well as Dr. Gail Atkinson, University of Western Ontario and Michael Snow, P. Eng., of Golder Associates, were very helpful. The co-operation of the staff from the cities of Ottawa and Gatineau is greatly appreciated and was critical in the data collected for this map.

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## Disclaimer

"Her Majesty the Queen in right of Canada, as represented by the Minister of Natural Resources ("Canada"), does not warrant or guarantee the accuracy or completeness of the information ("Data") on this map and does not assume any responsibility or liability with respect to any damage or loss arising from the use or interpretation of the Data.

The Data on this map are intended to convey regional trends and should be used as a guide only. The Data should not be used for design or construction at any specific location, nor are the Data to be used as a replacement for the types of site-specific geotechnical investigations recommended by the 2010 National Building Code of Canada, Ontario's 2006 Building Code or the 2008 Building Code of Québec.

2014/06/25

K-1-10

Issue of truck  
excavation to 'investigate'  
post quake  
effects.

## Ottawa at risk for big earthquake

**Destruction could be far worse than in Christchurch, New Zealand**

[CBC News](#)

Posted: Dec 28, 2011 8:27 AM ET



*The city of Ottawa is at risk for a big earthquake, experts say. The Val-des-Bois quake that shook the capital in 2010 caused this land collapse in Notre Dame de la Salette, Que. (CBC)*

Seismologists and structural engineers say the city of Ottawa is at risk for a big earthquake.

The Val-des-Bois quake that shook the capital last year reminded people that Ottawa sits in an earthquake zone. And there is a chance it could one day produce a destructive quake far worse than February's deadly magnitude-6.3 tremor in Christchurch, New Zealand.

Claude Blais was at the pharmacy in Gracefield, Que., when last year's quake hit.

"All the lights broke down, and all the shelves emptied themselves. It was just horrible," Blais said. "You kind of think it's the end of the world."

It wasn't like that in Ottawa. That's the difference between being close to the epicentre of a 5.2 earthquake, and being 65 kilometres away.





*An expert examines a land collapse that occurred in Notre Dame de la Salette, Que., one day after the Val-des-Bois quake that shook the Ottawa area. (CBC)*

Even a small quake can be damaging, but seismologists say the Ottawa region is capable of something much bigger.

"We can certainly imagine something stronger could happen," seismologist John Adams of Natural Resources Canada said. "And we think there's a possibility of a magnitude seven in the Ottawa or St. Lawrence Valley."

## What Ottawa did wrong

Thousands of office workers in downtown Ottawa did the wrong thing during last year's earthquake. [Read here how they should have reacted](#), and how the city is trying to get it right.

That kind of earthquake close to the capital would be a doomsday scenario. But something like this year's quake in Christchurch is much more likely.

"What we would worry about is the magnitude 6.2 or 6.3, 30 or 40 kilometres away," Adams said. "That would be bad enough in Ottawa without going into the worst, worst case."

"We would probably see building collapses among older brick buildings in particular, and a lot of infrastructure would be damaged."

Frustrating efforts to prepare for such a disaster, the movements of tectonic plates near Ottawa are a mystery and can't be tracked. The mid-continental faults that underlie the region give few clues as to when they might shift again.

That means it could be in the next few minutes, or it could be millennia.



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# A massive sensitive clay landslide, Quyon Valley, southwestern Quebec, Canada, and evidence for a paleoearthquake triggering mechanism

Gregory R. Brooks

Natural Resources Canada, Geological Survey of Canada, 601 Booth Street, Ottawa, ON K1A 0E8, Canada

## ARTICLE INFO

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Available online xxx:

Keywords:  
Landslide  
Sensitive sediments  
Radiocarbon chronology  
Holocene  
Champlain Sea  
Eastern Canada  
Paleoearthquake  
Natural hazards

## ABSTRACT

A landslide debris field covering ~31 km<sup>2</sup>, the presence of large sediment blocks up to hundreds of meters long, and the exposure of deposits of a single landslide along the incised course of the Quyon River are evidence of a massive failure of sensitive Champlain Sea glaciomarine sediments along the lower Quyon Valley, southwestern Quebec, Canada. Seventeen radiocarbon ages indicate that the failure occurred between 980 and 1060 cal yr BP. Twenty-four additional radiocarbon ages reveal that nine landslides within a 65-km belt in the Quyon–Ottawa area also occurred at approximately this time. In combination, the contemporaneous occurrence of ten landslides between 980 and 1060 cal yr BP, the setting or morphology of five of the other failures, and the close proximity of two of the failures to the Quyon Valley landslide provide circumstantial evidence of a paleoearthquake-triggering mechanism. The paleoearthquake is estimated to be  $M_w$  ~6.1 or larger, with the epicenter within the West Quebec Seismic Zone. A common earthquake-triggering mechanism for the three largest landslides in eastern Canada suggests a close link between massive failures of sensitive glaciomarine sediments and the regional seismicity.

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## Introduction

Large areas of the St. Lawrence Lowlands, eastern Canada, are underlain by silty clay and clayey silt glaciomarine sediments that accumulated within saline to brackish water of the Champlain, Goldthwait and Laflamme seas during deglaciation (Occhietti, 1989). These deposits are often geotechnically sensitive and can experience rapid failure that generates large (>1 ha) earth flows and earth spreads (e.g., Mitchell and Markell, 1974; Mollard, 1977). Many hundreds of sensitive ‘clay’ landslides have been mapped in the region (e.g., Chagnon, 1968; P.B. Fransham et al., 1976). The ages of some individual and groups of failures are reported in the literature (e.g., Eden, 1967; Lasalle and Chagnon, 1968; Karrow, 1972; Desjardins, 1980; Rissman et al., 1985; Quilliam and Allard, 1989; Filion et al., 1991; Dionne, 1998; Aylsworth et al., 2000; Dionne et al., 2004; Cauchon-Voyer et al., 2011; Locat, 2011), but the majority of the landslides are of unknown age. Determining the age of prehistoric sensitive clay landslides can provide insights into triggering events (e.g., Aylsworth et al., 2000). As demonstrated by Adams (1981), numerous landslides triggered contemporaneously within a relatively confined area can be due to moderate to large earthquakes.

Wilson (1924) mapped a large-scale landslide area along the lower Quyon Valley, southwestern Quebec (Figs. 1 and 2) that he described as a depression, ~12.8 km (8 mi) long and 0.8–4.8 km (0.5–3 mi)

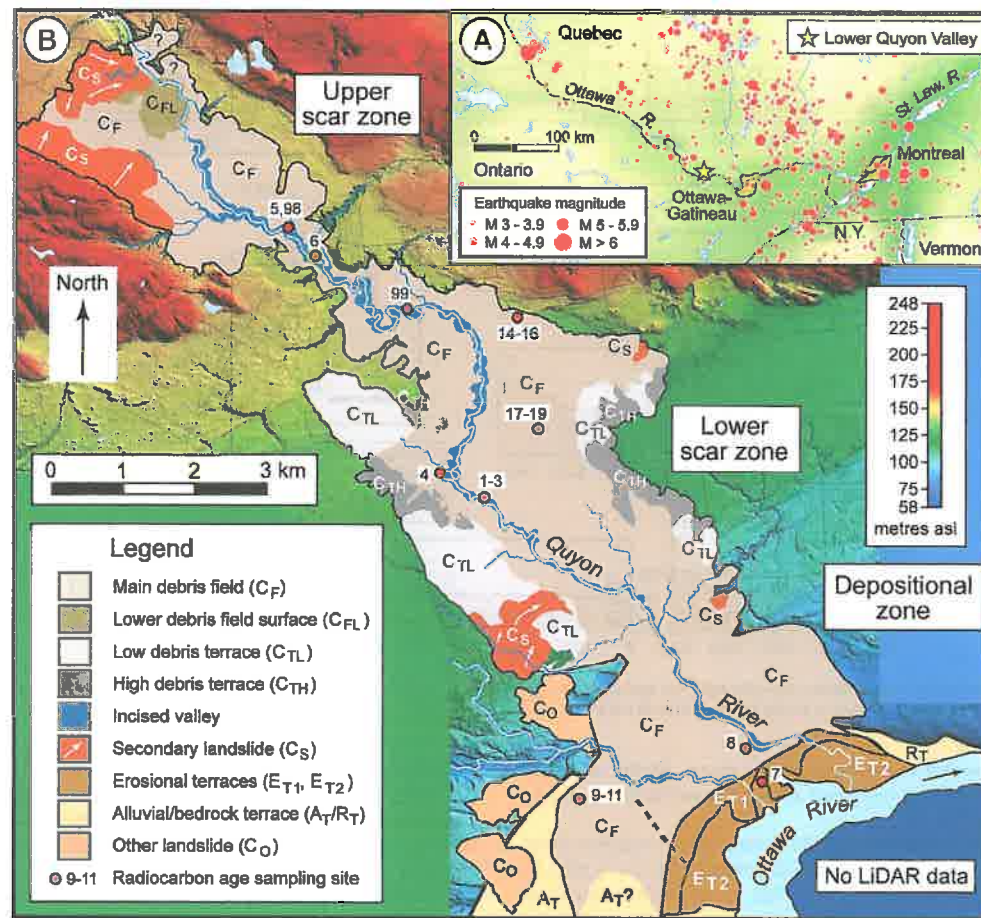
wide, “possessing a most irregular hummocky surface”. He suggested that it originated from “landslide movements”. This area appears on soil, landslide and surficial geology maps published in the 1960s and 1970s and is delineated by landslide map-unit polygons that represent landslide features, but do not differentiate closely-spaced, but separate, landslide source areas and deposits (Lajoie, 1962; Richard, 1976; Fransham et al., 1976b). The area is mentioned briefly or shown diagrammatically in papers as either the largest, or one of the largest, landslide areas in the Ottawa Valley (see Richard, 1974; F.P. Fransham et al., 1976a; Fransham and Gadd, 1977). Aylsworth et al. (1997) described the area as a “massive complex of coalescing and overlapping landslide deposits”. They report a radiocarbon age of  $1180 \pm 60$  <sup>14</sup>C yr BP (Beta-90879; sample 8 in Supplementary Table 1) collected from within the village of Quyon and suggested that the majority of the landslide deposits predate this age. A recent regional surficial geology map by St-Onge (2009) shows seven separate landslide polygons along the lower Quyon Valley that partly cover the larger landslide area depicted on earlier maps. Although none of these sources provides a detailed account, it can be inferred that the area experienced large-scale landslide activity, apparently as multiple failures, which presumably are of significantly different age. Also, a failure of unknown scale and specific origin occurred within the area in the late Holocene.

Recent research investigating the age of sensitive clay landslides in the lower Ottawa Valley elucidates the landslide activity within the lower Quyon Valley. As presented in this paper, the lower Quyon Valley is the source of one of the largest subaerial failures in glaciomarine sediments in eastern Canada and is a comparatively young feature. The age of the “Quyon Valley landslide” relative to other nearby failures in the

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**Figure 2.** A) Map showing significant historical seismicity within the West Quebec Seismic Zone of eastern Canada (courtesy of the Canadian Hazard Information Service, Natural Resources Canada). B) Map depicting the interpreted geomorphologic features of the Quyon Valley landslide and other relevant features, as explained in the text. The arrows within the larger secondary landslide areas (C<sub>S</sub>) are inferred flow directions. The surrounding shaded relief map is identical to that shown in Fig. 1B (LiDAR DEM, © Government of Quebec).

## Methods

Landslide deposits were examined at over 50 natural exposures along the incised course of the Quyon River and several tributaries during June 2011 and June–July 2012. Twelve radiocarbon-dated macrofossils were collected from exposed landslide debris or by coring organic layers buried beneath landslide deposits using a commercial drill rig. Where possible, the outer rings of logs or small branches with preserved bark were dated to obtain radiocarbon ages likely to closely approximate the age of the landslide. These ages were supplemented with six radiocarbon-dated terrestrial macrofossils sub-sampled from vibracores recovered from post-event wetlands formed within depressions on the landslide surface. Twenty-four additional published and unpublished radiocarbon ages, which relate to other landslides in the Ottawa–Quyon area, are used in this paper. These were collected by similar methods. All radiocarbon ages were calibrated to calendar years (before AD 1950) using Calib 6.1 (Stuiver and Reimer, 1993) and the calibration dataset of Reimer et al. (2009).

The shaded-relief digital elevation model (DEM) used in this study (Fig. 1B) was derived from LiDAR data obtained from the Quebec Ministère des Ressources Naturelles. The LiDAR survey was carried out on October 16, 2009, and has minimum planimetric and height precision of 0.15 m and 0.25 m, respectively. The thematic map depicting the Quyon Valley landslide area (Fig. 2B) was compiled based on ground-truthing of the study area and interpretation of the DEM. The

topographic profiles depicted in Figures 3 and 4 were extrapolated from the DEM using Global Mapper v.14.

## Source and depositional areas

The source area of the Quyon Valley landslide is delineated by an elongated and irregularly-shaped scar extending ~11.5 km along the lower Quyon Valley. The area consists of distinct upper and lower scar zones, separated by a narrow, ~300 m wide, constriction (Figs. 1B and 2B). The upper zone is ~4.8 km long and up to 2.1 km wide, while the larger, lower zone is ~6.8 km long and up to 4.5 km wide. The combined area of the lower (~20 km<sup>2</sup>) and upper (~8 km<sup>2</sup>) scar zones is ~28 km<sup>2</sup>. The depth from the inferred original surface of the Champlain Sea deposits to the scar floor ranges from 18 to 45 m (Fig. 3). The constriction may reflect the proximity of subsurface bedrock in combination with a localized change in lithology of the Champlain Sea deposits, as sand and gravel, ~35 m high, and a bedrock outcrop are exposed on the east side of the river directly below the constriction.

The depositional area is blanketed by landslide debris spilling ~2.6 km from the mouth of the scar, across an alluvial terrace, to at least the edge of the Ottawa River channel (Figs. 1B and 2B). The debris forms an elevated, hummocky surface that rises locally up to ~12 m above the inferred terrace plain (Fig. 3G). Two levels of erosional terraces truncate the southern edge of the depositional area and step down towards the Ottawa River (surfaces E<sub>T1</sub> and E<sub>T2</sub> in profile E–F;



the narrow constriction separating the upper and lower scar zones. A distinct step separates level 2 and 3 that ranges from 4 to 10 m high (profile C–D; Fig. 4).

Exposures along the incised courses of the Quyon River and several tributaries within both scar zones occur primarily within deposits of the main debris field ( $C_F$  surface; Fig. 2B). The exposures reveal large, tilted to quasi-horizontal, and vertically displaced slabs of intact Champlain Sea clay-silt, sand and, less commonly, sand and gravel deposits (Fig. 5). Buried organic materials and deformed or tilted organic layers can be found occasionally at the contact between or within slabs. No stratigraphic evidence of superimposed landslide deposits of different ages was found within the main debris field; all of the exposures contained deposits of a single landslide. These exposures reveal that level 2 in the longitudinal profile is a locally elevated area of the main debris field extending through the lower scar zone and is part of the same deposit underlying level 3. In the upper scar zone, a horizontal mat of detrital organic matter, several tens of centimeters thick and underlying clay, was encountered at the modern river level near sample sites 5–98 (Fig. 2B). This is thought to be part of the pre-failure incised valley bottom and is the only location where such a surface was observed in the landslide source area.

Surface characteristics of the main debris field ( $C_F$  surface) also are consistent with a single landslide deposit. The  $C_F$  surface is paired along both sides of the river (Figs. 3 and 4). Also, the surface of the debris field lacks features indicative of multiple, coalesced failures occurring at different times, for example, in the upper scar zone there are no large, distinct landslide lobes that originate from obviously different source areas and are separated by distinct medial ridges, levees or overridden margins (see Fig. 6). Overall, the scale and continuity of the main debris field ( $C_F$  surface), the presence of large debris blocks, and the thick deposits of a single landslide exposed along the Quyon River are consistent with a massive failure of Champlain Sea sediments within the upper and lower scar zones.

Other features of note in the Quyon Valley landslide area are the low and high debris terraces within the lower scar zone ( $C_{TL}$  and  $C_{TH}$ ; Fig. 2B). The low  $C_{TL}$  terrace is stepped 3 to 7 m above the main debris field ( $C_F$  surface), while the higher  $C_{TH}$  terrace is situated 12 to 25 m above the  $C_F$  surface (or 6 to 10 below the level of the Champlain Sea plain; Fig. 3E). There are a number of secondary landslides within both the upper and lower scar zones ( $C_S$  in Figs. 2B and 3A). Finally, a distinct low area ( $\sim 0.4 \text{ km}^2$ ) occurs within the  $C_F$  surface of the upper

scar zone ( $C_{FL}$  surface in Figs. 2B and 3A) that may be a landslide scar, or possibly is a remnant of a scar that pre-dates the  $C_F$  surface.

#### Age of the massive landslide

The nineteen AMS radiocarbon ages collected from the lower Quyon Valley landslide area are listed in Supplementary Table 1, including the date (sample 8) reported by Aylsworth et al. (1997). Seventeen of these are relevant to the age of the massive failure along the lower Quyon Valley. Of these, dated samples 1–4 and 5–6 are derived from logs recovered from exposures along the incised course of the Quyon River within the lower and upper scar zones, respectively (Figs. 2B and 7). Within the depositional zone, sample 7 is from one of several buried logs encountered in an excavation on the  $E_{T2}$  erosional terrace (Fig. 2B). Sample 8 is from a buried organic layer, 5 to 10 mm thick, at the interface between oxidized sand and an overlying mudflow deposit, 2–3 m thick, exposed within a clay-sand pit excavated into a large debris block within the village of Quyon (Fig. 2B). Samples 9 to 11 were collected from core that penetrated a pre-landslide vegetation layer underlying the western fringe of the depositional area. Dated samples 1 to 11 all represent maximum ages for the landslide. Six dated samples (12 to 17) were sub-sampled from vibracores extracted from two wetlands (three samples for each site) within the lower scar zone (Fig. 2B). These represent minimum ages for the landslide.

The calibrated  $2\sigma$  age ranges of the 17 radiocarbon ages are plotted in Figure 8. Notable is the general similarity of ten of the eleven maximum ages, which are indistinguishable statistically within the  $2\sigma$  age range. The age of sample 4 is slightly older, but is not inconsistent with these ages (Fig. 8). Five of the six minimum ages from the wetlands are considerably younger than the maximum ages, but the upper age range of sample 13 is within 10 yr of the youngest maximum age (sample 9; Supplementary Table 1). This minimum age provides a reasonable bracketing of the older maximum ages. The similarity of ten of the maximum ages and the oldest minimum age is consistent with the dated materials representing a common event within the two scar zones and across the depositional area. It is thus interpreted that the main debris field ( $C_F$  surface) in the upper and lower scar zones is the product of failures that coalesced during a single, massive landslide and flowed into the depositional area. Based on the specific overlap of the age ranges of samples 2, 3, 5, 8 and 9 (Fig. 8), the massive

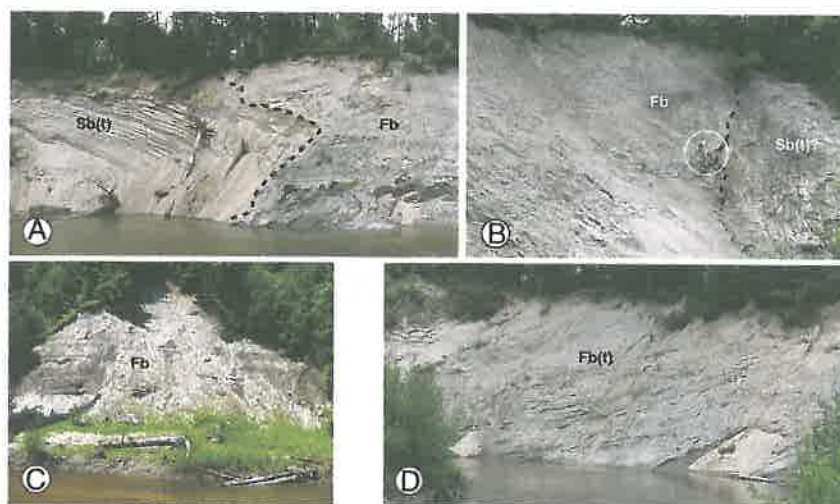
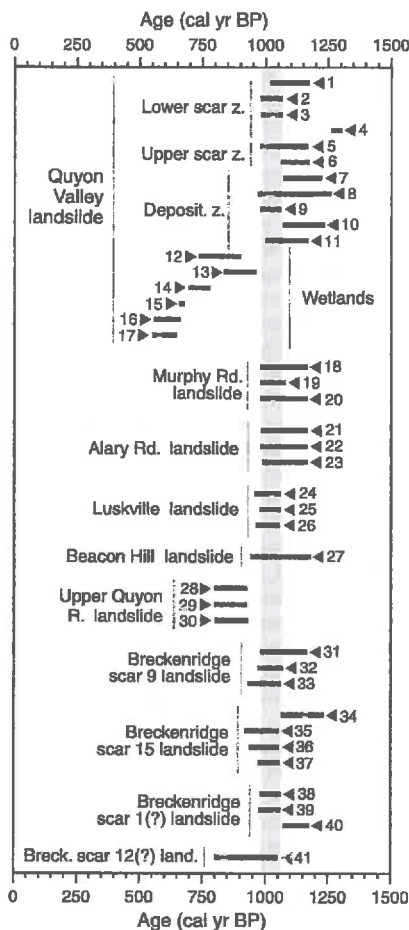
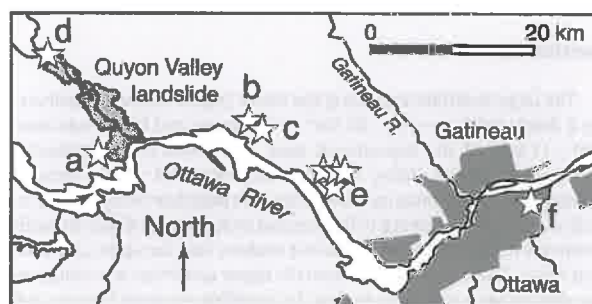


Figure 5. Photographs of landslide debris exposed along the Quyon River beneath the main debris field ( $C_F$  surface). Note, the large slabs of intact Champlain Sea sediments that extend from the river surface to the top of the banks in two of the four exposures. The exposures in A) and D) are located in the lower scar zone, while B) and C) are in the upper scar zone. Dashed lines mark the approximate location of the contact between sediment slabs. Note, the circled person for scale in B). Facies coding: Sb(t)—sand, bedded (tilted) and Fb(t)—fine sediments (silt, clay), bedded (tilted).



**Figure 8.** Plot of calibrated 2 $\sigma$  radiocarbon age ranges related to the age of the Quyon Valley landslide and nine other landslides in the Quyon–Ottawa area. Age ranges with left-pointing triangles represent maximum ages for a given landslide, while those with right-pointing triangles signify minimum ages. A gray-shaded bar marks the 980 to 1060 cal yr BP age range mentioned in the text. Refer to Figs. 2B and 9 for sample site and landslide locations.

over a relatively short period of time of hours or days because of the lack of features consistent with landslides of differing age. Some of the comparatively small-scale, secondary failures ( $C_S$ ; Fig. 2B) along the margins of both the upper and lower scar zones, may have occurred in the later



**Figure 9.** Map of the Ottawa Valley showing the locations of the Quyon Valley landslide (shaded polygon) and nine other landslides (white stars) mentioned in the text (a—Murphy Road, b—Alary Road, c—Luskville, d—upper Quyon River, e—Breckenridge Valley and f—Beacon Hill).

stages of the failure as the scar slopes and the main debris field began stabilizing.

Based on the main debris field ( $C_F$  surface) exclusively, the failure involved  $\sim 20$  km<sup>2</sup> of the source area. This area is a minimum, however, because some of the secondary failures ( $C_S$ ; Fig. 2B) clearly have overridden the  $C_F$  surface, but these areas ( $\sim 2.8$  km<sup>2</sup>) are not included in the  $C_F$  surface area. Also, it is possible that some of the low and high terrace surfaces ( $C_{TL}$  and  $C_{TH}$  terraces) are contemporary with the  $C_F$  surface. Estimating the volume of the Quyon Valley landslide is complicated because of the unknown pre-failure morphology of the lower Quyon Valley. Based on the entire source area topography, the volume of sediment removed from the lower and upper scar zones is  $\sim 450$  Mm<sup>3</sup> and  $\sim 150$  Mm<sup>3</sup>, respectively, for a combined  $\sim 600$  Mm<sup>3</sup>. This volume, however, is an order-of-magnitude estimate because a significant portion of the volume may have been removed by older landslides.

Debris exiting the lower scar zone flowed onto and across the alluvial terrace underlying the depositional area and probably into and across the Ottawa River channel. The presence of the  $E_{T1}$  and  $E_{T2}$  erosional terraces that truncate the depositional area adjacent to the Ottawa River (Fig. 2B) suggests that the landslide impounded the river. The identification of correlating landslide deposits along the Ottawa River opposite Quyon or discovery of similarly-aged lacustrine deposits upstream, would confirm this interpretation. The  $\sim 11$  km<sup>2</sup> size of the depositional area seems undersized relative to the  $\sim 20$  km<sup>2</sup> area of the  $C_F$  surface in the upper and lower scar zones. A portion of the debris undoubtedly has been reworked by the Ottawa River, but some probably flowed down the Ottawa River channel, analogous to the large AD 1663 landslide at St. Jean Vianney, Quebec ( $\sim 23$  km<sup>2</sup>; Potvin et al., 2001), traveling down the Saguenay River (see Dionne, 1972). Although no subaerial or subaqueous deposits have yet been reported along the Ottawa River downstream of Quyon, an investigation of the river sub-bottom could confirm the downstream extension of the deposits and provide further insights into the scale of the failure.

The coincidental occurrence of the Quyon Valley landslide with nine other failures in the Ottawa–Quyon area at  $\sim 1020$  cal yr BP provides compelling circumstantial evidence for a common triggering mechanism. Mechanisms usually attributed to multiple, synchronous landslides are severe rainstorms and earthquakes (Keefer, 1984; Crozier, 1997; Keefer, 2002; Jibson, 2009). Fluvial erosion that steepens and heightens slopes in combination with saturation of a weathered crust is considered the most common trigger of sensitive clay landslides (Leblais et al., 1983; Torrance, 2012). Available evidence, however, is not supportive of multiple, large ( $>1$  ha), sensitive clay landslides being triggered by a severe rainstorm. Gauthier and Hutchinson (2012) examined historical precipitation records for five large landslides in the St. Lawrence Lowlands–Ottawa Valley, and found that none were triggered by severe rainfall events. In July 1996, a severe rainstorm caused widespread flooding and significant bank and valley side erosion in the Saguenay–Lac St. Jean area, Quebec (see Milton and Bourque, 1997; Brooks and Lawrence, 1999, 2000). Over a thousand small ( $<1$  ha), shallow failures (up to 8 m deep) were triggered on slopes underlain by fine-grained, glaciomarine sediment (Perret et al., 1997, 1998), but there were no large-scale, retrogressive failures. While highly sensitive clay deposits and large landslide scars are present in the area affected by this storm, the small failures and bank erosion that happened were predominately in areas where the glaciomarine fine-grained sediments have low sensitivity (D. Perret, personal communication, 2012). This specific example demonstrates that the triggering of large sensitive clay landslides is complex, reflects site specific characteristics, and is not dependent simply on the occurrence of a severe rainstorm.

Many historic failures in sensitive sediments in eastern Canada occur in April to May (see Leblais et al., 1983) indicating that wet spring conditions following a winter of high snow accumulation warrant consideration as a mechanism. While numerous large landslides have occurred



Nine other landslides within a 65-km-long corridor extending from Quyon to Ottawa, have ages within the range 980 to 1060 cal yr BP of the Quyon Valley landslide. The contemporaneous age of these 10 failures provides circumstantial evidence that the landslides were triggered by a paleoearthquake. A minimum estimate for the paleoearthquake is  $M_w \sim 6.1$ , based on an empirical landslide area–earthquake magnitude relationship. The epicenter of the paleoearthquake may have been within the southern band of the WQSZ, but this is poorly constrained.

The Quyon Valley landslide is one of the three largest failures reported to have occurred in sensitive glaciomarine sediments in eastern Canada. Such massive landslides represent a major, localized, secondary seismic hazard in the areas of the Ottawa Valley–St. Lawrence Lowlands that are underlain by sensitive glaciomarine sediments.

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.yqres.2013.07.008>.

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**Edmond, Trish**

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**Subject:** Carlsbad Springs dump application (CRRRC)

-----Original Message-----

From:

Sent: June 24, 2014 5:03 PM

To: Zappone, Lorna (ENE)

Subject: Carlsbad Springs dump application (CRRRC)

Dear Ms. Zappone:

Based on your knowledge of prior applications for EA review, can you characterize how precise factual summaries are expected (by MoE officials) to be?

This question is prompted by the Draft EA document published this month by the Miller-Taggart consortium promoting the CRRRC near Ottawa -- specifically how it describes on p 255-6 (para. 13.2.4) "the area of the site"

viz. "Mainly properties/facilities/ yard areas . . .

Some existing residences fronting on Boundary Road."

1. This description does not describe "the area of the site" but merely the roads round the site, possibly even just one side of these roads. By contrast, only a dozen pages away in the Draft EA the area of the site is (for the proposed Property Value Protection Plan, p.268) described as a circle of radius 5 km. i.e. including the villages of Carlsbad Springs and Edwards.

The Draft EA was obviously written by many hands but it constitutes a single document submitted by a single commercial entity: only no editor has attempted to co-ordinate the various components of the EA so that they fit together. The same vague phrases, e.g. "the area of the site" are used to mean different things on different pages.

Do MoE officials normally expect applicants to be consistent in these respects, or does the MoE usually accept documents as ambiguous and imprecise as this?

2. It takes less than one man-hour to make an exact inventory of the geography actually described in para. 13.2.4. The peripheral roads of the dump site contain 13 business premises and 12 residences (3 already bought by M-T for demolition in 2015).

The Draft EA provides no such numbers. Readers cannot know whether the drafter of this paragraph never bothered to count the businesses and residences, or had the figures before him and could not be bothered to put them before local residents and MoE examiners. Readers are equally unaware why para. 13.2.4 omits the most obvious single business establishment directly opposite the dump site, a Petro-Canada gas station, also the only food vendor currently open for business adjacent to the site. (The paragraph specifies a gas bar with three gas pumps -- which means the Luso Garage, not Petro-Canada which has four double-sided pumps, i.e. countable as either 4 or 8.)

Readers who know the geography cannot know why so much was left out. Readers who do not know the geography cannot know that so much was left out.

Is this normal for planning documents placed before the MoE?

With thanks,

July 31, 2014

Mr. Hubert Bourque  
Project Manager,  
Taggart Miller Environmental Services  
225 Metcalfe Street, Suite 708  
Ottawa, Ontario K2P 1P9

CRCCPE response to the DRAFT EA report

Sent via e-mail to [hjbouque@crrrc.ca](mailto:hjbouque@crrrc.ca)

Mr. Bourque,

The Capital Region Citizens Coalition for the Protection of the Environment (CRCCPE) actively represents the concerned residents of Carlsbad Springs, Edwards and Vars, the unwilling host community for the proposed CRRRC landfill and diversion project. Since the announcement that the Boundary Road site was being considered for the private landfill project, CRCCPE has stated dissatisfaction with the planning, consultation, and lack of due diligence displayed by Taggart-Miller. The draft Terms of Reference (TOR) did not mention the Boundary Road site, but the final version of the Terms included it as an unlikely alternative to a North Russell property. At this point a draft EA report focussing exclusively on the Boundary Rd property has been put forward. Given the past experience on this project and the enormous deviation in content between the draft and final TOR documents, CRCCPE will reserve our detailed review and analysis for the final EA, once all information has been included.

In general, CRCCPE notes that Taggart-Miller has not referenced ALL published technical information on topics including biology, geology and engineering which are pertinent to properly assessing the foreseeable environmental impacts of the proposed CRRRC project at the Boundary Road location. The fact that Taggart-Miller has not made use of all the relevant studies of the property available from the City of Ottawa's own planning department, such as the GEOCON report for example, highlights the concerning lack of rigour with which they are approaching the risk assessment of this project.

Taggart-Miller informed the public that the draft EA report would require review between January and March 2014 and CRCCPE retained experts for that task in that time frame. The unexplained delay of the draft EA review period until high summer conflicts with the scheduled field work of several technical reviewers. Nonetheless, two of CRCCPE's technical experts have provided comment on this draft EA to Taggart-Miller, independently noting the lack of thoroughness. That Taggart-Miller's biologists failed to report beavers and other large fauna inhabiting the site is especially revealing. As recognized in the NCC's recently adopted Greenbelt plan, the proposed landfill site is a key wildlife corridor between protected green areas. The site is also the headwaters for Shaw's creek, the main artery through the protected Cumberland Forest and associated habitats. Of additional concern is the downplayed likely impact on local agriculture, the watershed, and ground water, as stated by another CRCCPE technical



reviewer: "There are issues with the reliability and calibration of the groundwater flow model used, which by Taggart-Miller's own admission is not up to par."

Geologists reviewing the draft EA mention: "The report is missing published relevant information on past seismic events (> M6.1, Brookes, 2013), that according to the National Building Code of Canada are to be used to design structures with an earthquake ground motion having a 2% in 50 years probability of exceedance (return period of 1 in 2475 yrs). We also note a continued refusal to recognize and study local faults in the immediate area that could activate future seismic events at a much closer distance to the site. One of these faults is clearly evident on the east-west cross-section Golder Associates prepared for the site and showed at Open Houses #5 and #6."

In numerous ways, Taggart-Miller fails to demonstrate the precautionary principle in their design. The resultant proposal lacks industry standard containment elements like a dual landfill liner system, instead suggesting an old-fashioned hole in the ground full of trash. Unlike Taggart-Miller, progressive waste management operators in the immediate CRRRC area are creating large diversion facilities WITHOUT building new landfills because the Ottawa region has ample waste disposal capacity to last a reasonable, multi-decadal planning window. Impacted residents have found the proponents to be evasive and lacking in good faith throughout this EA process and remain staunchly opposed to this destructive mega-project. We ask the Minister of the Environment to reject this EA and the flawed CRRRC project.

Sincerely,

Sue Langlois  
President, CRCCPE

## Appendix K-2

### Comment Received from the GRT

Table K-2: Summary of Comments from GRT on Draft EA

Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
Katherina Kirzati Heritage Planner MTCS	June 26, 2014	<p>This report forms part of the Environmental Assessment package and is identified as Technical Support Document #7 - Cultural Heritage Evaluation Report. The report lists five properties within a 250 m radius that were identified as having potential for cultural heritage value or interest. These properties are: 5384 Boundary Road 5409 Boundary Road 5507 Boundary Road 5508 Boundary Road 1129 Blackcreek Road</p> <p>In its analysis, the report indicates: Each of the five properties were evaluated independently. None of the properties were found to demonstrate cultural heritage value or interest under Ontario Heritage Act Regulation 9/06, and therefore not eligible for designation under Part IV of the Ontario Heritage Act. This finding was confirmed by the City of Ottawa.</p> <p>Based on these findings, there are no cultural heritage resources in the vicinity of the Boundary Road Site proposed for CRRRC. The ministry accepts the report, noting that it, and its recommendations, are considered part of the EA decision making process. The ministry suggests that a copy be provided to the local municipality and its Municipal Heritage Committee for their records. The report should also be available, upon request, to local heritage organizations with an interest in the project.</p>	Acknowledged. The draft EA report, including TSD #7, was provided to the City of Ottawa. The EA report will be made available to local heritage organizations on request.	No change to EA.
City of Ottawa	July 31, 2014	<p><b>Prioritize Diversion Over Landfill</b> The proposed integrated waste management facility is intended to service the Industrial, Commercial and Institutional (IC&amp;I) sector and the Construction and Demolition (C&amp;D) sector, which are both regulated by the Province and known to have relatively low diversion rates. The City encourages Taggart Miller to foster waste diversion activities for these sectors as a primary goal, and landfill disposal as a secondary measure. Further, diversion goals at the facility should be regularly reviewed and updated to maximize diversion opportunities, reflect changes in diversion technologies and markets that arise over the life of the proposed facility. Finally, the total allowable annual tonnage tipped at the proposed new landfill should decrease in accordance with rising diversion rates for IC&amp;I and C&amp;D waste.</p>	Waste diversion is a primary emphasis of the proposed CRRRC. Taggart Miller is making a significant investment in the diversion components of the CRRRC and this innovative facility will be the first of its kind in Ontario. Miller Waste is one of the most experienced waste diversion facility operators in Canada. As such, Miller regularly reviews diversion opportunities and advancements. The facility impact assessment has been based on receipt of 450,000 tonnes per year of waste/soil. There is no principled or logical basis to reduce allowable tonnage at the landfill as the diversion performance of the CRRRC improves over time.	No change to EA.
		<p><b>Service Area for Proposed Facility</b> It is noted in the draft EA that the proposed facility would primarily service the IC&amp;I and C&amp;D sectors in Ottawa and portions of eastern Ontario. It is the City's expectation that the service area for all waste diversion and disposal facilities at the site will be restricted to the City of Ottawa and the surrounding region, as identified in the draft EA, and that waste and contaminated soils originating outside of the identified service area will not be accepted at the site for processing and/or disposal.</p>	Acknowledged. Approval of the EA will have this legal effect.	No change to EA.
		<p><b>Air Quality and Noise</b> Proponent conducted noise study, groundwater study (drilling 25 wells) – why not an air quality study? Ottawa air quality should be different. P. 56, use local data – there is very limited air quality data representative of this rural eastern Ontario location. Establish your own monitoring location.</p>	Background air quality is required by the MOECC in modelling assessments of new or changing facilities. The MOECC has stringent requirements regarding the quality and quantity of data that needs to be available in order to use it as a background source to assess potential impacts of a project. As such, background air quality was determined from the closest existing MOECC monitoring stations. Taggart Miller considered establishing a meteorological station at the Site, however any data collected from the station would not be admissible for use in the model as it would lack in sufficient quantity. As detailed in Section 8.4.2 of the EA, Taggart Miller also evaluated an existing meteorological station at the Site but found that data from this station was of insufficient quality and quantity.	No change to EA.



Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team																						
		<p>Please provide the distance from the site boundary to the off site receptor in Table 8.4.1-3 (p.54).</p>	<p>The distance from the Site boundary to the off-Site receptors listed in Table 8.4.1-3 is as follows:</p> <table><tr><th>Receptor</th><th>Distance (m)</th></tr><tr><td>POR01</td><td>100</td></tr><tr><td>POR02</td><td>420</td></tr><tr><td>POR03</td><td>45</td></tr><tr><td>POR04</td><td>120</td></tr><tr><td>POR05</td><td>160</td></tr><tr><td>POR06</td><td>245</td></tr><tr><td>POR07</td><td>310</td></tr><tr><td>POR08</td><td>340</td></tr><tr><td>POR09</td><td>475</td></tr><tr><td>POR10</td><td>855</td></tr></table>	Receptor	Distance (m)	POR01	100	POR02	420	POR03	45	POR04	120	POR05	160	POR06	245	POR07	310	POR08	340	POR09	475	POR10	855	No change to EA.
Receptor	Distance (m)																									
POR01	100																									
POR02	420																									
POR03	45																									
POR04	120																									
POR05	160																									
POR06	245																									
POR07	310																									
POR08	340																									
POR09	475																									
POR10	855																									
		<p>Figure 8.4.1-1 – All noise monitoring is focused near Hwy 417 or immediately adjacent to the site boundary. This would generate background noise levels significantly higher than residences along Frontier Road and Blackcreek Road – add a noise monitoring location on the quiet side of the landfill near these residents.</p>	<p>The assessed points of reception (PORs) are within 500 m from the Site boundary. Residences to the north along Boundary Road (close to Hwy 417) have been included for the assessment of off-site haul route traffic noise as the primary haul route is along Boundary Road from Hwy 417. Noise monitoring location #3 is on the “quiet side” of the CRRRC and approximately 2km from highway 417, and is representative of background noise levels away from Highway 417. At POR03, the predicted noise levels from landfill and ancillary operations comply with MOECC guidelines. Residences along Frontier Road south of Devine Road, which are further away from the Site, would experience lower sound levels and so will comply with MOECC guidelines.</p>	No change to EA.																						
		<p>Fig. 8.4-1-1 does not show the residents along Blackcreek Road which are approximately the same distance as POR10 but on the quiet side of the landfill away from the highway. Add a measuring location which properly describes the noise levels away from the highway near the nine residences along Blackcreek Road.</p>	<p>The closest POR on Blackcreek Road is approximately 760 m from the Site boundary. As noted above, PORs within 500 m are included in the assessment as well as PORs located close to the off-Site haul route (Boundary Road). POR03 is approximately 500 m closer to the Site boundary in the same direction (southwest) and the predicted noise levels are below the established noise level limits. Any PORs located beyond POR03, i.e., residences along Blackcreek Road, will have lower noise levels.</p>	No change to EA.																						
		<p>Methane and other VOC’s monitoring should be included. Methane should be included in the Air Quality monitoring program.</p>	<p>The monitoring program is focused on air quality in relation to the indicator compounds used in the air quality assessment that were predicted to occur at other than de minimus levels in relation to their respective criteria. The trace VOC compounds that may be present in the landfill gas emissions evaluated in response to MOE comments were assessed and predicted to be well below their MOE POI limit using conservative estimates that included the decomposition of the organic-containing materials in the landfill. Additionally, unlike a typical landfill, at the proposed CRRRC the organic containing materials will be removed from the waste stream for processing.</p>	No change to EA.																						
		<p>The proponent states “four sensitive receptors have been identified within the Site....on Figure 2.3-1.” Twenty one POR are shown on this figure. Which is correct?</p>	<p>The text is correct and Figure 2.3-1 was inaccurate.</p>	Figure 2.3-1 in Volume I has been updated.																						



Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
		<p>The GHG's from leachate tankers hauling to ROPEC are not considered in the emissions summary. This should be included as a site impact.</p> <p>P. 168: odour modelling results should be depicted in a contour drawing in odour units on an aerial photo of the affected area.</p>	<p>Acknowledged.</p> <p>Predictions showed that provincial standards would be met at the nearest off-Site receptor, therefore modelled odour concentrations further off-Site were not depicted visually.</p>	<p>This GHG emission source has been included in the emission summary in Section 11.2.2.2 of Volume I and Section 5 of TSD #3.</p> <p>No change to EA.</p>
		<p><b>Hydrogeology and Geotechnical</b> In subsection 2.4, reference is made to performing a laboratory oedometer consolidation tests on soil samples to determine consolidation characteristics of the soils. Please indicate what test methodology was followed in performing this test.</p> <p>Subsection 2.7.2 discusses using Slug Testing to determine hydraulic conductivity based on Bouwer and Rice Method. Please discuss any methods used to correct for the high percentage of clay in the soil profile.</p>	<p>The consolidation testing was carried out in general accordance with ASTM D2435.</p> <p>The slug tests carried out in the monitoring wells as part of the hydrogeological assessment for the CRRRC Site were completed to provide information on the in-situ horizontal hydraulic conductivity of the overburden and bedrock adjacent to the monitoring well intervals.</p> <p>Within the <u>surficial silty sand layer</u>, there was no correction required in the slug test analysis for clay content. Groundwater flow within this layer is considered to be primarily horizontal. As such, the Bouwer and Rice Method provides a reasonable estimate of the hydraulic conductivity of this material.</p> <p>Slug tests were not completed within the <u>thick unweathered silty clay</u> deposit at the Site. Within this material, the groundwater movement is primarily in the vertical direction; as such slug tests estimating the horizontal hydraulic conductivity are of limited value. Instead, laboratory permeability testing on three undisturbed Shelby tube samples was conducted to provide information on the vertical hydraulic conductivity of this material. The results of the laboratory testing are provided in Section 7.2.3 of Volume III.</p> <p>For the analysis of the slug tests for the <u>silty layer</u> within the upper part of the unweathered silty clay deposit, it was assumed that the silty layer would contribute/receive the bulk of the water during the rising/falling-head tests. As a result, during the analysis of the slug test data, the screened interval was assumed to correspond to the thickness of the silty layer (i.e., the portions of unweathered silty clay adjacent to the monitoring interval were disregarded). This has the effect of increasing the estimated hydraulic conductivity by more accurately representing the zone contributing water to the monitoring interval, resulting in a more representative estimate of the horizontal hydraulic conductivity of the silty layer.</p> <p>The <u>glacial till material</u> underlying the unweathered silty clay deposit at the site has a relatively low clay content (i.e., less than 15 percent clay sized particles). As such, the slug test analysis method used is considered to provide a reasonable estimate of the horizontal hydraulic conductivity of this material.</p>	<p>No change to EA.</p> <p>No change to EA.</p>

Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
		<p>The map information in Figure 9.1 as discussed in subsection 9.3 should be extended to the south to include the proposed site in the map.</p> <p>The Slope Stability Figures 11-1 to 11-3 should be provided at a larger scale to improve readability.</p> <p>When the report is finalized and submitted for Site Plan Approval, the report must be signed and sealed by the engineer of record. In its current form, the report can be received as a preliminary investigation of the subject site.</p>	<p>Figure 9.1 comes from a paper by Brooks et. al., 2013 as noted under the reference section of the figure. Taggart Miller did not produce the figure and cannot extend its limits. Note that the location of the proposed CRRRC Site is accurately (to scale) shown on the Figure.</p> <p>Acknowledged.</p> <p>Acknowledged.</p>	<p>No change to EA.</p> <p>Figures 11-1 to 11-3 have been updated in Volume III.</p>
		<p><b>Land Use</b> Section 8.8.1 Land Use (p. 102) “There are currently no Official Plan Amendments, Zoning By-law Amendments or Draft Plans of Subdivision active in this immediate area. There is one application for a site plan in the vicinity of the Site. The application is for a Long Combination Vehicle Truck Transport De-Coupling facility at the southeast corner of the Boundary Road and Highway 417 interchange and the site is identified as 5341 Boundary Road. This development is commercial/industrial in nature, which is consistent with the immediate surrounding area.” In this paragraph it should also note a previous approved zoning amendment for 5592, 5606 and 5630 Boundary Rd. and 9460 Mitch Owens Road. Lands rezoned from Rural Commercial to Rural General Industrial.</p> <p>Section 11.6.1 Land Use (p.210) <b>City of Ottawa Official Plan (OP), By-law 2003-203:</b> The City completed a five-year review in 2013 of its OP (City of Ottawa, 2013g). As a result of this review, Official Plan Amendment #150 was adopted by Council in December 2013 and is “<b>currently awaiting Ministerial Approval</b>” with under appeal to the Ontario Municipal Board.</p> <p>The five-year review of the OP in 2013, included a <b>Land Evaluation and Area Review for Agriculture</b> areas. A draft report of the Lands Evaluation and Area Review was issued in 2012, which identified various calculation options for mapping agriculture parcels and areas throughout rural Ottawa, and did not include the Site as an Agricultural area. It should be noted that this document has no status.</p>	<p>Acknowledged.</p> <p>Acknowledged.</p> <p>Acknowledged.</p>	<p>The previous zoning amendment has been noted in Section 8.8.1 of Volume I and Section 3.2 of TSD #5.</p> <p>The text in Section 11.6.1 of Volume I and Section 4.1.4 of TSD #5 were amended to include that the plan is under appeal to the Ontario Municipal Board.</p> <p>Section 11.6.1 of Volume I and Section 4.1.4 of TSD #5 were amended to note that the Lands Evaluation and Area Review report has no status.</p>
		<p><b>Leachate</b> 230,000 m3/year = 5,750 tanker loads of leachate delivered annually to ROPEC or 22 loads per day over a standard 5 day work week. The greenhouse gas generated by this trucking operation was not considered in the Atmosphere – Air Quality Environmental Component.</p> <p>Since leachate must be pumped immediately – where will it be stored if, for example, 75mm of rain are forecast? What is the maximum design head on the leachate liner? What is the storage volume of the collection system?</p>	<p>Acknowledged.</p> <p>The storage of leachate is discussed in Section 4.3.2 of Appendix I of Volume IV Design &amp; Operations Report. The equalization tank has the capacity to hold 1,520 cubic metres and the leachate storage pond/tank(s) can hold approximately 44,000 cubic metres of leachate (an estimated two months’ worth) when necessary. With two months of storage capacity, 75 millimetres of rain can be accommodated. This does not include the temporary storage available within the leachate collection system, if it was required to utilize it in the short term.</p>	<p>This GHG emission source has been included in the emission summary in Section 11.2.2.2 of Volume I and Section 5 of TSD #3.</p> <p>No change to EA.</p>



Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
		<p>The groundwater monitoring program should include on-site and off-site monitoring including private wells within 3 kilometres of the landfill.</p> <p>Leachate Treatment System Treatment system must be designed as a batch treatment process. Once samples have been collected from the final pond to determine compliance, no further leachate can be added to the pond prior to discharge at ROPEC. May require two post treatment ponds to support a batch treatment process.</p> <p>On-site vehicle maintenance Requires an oil/water separator, proper maintenance and maintenance records. If this water discharges to a septic tank, it can be brought to ROPEC as restricted waste with a valid approval code.</p> <p>Storm pond/Ditches All stormwater run-off entering a ditch or municipal drain is required to meet the City of Ottawa's Storm Limits.</p> <p>Stormceptors to manage run-off from the parking lot for oil and fuel.</p> <p>Tire Wash Station Will require a solids interceptor. Is this water contained or will it run straight to the storm ponds?</p> <p>Miscellaneous Need to meet a TKN limit of 100mg/L. Need proper sampling ports – raw leachate (not mixed with other waste streams), treated leachate, liquid stream from organics processing facility (prior to mixing with other waste streams). Leachate water is to be brought on its own to ROPEC. Any storm water that needs to be trucked to ROPEC cannot be mixed with the final effluent of the leachate treatment system. Contingency plan will be required if liquid waste does not meet By-law limits and cannot be brought to ROPEC for further treatment. Discharge Agreement for Leachate will have monitoring requirements in addition to the provincial requirements already identified in the report. Hours of access for Regulated Waste is 8:00 a.m. to 3:30 p.m. Monday to Friday, excluding statutory holidays.</p>	<p>The Site must meet the Reasonable Use Guideline at the property boundary. Private wells located within the Site-vicinity (500 metres) will however be sampled one time before operation of the CRRRC as requested by the MOECC, if permission to access is made available by the owner.</p> <p>Acknowledged.</p> <p>Acknowledged. An oil-water separator will be provided at the maintenance building.</p> <p>Acknowledged. It should be noted that the existing surface water quality within these ditches was found to exceed City storm sewer limits for phenols and BOD on one occasion. However, most of the existing conditions data show the surface water at the Site is in compliance with the City of Ottawa storm sewer limits. The proposed undertaking is predicted to have no impact on existing surface water quality.</p> <p>There is likely insufficient grade at the Site for stormceptors but it is proposed to use reversed sloped outlet pipes that would serve the same purpose.</p> <p>The need for a solids interceptor is acknowledged. It is envisioned that the tire wash station will be a recirculating system. At times water will be added to the system and at other times there will be excess water. When there is excess water it could be used for other on-site purposes (including irrigation) or could be directed to the stormwater management ponds after it has been through the solids interceptor.</p> <p>All of these miscellaneous comments are acknowledged.</p>	<p>The monitoring program in Section 14.1.2.1 of Volume I, Section 13.2.1 of Volume III and Section 7.1 in Volume IV has been modified to include private wells within 500 metres of the Site one time in advance of CRRRC operations commencing, as requested by MOECC. The design of the final leachate holding pond has been modified to accommodate this requirement and the EA has been updated.</p> <p>Information on oil-water separators has been added to Section 10.11 of Volume I and Section 5.4 of Volume IV.</p> <p>No change to EA.</p> <p>Section 10.11 of Volume I, Section 5.4 of Volume IV and Section 5.2 of Volume IV Appendix A have been updated to include this information.</p> <p>Section 10.11 of Volume I and Section 5.4 of Volume IV have been updated to include this information.</p> <p>No change to EA.</p>



Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
		<p><b>Natural Environment, Natural Systems</b>  Some of the following comments will be more appropriate for the planning application submission and supporting studies. In the meantime, the following comments should provide some feedback to improve your report and to prepare your Environmental Impact Statements (EIS). Page references below relate to Volume 1 of the draft EA.</p> <p>P. 93, notes three area sensitive species. What are implications of identifying significant wildlife habitat (SWH)? Please follow up with SWH Criteria (Appendix of MNR's Significant Wildlife Habitat – Technical Guide).</p> <p>P. 93, three active Barn swallows nests discovered in north eastern corner of site. This scenario will require Endangered Species Act registration and mitigation plan when the planning application is submitted.</p> <p>Little brown myotis was recorded four times (pg 94). Your report suggests that the subject property is not significant habitat for endangered species and the MNR agrees with your interpretation. Please provide MNR's confirmation in writing.</p> <p>Do your findings identify significant wildlife habitat for herpetofauns? Please compare your findings with SWH Criteria (Appendix of Significant Wildlife Habitat – Technical Guide).</p> <p>4 out of the 5 surface water features had fish. These will require DFO self-assessment and a CA review. As well, fish sampling should be conducted in snow melt/early spring season (freshet).</p>	<p>The Environmental Assessment for this project was conducted in accordance with standard processes under the approved Terms of Reference. A detailed assessment of Significant Wildlife Habitat (SWH) is linked to the development requirements of the City. However, we have undertaken an assessment of SWH using the Draft SWH Ecoregion Criteria Schedule as requested by the City.</p> <p>Because it could not be confirmed whether the three woodland area sensitive bird species observed on the Site were breeding, the habitat would not be considered SWH using the Draft SWH criteria. In addition, based on our assessment of habitat in the region there are other more representative and larger area sensitive features elsewhere.</p> <p>Considering all natural features and functions present in the study area, the only potential SWH that has been identified on the Site is an area of suitable woodland amphibian breeding habitat in the southeastern corner of the Site and an area in the southwestern corner of the Site. Based on our assessment of habitat in the region, the habitat on the Site is not the largest concentration of woodland amphibian breeding habitat in the region, and there are other examples in the area. In addition, the outcome of the effects assessment concluded that the regional population of amphibians will not be adversely affected by removal of this habitat. During construction, mitigation measures will be implemented to protect individuals, including, but not limited to, restricting disturbance during the breeding season. No other SWH were identified on the site using the Draft SWH criteria.</p> <p>The details of the assessment using the Draft SWH criteria will be presented in the City planning/permitting documents, as required.</p> <p>Acknowledged. This requirement is described in Section 11.5.1 of Volume I of the EA. The activity will be registered with the MNRF under the Endangered Species Act prior to submitting the planning application.</p> <p>The e-mail confirmation received from MNR regarding little brown myotis has been provided to the City.</p> <p>Please see the response above regarding the assessment of habitat using the Draft SWH Ecoregion Criteria Schedule.</p> <p>There are 4 surface water features on the site, 3 of which contained fish as observed during field surveys. As described in Section 1.7 of Volume I, the South Nation Conservation Authority is responsible for issuing permits for any construction in or alternation of water courses under <i>The Conservation Authorities Act</i>. Approval from South Nation Conservation will be required to implement the Site development plan. If, at the time of permitting, South Nation Conservation requires a DFO self-assessment</p>	<p>A commitment to consider the SWH during the City planning and permitting process has been added to Section 15.0 of Volume I of the EA.</p> <p>A commitment to receive authorization from the MNRF under the Endangered Species Act prior to submitting the planning application has been added to Section 15.0 of Volume I of the EA.  No change to EA</p> <p>A commitment to consider the SWH during the City planning and permitting process has been added to Section 15.0 of Volume I of the EA.  No change to EA.</p>



Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
			or request for review, it will be done at that time. Given that the drainage features on the site are warmwater, the fish in these systems would be spawning in spring, and would not be found in the on-site drainage features. If additional data regarding the fish community is deemed necessary, it should be collected during the summer, which coincides with the MNRF restricted period.	
		<p>Migratory Bird Nests (p.202): on the basis of new and improved information from Environment Canada regarding the migratory bird breeding season, we recommend that there be no vegetation clearing between April 15 and August 15 unless a qualified biologist has checked for nests first.</p> <p>We disagree with statements (p. 203) regarding fish habitat. If fish were found in drain DD1 and this drain is scheduled for removal, how can it be concluded that this “will not result in direct loss of fish habitat on Site”? Please clarify.</p> <p>What are the mitigation measures for direct fish habitat loss in DD3? Although fish will be “salvaged and relocated”, this does not compensate for fish habitat loss.</p> <p>Please provide the source of information for “NCC has hypothesized the existence of a wildlife movement corridor from Cumberland Forest through the Vars Forest...” (p. 204).</p> <p>Alteration of surface water regime will require Conservation Authority permit. We recommend consulting with the local CA prior to submitting your planning application (p. 206).</p> <p>Increase Erosion section (p. 206): setbacks were noted for the Simpson Drain, however, little was described to mitigate erosion on the other drains/watercourses. Please elaborate.</p> <p>Section <i>Alteration of Surface Water Regime</i> (p.206): “increasing the deposition of fines in habitats”, is that supposed to mean deposits of fine sediment in aquatic habitats? Please clarify.</p> <p>P. 207, describes, “The three on-Site surface water discharge points meet...”. Have these three discharge points been discussed earlier in the report? If so, where and please indicate their locations on a map.</p> <p>The entire section “Alternation of Surface Water Regime” requires further attention (pg 206 &amp; 207). The section begins by acknowledging potential impacts on downstream sections of aquatic systems but does not present their reasoning in a sequence to justify or substantiate their conclusion of flow regime changes not being ecologically important. Please clarify and elaborate.</p>	<p>Acknowledged.</p> <p>The portion of DD1 that will be removed is a channel in an agricultural field that was dry during all field surveys. There is no direct channel upstream of the site, and it appears to only convey surface runoff from the site during limited periods.</p> <p>DD3 does not meet the criteria for fish habitat under the <i>Fisheries Act</i>, and therefore compensation is not required under that Act.</p> <p>The approximate location of the wildlife corridor was noted in the following source: National Capital Commission. 2013. Canada’s Capital Greenbelt Master Plan. URL: <a href="http://www.ncc-ccn.gc.ca/sites/default/files/pubs/gbmap-en_jan2014.pdf">http://www.ncc-ccn.gc.ca/sites/default/files/pubs/gbmap-en_jan2014.pdf</a> . We discussed the findings of the assessment (Section 11.5.2) with NCC and they are in agreement with our analysis. Follow up with the NCC on November 18, 2014 indicated that they were satisfied that their interests were addressed with the studies completed as part of the EA.</p> <p>South Nation Conservation Authority has been consulted and any necessary permits will be obtained as described in Section 1.7 of Volume I.</p> <p>DD1, DD2 and DD3 are being removed as part of the project. Sediment control structures will be put in place at the downstream end of the site for these features to prevent downstream off-site sedimentation.</p> <p>This is correct.</p> <p>The existing drainage at the Site is described in Section 8.6.2 and the discharge points are shown on Figure 8.6.2-1.</p> <p>Because the flow regimes of the drainage features will not be changing to a great extent, any changes to downstream aquatic habitat are also anticipated to be minor. In addition, it was considered that because any downstream change in aquatic habitat was within a relatively small geographic extent, and the magnitude of any changes is low, the overall importance of the change to the ecology was also low.</p>	<p>A commitment of no vegetation clearing between April 15 and August 15 unless a qualified biologist has checked for nests first has been added to Section 15.0 of Volume I of the EA.</p> <p>No change to EA.</p> <p>A sentence has been added to Section 11.5.2 of Volume I of the EA to clarify the location of the discharge points.</p> <p>The section “Alternation of Surface Water Regime” in Section 11.5.2 of Volume I of the EA has been updated to improve its clarity.</p>

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		P. 208: how are nuisance wildlife populations going to be controlled? If poisoning is an anticipated method of control, please describe and assess any potential implications of poison entering the food chain and possibly, the aquatic habitats and water regime.	As per Volume IV, Section 6.1.6-4, because the working area of the landfill will be compacted and covered daily, nuisance wildlife populations should be minimized. In addition, much of the organic component of the waste should be diverted. If required, vermin will be controlled at the landfill or diversion facilities by trapping or a pest management company (which could include other species control or poison). Pest management control companies which use poison do so under strict regulatory control.	No change to EA.
		Is there an active beaver using the beaver dam that is planned for dismantling? If so, what is anticipated to happen to the beaver and to prevent its return? Has a beaver deceiver been considered?	The beaver dam in question is located along a municipal drain. During a pre-consultation meeting with the City in the spring of 2013 the City Drainage Superintendent was alerted to the presence of the beaver dam. It is the City's responsibility to determine how and when to remove the dam and how to prevent its return. A beaver deceiver may be useful.	No change to EA.
		Are there any discharge or recharge areas identified on-site? Given that much of the subject property demonstrates recharge properties (p. 76), what are the anticipated impacts of removing DD1, DD2, and DD3 on the groundwater regime and any potential discharge areas off-site?	Based on the monthly and daily groundwater elevation data collected to date, vertical gradients at the Site are typically either downward (recharge conditions) or absent between the surficial silty sand, the silty layer, silty clay, glacial till and upper bedrock formations at most monitoring locations. As the soils at the Site generally consist of low permeability materials that provide very limited recharge, there is no anticipated impact of removing DD1, DD2 and DD3 on the groundwater regime.  Under the existing conditions, DD3 does not have an outlet. Post-development the outlet of DD1 and DD2 will be maintained, however the means of how the water will get there will change to be via the constructed drainage features. Stormwater management ponds will be designed such that the rate of surface water leaving the Site will be controlled and the hydrologic regime post-construction will meet the pre-construction conditions. There will be a small potential decrease in the total volume of streamflow at the outlet of DD2, however any change to discharge off-Site is not ecologically important. There will be a small potential increase in the total volume of streamflow at the outlet of DD1.	No change to EA.
		<b>Public Health</b> As noted above, the groundwater monitoring program should include on-site and off-site monitoring, including the monitoring of private wells within 3 kilometres of the landfill.  Ottawa Public Health would like to be informed when complaints regarding significant noise, odour and air quality are received.	The Site must meet the Reasonable Use Guideline at the property boundary. Private wells located within the Site-vicinity (500 metres) will however be sampled one time before operation of the CRRRC as requested by the MOECC, if permission to access is made available by the owner.  Acknowledged.	The monitoring program in Section 14.1.2.1 of Volume I, Section 13.2.1 of Volume III and Section 7.1 in Volume IV has been modified to include private wells within 500 metres of the Site sampled one time before operation of the CRRRC commences, if access is provided.  The Complaints Procedure outlined in Section 6.1.6 of Volume IV of the EA has been amended to include this request.
		<b>Transportation</b> Figure 2.1 Weekday Peak AM & PM Hour Traffic Count: please include Source of traffic counts in the Legend.	As described in Section 2.0, the traffic counts at the 417 eastbound and westbound ramps were obtained from MTO, the counts at Boundary Road and Mitch Owens Road were obtained from the City of Ottawa, and the Taggart Miller consulting team conducted the counts at Boundary Road and Devine Road.	Figure 2.1 of TSD 9 has been amended to include the requested information.

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		<p>Please provide Weekday Peak AM &amp; PM Hour Background Traffic and Total Traffic for 2017, similar to Figures 4.2 and 4.3 (2017 is the horizon year at build-out).</p> <p>The ROW protection for Boundary Road is 30m per the City's OP, so 15m from the centreline of existing pavement to the property line. Ensure that the road widening is conveyed to the City.</p> <p>Please note that the proposed roadway modifications will require the delegated authority approval of the manager of Development Review, Suburban Services.</p>	<p>Taggart Miller will provide this information for the City TIS report when City approvals are pursued.</p> <p>Acknowledged.</p> <p>Acknowledged.</p>	<p>No change to EA.</p> <p>No change to EA.</p> <p>No change to EA.</p>
		<p><b>Socio Economic</b> Noteworthy is intersection at Boundary and Hwy 417 is subject to study involving 400 series interchanges which will form part of the Employment Lands study. The selection process for consultant is underway and the study is expected late 2015. The result of this study may inform or recommend changes to Official Plan with respect to land use at interchanges.</p>	Acknowledged.	No change to EA.
		<p><b>Surface Water/ Stormwater</b> Drainage and conveyance of surface water on the site as well as the quality of surface water discharging from the site is very critical to protecting the natural environment. As a result, proposed stormwater management quality and quantity controls as well as potential erosion resulting in the downstream surface water receivers must be reviewed in detail by all regulatory agencies, such as the South Nation Conservation Authority, Ministry of the Environment, Municipal Drainage Superintendent and City of Ottawa staff.</p> <p>The proponent is proposing to alter drainage boundaries for three municipal drains within the property, which would necessitate revisions to the Municipal Drain Engineering Reports under the Drainage Act. The proponent is advised to consult with the Municipal Drainage Superintendent to confirm all requirements under the Drainage Act.</p> <p>In the event of a spill, the proponent must demonstrate mitigation methods to manage and remediate contaminated stormwater on the site in order to protect the natural environment.</p> <p>It appears that the proponent's analysis of potential environmental impacts was based solely on the 2006 WEPP document – "Water Quality in Ottawa's Rivers and Streams". This document does not contain sample results; only a very simplified characterization. It is suggested that the proponent complete their analysis based on the actual data collected by WEPP from 2008 to the present in order to assess the potential impacts of the discharge.</p>	<p>Acknowledged. The draft and final documents will be circulated to these agencies and all approvals required for this project have been discussed in Section 1.7 of Volume I.</p> <p>Acknowledged. Taggart Miller and its consulting team have met with and had several discussions with the Municipal Drainage Superintendent. These consultation activities are documented in Volume I, Section 3.6.6.</p> <p>Acknowledged. As noted in Volume IV, Section 6.1.14 an Environmental Emergency and Contingency (E2C) Plan, specifically prepared for the Site, will be developed and provided to the local office of the MOECC for their information and comment, and a copy retained in a central location on the Site and will be accessible to all staff at all times.</p> <p>WEPP data from 2008 to present for the Bear Brook Creek were obtained from the City. The concentrations of key water quality indicators (phosphorus, E. coli, copper and zinc) were compared to the provincial water quality objectives and the Canadian Water Quality Guidelines.</p>	<p>No change to EA.</p> <p>No change to EA.</p> <p>No change to EA.</p> <p>Section 8.6.1 of Volume I and Section 3.3.2 of Volume IV, Appendix A of the EA were amended to reference the 2008 to present data from WEPP.</p>
		<p><b>General Comments</b> The proponent must develop a comprehensive program to ensure that there are no future groundwater and surface water impacts on and around the site.</p> <p>All MOE and Sewer Use orders and issues of non-compliance identified should be reported to the Mayor, east end Councillors and General Manager of Environmental Services within 24 hours of identification.</p>	<p>Acknowledged. Taggart Miller believe the program described in the EA will ensure that groundwater and surface water are fully protected.</p> <p>Acknowledged.</p>	<p>No change to EA.</p> <p>This requirement has been added to the leachate contingency measures and trigger mechanisms described in Section 8.3 of Volume IV of the EA.</p>

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		<p>An annual report should be provided to the same group that ensures there are no environmental impacts resulting from the operations at the facility.</p> <p>In addition, the proponent should report all odour, litter, noise and traffic complaints received by the proponent or forwarded to the proponent by other parties to the General Manager of Environmental Services and the east-end Councillors within 24 hours of receipt.</p> <p>The report should include how and when the problem was addressed. A summary of all complaints and how they were resolved must be prepared and issued with the agenda for the Public Liaison Committee meeting.</p> <p>Ensure local Conservation Authority is consulted with respect to water quality and quantity issues in the Surface water plan.</p>	<p>Acknowledged.</p> <p>Acknowledged.</p> <p>This is part of the complaints procedure described in Section 6.1.7 of Volume IV.</p> <p>Acknowledge. South Nation Conservation has been and will continue to be consulted.</p>	<p>No change to EA.</p> <p>This requirement has been added to the complaints procedure described in Section 6.1.7 of Volume IV of the EA.</p> <p>No change to EA.</p> <p>No change to EA.</p>
Mathieu Leblanc, Environmental Planner SNC	August 7, 2014	<p>SNC maps do show that the property in question contains watercourses. Most have been identified in the report:</p> <ul style="list-style-type: none"> <li>- A tributary of the Regimbald Municipal Drain (Class F), identified as DD1 in the report, crosses the north eastern corner of the lot and has been recognized as fish habitat in the report.</li> <li>- The Simpson Municipal Drain (Class F) crosses the property west to east and has been recognized as fish habitat in the report.</li> <li>- A tributary of Shaw's Creek, identified as DD2 in the report, also crosses the property west to east (south of the Simpson Drain) and is not considered direct fish habitat in the report.</li> <li>- A man made ditch, identified as DD3 in the report, on the western edge of the property is not identified as fish habitat in the report. The report also mentions that DD3 seems to have a "tenuous connection" to DD2 during high water.</li> </ul> <p><i>Comment 1: Further to the list above, SNC's maps show a north-south tributary of Regimbald Municipal Drain in the northwestern corner of the property and a connection between DD2 and DD3. The report; however, seems to have the tributary stopping at the property line and does not show the connection between DD2 and DD3. This should be revised and/or clarified</i></p> <p>It is the obligation of SNC to implement Ontario Regulation 170/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, developed under Section 28 of the Conservation Authorities Act.</p> <p><i>Comment 2: The regulation limit at the subject location has been determined as the top of bank of the above identified watercourses. Any development and/or site alteration (e.g. filling, culvert installation, outlet connections, etc.) proposed within the regulated area may require a permit from SNC and restrictions may apply.</i></p> <p><i>Comment 3: Note that under Section 28 of the Conservation Authorities Act, a watercourse is defined as "an identifiable depression in the ground in which a flow of water regularly or continuously occurs".</i></p> <p>It is our understanding that the proposed development consist of facility and administrative buildings, outdoor diversion areas, roads, parking and stormwater management ponds. Further, the report mentions Alternative Site Development Concept A as the most favoured option.</p>	<p>Taggart Miller's consultant is aware of the mapping showing the north-south tributary and the connection between DD2 and DD3. During Site investigation and multiple Site visits the north-south tributary was never found on-Site or near the Site boundary and hence was excluded from figures produced, which show water features on the Site. DD3 is a constructed feature containing water that may possibly have a tenuous connection with DD2 during periods of high water, such as following a storm event or spring freshet. During Site investigation and multiple Site visits this connection never had water. Under Section 28 of the Conservation Authorities Act, a watercourse is defined as "an identifiable depression in the ground in which a flow of water regularly or continuously occurs". Since this was not the observed case this was removed from the figures prepared for the CRRRC.</p> <p>Acknowledged.</p> <p>Acknowledged.</p> <p>Acknowledged.</p>	<p>No change to EA.</p> <p>No change to EA.</p> <p>No change to EA.</p> <p>No change to EA.</p>



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		<p><i>Comment 4: From the Conservation Authority's point of view, Concept A would be preferred as the Simpson Municipal Drain would only be bordered by the landfill on one side instead of two.</i></p> <p>The report mentions a perimeter berm surrounding the landfill area. The said berm shall have a height of 3 to 3.5 metres, a top width of either 35 metres (Volume 1 p. xxi) or 36 metres (Volume 1 p. xxiv) and 7H:1V sideslopes.</p> <p><i>Comment 5: The height and top width should be confirmed as much as possible, since this will affect the total width of the berm and thus the setback between the berm and the watercourse.</i></p> <p><i>Comment 6: By looking at Figure 10-2 (Volume 1), it is somewhat difficult to accurately identify the proposed setback between the toe of the berm and the top of bank of the Simpson Municipal Drain. Would it be possible to confirm this distance? In general, SNC recommends a 30 metre "no touch" setback from the top of bank to protect potential fish habitat. Further, is anything being proposed within this setback (e.g. access road, path, drainage swales, etc.)? If so, this should be clearly identified on the submitted plans.</i></p> <p>As per Section 13 - Volume 3, it is our understanding that the ongoing surface water monitoring program will be done 3 times a year (spring, summer and fall) at 4 locations as shown on Figure 13-1.</p> <p><i>Comment 7: Will this information be available to the general public and/or public agencies? If so, how will this be made available?</i></p> <p>Section 13 also speaks of the ongoing groundwater monitoring which will take place 4 times a year (spring, summer, fall and winter) at existing and proposed well locations as shown on Figure 13-1.</p> <p><i>Comment 8: Again, will this information be available to the general public and/or public agencies? If so, how will this be available?</i></p> <p>Both monitoring programs have been developed to "generally adhere" to the Landfill Standards (MOE, 1998b, revised January 2012) including the list of parameters to be analysed (Tables 13-3 &amp; 13-5).</p> <p><i>Comment 9: Please clarify what "generally adhere" means in this situation.</i></p>	<p>Acknowledged.</p> <p>Volume 1 p. xxi describes the conceptual design, while Volume 1 p. xxiv describes the proposed design, which is why there is a slight difference in the top width of the berm. The top width of the berm is 36 metres. The top width of the berm is also stated as 36 metres in Appendix I (Landfill Design and Operations Report) of Volume IV Design and Operations Report.</p> <p>Acknowledged. See above.</p> <p>From discussion with the City Drainage Superintendent, Taggart Miller understands that a minimum 15 m setback is required along one side of a municipal drain for infrequent access for drain maintenance. The Site layout has provided more than this setback (25 m on the south side and 20 m on the north side) from the centerline of the drain and will adequately provide protection of potential fish habitat. More detailed layout of the area adjoining the Simpson Drain is provided in Volume IV Appendix A, Dwg. No.C- 01.</p> <p>An annual report which would contain surface water monitoring results will be prepared and submitted to the MOECC for review and comment. The local Ottawa MOECC office will have a copy of the report and the CRRRC will have a copy of the report that can be accessed by the public for review if desired. The Public Liason Committee will have a copy. If public agencies wish to receive a copy of the annual they can make that request to the CRRRC. MOECC has requested that a 4<sup>th</sup> (large rainfall event) monitoring session be added to the surface water monitoring program.</p> <p>See response above.</p> <p>The monitoring programs in the draft EA adhere to the Landfill Standards with the exception that no winter surface water monitoring program was proposed due to our harsh winters and freezing constraint. MOECC has requested that a large rainfall event session be added.</p>	<p>No change to EA.</p> <p>No change to EA.</p> <p>Section 14.1.3 of Volume I, Sections 13.1 and 13.3.2 of Volume III, and Section 7.2 of Volume IV have been changed to include a 4<sup>th</sup> annual monitoring session, during heavy rainfall event.</p> <p>No change to EA.</p> <p>Section 14.1.3 of Volume I, Sections 13.1 and 13.3.2 of Volume III, and Section 7.2 of Volume IV have been changed to include a 4<sup>th</sup> annual monitoring session, associated with a heavy rainfall event.</p>



Commenter	Date Received	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
		<p>It is anticipated that some changes will occur to the three sub-catchment areas; however, the overall catchment area of the site shall remain the same. <i>Comment 10: As changes to the sub-catchment areas are anticipated, the engineers reports for the impacted municipal drains (i.e. Regimbald, Simpson and William-Johnston) should be reviewed and updated if needed.</i></p> <p><i>Comment 11: A separate Sedimentation and Erosion Control (SEC) Plan should be submitted. The SEC Plan should include:</i></p> <ul style="list-style-type: none"> <li><i>i. Who is responsible to install, inspect, maintain and remove the control measures?</i></li> <li><i>ii. An inspection Schedule to indicate specifically when the inspections are to be completed (i.e. daily).</i></li> <li><i>iii. Indicate the locations of all control measures with their corresponding OPSD number and as well as their detail.</i></li> <li><i>iv. Indicate that it is to be considered a “Living Document” which may be modified in the event the control measures are insufficient.</i></li> </ul>	<p>Acknowledged. When City approvals are pursued the engineers’ reports will be reviewed and updated as required as described in Section 1.7 of Volume I.</p> <p>A detailed Sediment and Erosion Control Plan would be prepared as part of the City of Ottawa Site Plan Approval Process and in support of any permit applications to the SNC for “Alterations to Watercourses”. It will include all of these details.</p>	<p>No change to EA.</p> <p>A commitment to provide the Sediment and Erosion Control Plan has been added to Section 15.0 of Volume I of the EA.</p>
Sylvain Vallée, Catholic School Board Central East	August 18, 2014	<p><u>Comment was provided in French. This is a translation.</u></p> <p>Despite this draft, the CECCE remains concerned about the negative effects (odors, dust, environmental impacts, etc.) of the project on the welfare of its students from the Catholic St. William Elementary School in the village of Vars. CECCE retains the original position of the October 15, 2012 (see attached letter) with respect to the location of the CRRRC.</p>	<p>The concerns of the CECCE are understood. As indicated in the response to the CECCE at the TOR stage, atmospheric emissions from the proposed facility were assessed against strict MOECC standards as described in the Atmospheric work plans. MOECC standards are predicted to be met at the property boundary and/or nearest receptor. As the École élémentaire catholique Saint-Guillaume is located approximately 5.5 kilometres from the CRRRC Site, there would be no adverse air quality impacts from the CRRRC at the school.</p>	No change to EA.



## Appendix K-3

### Comment Received from the MOECC

Table K-3: Summary of Comments from GRT on Draft EA

Commenter	Date Received (Dated)	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
Frank Crossley, Hydrogeologist, Technical Support Section, Eastern Region	September 5, 2014 (July 24, 2014)	The consultants do not propose to install an engineered liner at the proposed landfill site. The consultants state that the native materials are low permeable materials, thus a liner is not necessary. In general, I concur with this variance however conditional on the phasing sequence being changed from its current configuration from east to west to the operation working from west to east. The reason for this is if problems arise, there is a greater buffer between the waste and the hydraulically downgradient boundary to allow remedial activities, such as a liner, to be undertaken.	Altering the phasing sequence created site development and operational concerns. Instead, to provide enhanced off-Site groundwater protection downgradient (east) of the proposed landfill, the perimeter collection trench system in the surficial silty sand layer proposed in the draft EA as a contingency measure will be installed as a component of the design along the east side of the landfill. The trench system will be installed approximately 115 m inside the east property line. This design component will provide both leachate detection and a secondary containment system continuously along the east side of the landfill.	Changes have been made to Section 10.8 of Volume I, Section 10.8 of Volume III and Section 5.11 and Appendix I, Volume IV of the EA.
		The landfill site is to have a leachate collection system. The leachate is to be pre-treated onsite. Excess leachate, above the pre-treatment system capabilities, is to be directed to a lined pond (estimate two months capacity) for holding until it can be pre-treated. Groundwater monitoring is undertaken around the pond for leak detection. The pre-treatment effluent has to meet the City of Ottawa's sewer use bylaws.	Acknowledged.	No change to EA.
		The consultants conducted a modelling exercise that shows the leachate impacts will be primarily restricted to onsite. While the inputs into the models are representative, models are a predictive tool but a groundwater monitoring program is required to support the findings in the models.	Acknowledged. A groundwater monitoring program is proposed.	No change to EA.
		The proposed leachate monitoring program is: - Frequency - three times per year (spring, summer and fall). - Location - prior to pre-treatment. - Parameters - Column 2, Schedule 5 in the spring and summer and Column 1, Schedule 5 in the fall. This is acceptable along with the inclusion of: manganese; TKN; potassium and hardness in the Column 2 parameter list and hardness in the Column 1 parameter list. - In addition, a complete volatile organic compound scan along with 1,4-dioxane is required from within the leachate collection system at a frequency of one time per year.	Acknowledged.	The monitoring program has been changed in Section 14.1.2 of Volume I, Section 13.2 of Volume III and Section 7.1 of Volume IV of the EA to include the additional parameters suggested.
		The proposed groundwater monitoring program for the northern portion of the site (facilities) is designed primarily to determine leaks and/or spills. This is acceptable.	Acknowledged.	No change to EA.
		The proposed groundwater monitoring program for the southern portion of the site (landfill site) is: - Frequency - three times per year (spring, summer and fall). This is acceptable. - Locations primarily at the site boundary. Additional interior monitoring wells are required. - Parameters are Column 1 or Column 2 from Schedule 5. This is acceptable along with the inclusion of: manganese; TKN; potassium and hardness in the Column 2 parameter list and hardness in the Column 1 parameter list. - In addition, a complete volatile organic compound scan along with 1,4-dioxane is required from the leachate characterization monitoring well(s) at a frequency of one time per year.	Acknowledged.  The draft EA did not propose leachate characterization monitoring wells, but rather proposed sampling and analysis of the leachate collected for pre-treatment. In order to characterize the leachate within the landfill prior to collection, leachate characterization monitoring wells will be installed adjacent to selected leachate collection manholes.  Additional interior monitoring wells are not required given the proposed east to west landfill phasing.	The monitoring program in Section 14.1.2 of Volume I, Section 13.4 of Volume III and Section 7.1 of Volume IV of the EA has been changed to include leachate characterization monitoring well locations.
		The groundwater monitoring program should be commenced one year prior to operations at the facility to obtain baseline groundwater conditions.	Acknowledged.	The monitoring program has been changed in the EA to reflect the program will commence one year prior to operations at the facility.

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		The water wells within 500 metres of the site should be sampled (one water quality sampling event), upon consent from the homeowner, along with a survey. This should be undertaken prior to operations at the facility commencing to obtain baseline water quality results.	Acknowledged.	The monitoring program has been changed in Section 14.1.2.1 of Volume I, Section 13.2.1 of Volume III and Section 7.1 in Volume IV to reflect the program will include sampling water wells within 500 metres of the Site one time prior to commencing operations at the facility if access is granted.
		The consultants indicate that Guideline B-7 applies to the landfill site only, this is incorrect as Guideline B-7 should be applied to the whole site.	Acknowledged.	The EA has been amended to indicate that Guideline B-7 applies to the whole Site.
		The number of groundwater trigger parameters are limited. Additional trigger parameters are required.	Acknowledged.	Additional trigger parameters have been described in Section 13.8.1 of Volume III in the EA.
		The proposed groundwater trigger mechanism is acceptable however additional compliance monitoring wells are required as the current spacing in between the compliance monitoring wells is too large.	Acknowledged.	Additional monitoring wells have been added to the monitoring program in Section 14.1.2 of Volume I, Sections 13.2.1 and 13.9.2 of Volume III and Section 7.1 of Volume IV in the EA to reduce the spacing between monitoring locations along the east side of the landfill.
		The proposed potential contingency measures are feasible and can easily be implemented.	Acknowledged.	No change to EA.
		The proposed final cover meets the minimum thickness requirements and is to be a permeable material. The permeable cover will allow infiltration which in turn will generate leachate. Since there is a leachate collection system, this is acceptable and will reduce the longevity of the contaminated lifespan of the landfill. The final cover should be applied sequentially as the area is closed. A low permeable cover (soil or engineered) could be applied as a contingency measure (to reduce leachate generation).	Acknowledged.	No change to EA.
Youssef Kalogo, P.Eng. Senior Wastewater Engineer, Environmental Approvals Branch	September 5, 2014 (July 16, 2014)	On Page 157 of the report, it is indicated that the SWM system will consist of site grading, ditching and culvert leading to five linear stormwater ponds or pairs of ponds; one of the ponds will receive stormwater drainage to provide water for firefighting purposes. However, Figure 10-1 shows 7 ponds including 2 for firefighting purposes.	There are two sets of pond “pairs” (ponds that have two cells). Considering that a pair of ponds is one linear pond, then there are five as described.  The pond for firefighting purposes happens to be one of the pond “pairs”.	In the EA, the naming convention for the ponds, which is outlined in Appendix A of Volume IV, has been added to Figure 10-1 in Volume I for clarity.
		It is my opinion that there may be a lot of truck traffic at the CRRRC. However, it is unclear whether the SWM system will include Oil & Grit Separators.	Oil water separators will be used in the vehicle maintenance garage and reversed slope outlet pipes will be used for stormwater management ponds that receive drainage from vehicle parking areas. It is envisioned that the tire wash station will be a recirculating system; at times water will be added to the system and at other times there will be excess water. When there is excess water it could be used for other on-site purposes (including irrigation) or could be directed to the stormwater management ponds after it has been through the solids interceptor.	Information on oil-water separators, reversed slope outlet pipes and solids interceptor has been added to the EA.

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		It appears from Figure 10-1 that two of the ponds will be surrounding the landfill area. It is unclear how the ponds will be protected from leachate infiltration.	The landfill is to be surrounded, above ground, by a perimeter berm which is 36 metres wide at the top. The base of the landfill is situated primarily on or within native silty clay, or on a thin remaining layer of surficial silty sand underlain by native silty clay. In addition, a geosynthetic clay liner (GCL) hydraulic barrier is proposed for the sideslope liner system to prevent leachate from entering the surficial silty sand/weathered crust zone or overlying perimeter berm fill; a leachate detection and secondary collection system is also proposed along the east side. The combination of these natural and engineered containment features within the landfill protect the two ponds from potential leachate effects.	No change to EA.
		The report is silent on how the surplus wastewater from organics processing will be handled and where the effluent will be discharged.	The treatment of excess wastewater (i.e., liquor) from the organics processing facility is discussed in Sections 6.3.3 and 10.9 of the EA.	No change to EA.
		The number of employees for the proposed CRRRC has not been provided nor has the quantity of wastewater that could be generated by the workers been quantified and the fate of the wastewater been documented.	Section 11.6.2 states that during the operation phase, the CRRRC is expected to generate approximately 198,000 person-hours of employment per year, which represents approximately 80 – 100 full-time equivalent positions over the thirty year life of the CRRRC. It is envisioned that wastewater from staff will be managed by an on-Site septic system(s) or stored in a holding tank(s) for subsequent off-Site management. The details of this system will be developed and provided during the City of Ottawa approval processes.	No change to EA.
Dale Gable, P.Eng., Senior Review Engineer – Team 1, Approval Services Section, Environmental Approvals Branch	September 5, 2014 (July 17, 2014)	1) The report and/or supporting documentation references the Landfill Standard Guidance Document. It should be noted that the document has been updated. The current version is January 2012.	Noted. The bracket reference for the Landfill Standards within the text uses 1998 (the date that the document was originally written). The reference itself says, "Last updated: January 2012."	No change to EA.
		2) As the base of the landfill site is proposed to be a natural attenuation landfill, input from the ministry's Technical Support Section - Groundwater is very important in the assessment of the landfill design. The ministry's Eastern Region Technical Support Section will need to comment on whether the TM has adequately shown that they understand the groundwater flow regime at the Site.	Noted. The Eastern Region Technical Support Section groundwater reviewer has commented on the draft EA.	No change to EA.
		3) TM should include a discussion on the anticipated contaminating lifespan for the two options discussed and whether or not there is a preferred option between the two options.	Noted.	A discussion regarding consideration of contaminating lifespan in the comparison of the two alternative Site development concepts has been added to Section 9.4 of the EA.
		4) The final EA report should clearly identify whether the Site is located within a Source Water Protection Area (SWPA). Should the Site be located within a SWPA, TM should include a discussion on whether the draft SWPA plan identifies whether or not the proposed undertaking is considered a drinking water threat that will require TM to manage the threat or whether the type of undertaking is prohibited altogether. TM should be made aware that should the SWPA plan prohibit the type of undertaking, the Ministry will adhere to the plan and not issue an EPA approval for the Site.	The Boundary Road Site is not located within a SWPA as stated in Section 7.1 of Volume III.	Volume I of the EA has been amended to describe that the Boundary Road Site is not located within a SWPA.
		5) An activity to occur at the Site is surplus soil management. The report will have to clearly identify the extent of this activity and include the activity in their overall site assessment. As part of the discussion, it will have to include what is considered uncontaminated soil. The overall site flow chart shown on Figure 10-3 indicates that no soil will be going for final disposal. TM will have to include a discussion on the standard to which soil accepted at the Site will be treated to ensure that this statement is achievable	Description of the surplus soil management, including what is considered uncontaminated soil, is discussed in Section 6.3.1.5 of Volume I and 5.10 of Volume IV Design and Operations Report. Uncontaminated soil will be used as daily cover, for roads, berms, landscaping, etc. Contaminated soil, with the exception of PHC contaminated soil directed to treatment, will be either disposed of within the landfill either as waste or re-used as daily cover.	In the EA, Figure 10-3 of Volume I has been amended to indicate that soil may be sent directly to the landfill for disposal (to account for the contaminated soil received that may be managed within the landfill as waste).

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		6) Section 6.4.2.1 discusses final cover. The assessment and type of final cover will have to be assessed and be completed as per the requirements of Regulation 232/98. The Design and Operations Plan indicates general earth material. This statement is vague and should provide more clarification on the type of soil, permeability and compaction. A discussion on the overall goal of the final cover and site design should be provided.	O. Reg. 232/98 indicates that landfills with a leachate collection system can have permeable covers. Since the leachate is being collected, infiltration will reduce the contaminating lifespan of the landfill.	In the EA, Section 9 of Volume IV Design and Operations Report has been amended to indicate the permeable nature of the final cover and the goal of this type of cover. Additional information has been added about soil types, their characteristics and placement/compaction.
		7) Pg. 123 discusses the potential diversion rate for the site. For the various materials an ultimate target and range for diversion is provided. There does not appear to be a discussion on how the target and range is justified. TM should provide a justification for that range.	Noted.	Additional information on the diversion rates used in the analysis has been added to Section 9.1 of the EA.
		8) Section 4.5 of the Design and Operations Plan indicates that the water table is 0.4 m below ground surface at the Site on average. Section 5.11 indicates that the landfill base will be approximately 1.5 – 2 m below existing ground. Section 11 of Regulation 347 indicates that waste shall be placed sufficiently above or isolated from the maximum water table at the site in such manner that impairment of groundwater in aquifers is prevented and sufficiently distant from sources of potable water supplies so as to prevent contamination of the water, unless adequate provision is made for the collection and treatment of leachate. It is understood that the site design is a site-specific design as permitted by O. Regulation 232/98, however, the final report should indicate clearly whether the proposed leachate collection system and use of the GCL is adequately addressing this requirement in Regulation 347.	The landfill is situated on clay soils where the maximum water table is typically at or near ground surface. The design, as proposed, uses the combination of the natural low permeability silty clay deposit and engineered systems (perimeter hydraulic barrier and leachate collection system) to prevent impairment of the groundwater in both the surficial sand layer and the deep basal till/contact zones. The minor inward groundwater seepage (“hydraulic trap design”) will be collected with leachate for treatment.	No change to EA.
		9) On Figure 10-1, a proposed site layout is shown. A stormwater management pond is located in the south-east corner of the Site. There appears to be limited space between the edge of the stormwater management pond and the site boundary. The Design and Operations Plan indicates an interceptor trench could be located between the berm and the stormwater management pond. There is a concern that much of the pond takes up the area of the buffer zone in this area which may limit accessibility in the area to allow the contingency plan to be implemented. A discussion is needed on how a contingency plan will be implemented in this area given the potential lack of space.	Details of the layout of Pond 2 (the pond in the southeast corner of the site) are provided in Drawing No. P2 in the Stormwater Management Report (Appendix A of Volume IV). Drawing No. P2 shows that there is 23 metres width of vegetated buffer between the toe of the slope of the perimeter berm and the main pond. The vegetated buffer is intended to allow runoff into the ponds as sheet flow to assist with removal of total suspended solids.  As described previously, a perimeter collector is to be installed along the east side of the landfill as a component of design; this trench will be installed beneath the perimeter berm. If a contingency measure was ever required along the south side of the landfill, there is adequate space between the perimeter berm and that portion of Pond 2 to accommodate an interceptor trench or vertical cut-off barrier (the contingency measures). There is also 16 metres width of vegetated buffer on the east side of Pond 2 with another 14 metres to accommodate the screening berm, all of which could be made available for implementation of contingency measures, if needed.	No change to EA.
		10) On Figure 10-2 in Cross Section B-B', there is a significant step in the base liner in the area of 0+850 to 0+950. This step should be explained.	Details of the subgrade design are provided in the Landfill Design and Operations Report (Appendix I of Volume IV Design and Operations Report). The step in the subgrade is necessary to minimize the initial excavation depth, maintain the minimum as-constructed subgrade slopes of 0.5 percent and, because of the expected settlement of the subgrade (Section 3.6.5, Appendix I, Volume IV), allow for collection of leachate in an increased number of central locations within the landfill. These “flank” areas are on the north and south edges of the waste footprint and are shown in Sections B-B' and C-C' on Figures 4a and 4b, respectively, in Appendix I of Volume IV.	No change to EA.



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		11) Section 10.7 indicates that the soil brought as part of the Surplus Soil Management operation will only be used on-site. The report should discuss the expected soil import requirements at the Site to justify the need for the facility. It is recommended that as part of the EPA application that TM provide and justify the amount and a condition be added to the ECA that limits the Site to that amount of soil.	The need for the facility was discussed in the TOR. Uncontaminated soils (or rock) will be used for a variety of on-site needs such as berms, grade raises, temporary roads and cover material as described in Section 6.3 of Volume I. It is estimated, based on a typical 4:1 waste to cover ratio and 10,170,000 cubic metres of airspace available for waste and daily cover, that 2,034,000 cubic metres of soil could be required over the operational life of the landfill for daily cover alone. Since virtually all of the on-site excavated soil from the landfill footprint will be required for construction of the perimeter berm around the landfill, the soil required for daily cover will have to be mainly imported to the site. A limit on the amount of imported uncontaminated soil brought to a landfill is not typical for landfills and is not proposed for the CRRRC. The PHC impacted soil, however, is proposed to be limited to 25,000 tonnes processed per year (Volume IV).	No change to EA.
		12) Pg. 140 of the Report indicates that it is proposed that the landfill airspace be approved under the EPA in stages. The proponent should confirm that they are asking for approval for the Site to be approved in two stages and the second stage could be denied based on the environmental performance of Stage 1.	Confirmed and understood.	No change to EA.
		13) Pg. 140 indicates that the landfill gas collection system for the landfill will be able to connect to a possible power generation facility. The proponent will have to consider any approvals/processes under the Renewable Energy Approval process, if applicable.	Acknowledged.	No change to EA.
		14) The report indicates that the GCL for the proposed site design will have a service life of greater than 1000 years is considered reasonable. Further discussion to justify that statement is warranted.	Explanation of the assumed greater than 1000 year service life for the GCL is discussed in Section 12.3.6 of Volume III.	No change to EA.
		15) The review and checked boxes in Figures 11.3.2-1 and 11.3.2-2 has not been completed.	Acknowledged. All review and check boxes have been filled in for the final EA.	Review and check boxes have been filled in for all figures in the EA.
		16) Whereas, the proposed monitoring plan is contained within the supporting appendices, it is recommended that the EMP be a stand-alone appendix in the EPA application.	Acknowledged.	No change to EA.
		17) Section 11 .9 provides a description of the traffic impact for the Site. It indicates that the peak time will have 41 trips per hour entering and exiting the Site. What is the average time it takes a truck to enter the site and go through the scales?	Based on Miller's experience at other facilities, it is expected that trucks can pass through the scale in approximately 10 seconds on average (up to 20 seconds if it is a new truck that needs to be entered into the scale computer). Further, there is sufficient queuing capacity for the all 41 trucks during the peak hour along the on-site main access road truck queuing area.	No change to EA.
		18) In general, when considering a new landfill or expanding an existing landfill, TM should consult the document entitled "Landfill Standards: A Guideline to the Regulatory and Approval Requirements for New and Expanding Landfills (MOE June 2012)", specifically Section 6, to identify the assessments that are required to be addressed in the supporting documentation as part of the EPA application should the EA be approved. These include the following: i. Hydrogeological Assessment; ii. Leachate Assessment; iii. Landfill Gas Assessment; iv. Landfill Capacity Assessment; v. Geotechnical Assessment; vi. Noise Assessment; vii. Contaminated Life Expectancy; and viii. Contingency Plans	Acknowledged. The assessments listed are provided in Volumes III and IV.	No change to EA.



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Ross Kircher, Air Quality Analyst, Technical Support Section, Eastern Region	September 5, 2014 (July 18, 2014)	I recommend the emissions inventories and modelling files be amended to include the additional LandGEM contaminants, a negligibility assessment, and additional modelling, if required. (Particularly with respect to benzene and other VOCs).	Acknowledged. A negligibility assessment was completed using the MOE Procedure for Preparing an Emission Summary and Dispersion Modelling Report (see attached Table 1) to this comment. Additional modelling was also completed for contaminants that were found to be above negligibility but not identified as Indicator Compounds (therefore not included in the EA). The additional contaminants were also all found to be below their respective limits as shown in Table 2 attached.	No change to EA.
		I cannot comment on the veracity of the model outputs, as AERMOD inputs and output files have not been provided. I recommend these be submitted to the ministry for review.	AERMOD input and output files have been provided to the Ministry for their review.	No change to EA.
		I recommend any emissions estimates or exhaust flow rates that are assumed based on information “provide by Taggart Engineering” (Appendix A, TSD#3), as well as BIOREM or other sites’ emission standards etc., be supported with additional documentation or equipment specifications.	At the present level of design of the equipment and facilities, there are no additional documents or equipment specifications available. It is envisioned that as more detailed design is completed any final equipment selected for the CRRRC will fall within the emission values of the equipment utilized in the assessment of impacts.	No change to EA.
		For completeness, I recommend that cumulative effects be discussed as a sum of both modelled concentrations and background levels, and compared to relevant limits for all contaminants (including those not included in the current submission, ie: benzene). Similarly, I recommend that a comparison be carried out between future build and future no-build cases, where the modelled concentrations are compared to pollutant levels that are expected should the CRRRC not be constructed.	Acknowledged. Table 4-3 in TSD #3 has been prepared to specifically address cumulative effects. Table 4-4 in TSD #3 addresses regulatory compliance at the CRRRC.  In SD#1 to the TOR, the project opportunity was described and the need for and purpose of the project was identified, and “alternatives to” were assessed – the proposed CRRRC approach was identified as preferred. Do-nothing (“future no-build”) was considered and eliminated in the Alternatives To assessment in the TOR, which was approved by the Minister. In accordance with the approved TOR, further consideration of the air quality associated with a “no-build” scenario is not part of the EA assessments.	The text in TSD #3, Section 4.3 and 4.4 have been amended to better explain air quality cumulative effects.
		I recommend all air quality related information (modelling files, supporting documentation, equipment specifications, background concentration calculations, frequency analysis, etc) be included as additional appendices in TSD#3. Currently LandGEM output is included as part of the D&O report provided by Golder Associates (Volume IV). The LandGEM summary report should be duplicated in TSD#3 for clarity.	AERMOD input and output files have been provided to the Ministry for their review.	The LandGem output has been added to TSD#3 in the EA.
Lance Larkin, Ottawa District Office	September 5, 2014 (June 30, 2014)	While the proponent predicts that they will be in compliance with odour and dust emissions a robust operational and maintenance plan must be implemented to ensure that operational upsets are prevented and to ensure that odour and other air pollution sources will be controlled and emissions from these sources will remain under the regulated limits.	Acknowledged	No change to EA.
		The success of the organics processing component will rely heavily on operational aspects to control odour. The process includes injection of oxygen into the anaerobic compost piles prior to turning the piles. This process should be monitored closely to ensure that no process upsets or releases occur.	Acknowledged	No change to EA.
		Biofilters will be used in the organics processing and contaminated soil treatment cells. This is a proven technology to control odour. Consideration may be given to put the buildings under negative pressure to ensure that there are no releases of odour during entry into the buildings.	As described in Section 10.5, “the organics receiving and storage building, as well as internal and external storage tanks, will be kept under negative pressure to reduce the potential for fugitive odour emissions”. Should the storage building for the PHC impacted soil be constructed, consideration at that time will be given to putting it under negative pressure. The odour assessment, which concluded that the facility meets MOECC requirements, did not include the PHC impacted soil building being under negative pressure.	No change to EA.

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		Consideration should be given to potential odour impacts along highway 417 which is frequently used by commuters and tourists to the National Capital. Such consideration may be provided by modelling odour impacts along the 417. The EAB reviewer should verify that virtual receptors were used along the 417 to assess potential impacts.	The MOECC odour guideline is 1 o.u. at sensitive receptors on a 10 minute averaging period for the 99.5th percentile. The highway is not a sensitive receptor, and a 10 minute averaging period would be inappropriate in any event for a motorist passing by the Site on the highway.  Further, there are no guidelines applicable for the odour applicable at a non-sensitive receptor such as a highway. In addition, vehicles travelling along the highway should not be considered receptors as they travel at speeds of about 100 kilometres per hour and would be along the area of the CRRRC Site for less than 10 seconds.	No change to EA.
Enoch Tse, P.Eng., Senior Noise Engineer, Environmental Approvals Branch	September 5, 2014 (August 14, 2014)	Vacant Lot Noise Receptors: The EAR indicates that ten (10) points of reception have been identified as the most sensitive in the study. However, no vacant lot receptors have been identified and assessed. Vacant lot noise receptors have to be considered if the vacant lands adjacent to the facility are zoned for future noise sensitive uses.	Acknowledged.	In the EA, TSD #2, Volume IV Appendix B, and Volume I have been amended to identify and assess vacant lot noise receptors.
Lorna Zappone, Special Project Officer, Environmental Approvals Branch	September 5, 2014 (September 4, 2014)	<b>General</b> 1) The draft EA should be carefully reviewed to ensure that it has been completed in accordance with the approved Terms of Reference (TOR), the ministry's Code of Practice for Reviewing and Preparing Environmental Assessments in Ontario, January 2014 (Code of Practice: EA), and the <i>Environmental Assessment Act</i> (EAA).	Acknowledged. This is described in Section 1.8 of Volume I.	No proposed changes to the EA.
		2) Where appropriate, always cross reference tables, figures, appendices, etc., ensuring accuracy.	Noted.	A quality control check was completed on the entire EA.
		3) Update ministry names, guidelines, provincial policies, etc., as appropriate.	Acknowledged.	Changes were made to EA as appropriate.
		4) As not all project documentation, such a workplans, assessment criteria for the comparative evaluation of the alternative sites, alternative haul routes and leachate treatment options, were provided to the ministry for review it is not possible to determine if the EA has been prepared in accordance with the approved ToR or if all studies undertaken are appropriate, current, accurate, and the data appropriately interpreted.	-	The full TOR, with the exception of Appendix C- North Russell Road workplans, has been included in Appendix A of Volume I of the EA. The TOR contains the relevant approved assessment framework for these items.
		5) It is recommended that the draft EA be reviewed and revised to ensure the EA process is traceable. For instance, the methodology is comprised of three phases; six tasks within phase 1, yet task 4 has been combined with task 3. Also, the description of the existing environment presented between two sections each with a description of the proposed CRRRC can be confusing.	Noted. In the EASR, the task numbering in the methodology section 2.3 was kept consistent with that in the TOR. When the Boundary Road Site was identified as preferred, in accordance with the approved TOR, this component was reduced in scope from a haul route assessment to a traffic impact assessment for the preferred Site development concept, so the results of the impact assessment were presented in Section 11 together with impact assessment results of the other environmental components.  The description of the proposed CRRRC and its components in Section 6.0 of Volume I is at a general conceptual level of detail only for the purpose of comparing the two alternative Sites. After the Boundary Road Site was identified in Section 7.0 as the preferred Site for the CRRRC, the description of the existing environment for the Boundary Road Site (Phase 1- task 1) is provided in Section 8.0. In accordance with the methodology in the approved TOR, the next step in the assessment (Phase 1 – task 2) is the identification of the preferred Site development concept	Clarification regarding the traffic assessment has been made to Section 2.3.4 of Volume I of the EA. Further clarification has been added to the introduction of Section 11.0 of Volume I to state that the impact assessment includes both tasks 3 and 4. Additional text has been added and re-arranged within Sections 6.0, 9.0 and 10.0 of the EA to explain the different levels of description of the proposed CRRRC.

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			(or Alternative Method). To carry out task 2, the general information provided in Section 6.0 required an increased level of detail to be able to define the diversion and disposal processes and their operational area requirements, and thereby be able to prepare the two alternative site layouts (Section 9.0). To complete Section 9.0, these two site development concepts were then compared to identify which was preferred.	
		6) As above, it is recommended that the draft EA be reviewed and revised to ensure technical details are presented in a manner easily understood by any person reading the document. For example, a plain language summary provided ahead of technical descriptions about the geotechnical conditions and potential impacts may be helpful.	Noted.	Technical details were reviewed and summaries were put in the EA Volume I at strategic locations to improve understandability of technical details.
		7) The draft EA document posted to the project website should more clearly identify the sections contained in each download file. In addition, two download files ( <i>summary of commitments</i> and <i>references and appendix A: ToR</i> ) are damaged making them inaccessible.	Acknowledged. At the time of upload the draft EA documents were checked to ensure all could be downloaded, and they could be in June 2014. Upon receipt of these comments in September the documents were checked again. While the summary of commitments and references file was at that point damaged, Appendix A appeared to download successfully.	The EA will be uploaded to the website using Chapter headings as titles. The EA will be checked by several sources to ensure all files will download.
		8) Ensure the final EA includes a comprehensive evaluation of advantages and disadvantages to the environment for all components of the undertaking, and the alternative methods of carrying out the undertaking. It is recommended this evaluation be set out in tables, in which mitigation measures, net effects and commitments are clearly presented.	Noted. A comprehensive evaluation of the advantages and disadvantages is provided throughout the EA, as follows: <ul style="list-style-type: none"> <li>described by component in the comparative evaluation of alternative sites (Section 7, Table 7.3-1);</li> <li>described for the alternative methods in section 9 (but not by component since the approved approach in the TOR is not by component);</li> <li>provided in Table 11.10-1 by component in terms of mitigation, net effects and monitoring following the impact assessment for the preferred alternative, and commitments are cross-referenced in the Section 15.0 tables; and,</li> <li>provided by component as outlined in the TOR for the assessment of leachate treatment alternatives in Table 12.5-1 and text following.</li> </ul>	Sections 7.3, 7.4, 9.4 and 12.5 of Volume I of the EA were updated to more succinctly describe the requirements of the TOR and the evaluation of advantages and disadvantages with regard to comparisons.
		9) It should be noted that application forms for Environmental Compliance Approvals under the <i>Environmental Protection Act</i> (EPA) and the <i>Ontario Water Resources Act</i> (OWRA) included in the draft EA will not be reviewed by the ministry until formal application is made once EAA approval is granted by the Minister of the Environment and Climate Change, with Cabinet concurrence.	Acknowledged. While the material necessary to support the ECA application is contained in the EA package, no application forms were included in the draft EA. Taggart Miller's intention to submit the application forms only after EA approval is stated in Section 1.7.	No change to EA.
		<b>Executive Summary</b> 10) When finalizing the EA ensure details about the review of the draft EA are included.	Acknowledged.	The comments received on the draft EA from the public and the GRT members and the responses to those comments are provided in Appendix K of Volume II Consultation Record. A summary of the comments and their consideration has been provided in Volume I of the EA.
		11) Provide a high-level description of the types of concerns raised during consultation undertaken for the preparation of the EA.	Acknowledged.	A high-level description of the types of concerns raised during consultation has been added to Volume I of the EA.

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		12) Provide details in support of the statement on page xvi about changes in diversion-related provincial goals and policies.	Noted.	This information has been added to the Executive Summary of Volume I of the EA.
		13) It should be made clear that <i>Alternatives To</i> the proposed undertaking were considered in the ToR, and the preferred alternative to be brought forward for study in the EA should be identified. Much of this information is repeated in Section 5, and as such may not be needed in the Executive Summary.	Noted.	This information has been amended in the Executive Summary of Volume I of the EA.
		14) On page xx, for a 30 year planning period, it is identified that the needed landfill volumes range from 9.4 to 10.7 million cubic metres, yet landfill design options A and B on page xxi are for 11.5 and 10.5 million cubic metres, respectively. This difference should be noted in the summary, including an explanation for the difference.	Design concepts A and B did not include or account for the site area required for stability berms, stormwater features and geotechnical requirements. Once the area requirements to accommodate these features were subsequently determined and added to the preferred concept A, the capacity of concept A was determined to be 10.17 million cubic metres, which is within the stated range.	No change to EA.
		15) It is unclear why summaries of sections 9 and 10 are not presented in the Executive Summary.	Section 9 is summarized in the Executive Summary on pages xix to xxi of the draft EA Volume I. Section 10 was not summarized in the Executive Summary.	A summary of Section 10 of Volume I was added to the Executive Summary of Volume I in the EA.
		16) Provide additional details related to the prediction about Industrial, Commercial and Institutional and Construction and Demolition waste stream, as referenced on page xix.	Acknowledged.	Additional details about Industrial, Commercial and Institutional and Construction and Demolition waste stream has been added to the Executive Summary of the EA Volume I.
		17) Provide summary details about net effects and monitoring as presented in Section 11.10 (see page xxii).	Acknowledged.	Summary details about net effects and monitoring have been added to the Executive Summary of the EA Volume I.
		18) Identify at a high-level the types of commitments made by TMES (see page xxxvi).	Acknowledged.	A high level summary of the types of commitments have been added to the Executive Summary of the EA Volume I.
		<b>1.0 Introduction</b> 19) Identify the specific EPA/OWRA approvals required for the CRRRC.	Acknowledged.	The specific EPA/OWRA approvals required have been noted in Section 1 of Volume I of the EA.
		20) Provide here or cross-reference where in the EA additional details can be found about other approvals. For example, for what reasons are a letter of concurrence and amendments to the Official Plan and Zoning By-Law <i>[required]</i> .	Acknowledged.	Additional details regarding other approvals have been added to this section of Volume I of the EA.
		21) Table 1.8-1 should be revised to clarify the ToR requirements in accordance with the EA Act. For example, it should include a description of the purpose of the undertaking not just a description of the undertaking. Also a description of the environment that may be affected and the potential effects on the environment that might reasonably be expected by the undertaking and the alternative methods should be included (see EAA s.6.1(2)(a) and (c)).	Acknowledged.	Table 1.8-1 has been revised as requested.
		<b>2.0 Overview of Methodology</b> 22) It should be made clear the result of the assessment of potential traffic impacts is to determine the preferred haul route (see Figure 2.1-1).	As described in the TOR, if the North Russell Road Site was identified as the preferred Site for the project, then the traffic assessment would have evaluated alternative haul routes (TOR section 8.3.4.2 and Figure 8.3.4.1). If the Boundary Road Site was identified as preferred, then the haul route would be from the Highway 417/Boundary Road interchange and along Boundary Road to the Site (i.e., no alternative haul route assessment to be completed). The Boundary Road Site was selected as preferred.	Sections 2.3.4 and 11.9 of Volume I of the EA have been updated to document why there was not an assessment of alternative haul routes completed for the Boundary Road Site.



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		23) The workplans referenced in this section were not included in the draft EA submission for review.	Noted.	The full TOR, with the exception of Appendix C- North Russell Road workplans, has been included in Appendix A to Volume I of the EA.
		24) It should be identified when the Financial Assurance Report is expected to be completed and submitted to the ministry.	Acknowledged.	The timing for the Financial Assurance Report has been added to Section 2 of Volume I of the EA.
		<b>3.0 Consultation Activities</b>		
		25) Update ministry names as appropriate.	Acknowledged.	EA contains updated ministry names.
		26) Details about consultation with the Algonquins of Ontario should be presented in chronological order to avoid confusion. This comment also applies to item J in Table 15-1.	Noted.	Section 3.6.7 of Volume I of the EA and item J of Table 15-1 were put in chronological order in the EA.
		27) Identify the purpose of the October 8, 2013 meeting with the Algonquins of Ontario.	Acknowledged.	The purpose of the October 8, 2013 meeting with the Algonquins of Ontario has been added to the EA Volume I.
		28) Where possible provide summary details of the evaluation, mitigation measures, predicted compliance, and future commitments made to address concerns presented in Table 3.7.1-1 and Table 3.7.3-1.	Acknowledged.	The requested details have been added to Tables 3.7.1-1 and 3.7.4-1 of Volume I of the EA.
		29) Provide confirmation that no concerns were raised by attendees at Open House #4.	Noted.	Details regarding concerns raised at Open House #4 have been added to Section 3 of Volume I of the EA.
		30) Provide a summary of concerns raised during the groundwater workshop.	Acknowledged.	A summary of concerns raised during the groundwater workshop have been added to Section 3 of Volume I of the EA.
		31) Table I-1 through 6 should be summarized and included in Section 3, as appropriate.	Acknowledged.	Tables I-1 through 6 have been summarized and included in Section 3.7.6 of Volume I of the EA.
		32) When finalizing the EA ensure sufficient level of detail about the review of the draft EA is presented, including concerns raised and how being addressed and where recorded in the EA.	Acknowledged.	For the draft EA, the comments received from the public and the GRT members and the responses to those comments are provided in Appendix K of Volume II Consultation Record. A summary of the review of the draft EA is provided in Section 3.0 of Volume I.
		<b>6.0 Conceptual Level Description of the Proposed CRRRC</b>		
		33) Reference to 'further refinements' is confusing. Provide additional detail as appropriate.	Acknowledged.	The wording in the EA has been changed to clarify the site design refinement in question.
		34) Identify reason for providing a conceptual level description of the CRRRC, including relevancy to the EA process in doing so.	As described in Section 6 of Volume I, without at least a preliminary description of the CRRRC activities, and what they would entail from an operation and size perspective, it would not be possible to compare the two alternative Sites and their suitability. However, at this stage in the EA, further details of the final design were not required and hence weren't developed. Further, the TOR did not require the full development of the description of the CRRRC at this stage of the methodology.	Section 6.0 of Volume I of the EA has been revised to further describe why the conceptual level description of the CRRRC was required prior to comparison of the two alternative Sites.
		<b>11.0 Prediction and Assessment of Environmental Effects</b>		
		35) Table 11.10-1 should include sufficient level of details about monitoring rather than cross-references to another section in the EA.	Acknowledged.	Further details about the monitoring programs have been added to Table 11.10-1 of Volume I of the EA.
		36) Table 11.10-1 does not include the geotechnical monitoring described in Section 14.1.2.2.	Geotechnical monitoring was mentioned in Table 11.10-1; however it did not include all of the details provided in Section 14.1.2.2.	The details of the geotechnical monitoring have been added to Table 11.10-1 of Volume I of the EA.



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		37) The monitoring description for the biology component in Table 11.10-1 appears to be incomplete or the response is unclear.	Acknowledged.	The details of the biology monitoring have been added to Table 11.10-1 of Volume I of the EA.
		38) The methodology identifies the assessment of haul route options and traffic impacts as a separate task (#4), yet this assessment is not presented as such in the report. Revise as appropriate.	In the EASR, the task numbering in the methodology section 2.3 was kept consistent with that in the TOR. When the Boundary Road Site was identified as preferred, in accordance with the approved TOR, this component was simply a traffic impact assessment, so the results were presented in Section 11 together with the impact assessment for the other environmental components. The opening sentence of Section 11.9 states that this assessment is Task 4 of the methodology.	Further clarification has been added to the introduction of Section 11.0 to state that the impact assessment includes both Tasks 3 and 4 of the methodology.
		<b>13.0 Cumulative Impact Assessment</b> 39) Ensure and confirm the cumulative impact assessment has been undertaken in accordance with the commitment made in the ToR and the methodology described at that time.	Acknowledged.	The cumulative impact assessment has been undertaken in accordance with the methodology and commitment outlined in the TOR. No change to EA.
		40) Review Table 13.2.5-1 to ensure residual effects are accurately reflected in Table 13.3-1.	Acknowledged.	Tables 13.2.5-1 and 13.3-1 have been reviewed to ensure residual effects are accurately outlined.
		<b>14.0 Monitoring and Contingency</b> 41) Effects monitoring and compliance monitoring should be described and itemized separately in this section, summarizing the importance and function of each.	Acknowledged. Effects monitoring has been discussed in Section 14.0 of Volume I, whereas compliance monitoring has been discussed in Section 15.0 of Volume I.	Some additional description of effects monitoring and compliance monitoring has been added to Volume I Sections 14.0 and 15.0, including a description of the function of each type of monitoring.
		42) This section should be reviewed to ensure that all environmental components have been discussed, in a consistent manner, and includes a sufficient level of detail from the technical support documents.	Acknowledged.	Section 14.0 of Volume I was amended to ensure that all environmental components were discussed consistently.
		43) Ensure all components are represented in Table 11.10-1, as applicable.	Acknowledged.	Amendments to Table 11.10-1 of Volume I of the EA have been made.
		<b>15.0 Summary of Commitments</b> 44) Ensure all commitments made during the development of the ToR have been captured in Table 15-1. For example, the commitment to establish a Community Liaison Committee has not been reflected.	Noted. All commitments made during development of the TOR are included in Table 15-1. There was not a commitment made during the TOR to develop a Community Liaison Committee; this was made during the EA process and so is correctly captured in Table 15-2 as #77	No change to EA.
		45) Provide cross-references to where the commitment was made (e.g., ToR, Notice of Approval, the November 16, 2012 letter from TMES to the MOECC, etc.). For instance, Section 12.1 in the ToR can be cross-referenced for commitments A through E in Table 15-1.	Acknowledged.	The location of where the commitments were made has been added to Table 15-1 in Volume I of the EA.
		46) Identify where in Table 15-2 other components of community benefits can be found (page 269).	Acknowledged.	Additional details of where components of community benefits can be found has been added to Table 15-2 of Volume I of the EA.

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Dana Cruikshank, Surface Water Scientist, Water Resources Group, Eastern Region	September 5, 2014 (June 19, 2014)	47) Additional information is required in order to illustrate if the commitment detailed in item C has been met (page 269).	This commitment was clearly made in Section 6.0 of the TOR. The EASR reflects this commitment through the consideration of diversion rates from Year 1 in Site operations planning for 30 years (Section 9.0), description of the scalable design of the facilities themselves and Site operations from the start of operations at the CRRRC. In Table 15-1, the status of this commitment is correctly described as ongoing.	No change to EA.
		48) Additional information is needed in the response to J to make clear the efforts made to consult with all potentially interested Aboriginal communities.	Acknowledged.	Additional information has been added to response J in Volume I of the EA.
		49) Ensure all commitments made during the preparation of the EA have been captured in Table 15-2 and provide cross-references to where the commitment was made in the EA.	Cross-references to where the commitments were made in the EA were provided in Table 15-2 of Volume I of the draft EA.	Table 15-2 of Volume I has been modified to clarify the location of where commitments were made in the EA.
		The website of the Halifax C&D recovery centre has a diversion rate of 75%. CRRRC seems to have a much lower diversion rate and I am interested in knowing why since the purpose is to divert waste from landfills.	In reviewing the website of the Halifax C&D recovery centre it appears to only do diversion of C&D waste. The CRRRC will accept IC&I as well as C&D waste. Within Table 9.1-1 of Volume I of the draft EA, the estimated range in target diversion rates for different waste streams received by the CRRRC have been provided. This table reports that the CRRRC anticipates 60 to 80 % diversion on C&D waste, which is comparable to the rate achieved at the Halifax C&D recovery centre.	No change to EA.
		The proposed monitoring program is inadequate. An additional monitoring event is required and additional receiver stream monitoring is required.	Acknowledged.	An additional surface water monitoring event, consisting of monitoring after a large rainfall event, has been added to the monitoring program and is described in Section 14.1.3 of Volume I, Section 13.3.2 of Volume III and Section 7.2 of Volume IV. Additional receiver stream background monitoring has been added in Section 13.3.2 of Volume III.
		1) The description of stormwater control during the construction phase is too minimal to assess. Therefore a more detailed construction phase stormwater monitoring plan is required.	A more detailed construction phase stormwater control plan (a Sediment and Erosion Control Plan) will be provided in support of the ECA application.	No change to EA.
		2) To better assess landfill impacts additional stations based on the revised Figure 1 would be required on Regimbald Drain just upstream on its confluence with Simpson Drain and upstream on Wilson-Johnston Drain from Devine Rd. (Lot 26, Concession 9).	In terms of physical access, establishing the new station in the Regimbald Drain may be problematic since the location is land locked within privately owned land distant from any road and permission to access will have to be obtained. In addition, the area around this Drain is quite wet and it is unknown if the sampling location can be reached on foot. There is public access available to a new station on the Wilson-Johnston Drain.	In Section 14.1.3 of Volume I, Section 13.3.2 of Volume III and Section 7.2 of Volume IV, the surface water monitoring program has been modified to describe that the surface water sampling program will commence in 2014 to increase the baseline database; the program will include the two requested sampling locations as noted in Section 13.3.2 of Volume III, provided permission to access can be obtained, and if the sampling location on the Regimbald Drain can be reached on foot. These locations will be removed from the program once the Site becomes operational.

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		3) Assessment of ditches to handle extra capacity of runoff with respect to erosion and flooding potential is required.	As described in Section 11.4 of Volume I, considering the proposed stormwater management ponds, the controlled, post-development peak flows for each Site sub-catchment area are less than the pre-development flows. The CRRRC will therefore not lead to increased peak off-Site surface water flows. The off-Site ditches are expected to have water flowing more consistently through the year, post-development.	No change to EA.
		4) Additional surface water quality sampling is required in 2014 up to site development at the existing stations (except BSW7 and BSW9) plus the two recommended additional stations.	Acknowledged.	The monitoring program has been changed in Section 14.1.3 of Volume I, Section 13.3.2 of Volume III and Section 7.2 of Volume IV to describe that the surface water sampling program will commence in 2014 to increase the baseline database. It is noted that Taggart Miller had been voluntarily continuing with surface water quality monitoring in 2014 prior to receipt of the reviewer's comments.
Dr. Greg Brookes, NRCan on behalf of MOECC	October 23, 2014 (July 18, 2014)	<p><i>Even when larger earthquakes have occurred in the recent past (Aylsworth et al., 2000), they may not be of sufficient magnitude (energy) to generate surface fault rupture. (Vol 1, p. 177.)</i></p> <p>Negative evidence of paleoseismicity always needs to be interpreted carefully – is there a real absence of evidence or has it not just been recognized? It is entirely possible that larger earthquakes in the past were large enough to generate surface ruptures, but historical evidence of these ruptures has not yet been recognized or documented. Prior to research identifying three post-Champlain Sea paleoearthquakes by Aylsworth et al., (2000) and Brooks (2013), there was no evidence of strong earthquakes in the area. It is possible that the growing availability of LiDAR imagery in the West Quebec Seismic Zone area will result in the discovery of evidence of Holocene fault movement. In this context, the above statement can be viewed as speculative.</p> <p><i>Furthermore, where evidence of surface faults has been found in outcrops, it is best explained as local ice deformation rather than by a major through-going surface fault. (Vol 1, p. 177.)</i></p> <p>There are many examples of surface faulting in outcrops of Champlain Sea deposits in the Ottawa Valley within areas that have experienced sensitive clay landslide activity or within the Lefaivre, Treadwell and Wendover disturbed areas (e.g., Aylsworth and Lawrence, 2003; Brooks, 2013). Such faulting is explained by post-Champlain Sea mass movement processes, which may or may not have been triggered by paleoseismic activity.</p>	<p>The responses to the comments from Dr. Brooks were prepared by Dr. Alan Hull, Seismic Hazard Practice Leader with Golder Associates, in consultation with Dr. Laurent Godin, Associate Professor, Geological Sciences &amp; Geological Engineering, Queen's University, Ontario,</p> <p>We concur that a lack of evidence for past large earthquakes such as surface fault traces, liquefaction features and earthquake-induced landslides does not necessarily establish definitively that such events have not occurred does not exist in the Ottawa region. Indeed, it is the purpose of paleoseismic inquiry to find and test evidence for the sources and frequency of occurrence of past earthquakes.</p> <p>The primary goal of this section of the EA is to characterize surface faulting and earthquake ground shaking in the region surrounding the proposed CRRRC. The current understanding is that coseismic surface fault traces are not known in this area. We cannot rule out the possibility that future investigations will find evidence for additional past large earthquakes, both with and without surface rupture. The present state of knowledge, however, is that the past large earthquakes are not known to have generated surface fault rupture in the area within which the CRRRC is located. We concur that there are local examples where displacement of near-surface sediments have been observed, and that these displacements have a range of potential origins. The purpose of the EA discussion was to address interpretations where faults observed in near-surface sediments have been cited as evidence for ongoing rupture and/or reactivation of adjacent/underlying faults in the bedrock structure.</p>	Clarifications have been added to Section 11.3.1 of Volume I and Sections 9.1, 9.2 and 9.3 of Volume III to reflect the input provided through these comments and the responses below.



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			<p>For example, some writers have postulated that fault exposures in the Rouge River valley near Toronto are the surface expression of deep coseismic tectonic faults. It was argued that an increased seismic hazard could influence the current understanding of the seismic safety of the Darlington and Pickering Nuclear Power plants.</p> <p>The combination of frequent small earthquakes (Martini and Bowlby 1991) and the presence of three proposed geophysical lineaments intersecting near the Rouge River valley in southern Ontario stimulated geological and geophysical investigations in the area (e.g., Wallach and Mohajer 1990; Wallach et al. 1998). These studies questioned the assessments of seismic hazard in the Greater Toronto area. Mohajer et al. (1992) reported normal faults affecting both the Ordovician bedrock and the overlying Pleistocene sediments in the Rouge River valley, about 7 km from the Pickering nuclear power plant. Based on the presence of prominent geophysical lineaments and the overall seismotectonic environment of southern Ontario, Mohajer et al. (1992) suggested that these faults could have a neotectonic origin and should be taken into account in the earthquake hazard assessments for the GTA generally and the Darlington and Pickering nuclear power plants in particular.</p> <p>Not all the geoscientific community shared their interpretations. In response to Mohajer et al. (1992), Adams et al. (1993a, b) suggested that most of the faults of the Rouge River valley could be listric, and may not align with recognized regional geophysical lineaments. Furthermore, as normal faults are common in glaciotectonically disturbed sequences and glacial deformation features exist nearby, Adams et al. (1993a, b) interpreted the normal faults of the Rouge River valley as being most probably the result of ice push-related deformation during one of the last glaciations.</p> <p>After collecting extensive data of local and regional ice flow direction, and kinematically analyzing them in relationship to observed faults, Godin et al. (2002) concluded that (1) surficial faults in the Rouge River valley cannot be connected geographically from one site to the other, (2) deformation (fault offset) rapidly decreases with depth, and (3) most studied faults are kinematically compatible with local and regional ice flow directions. For these reasons, the surficial deformation observed in the Rouge River valley was concluded not to be seismic in origin.</p> <p>In the draft EA, the intent was to suggest that where surficial outcrops of faulted glacial sediments have been examined in detail, the glaciation-related (glacio-tectonic) processes similarly best explained the structural features observed in the Quaternary sediments and underlying bedrock.</p>	



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		<p><i>A key layer for the evaluation of the potential for past surface fault rupture at this Site is the 0.1-metre to 0.6-metre thick silty layer about 4 to 6 mbgs.... This marker bed within the upper part of the silty clay deposit is horizontal and interpreted to be continuous across the CRRRC Site (Figures 8.5.1-7 and 8.5.1- 8). The constant elevation and lateral continuity indicates that this layer has not been offset by displacements at local faults beneath the area of the CRRRC, and confirms that evidence of fault rupture is absent at both the ground surface and in the shallow subsurface. It is reasonable to conclude, therefore, that there has been no surface fault rupture at the CRRRC Site since at least the deposition of the silty layer (i.e., in the past 8,000 to 10,000 years). Further, the evidence from the surrounding geological structure indicates that recent fault movements are unlikely to have occurred within the bedrock underlying the Site and surrounding area.</i></p> <p><i>Considering the regional, local and Site [sic] geological conditions within the CRRRC Site and surrounding area, and the nature of “active” faults as described above, it is reasonable to conclude that the probability of future fault movement resulting in large differential displacements at the surface or shallow subsurface is negligible and of no engineering or environmental significance for the development of the CRRRC Site. (Vol. 1, p. 178)</i></p> <p>NRCan has several comments on the interpretation of the 0.1 to 0.6 m thick, silty layer and its relevance to assessing possible fault movement within the CRRRC site.</p> <p>i) As depicted in Fig 8.5.1-8, the silty bed in profile F-F’ does not have a constant elevation, as it undulates slightly up to ~1.5 m. A better term to describe the layer would be “quasi-horizontal”. It is important to note that displacements from an earthquake of ~6.5 Mw may be less than 1 m, based on empirical evidence for historical earthquakes elsewhere (see Fig. 9.3 in McCalpin, 2009), which falls within the waviness range of the quasi-horizontal silty layer.</p> <p>ii) The silty layer is inferred to be continuous and quasi-horizontal based on cross-sections E-E’ and F-F’ in Figs. 8.5.1-7 and 8.5.1-8 (and similar Figs. 3-14 and 3-15 in Vol. III), respectively. This is a reasonable interpretation considering that the layer aggraded within a glaciomarine depositional setting, however, the interpretation needs to be substantiated using all available data. Therefore, all borehole data from the CRRRC site should be incorporated to represent diagrammatically the horizontal and vertical distribution of the silty layer. This layer should appear to be quasi- horizontal and continuous throughout the site in the new diagram, if the Proponent’s inference is correct. However, if the silty layer is not present in any borehole or the layer does not appear to be quasi-horizontal, then an explanation should be provided about this discrepancy.</p> <p>iii) In the report, the quasi-horizontality characteristic of the silty layer is used to infer absence of a fault rupture within the CRRRC site. This deduction is reasonable in assessing the possible presence of a normal or reverse fault. However, the possibility of minor vertical displacement along a fault in the order of several tens of centimetres cannot be rejected, based on the widely-spread, borehole data alone. Based on profiles in E-E’a and F-F’ (Figs. 8.5.1-7 and 8.5.1-8), there seems to be no evidence of metre-scale (or more), vertical fault displacement at the CRRRC site, assuming that all of the borehole data supports the quasi-horizontal and continuous characteristics (see comment ii).</p>	<p>We agree that “quasi-horizontal” or sub-horizontal is a better description of the elevation of this important marker layer. We also concur that given the sub-horizontal and variable thickness of the layer, and the density of sampled layer thicknesses, it will be difficult to confirm vertical displacements of less than about 0.5 m.</p> <p>An isopach map for the silty layer is provided in Volume III Figure 3-17. This map was compiled using all the borehole and CPT data available for the Site. Volume III Figure 3-17 also provides the thickness of the silty layer at each of the 25 investigation locations, thereby answering the question in that it was found in every one of the 25 test locations on the CRRRC Site. The silty layer was first recognized as a sharp increase in cone resistance, qt, in the CPT borings. Continuous soil sampling in the five deep boreholes and continuous cores to about 7.5 m depth in an additional nine boreholes were used to sample through and confirm the silty layer identified from the CPT investigations. On this basis, we interpret the silty layer as continuous across the Site.</p> <p>We concur that the lateral continuity of the silty layer suggests that it has not been disrupted by major subsurface displacements, whether of tectonic or other origin. We also agree that minor vertical movements of less than about 0.5 m could not reasonably be detected given the natural variability and borehole spacing.</p>	



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		<p>iv) In the report, the quasi-horizontality characteristic of the silty layer is used to infer absence of a fault rupture within the CRRRC site. This deduction does not preclude the occurrence of a strike-slip fault which led to horizontal displacements and offsets, as well as possible slight (centimetre-scale) vertical displacement. The report needs to explain why there could not have been metre-scale (or more), horizontal strike-slip fault displacement at the site.</p> <p>Given the above comments, NRCan reserves judgment on the conclusion that <i>“the probability of future fault movement resulting in large differential displacements at the surface or shallow subsurface is negligible and of no engineering or environmental significance for the development of the CRRRC Site (p. 178, Vol. I)”</i>.</p>	<p>While the major displacement sense along strike-slip faults is horizontal, strike-slip faults typically also develop apparent vertical separations because:</p> <ul style="list-style-type: none"> <li>There is typically a small component of vertical displacement in addition to major horizontal displacement. For major faults, that horizontal to vertical ratio can range from 1:1 to 15:1 depending on the strike of the trace with respect to the principal horizontal strain axis.</li> <li>Even pure strike-slip offset of a bed of irregular thickness will produce an apparent vertical offset.</li> </ul> <p>We agree, however, that both these processes would result in only small (centimetre-scale) vertical displacements that are below the detection threshold of the investigation as described in Section 2.2.3.</p> <p>We concur with the vertical and horizontal detection limitations for potential fault offset of the silty layer described above. We consider it important, however, that analysis of the bedrock geology surrounding the site, the stratigraphy of the subsurface sediments, the surface geomorphology at and surrounding the site, and the historical earthquake record all do not suggest that a fault capable of vertical and/or horizontal movements is present at or beneath the CRRRC site. Because of these positive indicators for the absence of a fault at the site, we consider it is reasonable to interpret the absence of major disruptions to the lateral and vertical continuity of the silty layer as further evidence that the CRRRC is not the site of a major coseismic fault capable of generating large earthquakes and surface or near-surface differential displacements.</p> <p>In terms of the engineering significance of surface or subsurface displacements from potential future fault movement on the design and performance of the proposed CRRRC landfill, both the landfill mass itself and the proposed leachate containment and collection system (and its components), are very flexible. There is no constructed or manufactured liner on the base of the landfill as designed; rather, it relies on the natural containment properties of the 30 metres of low permeability silty clay underlying the site. The proposed leachate containment and collection system has been designed to withstand relatively large movements and continue to perform its intended function. For example, this system has been designed to function when experiencing the predicted movements associated with consolidation of the clay deposit beneath the landfill over time, i.e., total settlements of 6 to 8 metres under the central portion of the landfill, as well as predicted lateral movements of up to 340 mm under seismic loading conditions. As such, the effects of surface or subsurface displacements from fault movement, in the unlikely event this should occur during the contaminating lifespan of the landfill, are not of consequence in terms of the engineering design or performance of the landfill.</p>	

Commenter	Date Received (Dated)	Issues/ Concerns Raised	Response	How Comments were Considered by Project Team
		<p>The flat topography at the CRRRC site is strong evidence against the presence of large-scale, highly-disturbed terrain similar to those underlying the Lefaivre, Treadwell and Wendover areas. Additional evidence is the lack of evidence of sediment disturbance in continuous soil cores from the site, as indicated on p. 179 of Vol. I. As indicated in the report, the subsurface conditions at the CRRRC site seem significantly different from that documented for the Lefaivre area, as presented by Aylsworth and Lawrence (2003) i.e., the presence of thick sand deposits (up to ~20m) and a steep-sided bedrock basin containing clay up to ~100 m thick. This supports the conclusion that there is absence of large-scale liquefaction or disturbed clay deposits at the CRRRC site that could be considered analogous to the Lefaivre area (which is better documented than the Treadwell and Wendover areas). However, the Proponent’s concluding statement that <i>“the large-prehistoric earthquakes [inferred to have occurred in the area] have not resulted in deformation of the silty clay deposit that underlies the site (p. 180, Vol I)”</i> is not fully substantiated based on widely-dispersed borehole data over the large CRRRC site. There is a need to address the possibility that there has been smaller-scale deformation to the silty clay deposit, which is not apparent in the boreholes, and to indicate whether future movement of this scale could represent a hazard at the CRRRC site.</p> <p>Brooks (2013) and Brooks (2014) hypothesize that many of the large-scale, retrogressive landslides in the sensitive glaciomarine clay areas of the Ottawa Valley and St. Lawrence Lowlands have been triggered by strong earthquakes (~6.0 Mw or larger). Regionally, the largest of the documented earthquake-triggered landslides have retrogressed in excess of the 1.5 to 3.5 km distance from the southern margin of the Mer Bleue paleochannel to the CRRRC site (e.g., Quyon valley landslide and the ancient St. Jean Vianney landslide; see Brooks et al., 2013; Potvin et al., 2001). As summarized by the Proponent on p. 179, large-scale retrogressive landslides occur along the margins of paleochannels and terraces of the Ottawa River, although these are absent along the southern margin of the Mer Bleue paleochannel in the general area of the CRRRC site (see Fig. 9-1, Vol. III). Nevertheless, the potential occurrence of a large-scale sensitive clay landslide originating from the nearest margin of the Mer Bleue paleochannel retrogressing into the CRRRC site needs to be considered. Seismic shaking should also be considered as the triggering mechanism for such a failure.</p>	<p>We concur that we cannot eliminate the potential that a small-scale disturbance feature or features exists within the glaciomarine sediments the CRRRC site. As in the case of the detection of the potential for small-scale vertical and horizontal displacements of the silty layer, we are relying, reasonably in our view, on the apparent vertical and lateral continuity of this marker horizon to infer its lack of tectonic or seismic disturbance. Providing information at the scale required to eliminate this potential beyond any possibility is not considered practical or warranted given the tectonic setting of the region and site.</p> <p>It is not clear where a large scale retrogressive landslide would originate that would regress back to the CRRRC site. Large slides tend to be initiated at existing topographic slopes. One triggering mechanism is prehistoric large earthquakes as documented in Brooks (2013, 2014). In historic times, the landslides have been triggered by various factors such as oversteepening from channel erosion. These slides can retrogress large distances from the slide mass into the low-relief region behind the headscarp. The CRRRC site is located within a large low-relief area about 2 km south of what was the Mer Bleue paleochannel. This about ~10,000 years ago channel has been largely infilled by subsequent deposition, and the paleochannel scarp/margin is now only about 4m in height. This 4 m high former paleochannel margin leads down to the broad valley surrounding Bear Brook Creek. We understand that current studies of retrogressing slides developed in clay soils conservatively suggest that 95% of retrogression occurs within a ratio of 40:1 retrogression distance: slope height. On this basis, the 4 m high slope along the nearest margin of the former paleochannel could potentially retrogress up to 160 m southward from the paleochannel margin—much less than the 2 km distance between the former paleochannel margin and the CRRRC site. We conclude, therefore, that the potential for a future retrogressive landslide to encroach on the CRRRC site is insignificant.</p>	

**Table 1**  
**Negligibility Assessment Table**

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Averaging Period [hours]	MOE POI Limit [µg/m³]	Emission Threshold [g/s]	Negligibility Assessment
Sulphur Dioxide	7446-09-5	2.04E-01	AERMOD	24	275	6.56E-02	Indicator Compound
Sulphur Dioxide	7446-09-5	2.04E-01	AERMOD	1	690	6.76E-02	Indicator Compound
Hydrogen Sulfide	7783-06-4	7.85E-03	AERMOD	24	7	1.67E-03	Indicator Compound
Hydrogen Sulfide	7783-06-4	7.85E-03	AERMOD	10-min	13	1.05E-03	Indicator Compound
Ethylbenzene	100-41-4	2.95E-03	AERMOD	24	1000	2.39E-01	Negligible
Ethylbenzene	100-41-4	2.95E-03	AERMOD	10-min	1900	1.53E-01	Negligible
Nitrogen Oxides	10102-44-0	8.60E-01	AERMOD	24	200	4.77E-02	Indicator Compound
Nitrogen Oxides	10102-44-0	8.60E-01	AERMOD	1	400	3.92E-02	Indicator Compound
Ethylene Dibromide	106-93-4	8.65E-06	AERMOD	24	3	7.16E-04	Negligible
Butane	106-97-8	5.21E-04	AERMOD	24	7600	1.81E+00	Negligible
Acrylonitrile	107-13-1	1.53E-06	AERMOD	24	0.6	1.43E-04	Negligible
Methyl isobutyl ketone	108-10-1	5.06E-04	AERMOD	24	1200	2.86E-01	Negligible
Toluene	108-88-3	1.55E-02	AERMOD	24	2000	4.77E-01	Negligible
Chlorobenzene	108-90-7	4.29E-04	AERMOD	1	3500	3.43E-01	Negligible
Chlorobenzene	108-90-7	4.29E-04	AERMOD	10-min	4500	3.63E-01	Negligible
Pentane	109-66-0	1.84E-03	AERMOD	24	4200	1.00E+00	Negligible
Hexane	110-54-3	1.53E-03	AERMOD	24	7500	1.79E+00	Negligible
Myrcene	123-35-3	0.00E+00	AERMOD	24	0.1	2.39E-05	Negligible
Perchloroethylene	127-18-4	0.00E+00	AERMOD	24	360	8.59E-02	Negligible
β-Pinene	127-91-3	0.00E+00	AERMOD	24	270	6.44E-02	Negligible
Xylene	1330-20-7	5.60E-03	AERMOD	24	730	1.74E-01	Negligible
Xylene	1330-20-7	5.60E-03	AERMOD	10-min	3000	2.42E-01	Negligible
Carene	13466-78-9	0.00E+00	AERMOD	24	448	1.07E-01	Negligible
Ethyl Acetate	141-78-6	0.00E+00	AERMOD	1	19000	1.86E+00	Negligible
t-1,2-dichloroethene	156-60-5	2.19E-05	AERMOD	24	105	2.51E-02	Negligible
Carbonyl sulfide	463-58-1	5.77E-05	AERMOD	24	3.2	7.64E-04	Negligible
Carbon tetrachloride	56-23-5	9.67E-06	AERMOD	24	2.4	5.73E-04	Negligible
Limonene	5989-27-5	0.00E+00	AERMOD	24	625	1.49E-01	Negligible
Carbon Monoxide	630-08-0	5.07E+00	AERMOD	½	6000	4.84E-01	Indicator Compound
Ethanol	64-17-5	6.06E-05	AERMOD	1	19000	1.86E+00	Negligible
Isopropanol (Isopropyl Alcohol)	67-63-0	1.56E-04	AERMOD	24	7300	1.74E+00	Negligible
Acetone	67-64-1	5.60E-04	AERMOD	24	11880	2.84E+00	Negligible
Chloroform	67-66-3	2.82E-05	AERMOD	24	1	2.39E-04	Negligible
Benzene	71-43-2	1.07E-03	AERMOD	24	100	2.39E-02	Negligible
Benzene	71-43-2	1.07E-03	AERMOD	Annual	0.45	5.60E-04	Not Negligible
Methyl chloroform (1,1,1-Trichloroethane)	71-55-6	1.17E-04	AERMOD	24	115000	2.75E+01	Negligible
Mercury	7439-97-6	0.00E+00	AERMOD	24	2	4.77E-04	Negligible
Ethane	74-84-0	1.56E-03	AERMOD	24	4800	1.15E+00	Negligible
Chloromethane	74-87-3	9.70E-05	AERMOD	24	320	7.64E-02	Negligible
Methyl mercaptan	74-93-1	3.77E-04	AERMOD	24	0.1	2.39E-05	Not Negligible
Propane	74-98-6	3.91E-03	AERMOD	24	7200	1.72E+00	Negligible
Chloroethane	75-00-3	2.01E-03	AERMOD	24	5600	1.34E+00	Negligible
Vinyl chloride	75-01-4	6.99E-04	AERMOD	24	1	2.39E-04	Indicator Compound
Ethyl mercaptan (ethanethiol)	75-08-1	7.03E-05	AERMOD	24	0.1	2.39E-05	Not Negligible
Methylene chloride	75-09-2	4.11E-03	AERMOD	24	220	5.25E-02	Negligible
Carbon disulfide	75-15-0	3.65E-05	AERMOD	24	330	7.88E-02	Negligible
Dimethyl sulfide	75-18-3	2.01E-03	AERMOD	10-min	30	2.42E-03	Negligible
Bromodichloromethane	75-27-4	5.18E-06	AERMOD	24	0.1	2.39E-05	Negligible
1,1-Dichloroethane	75-34-3	8.48E-04	AERMOD	24	165	3.94E-02	Negligible
Vinylidene chloride (1,1-Dichloroethene)	75-35-4	5.58E-05	AERMOD	24	10	2.39E-03	Negligible
Chlorodifluoromethane	75-45-6	5.42E-04	AERMOD	24	350000	8.35E+01	Negligible
Fluorotrichloromethane	75-69-4	8.22E-04	AERMOD	24	6000	1.43E+00	Negligible
Dichlorodifluoromethane	75-71-8	1.12E-03	AERMOD	24	500000	1.19E+02	Negligible
Hydrogen Chloride	7647-01-0	1.49E-01	AERMOD	24	20	4.77E-03	Not Negligible
Ammonia	7664-41-7	0.00E+00	AERMOD	24	100	2.39E-02	Negligible
Propylene dichloride (1,2-Dichloropropane)	78-87-5	2.12E-05	AERMOD	24	2400	5.73E-01	Negligible
Methyl ethyl ketone	78-93-3	1.65E-03	AERMOD	24	1000	2.39E-01	Negligible
Trichloroethylene (TCE)	79-01-6	8.57E-04	AERMOD	24	12	2.86E-03	Negligible
1,1,2,2-Tetrachloroethane	79-34-5	3.23E-04	AERMOD	24	0.1	2.39E-05	Not Negligible
Camphene	79-92-5	0.00E+00	AERMOD	24	20	4.77E-03	Negligible
α-Pinene	80-56-8	0.00E+00	AERMOD	24	270	6.44E-02	Negligible
Dichlorobenzene (1,4 isomer)	95-50-1	0.00E+00	AERMOD	1	30500	2.99E+00	Negligible
Suspended particulate matter (< 44 µm Diameter)	N/A	1.51E+00	AERMOD	24	0.1	2.39E-05	Indicator Compound
PM10	N/A	7.68E-01	AERMOD	24	0.1	2.39E-05	Indicator Compound
PM2.5	N/A	5.91E-01	AERMOD	24	0.1	2.39E-05	Indicator Compound
Odour	N/A	2.17E+04	AERMOD	24	0.1	2.39E-05	Indicator Compound
Nitrogen Oxides (EPG)	10102-44-0	1.45E-01	AERMOD	1/2	1880	1.52E-01	Negligible

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**Table 2**  
**Emission Summary Table**

Contaminant	CAS No.	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Maximum POI Concentration [µg/m³]	Averaging Period [hours]	MOE POI Limit [µg/m³]	Limiting Effect	Regulation Schedule No.	Percentage of MOE Limit [%]
Benzene	71-43-2	1.07E-03	AERMOD	0.00	Annual	0.45	Health	Schedule 3	<1%
Methyl mercaptan	74-93-1	3.77E-04	AERMOD	0.01	24	0.1	—	De Minimus	Below De Minimus
Ethyl mercaptan (ethanethiol)	75-08-1	7.03E-05	AERMOD	0.00	24	0.1	—	De Minimus	Below De Minimus
Hydrogen Chloride	7647-01-0	1.49E-01	AERMOD	6.39	24	20	Health	Schedule 3	32.0%
1,1,2,2-Tetrachloroethane	79-34-5	3.23E-04	AERMOD	0.02	24	0.1	—	De Minimus	Below De Minimus

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