APPENDIX B

External Agency Consultation and Correspondence

Waterdown/Aldershot Transportation Master Plan: Phase 3

Agency Comments Database

January 2008 to May 2009

LURA
LISTEN · UNDERSTAND · RELATE · ADVANCE

This document includes all questions and responses by the agencies received from January 2008 to May 2009 for the Waterdown/Aldershot Transportation Master Plan – Phase 3. This list is in chronological order from the date in which the comment/question was received. This document was prepared by Lura Consulting, the neutral third-party consultation facilitator for this project.

A summary of the issues raised through the comments in this database can be found in the document *East-West Road Class EA – Phase 3 and 4: Master Summary of Comments (January 2008 – May 2009)*.

For more information, please contact:

SALLY LEPPARD
Lura Consulting
36 Hunter Street East, Suite 601
Hamilton, ON L8N 3W8
Tel: (905) 527-0754
E-mail: sleppard@lura.ca

COMMENTS FROM THE AGENCIES

Correspondent	Issue/Concern	To	Responder	Response
ID# 16 Suzanne McInnes (Niagara Peninsula Conservation Authority Feb 19, 2008 Email	Please remove my name and Paul Bond's name from your mailing list. This project is located outside on the NPCA's jurisdiction.	Waterdown-Aldershot Information	Waterdown-Aldershot Information	Removed from Database February 19th, 2008
ID# 39 Darylan Perry (CN Rail) Feb 28, 2008 Email	Thank you for your letter dated February 15, 2008 regarding the above noted project. This project does not affect any CN rail line or property and CN requests to be removed from the project mailing list.	Waterdown-Aldershot Information	Waterdown-Aldershot Information	Removed from database
ID# 60 Nora Jamieson (Hamilton Conservation Authority) Mar 7, 2008 Email	To Neutral Community Facilitator's Office and Diana Morreale at City of Hamilton Public Works Dept.: Hamilton Conservation Authority (HCA) has just recently received a copy of a letter from Conservation Halton to the Neutral Community Facilitator's Office, dated March 6, 2008 advising that they have some concerns with the Phase 3 and 4 and that there has been no discussions to date between the Secondary Plan Team and the EA Study Team which includes Conservation Halton. We wish to advise that HCA is also part of this EA Study Team and we too have not been involved with these discussions. As well, a copy of the Phase 3 and 4 report was not submitted for our review. Please be advised that we have had problems in the past with not being circulated documents for review and have not been invited to some discussion meetings. We request that a copy of the report be submitted to HCA and that we be added to the circulation list if we were inadvertently removed.	Waterdown-Aldershot Information & Diana Morreale	Waterdown-Aldershot Information Mar 26, 2008 Email	Email was acknowledged Mar 10, 2008. Dear Ms. Jamieson, Thank you for your e-mail dated March 7, 2008. We have received a response from the project team and provide it below. --- The Project Partners are aware that Conservation Halton and Hamilton Conservation Authority are a part of the Waterdown/Aldershot Transportation Master Plan (WATMP) EA Study Team. We also look forward to working with the two conservation authorities in the upcoming Phases (3 & 4). The Project Partners have finalized the Phase 2 Report for the WATMP, a copy of the final report will be sent to all agencies that have been a part of the EA Study Team. As Phase 2 of the Waterdown/Aldershot Transportation Master Plan is now complete, the Study will proceed to Phases 3 and 4 to examine two distinct roadway projects. They are identified as the North-South Road (Waterdown Road) Class Environmental

				Assessment project and the East-West Road Class Environmental Assessment project. The Project Partners will continue to meet with the WATMP EA Study Team at key stages of the Phase 3 and 4 work. We look forward to HCA's continued participation in the next phases. Please note, the City of Hamilton staff meet once a month to discuss all studies that are going on in Waterdown. In addition to these monthly meetings staff working on the WATMP and the Waterdown South Secondary Plan meets regularly to ensure the two studies are coordinated with one another. The project team will be contacting you in the next little while to set up agency consultation dates for Phase 3 work. In the meantime, if you have any additional questions or comments please do not hesitate to contact us.
ID# 148 Margaret Charles (Halton Conservation) Jun 19, 2008 Phone	Ms. Charles (Halton Region) would like feedback on whether or not she should prepare the one page memo/list for the upcoming Public Information Centres from the Conservation of Halton as discussed with Liz Nield.	Waterdown-Aldershot Information	Sally Leppard Jun 19 & 23, 2008 Email & Phone	Hello Ms. Charles. Thank you for following up on Halton CAs offer to provide a memo to the NAC outlining the CAs area of interest vis a vis the Waterdown-Aldershot Transportation Master Plan and the resulting Class EA road projects. At the NAC meetings last week, we conveyed Halton Conservation's offer to prepare this memo. From our understanding of the NAC perspectives, they have indicated that they would appreciate receiving more knowledge about the natural environment aspects to assist them with the evaluation of alternatives. I think it would be useful to describe Halton Conservation's approach to participating/providing knowledge in projects such as this. If you would like to discuss this further with me, I would be happy to call you on Monday, since I am away tomorrow. Regards, Sally

				---------- Ms Charles was contacted and a time was set up to discuss the matter with Sally Leppard on Monday June 23.
ID# 153 Kathryn Pounder (Niagara Escarpment Commission) Jun 23, 2008 Email	**Subject:** RE: NAC meeting #4 - Review of E-West Alternatives on June 12th 2008 Sally - Thank you for keeping me in the loop. Could you send a copy of the alternative alignment that was suggested at the meeting that Rick is referring to. Thanks Kathy	Waterdown-Aldershot Information	Waterdown-Aldershot Information Jun 26, 2008	Dear Ms. Pounder, Thank you for your email. The attached display panels provide an explanation of the work Dillon Consulting is undertaking relating to the evaluation of the alignment in section N3, that includes the option proposed by the NAC, and as referred to in Mr. Breznik's e-mail below. Please note that Dillon Consulting will be adding a line to show where this northernmost alignment could go. As well, Dillon is preparing a memorandum to the NAC and members of the public, that will provide an explanation of the evaluation procedure and data collection activities that they will be using to evaluate this, along with other outstanding issue areas in other parts of the road. We will ensure that your receive a copy of this memo when it is available in early July. Please note the EW NAC Meeting #4 Minutes (June 12, 2008) will also provide a summary of the discussion around this alternative alignment, and these will be available later this week. Kind Regards, Patricia Prokop on behalf of Sally Leppard
ID# 154 Darylann Perry (CN Rail) Jun 23, 2008 Email (ID# 39)	**Re: Phase 3 & 4 Municipal Class EA – New East-West Corridor and Waterdown Road Corridor** Thank you for your letter dated June 13, 2008 regarding the above noted project. As per our previous letter to Diana Morreale, dated February 28, 2008, this project does not affect any CN rail line or property and CN requests to be removed from the project mailing list. Sincerely, **Darylann Perry** for John MacTaggart, P.Eng.	Forwarded to Waterdown-Aldershot Information from Syeda Banury	Waterdown-Aldershot Information	Already removed from Lura's database in February 2008

	Senior Engineering Services Officer			
ID# 158 Transport Canada Jun 24, 2008 Email	Syeda, Thank you for your letter regarding the above referenced environmental assessment. We have reviewed the information, and note the following: Transport Canada is responsible for the administration of the Navigable Waters Protection Act, which prohibits the construction or placement of any "works" in navigable waters without first obtaining approval. If any of the related project elements or activities may cross or affect a potentially navigable waterway, you are requested to prepare and submit an application in accordance with the requirements as outlined in the attached Application Guide. Any questions about the NWPA application process should be directed to Suzanne Shea, NWP Officer at (519) 383-1866. Please note that certain approvals under the Navigable Waters Protection Act or Railway Safety Act trigger the requirement for a federal environmental assessment under the Canadian Environmental Assessment Act. You may therefore wish to consider incorporating CEAA requirements into your provincial environmental assessment. <<Annex A Navigable Waters Protection Act Application Addresses.doc>> <<TC Application Form.pdf>> <<TC Application Guide.pdf>> We would also appreciate if your agency distribution list could be updated by removing the Navigable Waters Protection Program. All correspondence should be directed to the Environment and Engineering Section to review projects against all of Transport Canada's potential interests. The contact information should be changed to: Environmental Assessment Coordinator Environment and Engineering	Forwarded to Waterdown-Aldershot Information from Syeda Banuri	None	No response required. Updated database.

	Transport Canada 4900 Yonge Street Toronto, ON M2N 6A5 Please contact me should you wish to discuss this further. Regards, Haya Finan Environmental Officer Environment and Engineering Transport Canada			
ID# 211 Margaret Charles (Conservation Halton – Agency) Sep 22, 2008 Email (PDF)	Refer to hard copy – (attached) Comments on the preferred road alignment sections for the new East-West Road (N1-N7) and Waterdown Road widening (W1-W7).	Forwarded to Waterdown-Aldershot Information from City of Hamilton		No response required.
ID# 237 Anne Gibbs (Diocese of Hamilton) Oct 23, 2008 Telephone	I would like to know how the proposed east-west road will affect the Diocese of Hamilton. We have a property at X Centre Road, how will this road affect us? Where will the road intersect Centre Road and where will it come out? I would also like to request an enlarged and more detailed map of the area.	Waterdown-Aldershot Information	Waterdown-Aldershot Information Dec 3, 2008 Email	Dear Ms. Gibbs, Thank you for your phone call dated October 23, 2008. We have obtained a response to your inquiry from the Project Team, and have provided it in blue below. --- *I would like to know how the proposed east-west road will affect the Diocese of Hamilton. We have a property at X Centre Road, how will this road affect us? Where will the road intersect Centre Road and where will it come out?* *I would also like to request an enlarged and more detailed map of the area.* **Response**: The proposed crossing location of Centre Road with the new east-west roadway is considerably south of your property. The proposed locations for the new intersection are approximately 160 metres north of the current Centre

				Road/Northlawn Avenue intersection. The new road will cross Centre Road and continue east to connect with Parkside Drive. The air photo below shows the crossing location alternatives that were considered. The light blue alignment (second from the bottom) is currently the preferred crossing location.
ID# 269 Ontario Realty Corporation Nov 4, 2008 Email	Please see attached letter. Thank you. Hoeun Heng Ontario Realty Corporation *Attached letter, with map, reads:* November 3, 2008 To Whom It May Concern, **RE: ORC Initial Comments on Notice of PIC Class EA, New east-west corridor and Waterdown Road corridor** Thank you for circulating Ontario Realty Corporation (ORC) on your Public Information Centre. The ORC is the strategic manager of the government's real property with a mandate of maintaining and optimizing value of the portfolio, while ensuring real estate decisions reflect public policy objectives of the government. Our preliminary review of your notice and supporting information indicates that ORC-managed property is directly in the study area. As a result, your proposal may have the potential to impact this property and/or the activities of tenants present on ORC-managed lands. Attached please find a map that identifies this property to assist you in identifying and avoiding potential impacts. **Potential Negative Impacts to ORC Tenants and Lands** **General Impacts** Negative environmental impacts associated with the project design and construction, such as the potential for dewatering, dust, noise and vibration impacts, and impacts to natural heritage features/habitat and functions, should be avoided and/or appropriately mitigated in accordance with applicable regulations best practices and MNR and MOE standards. Avoidance and	Waterdown-Aldershot Information	Waterdown-Aldershot Information Dec 4, 2008 Email	Dear Ms. Myslicki, Thank you for your letter dated November 3, 2008. We have obtained a response to your inquiry from the Project Team, and have provided it in blue below. --- **Project Team Response**: Thank you for your letter and interest in the Waterdown Road Class Environmental Assessment. In reviewing the information you provided, it would appear that Waterdown Road crosses two power transmission line corridors that are under the mandate of the Ontario Realty Corporation (ORC). We have not identified any other lands to be required from the ORC. As it is proposed that Waterdown Road be widened from two to four lanes, there could be the need for lands contained within these power transmission corridors. We are in the process of confirming property needs along the entire length of roadway. Once this has been confirmed, we will contact you to advise of the land requirement and to discuss the process to facilitate this. --- Kind regards, Patricia Halajski née Prokop on behalf of Sally Leppard,

	mitigation options that characterize baseline conditions and quantify the potential impacts should be present as part of the EA project file. Details of appropriate mitigation, contingency plans and triggers for implementing contingency plans should also be present. **Impacts to Land holdings** Negative impacts to land holdings, such as the taking of developable parcels of ORC managed land or fragmentation of utility or transportation corridors, should be avoided. If the potential for such impacts is present as part of this undertaking, you should contact the undersigned to discuss these issues at the earliest possible stage of your study. If takings are suggested as part of any alternative these should be appropriately mapped and quantified within EA report documentation. In addition, details of appropriate mitigation and or next steps related to compensation for any required takings should be present. ORC requests circulation of the draft EA report prior to finalization if potential impacts to ORC managed lands are present as part of this study. **Cultural Heritage Issues** If proposed alternatives may impact cultural heritage features on ORC managed lands, we would request that the examination of cultural heritage features be enhanced to include issues such as cultural landscapes, archaeology and places of sacred and secular value. **Potential Triggers Related to ORC's Class EA** The ORC Class Environmental Assessment (ORC Class EA) applies to a range of realty and planning activities including leasing or letting, planning approvals, selling, demolition and property maintenance/repair. For details on the ORC Class EA please visit the Environment and Heritage page of our website found at http://www.orc.on.ca/Page133.aspx. If the ORC Class EA is triggered, consideration should be given to explicitly referring to the ORC's undertaking in your EA study. The purchase of ORC lands or disposal of rights and responsibilities (e.g. easement) for ORC lands triggers the ORC's Class EA. If any of these are being			

	proposed as part of any alternative, please contact the Sales and Marketing Group through ORC's main line (Phone: 416-327-3937, Toll Free: 1-877-863-9672) at your earliest convenience to discuss next steps. The undertaking of physical work on ORC lands also triggers the ORC Class EA. If any work is proposed on ORC lands, please contact the undersigned at your earliest convenience to discuss next steps. **Specific Comments** Please note that various government lands, managed by ORC and Hydro One, are in the study area. Please contact ORC and Hydro One for policies and processes. **Concluding Comments** Thank you for the opportunity to provide initial comments on this undertaking. If you have any questions on the above I can be reached at the contacts below. Sincerely, **Lisa Myslicki** Environmental Coordinator Ontario Realty Corporation - Professional Services			
ID# 303 Nancy Mott-Allen (Niagara Escarpment Commission) Nov 12, 2008 Email	**Subject:** NEC comments on East-West Road. Good afternoon: I attended both Public Information Centres regarding the proposed alignments of the East/west and North/south roads that are part of the Waterdown-Aldershot Transportation Master Plan. Our comments are as follows: East/West - Rock cut on north side of Dundas, west of Brant Street: more information required to understand extent of rock cut required for road widening and impact on the Escarpment - Street lighting on Dundas: lighting should be directed downward to the roadway to minimize visual impact on the Escarpment	Waterdown-Aldershot Information & Large list	Waterdown-Aldershot Information Feb 27, 2009 Meeting	Email was acknowledged Nov 19, 2008 Meeting was held with Dillon Consulting Feb 27, 2009.

	- Generally support the preferred route as it minimizes impact to environmental features in Waterdown If you have any questions with respect to these comments, please contact me at the number below. Nancy Mott-Allen, MCIP, RPP Senior Planner Niagara Escarpment Commission			
ID# 335 Hamish Campbell (GO Transit) Nov 24,2008 Email	**Subject:** Waterdown Road and Dundas West Class EA Ms. Banuri, Further to my voicemail of November 18th, there are a number of issues of interest to GO Transit related to the subject study. Specifically, we are interesting to find out more about: - How the Waterdown road widening would function (if at all) with the new highway interchange that has been proposed off the 403? - What pedestrian and cycling facilities would exist along the new north/south (Waterdown Road) and east/west (Dundas West) alignments, if any. - Consideration and function of Dundas Street as a higher order inter-regional transit corridor. This portion of Dundas has been identified in Metrolinx's Draft Regional Transportation Plan as a corridor for Rapid Transit improvements (under the 15-year plan labeled as "Dundas West - Waterdown to Kipling Station). Any additional information and specifics as they relate to the subject study on the above-noted issues would be greatly appreciated. I look forward to communicating with you further at your earliest convenience. Best Regards, **Hamish Campbell** Transportation Planner - GO Transit Transportation Planning and Development	Forwarded to Waterdown-Aldershot Information from City of Hamilton (Syeda Banuri)	Waterdown-Aldershot Information Mar 4, 2009 Email	Dear Mr. Campbell, Thank you for your voicemail November 18, and email dated November 24, 2008. We have received a response from the Project Team and provide it below. For ease of reference, we have included excerpts of your e-mail in italics, with the project team response following. --- *Further to my voicemail of November 18th, there are a number of issues of interest to GO Transit related to the subject study. Specifically, we are interesting to find out more about:* *-How the Waterdown road widening would function (if at all) with the new highway interchange that has been proposed off the 403?* **Project Team Response**: Waterdown Road interchange is a City of Burlington project. The Waterdown Road and the Highway 403 interchange is being built to tie into a future 4 lane Waterdown Road. Waterdown Road through the new highway interchange will have four lanes plus turn lanes. The City of Burlington is planning to start construction on the Waterdown Road interchange in 2009, to facilitate future increased vehicle capacities. The technical aspects of a four-lane roadway are currently being finalized along

				Waterdown Road. Once the preferred four-lane concept has been finalized the project team will develop and evaluate providing a three-lane option as the first stage in implementing the four-lane concept. *- What pedestrian and cycling facilities would exist along the new north/south (Waterdown Road) and east/west (Dundas West) alignments, if any.* **Project Team Response**: The proposed Pedestrian and Cycling facilities for both corridors are outlined below. **North-South Corridor:** ***Waterdown Road*** - Proposing a 4m wide Multi-Use Pathway for pedestrians and cyclists (off road, behind curb and boulevard) on the **west side of the road only** throughout the entire alignment. A 1.5m sidewalk on the east side is proposed from Flatt Road northerly for approximately 600m. ***Mountain Brow Road*** - Proposing a 3.5m wide Multi-Use Pathway for pedestrians and cyclists (off road) on the **north side of the road only** from Waterdown Road to the new Mid-Block Road (Edworthy Road). No allowance is made on the south side of the road. ***Mid-Block Road*** - Proposing 1.5m on-road bicycle lanes and 2.0m sidewalks on both sides of the road throughout the entire alignment. **East-West Corridor:** ***New E-W Road (Highway 6 to Waterdown North Development)*** - No allowance made as this is a rural section,

				though paved shoulders are included in design. ***New E-W Road (through Waterdown North Development)*** - Proposing a 4m wide Multi-Use Pathway for pedestrians and cyclists (off-road) on the **south side of the road only** throughout entire development. ***New E-W Road (From Centre Street to Parkside Drive)*** - Potential Multi-Use Pathway on south side from Centre Road connecting to Joe Sam's Park to be further assessed. No other allowances made through this rural section, though paved shoulders are included in the design. ***Parkside Drive Widening*** - Proposing on-road bicycle lanes (1.2m) and 1.5m sidewalks on both sides of the road. ***N-S Link through Upcountry Development*** - Proposing a 4m wide Multi-Use Pathway for pedestrians and cyclists (off-road) on the **west side of the road only** throughout the entire development. ***Dundas Street (From new N-S Link to Kerns Road)*** - Proposing on-road bicycle lanes (1.5m) and 2.0m sidewalks on both sides of the road. ***Dundas Street (From Kerns Road to Brant Street)*** - Proposing 4.2m wide shared curb lanes (both sides of the road) for traffic and cyclists and a 1.5m sidewalk on the **south side of the road only**. The final recommended preferred option will be provided in the ESR *- Consideration and function of Dundas Street as a higher order inter-regional transit corridor. This portion of Dundas has*

				been identified in Metrolinx's Draft Regional Transportation Plan as a corridor for Rapid Transit improvements (under the 15-year plan labelled as "Dundas West - Waterdown to Kipling Station). **Project Team Response**: Dundas Street falls under the jurisdiction of the Region of Halton. It is the City of Hamilton's understanding that the Region of Halton, in regards to this project, is releasing a TOR early in the new year. We have forwarded your input to the Region of Halton for their consideration. Kind regards,Patricia Halajski on behalf of Sally Leppard,

From: McInnes, Suzanne [suzanne.mcinnes@conservation-niagara.on.ca]
Sent: February 19, 2008 1:50 PM
To: Waterdown-Aldershot Information
Subject: PIC Notice February 15, 2008
Please remove my name and Paul Bond's name from your mailing list. This project is located outside on the NPCA's jurisdiction.

Suzanne McInnes, MCIP, RPP
Watershed Planning Coordinator
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario L3C 3W2
phone: (905) 788-3135 ext. 235
fax: (905) 788-1121

Regional Engineering
Engineering Services

Canadian National Railway
1 Administration Road
P.O. Box 1000
Concord, Ontario L4K 1B9
Tel.: 905-669-3155
Fax: 905-760-3406

February 28, 2008

Email: info@waterdown-aldershot.ca

Diana Morreale, MCIP, RPP
Senior Project Manager
Environmental Planning, Public Works
77 James Street North
Hamilton, Ontario L8R 2K3

Dear Ms Morreale;

Re: Waterdown / Aldershot Transportation Master Plan
Phase 2 Report – Public Information Centers

Thank you for your letter dated February 15, 2008 regarding the above noted project. This project does not affect any CN rail line or property and CN requests to be removed from the project mailing list.

Sincerely,

Darylann Perry for
John MacTaggart, P.Eng.
Senior Engineering Services Officer

From: Waterdown-Aldershot Information
Sent: Wednesday, March 26, 2008 8:41 AM
To: 'Jamieson, Nora'
Cc: Morreale, Diana
Subject: RE: Waterdown/Aldershot Transportation Master Plan EA Phases 3 & 4

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Ms. Jamieson,

Thank you for your e-mail dated March 7, 2008. We have received a response from the project team and provide it below.

The Project Partners are aware that Conservation Halton and Hamilton Conservation Authority are a part of the Waterdown/Aldershot Transportation Master Plan (WATMP) EA Study Team. We also look forward to working with the two conservation authorities in the upcoming Phases (3 & 4). The Project Partners have finalized the Phase 2 Report for the WATMP, a copy of the final report will be sent to all agencies that have been a part of the EA Study Team.

As Phase 2 of the Waterdown/Aldershot Transportation Master Plan is now complete, the Study will proceed to Phases 3 and 4 to examine two distinct roadway projects. They are identified as the North-South Road (Waterdown Road) Class Environmental Assessment project and the East-West Road Class Environmental Assessment project. The Project Partners will continue to meet with the WATMP EA Study Team at key stages of the Phase 3 and 4 work. We look forward to HCA's continued participation in the next phases.

Please note, the City of Hamilton staff meet once a month to discuss all studies that are going on in Waterdown. In addition to these monthly meetings staff working on the WATMP and the Waterdown South Secondary Plan meets regularly to ensure the two studies are coordinated with one another.

The project team will be contacting you in the next little while to set up agency consultation dates for Phase 3 work.

In the meantime, if you have any additional questions or comments please do not hesitate to contact us.

Regards,
Patricia Prokop on behalf of Sally Leppard
Neutral Community Facilitator's Office
36 Hunter Street East, 6th Floor
Hamilton, ON L8N 3W8
Tel. (905) 818-8464
Fax (905) 528-4179
Email: info@waterdown-aldershot.ca

From: Jamieson, Nora [mailto:njamieso@conservationhamilton.ca]
Sent: March 7, 2008 10:29 AM
To: Waterdown-Aldershot Information
Cc: Morreale, Diana
Subject: Waterdown/Aldershot Transportation Master Plan EA Phases 3 & 4

To Neutral Community Facilitator's Office and Diana Morreale at City of Hamilton Public Works Dept.:

Hamilton Conservation Authority (HCA) has just recently received a copy of a letter from Conservation Halton to the Neutral Community Facilitator's Office, dated March 6, 2008 advising that they have some concerns with the Phase 3 and 4 and that there has been no discussions to date between the Secondary Plan Team and the EA Study Team which

includes Conservation Halton. We wish to advise that HCA is also part of this EA Study Team and we too have not been involved with these discussions. As well, a copy of the Phase 3 and 4 report was not submitted for our review. Please be advised that we have had problems in the past with not being circulated documents for review and have not been invited to some discussion meetings. We request that a copy of the report be submitted to HCA and that we be added to the circulation list if we were inadvertently removed.

Ministry
of the
Environment

2 St. Clair Ave. West
Toronto ON M4V 1L5

Ministère
de
l'Environnement

2, avenue St. Clair Ouest
Toronto ON M4V 1L5

Ontario

COPY

ENV1283MC-2008-965

March 31, 2008

Mr. Rick Breznik
11 Northlawn Avenue
Waterdown ON L0R 2H1

Dear Mr. Breznik:

Thank you for your March 12, 2008 email to the Minister of the Environment about the City of Hamilton, the City of Burlington and Halton Region's proposed Waterdown-Aldershot Transportation Master Plan. I am pleased to reply on behalf of the Minister.

Municipal infrastructure projects in Ontario require approval under the *Environmental Assessment Act* (EAA). Approval can be obtained by proponents through planning and developing infrastructure projects in accordance with the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA). The Class EA provides the flexibility for proponents to plan and obtain approval for individual projects, or obtain approval for a series of projects comprising an infrastructure system through the preparation of a master plan. A master plan is a long range planning document which sets out infrastructure requirements for existing and future land use. It is prepared following environmental assessment planning principles, such as the consideration of alternatives and environmental effects.

A master plan provides the context for the examination of specific, discrete projects which collectively implement part of the larger infrastructure system. The projects set out in a master plan are distributed geographically throughout a defined service area, and implementation occurs over an extended period of time. In this way, the need and justification for the series of related projects are defined in a broader context. The separate projects which are identified in a master plan must meet all of the requirements of the Class EA.

It is the understanding of this ministry that the Master Plan is being prepared to identify a future transportation network that will service urban development in the community of Waterdown. The Master Plan is prepared in accordance with the Approach # 2 of the master plan provisions of the Class EA. In accordance with this approach, the cities and the region have completed Phase 1 and Phase 2, and now are proceeding with completion of the Phase 3 for two Schedule C projects planned under the Master Plan. The city will hold public open houses as part of the mandatory consultation to solicit public input during Phase 3 of the process.

... 1

There are no Part II Order provisions for master plans. You, however, have the opportunity to make a written submission to the Minister asking that an individual Environmental Assessment be prepared for any proposed project which is planned under the Master Plan. This is required by the Class EA to be done during the 30-day comment period once a Notice of Completion is published. In accordance with the provisions of the Class EA, the cities and the region are required to make all documentation prepared for all three phases; including Phase 1, Phase 2 and Phase 3, available for the public and agency review during 30 days comment period.

Please note that personal and other information in your letter such as your name, address, and telephone number and your concerns with this Project will form part of the public record on this matter. If you wish this information to be excluded from the public file, this Branch must be advised. Despite this, this information may still be obtained by members of the public if the ministry is required to disclose it under the *Freedom of Information and Protection of Privacy Act*.

Thank you for taking the time to share your concerns with this ministry.

If you have any questions with respect to the Class EA process, you can contact this ministry's West Central Regional Office at 905- 521-7640. The West Central Regional Office is responsible for coordinating this ministry's activities as a technical review agency for projects proceeding through the Class EA process.

Yours sincerely,

Sarah Paul

Sarah Paul
A/Manager
Environmental Assessment & Approvals Branch

c: ✓Ms. Diana Morreale, Senior Project Manager, City of Hamilton
Mr. Andrew Head, Manager – Transportation Services, Halton Region
Mr. Paul Allen, P.Eng., Senior Transportation Engineer, City Of Burlington
Ms. Barb Slattery, EA and Planning Coordinator, Ministry of the Environment

ENV1283MC-2008-965

John, JessyMary (ENE)

From: Richard Breznik [rbrez@sympatico.ca]
Sent: March 12, 2008 9:55 PM
To: Minister, MOE (ENE)
Subject: Online-Form Response for Minister of the Environment

Online-Form Response for Minister of the Environment:

Name: Richard Breznik

Email: rbrez@sympatico.ca

Address: 11 Northlawn Ave

City: Waterdown

Province: ON

Postal Code: L0R2H1

Country: Canada

Phone Number: 905-689-3938

Comments: March 12th, 2008
To:
The Honourable John Gerretsen
Minister of the Environment
12th Floor, 135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5

Mr. Gerretsen:

In 2005, I had sent numerous letters and e-mails to the Premier, yourself and other Ministries of Ontario, regarding the Waterdown Aldershot Master Transportation Plan, currently being undertaken by the City of Hamilton.

The Replies letters I received are:
- ENV1283MC-2005-4112 from James O'Mara
- 05-18324 from yourself under the Ministry of Municipal Affairs and Housing
- 05-19062 from yourself under the Ministry of Municipal Affairs and Housing

The general advice to me at the time was to continue working with the City of Hamilton Project Team (the Proponents).

I had continued trying your suggested method until Sept 2006 when the Hamilton Public Works Manager wrote back to me, advising that the City of Hamilton would no longer communicate with me until the next phase 3 and 4 of the study. Their stated reason was they simply disagree with everything I have brought forward to them about the misleading information and errors in their Draft Phase 2 report.

Although I had the odd communication with the Proponents since that time, I decided to wait until the final phase 2 report was completed to see if the proponent did change any of their errors and misleading information from their original Sept 2005 Draft Phase 2 report. Sadly they haven't.

They have now announced (Feb 2008) that they have completed Phase 2 Report and Master Plan and are now starting Phase 3 of their Master Plan's recommended Projects.

I have asked the proponent on two occasions in the past (Aug 2006 and Dec 2007), if they would bump up this project to an individual EA. They have indirectly replied back both times that:
- Their Master Plan cannot be challenged for a bump up.
- Only the results of the Phase 3 and Phase 4 ESR of the (class C) Projects from the Master Plan, can be a cause for requesting a bump up.
- The Projects can only be challenged once their Phase 4 ESR reports are completed.

However, it is the Master Plan that recommends the Projects. If the Master Plan is flawed, then the proponent may be undertaking the incorrect Projects to follow in their next phases.
The incorrect Project might then be performed perfect in accordance with the Municipal Engineers Association guideline. Then once challenged by the Public, the MOE may review the results of the ESR and still pass the Project because, although it might be the wrong project, it was done correctly.

The fact remains that a flawed Master Plan may still have recommended the wrong Projects to proceed with.

Therefore my question is simple: - If the Public has to wait for the MOE to get involved until after the ESR of a Class C Project, then what is the MOE reviewing:
- The issues as they relate only to the Project?
or
- The issues as they relate to the original Master Plan that recommended the project?
or
- The issues as they relate to both the recommendations of the Master Plan and the results of the project?

I hope you can appreciate the problem I see. If the public cannot challenge the Master Plan that made the wrong project recommendations, then current system has failed the public.

If the Public can challenge the Master Plan that recommended the Project, but have to wait for the "wrong Project" to be completed, then the system is causing an unjust hardship to all of the involved parties:
- The Proponent who is wasting their time and money on the wrong project that may have to be redone
- The Public having to wait 1 to 2 years for the Project to be completed before they can present their information to the MOE
- The MOE time and money for having to wade through not only the Project information but also the original Master plan information.

I ask for clarification on this matter as soon as possible. The Proponent has finished their final Phase 2 report, stating their Master Plan is now completed, and are starting the Phase 3 and 4 Projects from their Master Plans recommendations.

Thank You

Richard Breznik
Waterdown Ontario
905-689-3938
rbrelz@sympatico.ca
C.C.:
- Hon Ted McMeekin (e-mailed)
- Bill Bardswick (MOE) (e-mailed)
- Carl Slater (MOE) (e-mailed)
- Michael Harrison (MOE) (e-mailed)
- Barbara Slattery (MOE) (e-mailed)
- Mayor Fred Eisenberger (Hamilton) (e-mailed)
- Mayor Cam Jackson (Burlington) (e-mailed)
- Parkside Residents Association (e-mailed)
- Waterdown Road Community Association (e-mailed)
- Hunter Park Survey Residents (e-mailed)
- Waterdown Aldershot Master Transportation Plan Project Team (e-mailed)

MINUTES OF MEETING

PROJECT:	Waterdown Road & New East West Road		
PURPOSE:	Government Agency Technical Committee Meeting		
DATE:	May 12, 2008	9:00 AM	
LOCATION:	Hamilton City Centre, 400E		
PRESENT:	City of Hamilton:	Syeda Banuri	Jim Doyle
		Christine Lee-Morrison	Joe Spiler
		Andy McLaughlin	Gavin Norman
		Paul McShane	Tony Sergi
		Hart Solomon	Gary Moore
		Cathy Plosz	Jill Stephen
		Brenda Khes	Susan Jacob
		Kirsten McCauley	Gord Baguley
		Tanya McKenna	
	City of Burlington:	Paul Allen	
		Greg Simon	
	Region of Halton:	Melissa Green-Battiston	
	Conservation Halton:	Jennifer Lawrence	
		Margaret Charles	
	MOE:	Barb Slattery	
	MTO:	Joseph Lai	
		Greg Roszler	
		Ayvun Jeganathan	
	NEC:	Neil Hester	
	Lura Consulting:	Liz Neild	
	Dillon Consulting:	Paul MacLeod	
		Don McKinnon	
		Paul Acquaah	
		Amanda Shepley	

ITEM

A. Introductions

ITEM

B. Presentation by Paul MacLeod and Don McKinnon

- See attached

C. Agency Comments

1. Conservation Halton Aspects

- Amphibian survey complete
- Vegitation survey completed last summer
- No need for further fisheries studies
- Grindstone Creek structure at Parkside will be widened or replaced, assuming that the Option 5 alternative is not carried forward
    - The flood plain must be looked at carefully
- Concerns about the road encroaching into the ESA
- Suggestion to connect further to the East at Pamela Street rather than at Burke St.

2. City of Hamilton – Gavin Norman

- Evaluation
    - Constructability should be considered
    - Road will be built in stages
- Property Taking
    - As many as 5-6 properties may need to be acquired, primarily on Waterdown Road
    - Conversations with property owners are taking place in the near future

3. City of Hamilton – Brenda Khes

- Centre Road wetland is ESA
- Wooded area at N2 is a PSW
- Evaluation criteria comments:
    - Lifecycle cost should be considered
    - Maintainabiltiy
    - Impact on user
    - Air quality should be considered
    - Road safety audit should be completed of alternative intersection

4. MTO – Greg Roszler, Joseph Lai, and Ayvon Jecanathan

- Hwy 6
    - Concerned that Northern Option doesn't meet the minimum signal spacing standard
    - 4th Line is not intended to be realigned with the proposed design. Perhaps in the

ITEM

future.
  - MTO received a call from a concerned resident about the Parkside & Hwy 6 intersection
  - MTO confirmed Dillon's understanding of MTO's plan for the Highway 6 corridor; there are no plans for extending the controlled access section north of Highway 6 at this time. When this does happen the Parkside intersection will be closed.
- Waterdown Road at Hwy 403
  - Anticipated increase in traffic coming from the development areas from the north to the 403 interchange
  - Dillon's study does not include the 403 interchange as it matches in north of the new North Service Road location
    - Capacity concerns at the 403 interchange
    - South bound left turn lane needs to be addressed (as the structure over the 403 may need to be widened)
    - MTO recommended that the study area extend south of 403 (Burlington indicated that the two projects should remain separate)

5. Conservation Halton

- Conservation Halton would like to move the N-S connection to Pamela Street
  - Dillon explained that the traffic assessments from Phase 2 have identified the Burke location as the optimum connection but this will be confirmed in this Phase

6. Future Meetings

- Next meeting on the second week of June
  - Will display PIC information
- PIC #1 will include preliminary evaluation including the NAC's input
- Draft evaluation criteria to be distributed to all Agency members
  - Comments to Syeda Banuri

DISTRIBUTION: Attendees

Please contact Amanda Shepley of Dillon Consulting with any errors or omissions.

Municipal Class Environmental Assessments

Waterdown Road Corridor (North Service Road to Dundas Street)
New East – West Road (Highway 6 to Brant Street)

Government Agency Technical Committee Meeting #1

Meeting Agenda

- Welcome & Meeting Purpose
- Introductions
- Presentation
  - Overview of Phase 1 and 2 Work
  - Carry Over Phase 2 Issues & Questions
  - Proposed Phases 3 & 4 Work Program
  - Alternative Design Concepts
  - Schedule
- Discussion
  - Agency Involvement
  - Issues & Concerns
  - Study Expectations
  - Permit & Approval Requirements
- Next Meeting
- Adjourn

Introductions

Phase 2 - Issues and Questions

Carry forward into Phases 3 & 4

Natural Environment

- Impact on ESAs
- Impact on watersheds, watercourses, groundwater, wetlands, trees, wildlife and mitigation
- Impact of roads on Greenbelt and mitigation through design
- Increased air emissions
- Suggestion: Increased tree plantings

Socio-Cultural Environment

Community

- Impact on character of the area (rural)
- Effect on heritage properties/areas
- Pedestrian and bike trails (on or off road)
- Increased traffic noise, and noise mitigation
- Safety backing in/out of driveways
- Safety for vehicles and pedestrians
- Suggestion: Signs that indicate that residential roads are not through streets and other traffic calming measures

Socio-Cultural Environment

Public Infrastructure

- Street improvements and closures
- Streetscape designs
- Mitigation measures (retaining walls, vegetated buffer strips, barricades)
- Location of new sidewalks
- Location and design of traffic signals and intersections
- Driveway grading and relocation
- Room for rural mailbox delivery
- Location and safety of hydro lines

Socio-Cultural Environment

Property Impacts

- Process for determining fair compensation
- Encroachment policy and its effect
- Effect on septic systems
- Effect on farming operations

Transportation

- **Capacity, Routing and Costs**

- Downtown Dundas Street capacity concern
- Truck traffic road capacity
- Effect on Certificate of Approval for Barnes
- More detailed traffic operations analysis
- Connection between N/S and E/W
- Street alignment and shifting possibilities
- Costing and payment responsibility of project
- Timing of development
- Transit Alternatives and carpool lot

Proposed Work Program

Two separate projects

Technical Work Components

- Data Collection and Inventory
- Development of Design Alternatives
- Evaluation of Design Alternatives
- Development of the Preferred Alternative
- Environmental Study Report

Data Collection and Inventory

Environmental

- Terrestrial Environment
- Fisheries & Aquatic Resources
- Hydrogeology/Well Survey
- Socio-Economics/Land Use
- Archaeological & Heritage
- Environmental Conditions Report

Data Collection and Inventory

Engineering

- Prepare New Aerial Photo Base Plans of Corridors
- Waterdown Road Topographic Field Survey Work
- Prepare Corridor Base Plans / Digital Terrain Models
- Geotechnical
- Utilities
- Property
- Surface Drainage Inventories
- Roadside Elements & Safety Review
- Finalize Project Base Plans

Development of Design Alternatives

- Preliminary Option 5 Concept Development (East-West Corridor)
- King Road Feasibility Assessment
- Draft Design Criteria
- Assess Alignment Options
- Traffic & Network Analyses
- Assess Profile & Grading Aspects
- Assess Drainage Alternatives/Concepts
- Assess Structural & Retaining Wall Alternatives
- Utility Conflict Assessment
- Develop Streetscape Alternatives
- Develop Intersection Alternatives/Requirements
- Develop Grading, Frontage & Driveway Alternatives/Requirements
- Prepare Plans of Design Alternatives

Evaluation of Design Alternatives

- Confirm Evaluation Methodology
- Preliminary Option 5 Evaluation & Documentation
- Finalize Option 5 Evaluation & Documentation
- Prepare Evaluation Materials & Support Information
- Preliminary Evaluation of Design Alternatives
- Finalize Evaluation

Development of the Preferred Alternatives

- Resolve Final Plan & Profile Elements
- Grading/Cross Section Assessments
- Structural Concepts Development
- Resolve Streetscape Elements
- Noise & Air Quality Assessments
- Identify Utility Issues & Requirements
- Identify Property / Easement Requirements
- Detailed Archaeological Resource Assessments
- Asses Effects/Finalize Mitigation Measures
- Cost Estimate
- Prepare Plans & Details of Preferred Alternative

Environmental Study Report

- Prepare Initial Draft of ESRs
- Partnering Group Review of Initial Draft ESRs
- Prepare Final ESRs Draft 1
- Public & Agency Review of Final ESRs Draft 1
- Prepare Final ESRs Draft 2,
- Partnering Group Sign-Off of Draft ESRs
- Council Presentations
- Finalize ESRs
- Issue Final ESRs, Notice of Completion & 30 Day Review Period

Assessing Alternative Design Concepts

- Analysis section identified
- Design issues identified
- Alternative alignments identified

Option 5 vs. 4 Reexamination Process

Step 1 - Confirm Option 5 Alignment
Step 2 – Data Collection/Detailed Costing
Step 3 – Confirm Feasibility of Option 5
Step 4 – Route Reevaluation

Option 5

Alternatives – New E/W Road

- Alignment at Highway 6
- Crossing of Borers Creek
- Crossing of Centre Road
- Crossing of Hydro corridor
- Option 5 versus widening Parkside
- Dundas /Brant Street

Alternatives - Waterdown

- South end
- Off-road alignment alternative
- Minimizing frontage impacts
- Waterdown Road – Mountain Brow Road intersection
- Mountain Brow Road
- North-south connector

Schedule

- Public Consultation Centres #1 in June 2008 to review preliminary evaluation and design alternative selection
- Advance design concept work during the summer 2008
- Public Consultation Centres #2 in September 2008 to review preliminary recommendations
- Finalize recommendations in Fall of 2008
- Prepare draft & final ESRs fall/winter 2008/2009
- File ESRs February/March 2009

Discussion

- Agency Involvement
- Issues and Concerns
- Study Expectations
- Permits & Approvals Process

Next Meeting?

Adjourn

From: Sally Leppard

Sent: June 19, 2008 1:31 PM

To: mcharles@hrca.on.ca

Cc: Liz Nield; Patricia Prokop; Banuri, Syeda; MacLeod, Paul; Waterdown-Aldershot Information

Subject: ID# 148-Jun-19-08-Ms Charles-Neighbourhood Advisory Commitee- waterdown-Aldershot Transportation master plan

Hello Ms. Charles. Thank you for following up on Halton CAs offer to provide a memo to the NAC outlining the CAs area of interest vis a vis the Waterdown-Aldershot Transportation Master Plan and the resulting Class EA road projects.

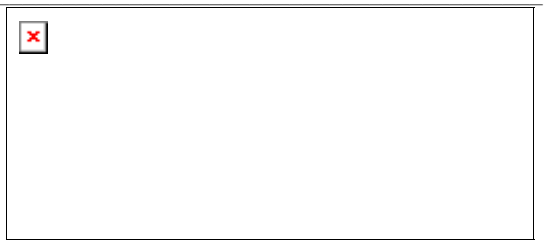
At the NAC meetings last week, we conveyed Halton Conservation's offer to prepare this memo. From our understanding of the NAC perspectives, they have indicated that they would appreciate receiving more knowledge about the natural environment aspects to assist them with the evaluation of alternatives. I think it would be useful to describe Halton Conservation's approach to participating/providing knowledge in projects such as this.

If you would like to discuss this further with me, I would be happy to call you on Monday, since I am away tomorrow.

Regards,

Sally

Sally Leppard
Founder and CEO



-----Original Message-----
From: Banuri, Syeda [mailto:Syeda.Banuri@hamilton.ca]
Sent: June 24, 2008 3:34 PM
To: Waterdown-Aldershot Information; MacLeod, Paul
Subject: FW: New East-West Corridor and Waterdown Road Corridor TC NEATS #13294

Syeda Basira Banuri
Senior Project Manager
Environmental Planning
Capital planning & Implementation Division Public Works Department, City of Hamilton
Phone: (905) 546-2424 x 4101 Fax: (905) 546-4435

-----Original Message-----
From: Finan, Haya [mailto:FINANHA@tc.gc.ca]
Sent: Tuesday, June 24, 2008 2:23 PM
To: Banuri, Syeda
Subject: New East-West Corridor and Waterdown Road Corridor TC NEATS #13294

Syeda,
Thank you for your letter regarding the above referenced environmental assessment.

We have reviewed the information, and note the following:

Transport Canada is responsible for the administration of the Navigable Waters Protection Act, which prohibits the construction or placement of any "works" in navigable waters without first obtaining approval. If any of the related project elements or activities may cross or affect a potentially navigable waterway, you are requested to prepare and submit an application in accordance with the requirements as outlined in the attached Application Guide. Any questions about the NWPA application process should be directed to Suzanne Shea, NWP Officer at (519) 383-1866.

Please note that certain approvals under the Navigable Waters Protection Act or Railway Safety Act trigger the requirement for a federal environmental assessment under the Canadian Environmental Assessment Act. You may therefore wish to consider incorporating CEAA requirements into your provincial environmental assessment.

<<Annex A Navigable Waters Protection Act Application Addresses.doc>>
<<TC Application Form.pdf>> <<TC Application Guide.pdf>>

We would also appreciate if your agency distribution list could be updated by removing the Navigable Waters Protection Program. All correspondence should be directed to the Environment and Engineering Section to review projects against all of Transport Canada's potential interests.

The contact information should be changed to:

Environmental Assessment Coordinator
Environment and Engineering
Transport Canada
4900 Yonge Street
Toronto, ON
M2N 6A5

Please contact me should you wish to discuss this further.

Regards,
Haya Finan
Environmental Officer
Environment and Engineering
Transport Canada - Ontario Region (PHE)
4900 Yonge Street, North York, ON M2N 6A5
p: 416-952-0475
f: 416-952-0514
e: finanha@tc.gc.ca

Subject: ID# 153 - (Response) NAC meeting #4 - Review of E-West Alternatives on June 12th 2008
Attachments: Waterdown Road Corridor PIC Panels - 25June2008.pdf

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From: Waterdown-Aldershot Information
Sent: Thursday, June 26, 2008 10:17 AM
To: 'Pounder, Kathryn (MNR)'
Subject: I.D.# 153 - NAC meeting #4 - Review of E-West Alternatives on June 12th 2008

Dear Ms. Pounder,

Thank you for your email. The attached display panels provide an explanation of the work Dillon Consulting is undertaking relating to the evaluation of the alignment in section N3, that includes the option proposed by the NAC, and as referred to in Mr. Breznik's e-mail below. Please note that Dillon Consulting will be adding a line to show where this northernmost alignment could go. As well, Dillon is preparing a memorandum to the NAC and members of the public, that will provide an explanation of the evaluation procedure and data collection activities that they will be using to evaluate this, along with other outstanding issue areas in other parts of the road. We will ensure that your receive a copy of this memo when it is available in early July.

Please note the EW NAC Meeting #4 Minutes (June 12, 2008) will also provide a summary of the discussion around this alternative alignment, and these will be available later this week.

Kind Regards,
Patricia Prokop on behalf of Sally Leppard
Neutral Community Facilitator's Office
36 Hunter Street East, 6th Floor
Hamilton, ON L8N 3W8
Tel. (905) 818-8464
Fax (905) 528-4179
Email: info@waterdown-aldershot.ca

From: Pounder, Kathryn (MNR) [mailto:kathryn.pounder@ontario.ca]
Sent: June 23, 2008 9:31 AM
To: Waterdown-Aldershot Information
Cc: Rick Breznik
Subject: RE: NAC meeting #4 - Review of E-West Alternatives on June 12th 2008

Sally - Thank you for keeping me in the loop. Could you send a copy of the alternative alignment that was suggested at the meeting that Rick is referring to. Thanks

Kathy

Kathryn Pounder, MA, MCIP, RPP
Senior Strategic Advisor (Acting)
Niagara Escarpment Commission
232 Guelph Street
Georgetown, ON L7G 4B1
905 877-8363
kathryn.pounder@ontario.ca

MINUTES OF MEETING

PROJECT:	Waterdown Road & New East West Road	
PURPOSE:	Halton Conservation Authority Meeting	
DATE:	July 23, 2008	
LOCATION:	Conservation Halton	
PRESENT:	Conservation Halton:	Jennifer Lawrence
		Margaret Charles
	City of Hamilton:	Syeda Banuri
	Dillon Consulting:	Paul MacLeod
		Ian Roul
		Amanda Shepley

ITEM **ACTION BY**

1. Status of Class EA projects

- Started hydraulic assessment and drainage design.
- Current schedule is for mid to late September – go to public with our design.
- Go to council in January/early February.

2. Issue Areas

- Halton Conservation will look into Upcountry modified road alignment — Halton C.A.
- Dillon proposing traffic circles on either side of Parkside Drive.
- Grindstone Creek crossing at Parkside Drive overtops during the regional storm
- Dillon is proposing to raise the grade on Parkside at Grindstone Creek requiring a full bridge replacement.
- Jennifer will discuss the project with her technical team and set up a meeting ASAP. — Halton C.A.
- Dillon will look at impacts to vegetation from raising the road at Parkside Drive. May shift the alignment to the north slightly. — Dillon
- Grade separation at the railway and Parkside Drive is not

ITEM	ACTION BY
warranted.	
• Dillon will provide the conservation authority with an electronic copy of plan at Parkside & Grindstone Creek.	Dillon
• Dillon's analysis rejected Option 5 because it crosses the flood plain, requires three major crossings of the Grindstone Creek, and would require purchasing the Opta Minerals property	
• Residents suggested that the conservation authority might be interested in purchasing the Opta property to create park land	
• Halton Conservation indicated that they have no interest in the Opta property.	
• When Option 5 was rejected, public suggested a previous option which avoids the Opta property developed by Stantec in a earlier study	
• Dillon also rejected this option because it encroaches into ESAs and includes a sub-standard alignment.	
• Halton Conservation's comments on this option were: o Crosses a floodplain o Road would need to be raised o Increases flooding to residents upstream	
• Halton Conservation will provide a formal letter explaining their preference of Option 4 over Option 5	Halton C.A.
• Dillon will provide the plan of Option 5 electronically.	Dillon
• Dillon will provide Halton Conservation's previous comments regarding Option 5.	Dillon
• Halton Conservation will look into the existing berms that have apparently been built in the floodplain north of Opta.	Halton C.A.
• The road alignment along Upcountry isolates the watercourse from the floodplain on the west side.	
• Halton Conservation will look into the floodplain at Upcountry.	Halton C.A.
• Dillon plans to lengthen the existing culvert on Dundas St. o The road will be widened to six lanes	
• Dundas currently overtops during the Regional storm at the culvert	
• Dillon will send a plan to Transport Canada determine if the watercourse is navigable.	Dillon
• Dillon is proposing to maintain the existing centreline of the road with some widening to the south in some areas to minimize property impacts	
• Halton Conservation is concerned about impacts on vegetation at the east end of Dundas o Dillon is recommending a retaining wall to decrease grading impacts	
• Amphibian calling, breeding bird, ecological land classification	

ITEM	ACTION BY
(ELC), and vegetative surveys have been completed • Dillon indicated that the existing Vegetation at Sassafrass Woods (from the roadway inward) is as follows 0 – 5m close to no vegetation 5 – 10m typical vegetation 10 – 20m natural forest (green ash, sugar maple, black walnut) • The ELC was taken to the most detailed vegetative community in most areas o Dillon will submit data sheets for the ELC	Dillon
• Dillon is matching the west edge of the pavement of Burke Street at the Mid Block Road • Dillon's current design is not proposing a dedicated right turn from Dundas onto the Mid Block Road o CA is concerned about creek encroachment • Dillon is revising the proposed grade on the Mid Block matching back to Dundas • Conservation Halton indicated that if the creek is shifted, the flood plain may be affected o CA has not agreed to the re-alignment proposed by developer. • Conservation Halton's preference is clear span along the Grindstone at the Mid Block location, however will consider a 2-span • Conservation Halton would like wildlife movement through the proposed culvert as well as a 15m buffer on either side of the ESA • Conservation Halton will comment on the design at Mid Block	Halton C.A.
• Dillon will avoid crossing the channel in Waterdown South; instead will shift the road west through that section • 2 traffic circles are being proposed in Waterdown South • Conservation Halton indicated that limestone in this area leads to uncommon vegetation. • Dillon will likely propose 2 lane improvements on Mountain Brow, east of Mid Block • Dillon is currently proposing a 4 lane urban cross section along Waterdown Road and Mountain Brow Road with a sidewalk on the north side of Mountain Brow and a sidewalk on both sides of Waterdown Road. • Dillon is recommending straightening the Waterdown Road section through the future development with T intersections at the "old" road • Conservation Halton would like to see contours on the plans	

ITEM	ACTION BY

• Hydro tower, substation and reservoir on the west side of Waterdown opposite Sassafras Woods
• Dillon is proposing a retaining wall to avoid major impacts to Sassafras Woods
• Conservation Halton is concerned with noise and light impacts in Sassafrass Woods
  o Has been considered in the study of the new interchange to the south
  o Concluded that the noise impact is minimal	

3. Stormwater Management	
• Conservation Halton will provide performance criteria for stormwater	Halton C.A.
4. King Road	
• Alignment adjustments are being assessed to eliminate the existing sightlines; will be cutting into the rock instead of impacting the steep slope o Will be reviewing with Burlington then reviewing with Conservation Halton • Conservation Halton would prefer a "Do Nothing" option on King Road. • Potential impacts to the Jefferson Salamander will be need to be assessed	

DISTRIBUTION: Attendees
Christine Lee-Morrison
Paul Allen
Melissa Green-Battiston

Please contact Amanda Shepley of Dillon Consulting with any errors or omissions.

Correspondence File

Restivo, David

From: Pisapio, John (MNR) [john.pisapio@ontario.ca]
Sent: September 5, 2008 1:39 PM
To: Restivo, David
Cc: Followes, Emma (MNR)
Subject: RE: Halton Jefferson Salamander

David,

Based on your map, all of the naturally vegetated lands (including forests, field and meadow areas) south of Mountainbrow Road have been determined to be Jefferson Salamander habitat. There are several breeding ponds here and MNR has conducted terrestrial habitat use studies in this area. The forested area extending east of Mountainbrow Road where the road veers south, is also Jefferson habitat. These areas will fall under regulation in the new Endangered Species Act. The areas north of Mountainbrow Road and west of the existing subdivision are not habitat for Jefferson Salamander.

Just so the lines of communication are kept open, could you please advise me as to whom at Conservation Halton you have been dealing with. Thanks.

Regards,

John Pisapio
Biologist
Ministry of Natural Resources
Aurora District
(905) 713 - 7387

From: Restivo, David [mailto:DRestivo@dillon.ca]
Sent: Wednesday, September 03, 2008 5:09 PM
To: Pisapio, John (MNR)
Cc: Roul, Ian
Subject: Halton Jefferson Salamander

John,

Our company has been retained by the City of Hamilton and the City of Burlington to create a Transportation Master Plan for Waterdown/Aldershot. At a meeting with the Halton Region Conservation Authority your name was brought up by the CA as a reference person for potential Jefferson salamander occurrences/data for Sassafras Woods, Grindstone Creek and the surrounding area. Please see the attached air photo of the area of interest. Your assistance in providing us with Jefferson salamander information/observations for this area would be much appreciated.

Regards,

David Restivo
Biologist

Dillon Consulting Limited
800 - 235 Yorkland Blvd.
Toronto, ON, M2J 4Y8
Phone: 416-229-4647 ext. 2438
Fax: 416-229-4692


Summit
Centre

Restivo, David

From: Timmerman, Art (MNR) [art.timmerman@ontario.ca]
Sent: September 9, 2008 2:22 PM
To: Faulkenham, Shari; Restivo, David
Subject: RE: Centre Street Candidate PSW
Attachments: Centre Street Wetland.jpg

This wetland is part of the Logies Creek-Parkside Drive provincially significant wetland complex. Our files show that the wetland boundaries of the wetland area shown on the attached were determine from roadside surveys and from the interpretation of colour ortho air photos taken in 2002. We do not survey and stake wetland boundaries.

Art

From: Faulkenham, Shari [mailto:sfaulken@conservationhamilton.ca]
Sent: Tuesday, September 09, 2008 8:38 AM
To: Restivo, David
Cc: Timmerman, Art (MNR)
Subject: RE: Centre Street Candidate PSW

Hi David,

I've cc'd Art Timmerman on this email...I believe he is the contact you are looking for. Art – the area in question is an extension of the PSW identified on Parkside Drive in Waterdown a few years ago. It is located on the east side of Centre Street, and is hydrologically connected to the remaining wetland area to the west by a tributary of Borer's Creek. It is also considered an ESA in the City of Hamilton (Waterdown North Wetlands ESA).

s

Shari Faulkenham
Ecologist

Hamilton Conservation Authority
838 Mineral Springs Road, P.O. Box 7099
Ancaster, Ontario L9G 3L3

P: (905) 525-2181 x133
F: (905) 648-4622
E: sfaulken@conservationhamilton.ca

From: Restivo, David [mailto:DRestivo@dillon.ca]
Sent: Monday, September 08, 2008 4:13 PM
To: Faulkenham, Shari
Subject: Centre Street Candidate PSW

Shari,

On behalf of Ian Roul, I am following up on an issue with the Waterdown Aldershot Transportation Master Plan

concerning the Centre Street Woodlot Candidate PSW. Could you provide the MNR contact that is responsible for PSW wetland evaluations for this area? I would like to determine if the wetland has been officially designated a PSW and whether or not the wetland boundaries have been determined. In the future, it would be reasonable to stake and survey the wetland with the MNR as well.

Regards,

David Restivo
Biologist

Dillon Consulting Limited
800 - 235 Yorkland Blvd.
Toronto, ON, M2J 4Y8
Phone: 416-229-4647 ext. 2438
Fax: 416-229-4692

MINUTES OF MEETING

PROJECT: Waterdown Road and New East-West Road Class EAs

PURPOSE: Technical Agency Committee Meeting #2

DATE: September 17, 2008, 1:00 PM

LOCATION: Hamilton City Centre, Room 400A

PRESENT:

City of Hamilton:	Syeda Banuri	Joe Spiler
	Christine Lee-Morrison	Tanya McKenna
	Brenda Khes	Jason Thompson
	Kristen McCauley	Gavin Norman
	Mark Robinson	Wayne Thompson
Hamilton EMS-Fire:	Jim Doyle	
City of Burlington:	Paul Allen	
Region of Halton:	Jeffrey Reid	
Conservation Halton:	Margaret Charles	
MTO:	Frederick Szymanski	
	Greg Roszler	
MOE:	Barb Slattery	
NEC:	Nancy Mott-Allen	
Lura Consulting:	Sally Leppard	
Dillon Consulting:	Paul MacLeod	
	Ian Roul	
	Jackson Marin	

ITEM	MINUTES	ACTION BY
1	Following introductions, Paul MacLeod conducted a presentation updating the technical agencies on the status of the Waterdown Road and the New East-West Arterial EAs. The presentation is attached to these minutes for reference.	
2	With regards to the new East-West Arterial, it was noted that: • In the area of the new Waterdown North development, the road alignment is to be shifted further south to accommodate the 30m buffer requirement to the existing ESA. • In the Centre Woodlot PSW, a Butternut Tree health condition survey is being undertaken to locate and assess the condition of any existing Butternut specimens.	

ITEM	MINUTES	ACTION BY
	• Input from MTO is required regarding the location of the proposed intersection between the new the new road with Highway 6.	
3	With regards to Waterdown Road, it was noted that the proposed realignment at the south end of Waterdown through the Eagle Heights development has not, as yet, been reviewed with the developer for that land.	
	AGENCY COMMENTS	
	City of Hamilton	
4	Gavin Norman asked what the rationale is for placing the new East-West road this far north of Parkside Drive and not lining it up with Concession Road 4 instead. He is concerned that vehicles traveling north on Highway 6 will rather use Parkside Drive rather than the new road to reach their destination.	
	Dillon noted that the primary objective of the east-west road is to provide east-west traffic capacity. The time savings involved in selecting Parkside over the new East-West road are expected to be sufficiently small that they will not influence driver route selection. In addition, there was a general preference by the public for this option, as it keeps traffic off Parkside Drive. There was also a general feeling that lining up the road with Concession 4 would make this route more attractive as a truck route, which the residents also opposed.	
5	Tanya McKenna noted that the project team should have the numbers to show that placing the East-West road further north will not discourage people living in Waterdown North from using it.	
	Dillon will ensure that this is documented.	Dillon
6	Gavin noted that the City Wide Master Plan calls for eventually closing Parkside Drive at Highway 6. This may not be desirable since Parkside represents the boundary for a future industrial development.	
	The City will review this matter internally.	Hamilton
7	Jim Doyle noted that the fire station on Parkside Drive (just west of Centre Road) currently has access to Highway 6. They would not want to loose this access and should be consulted regarding the potential closing	

ITEM	MINUTES	ACTION BY
	of Parkside Drive.	
8	It was asked if there has been any further development regarding the Waterdown South lands following the last meeting with the developer. Dillon noted that all information has been forwarded to the developer in digital format, as agreed at the meeting. No comments from them on the proposed design have yet been received.	
9	Dillon noted that at one of our previous meetings with City staff, there was some concern over the proposed phase 2 layout for the Upcountry development. The concern was whether or not there should be connectivity between the new East-West Road (the section linking Parkside to Dundas) and one of the internal subdivision roads. The City confirmed that the second phase of this plan is still in draft approval form. They will review the plans and advise Dillon of any changes in the proposed draft plan layout.	Hamilton
	Ministry of Transportation	
10	Frederick Szymanski noted that MTO has not done the study to confirm whether or not Parkside Drive will be closed as part of future improvements to Highway 6. He cautioned against using this assumption in our route assessments. Dillon clarified that as part of the Ministry's plans to convert Highway 6 into a controlled access highway, (from previous discussions with Joseph Lai), it was likely that Parkside would be closed and that an interchange would be placed at the new East-West road intersection. Future connectivity between Parkside and Highway 6 was not a factor in our route selection.	
11	Frederick asked if the project team will look at re-aligning Concession 4 (west of Highway 6) to line up with the new East-West road as part of this study. Dillon noted that re-aligning Concession 4 will not be done as part of this study. The reasons for the offset in the intersections are discussed in *Item 4* of these minutes.	
12	It was clarified that Joseph Lai remains the main MTO contact for this project, though he was unable to attend this meeting. MTO will review the proposed design and provide their comments to the project team.	MTO

ITEM	MINUTES	ACTION BY
	Conservation Halton	
13	Margaret Charles indicated that conservation staff is supportive of the proposed retaining wall through the Sassafras Woods to limit the footprint - but not necessarily supportive of the proposed horizontal location for the wall. They have provided their comments in a letter to the City of Hamilton.	
	Dillon noted that there were various constraints (both geometric and physical) involved in selecting the proposed retaining wall location. Following the meeting, the project team will review all of the comments provided by Halton CA and respond, as required.	Dillon
	Niagara Escarpment Commission	
14	Nancy Mott-Allen asked if plans would be made available for the proposed work on King Road.	
	Dillon noted that a separate meeting will be scheduled with NEC to discuss the Waterdown Road EA, the East-West Arterial EA, and the King Road feasibility study. Plans will be made available at the meeting.	Dillon
	Region of Halton	
15	Jeffrey Reid asked if traffic information would be provided to Halton Region for the intersections of Dundas Street with Brant Street and with Kerns Road.	
	Dillon indicated that this traffic data would be supplied shortly.	Dillon
	REVIEW TIME REQUIREMENTS	
16	For scheduling purposes, Dillon inquired about the review period needed by the agencies to comment on the draft Environmental Study Report (ESR).	
	NEC indicated that they meet monthly to pass resolutions. She further noted that they will need a minimum of 3 weeks to review the drawings and the report. Halton CA noted that they typically require 6 weeks to review a draft ESR, however, given their current staff involvement, they may be able to provide comments in 4 weeks.	

DISTRIBUTION: Attendees
Project File

Please contact Jackson Marin of Dillon Consulting with any errors or omissions.

PROTECTING THE NATURAL ENVIRONMENT FROM LAKE TO ESCARPMENT

2596 Britannia Road West
RR2, Milton, Ontario L9T 2X6
905.336.1158 Fax 905.336.7014
www.conservationhalton.on.ca

September 22, 2008

Ms. Syeda Banuri
Senior Project Manager
Public Works Department
City of Hamilton
320-77 James Street N
Hamilton ON L8R 2K3

Dear Ms. Banuri:

Re: Waterdown/Aldershot Transportation Master Plan
EA Phases 3 and 4
Draft Alternatives Evaluation Framework
CH File: MPR 341

Road Alignment Alternatives and Issues

Staff of Conservation Halton have reviewed the preferred road alignment sections for both the new east-west road (N1-N7) and the Waterdown Road Widening (W1-W7) and offer the following comments.

Overall Comments – Related to All Sections

This section outlines our general comments that are applicable to all the road sections.

The proposed study area passes through several areas that are regulated by Conservation Halton due to the presence of riverine hazards (including flooding, erosion and/or meander belt width), unstable soils and bedrock (including areas of karst), and proximity to wetland features. We have attempted to identify the extent of the regulated lands with respect to the description of the alignment provided in a letter (May 9, 2008) and the stationing in the drawing set (date) provided by the consulting team. Staff note that a Conservation Halton Permit pursuant to Ontario Regulation 162/06 must be issued prior to the start of any works within the regulated areas.

At all existing watercourse crossings, the proposed project must demonstrate no negative impacts to the flooding and erosion hazard, and should consider opportunities to improve the flooding situation if possible. For new and upgraded watercourse crossings, we recommend that safe access and egress be provided for both pedestrian and vehicular traffic. Per MNR guidelines, safe access and egress may be defined by a depth velocity product of less than 0.4 m^2/s, with a maximum flooding depth over the road of less than 0.3m, and a maximum velocity over the road of less than 1.7 m/s.

Several sections of existing and proposed roadway traverse through areas of steep slopes that are regulated by Conservation Halton. A slope stability assessment should be undertaken for all areas where the proposed road alignment encroaches within close proximity to a valley slope greater than 2m in height.

Through the South Waterdown Subwatershed Study and the City of Burlington's New Park Environmental Assessment (EA), karst have been identified in close proximity to several road

a) The use of porous pavement and other infrastructure that enables a reduction of road salt use. Development of local design standards that limit impervious surfaces. By using pervious pavement, like porous asphalt or concrete, the amount of salt needed for winter maintenance can be reduced drastically, maybe by as much as 70 percent. Porous pavements, which use an open-graded aggregate with high porosity, drastically reduce the amount of salt needed to stay clear of snow and ice. Porous asphalt allows snowmelt and rain to drain through the surface and filter through the layers of gravel and sand below. This type of pavement appears to need less salt and this infiltration process removes pollutants like sediment, heavy metals, and petroleum products. It also does a good job of reducing the volume of runoff. Care must be taken before using porous pavements in areas where there is potential for hazardous spills, such as near gas stations.
b) The creation of "No Salt" areas. This requires the identification of locations where no salt should be applied during winter storm events due to their proximity to natural resources.

In addition to the above, there are several natural heritage features within the Study Area that need to be assessed and potentially have mitigation measures developed to ensure minimal impacts to the features.

We understand that Ecological Land Classification (ELC) data has been collected for 2 seasons, staff look forward to reviewing the data in the future.

In previous correspondence dating back to 2005, Conservation Halton recommended that the road expansion be completed away from the natural heritage features within the study area, staff continue to make this recommendation. We do not support any works being undertaken that will impact Sassafras-Waterdown Woods. For example, we recommend that the Mountain Brow Road expansion be shifted to the north and be incorporated into the development that is proposed in this area given the level of disturbance that will be associated with this proposal, while maintaining the Environmentally Sensitive Area (ESA)/Area of Natural and Scientific Interest (ANSI) to the south. We also recommend that the widening of Waterdown Road be shifted to the west to limit the impact to the Sassafrass-Waterdown Woods ESA/ANSI.

Staff are concerned that the discussion relating to north-south alignment within the May 9, 2008 letter to NAC members does not include impacts to Sassafras-Waterdown Woods. Further discussion of these impacts is warranted.

When developing mitigation measures staff recommend ecopassages as a method of allowing for wildlife movement under roadways. Ecopassages should be installed in areas where there is local migration between two natural areas and can be as simple as sizing crossings that will allow for movement of the large mammals or installing dry culverts in areas where reptile migration occurs.

In addition, there is the potential for species at risk within the study area, which will have to be assessed as part of this phase of the EA.

Species at Risk (SAR)
Phase 3 of this EA involves not only identifying alternative designs for the preferred solution but preparing a detailed inventory of the natural environment. Given that there is the potential for species at risk within the study area, staff believe that this should be further assessed as part of this phase.

Staff have been in consultation with the MNR regarding species at risk within the study area. The MNR staff have advised that they have conducted extensive research in this area on Jefferson Salamander; a threatened species. All of the area directly south of Mountain Brow Road has been documented to be the habitat of Jefferson Salamander. Therefore, it is important to ensure that road

The "Environmental Implementation Report" prepared by Paragon Engineering Ltd. and Ecologistiesmited, dated May 1996 for the proposed Up Country Estates II Subdivision recommended that the watercourse's riparian zone be enhanced, and/or that the floodplain and meander patterns be re-constructed or restored. These recommendations are supported by Conservation Halton staff, and should be considered during the finalization of the new east-west road corridor.

We note that regardless of the approach selected by the design team, the proposed development must not reduce the riparian storage or floodplain conveyance under any of the design storms (from the 1:2 year design storm through to the Regional Storm Event). Supporting calculations must be provided to confirm that the flood plain storage and conveyance functions are maintained.

A Permit pursuant to Ontario Regulation 162/06 will be required for work within the Approximated Regulated Limit.

Section N6 (Approximate Station 16+100 to 16+200 and 8+700 to 10+700 – See drawings PP-6 and PP-7)

1. Conservation Halton's regulation limit begins at station 9+075 and extends to station 9+300. This limit is associated with the flood plain and steep valley walls of a Grindstone Creek Tributary. We note that the existing culvert at station 9+180 is proposed to be extended. Please provide hydraulic calculations confirming that the culvert extension will not have an impact on the up or downstream floodplain. A Permit pursuant to Ontario Regulation 162/06 will be required for work within the Approximated Regulated Limit.
2. Karst features have been identified throughout the southern adjacent property (within the City of Burlington's New Park lands) between stations 10+000 and 10+725.
3. Stations 9+900 to 10+400 fall within Conservation Halton's Approximate Regulatory Limit due to their proximity to an adjacent wetland feature.
4. There is a regulated wetland on the north side of Dundas Street near Kerns Road. Works within the regulated limit of this wetland will require a permit under Ontario Regulation 162/06.
5. Along the south side of Dundas where N5 and N6 meet, there is a significant woodland associated with the watercourse.
6. It is requested the new/wider road crossings (at both stations 9+200 and 9+700) of Grindstone Creek span the meander belt width of the creek.
7. Northern Pike have been demonstrated to migrate upstream of this crossing (station 9+200), as such, it is important that spring flows under the new road crossing are of a sufficient velocity that they do not create a barrier to fish passage during the spring freshet.
8. It is noted that a watercourse outlets from a pond upstream (north) of Dundas Street. This watercourse (station 9+700) has been demonstrated to contain a warm water forage fish community. A portion of this watercourse was previously been put in a pipe. As part of the road construction project, would it be feasible to daylight the 550 meter section that is currently underground?

Section N7 (Approximate Station 10+700 to 12+000 – See drawings PP-7 and PP-8)

1. Stations 11+400 to 11+500 fall within Conservation Halton's Approximate Regulatory Limit due to the presence of a regulated watercourse crossing and steep slopes associated with the

Section W3 (Approximate Station 41+200 to 42+300 – See related drawing Waterdown-3 and road grades)

1. Conservation Halton notes the presence of a hydrologic connection (i.e. an unregulated watercourse) at approximate station 41+620. We note that major system conveyance for this hydrologic connection does not appear to be considered.
2. Conservation Halton's current Approximate Regulatory Limit Mapping shows that Mill Street falls within our regulated area between stations 41+590 and 41+540, and stations 41+480 and 41+240, due to the presence of steep slopes. Conservation Halton's estimated top of stable slope encroaches within the existing roadway between stations 41+400 to 41+330. This is an area of significant concern for Conservation Halton. A geotechnical study and a Permit pursuant to Ontario Regulation 162/06 will be required in this location.
3. There are significant woodlands on both sides of the road in this section.

Section W4 (Approximate Station 60+100 to 60+000 and 42+440 to 42+300 Mountain Brow-1 and Waterdown-4

1. We note that Mill Street crosses Conservation Halton's regulatory limit approximately 75m north of the existing Mountain Brow Road intersection, therefore a Permit pursuant to Ontario Regulation 162/06 may be required should any upgrades be proposed beyond station 42+455.

Section W5 (Approximate Station 60+100 to 60+700 – See related drawing Mountain Brow-1 and the road grading plan).

1. This section of road alignment is adjacent to the Sassafras-Waterdown Woods ANSI and City of Hamilton Waterdown Woods ESA. Our preference is to ensure that all road construction is kept out of these areas.

Section W6 (Approximate Station 70+000 to 70+160, and 60+700 to 61+070 -See related drawings Mid-Block 1, Mountain Brow-1 and Mountain Brow-2 and the road grading).

1. It appears that the proposed upgrade of Mountain Brow Road, to the east of Mid Block Road will result in a modification of the existing watercourse crossing at Station 60+845. We note that this is a regulated watercourse, and a Permit pursuant to Ontario Regulation 162/06 from Conservation Halton will be required to complete any proposed works between stations 60+735 and 60+875. Per the grading plans the low point in Mountain Brow Road will be shifted to 60+819. Please confirm whether or not a minor watercourse re-alignment is proposed south of Mountain Brow Road, or whether the existing culvert location is to be maintained.

Section W7 (Approximate Station 70+160 to 70+880 – See related drawings Mid-Block 1 and the road grading).

1. We note that the "South Waterdown Subwatershed Study Stage 2 Report" has identified krst along the proposed road alignment extending from Dundas Street (south of Burke Street) to approximately 230m south of Dundas Street. The proposed design must incorporate the mitigation measures described above under the Overall Comments Section.
2. Mid Block 1 will cross a tributary of Grindstone Creek, identified as GS-1 at approximate station 70+810. Conservation Halton's rgultory limit associated with this feature extend from Dundas Street to station 70+780. We understand that the design of this crossing differs from the crossing identified by the landowners (Waterdown Bay) and may result in a local increase in regional storm water levels on the Waterdown Bay lands within the valley. Conservation Halton will only be able to support the potential increase in flooding upon receipt of written consent from all affected landowners.

Restivo, David

From: Schwan, Terry (MNR) [terry.schwan@ontario.ca]
Sent: September 29, 2008 8:29 AM
To: Restivo, David; Faulkenham, Shari
Cc: sbanuri@hamilton.ca; Plosz, Catherine; MacLeod, Paul; Roul, Ian; Beriault, Karine (MNR)
Subject: RE: Butternut Survey in WATMP

Hi

I just want to clarify David's statement.

At this point no one can legally declare a butternut retainable or non-retainable. The status of tree #111 is officially not determined until the Minister of Natural Resources decides who can determine retainable or not.

Terry

Terry Schwan, R.P.F., M. Sc.
A/Forest Program Specialist
Southern Region
and
District Forester
Guelph District
Ministry of Natural Resources
One Stone Road West
Guelph, Ontario
N1G 4Y2

Phone: 519-826-4933
Fax: 519-826-4929
Email: terry.schwan@ontario.ca

From: Restivo, David [mailto:DRestivo@dillon.ca]
Sent: September 26, 2008 3:43 PM
To: Faulkenham, Shari
Cc: Schwan, Terry (MNR); sbanuri@hamilton.ca; Plosz, Catherine; MacLeod, Paul; Roul, Ian
Subject: Butternut Survey in WATMP

Shari,

Please find the attached butternut locations in the PSW area adjacent to Centre Street as identified by Terry Schwan and me earlier this week. As you can see, the butternut trees observed in this area are south of the proposed road alignment ROW. The details of these species are as follows:

Tree ID #111 – Confirmed butternut with advanced butternut canker. This tree in non-retainable according to the tree retention guidelines - "70-50-20" rule (Ostry et al, 1994).

Tree ID #116 – Butternut or Hybrid (butternut/Japanese walnut) in good condition with no butternut canker disease observed.

Project: Waterdown Aldershot Transportation Master Plan (Project #08 9020), East-West Corridor.

Regards,

David Restivo
Biologist

Dillon Consulting Limited
800 - 235 Yorkland Blvd.
Toronto, ON, M2J 4Y8
Phone: 416-229-4647 ext. 2438
Fax: 416-229-4692

From: Szymanski, Frederic (MTO) [mailto:Frederic.Szymanski@ontario.ca]
Sent: Thursday, October 30, 2008 4:14 PM
To: MacLeod, Paul
Cc: Jeganathan, Ayvun (MTO); Roszler, Greg (MTO); Lai, Joseph (MTO)
Subject: FW: Highway 6/New East-West Road Intersection

Paul,
Ayvun and myself have reviewed the material and since I was at the last meeting regarding the new East-West Roadway I agreed I would respond. BTW, if you could keep me as part of the distribution list it would be greatly appreciated.

The ministry's primary position regarding a new access/intersection from Highway 6 is safety oriented. This was recently discussed at a liaison meeting with City of Hamilton senior staff and they have been made aware of the Ministry's interest in maintaining a safe highway. The introduction of a new intersection through this section of Highway 6 corridor is not desirable therefore, as mentioned at the last technical advisory committee meeting for this study, the ministry is requesting that the re-alignment of Conc. 4W be included in the study to intersect Hwy.6 opposite of the proposed East-West access. This way a staggered intersection would be eliminated and we would maintain the amount of existing intersections on highway 6 by merging the east with the west access.

From an operational point of view, the desirable location for this new intersection should be as close as possible to the midpoint between existing intersections. Operation/Traffic analysis would have to be done to determine this desirable location and provided for review by our traffic office.

Please note these are only comments provided in principle and the City's study would have to do both geometric and traffic analysis and provide justification on the rational that the recommended location is best suited to the ministry.

If you have any questions or comments please feel free to contact me.

Thank you,

Frederic Szymanski
MTO – Project Manager
Planning & Design, Hamilton/Niagara
(416) 235-4271

From: MacLeod, Paul [mailto:PMacLeod@dillon.ca]
Sent: October 24, 2008 2:56 PM
To: Lai, Joseph (MTO); Jeganathan, Ayvun (MTO); Roszler, Greg (MTO)
Cc: Banuri, Syeda; Lee-Morrison, Christine; Marin, Jackson
Subject: Highway 6/New East-West Road Intersection

To All:

Attached is a plan showing the technically preferred alternative location and layout for the New East-West Road corridors intersection with Highway 6. I've also included a plan showing the 3 alternatives that were considered. We would appreciate your comments.

Regards.

Paul

Paul MacLeod
Dillon Consulting
Phone: 416-229-4647 #2317
E-Mail: pmacleod@dillon.ca

WATERDOWN-ALDERSHOT TRANSPORTATION MASTER PLAN
PHASES 3 & 4
RECORD OF TELEPHONE CONVERSATION

Date: October 23, 2008

ID# 237

Recorder's Initials
PP

Time: 10:55 am

Name of caller (and company, if applicable): Anne Gibbs (Diocese of Hamilton)

Please check if follow-up required: [X] **By whom:** Dillon

Preferred method of response (please circle): ***E-mail*** ***Phone*** ***Mail*** ***Fax***

Contact information: agibbs@hamiltondiocese.com

Subject / Record of Conversation:

I would like to know how the proposed east-west road will affect the Diocese of Hamilton. We have a property at 715 Centre Road, how will this road affect us? Where will the road intersect Centre Road and where will it come out?

I would also like to request an enlarged and more detailed map of the area.

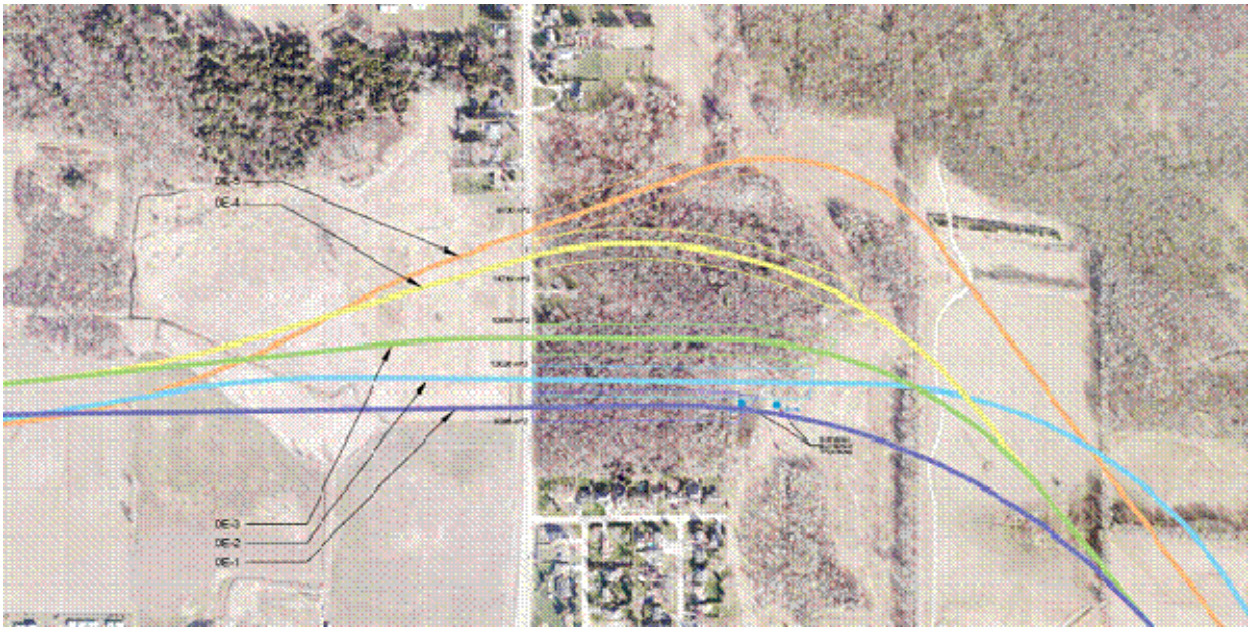
From: Waterdown-Aldershot Information
Sent: Wednesday, December 03, 2008 4:04 PM
To: 'agibbs@hamiltondiocese.com'
Subject: ID# 237 - Response to Telephone Inquiry
Attachments: attd6ace.gif

Dear Ms. Gibbs,

Thank you for your phone call dated October 23, 2008. We have obtained a response to your inquiry from the Project Team, and have provided it in blue below.

I would like to know how the proposed east-west road will affect the Diocese of Hamilton. We have a property at 715 Centre Road, how will this road affect us? Where will the road intersect Centre Road and where will it come out? I would also like to request an enlarged and more detailed map of the area.

Response: The proposed crossing location of Centre Road with the new east-west roadway is considerably south of your property. The proposed locations for the new intersection are approximately 160 metres north of the current Centre Road/Northlawn Avenue intersection. The new road will cross Centre Road and continue east to connect with Parkside Drive. The air photo below shows the crossing location alternatives that were considered. The light blue alignment (second from the bottom) is currently the preferred crossing location.



Kind regards,
Patricia Halajski née Prokop on behalf of Sally Leppard,
Neutral Community Facilitator's Office
36 Hunter Street East, 6th Floor
Hamilton, ON L8N 3W8
Tel. (905) 818-8464
Fax (905) 528-4179
Email: info@waterdown-aldershot.ca

Shepley, Amanda

From: Shepley, Amanda
Sent: Thursday, May 21, 2009 10:34 AM
To: Shepley, Amanda
Subject: RE: Highway 6/New East-West Road Intersection

From: MacLeod, Paul
To: Szymanski, Frederic (MTO)
Cc: Jeganathan, Ayvun (MTO) ; Roszler, Greg (MTO) ; Lai, Joseph (MTO) ; Banuri, Syeda; Lee-Morrison, Christine
Sent: Mon Nov 03 16:20:30 2008
Subject: RE: Highway 6/New East-West Road Intersection
Frederic:

Your response came as a surprise and will cause us to re-configure, re-detail and re-evaluate the alternatives at the Highway 6 end of our study area. This information was to be presented at PIC's this week.

Would it be possible to meet with MTO as soon as possible, to discuss our work in more detail.

Thanks.

Paul

Paul MacLeod
Dillon Consulting
Phone: 416-229-4647 #2317
E-Mail: pmacleod@dillon.ca

From: Szymanski, Frederic (MTO) [mailto:Frederic.Szymanski@ontario.ca]
Sent: Thursday, October 30, 2008 4:14 PM
To: MacLeod, Paul
Cc: Jeganathan, Ayvun (MTO); Roszler, Greg (MTO); Lai, Joseph (MTO)
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If you have any questions or comments please feel free to contact me.

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Frederic Szymanski
MTO – Project Manager
Planning & Design, Hamilton/Niagara
(416) 235-4271

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Sent: October 24, 2008 2:56 PM
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Subject: Highway 6/New East-West Road Intersection

To All:

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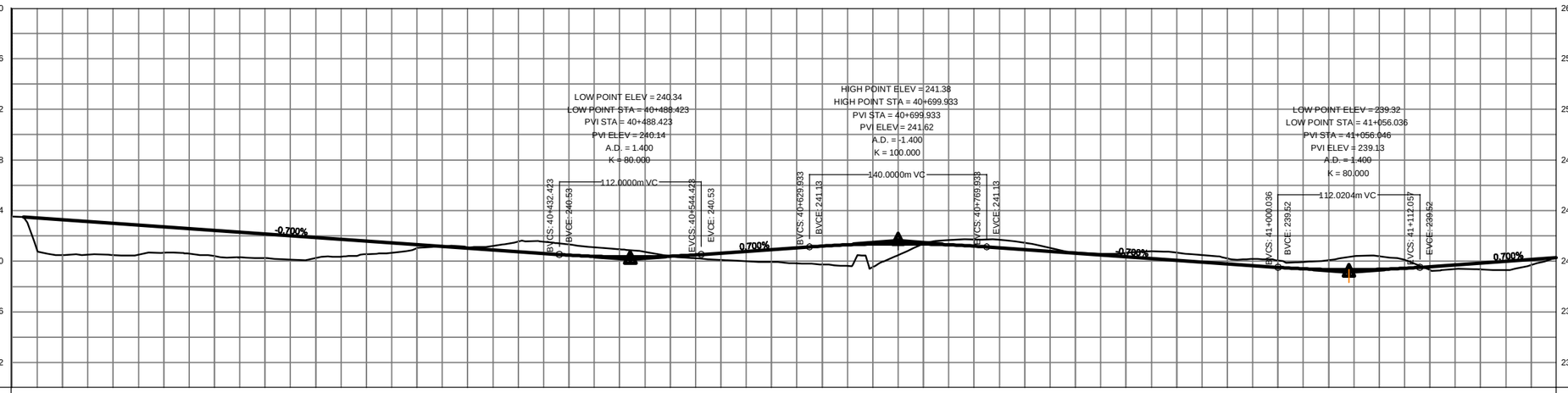
Regards.

Paul

Paul MacLeod
Dillon Consulting
Phone: 416-229-4647 #2317
E-Mail: pmacleod@dillon.ca

This message is directed in confidence solely to the person(s) named above and may contain privileged, confidential or private information which is not to be disclosed. If you are not the addressee or an authorized representative thereof, please contact the undersigned and then destroy this message.

Ce message est destine uniquement aux personnes indiquees dans l'entete et peut contenir une information privilegiee, confidentielle ou privee et ne pouvant etre divulguee. Si vous n'etes pas le destinataire de ce message ou une personne autorisee a le recevoir, veuillez communiquer avec le soussigne et ensuite detruire ce message.



PROPOSED SANITARY SEWER		PROPOSED SANITARY SEWER
PROPOSED STORM SEWER		PROPOSED STORM SEWER
EXISTING ℄ OF ROAD PROFILE ELEVATIONS	240.46 243.27 · 240.56 242.99 · 240.68 242.71 · 240.46 242.43 · 240.24 242.15 · 240.25 241.87 · 240.56 241.59 · 241.04 241.31 · 241.06 241.03 · 241.55 240.75 · 241.35 240.48 · 240.94 240.34 · 240.36 240.39 · 240.11 240.64 · 239.94 240.92 · 239.74 241.19 · 239.54 241.35 · 241.35 241.35 · 241.73 241.19 · 241.46 240.92 · 240.71 240.64 · 240.66 240.36 · 240.68 240.08 · 240.22 239.80 · 240.05 239.52 · 240.10 239.34 · 240.35 239.36 · 239.31 239.57 · 239.35 239.85 · 239.70 240.13	EXISTING ℄ OF ROAD PROFILE ELEVATIONS
EXISTING ℄ OF ROAD ALLOWANCE CHAINAGE	+000 · 40+080 · 40+160 · 40+240 · 40+320 · 40+400 · 40+480 · 40+560 · 40+640 · 40+720 · 40+800 · 40+880 · 40+960 · 41+040 · 41+120 · 41+2	EXISTING ℄ OF ROAD ALLOWANCE CHAINAGE

PRELIMINARY

Data Sources

Data provided by the Regional Municipality of Halton - Planning and Transportation Services

0 100 200m

Hamilton Public Works

Halton Region

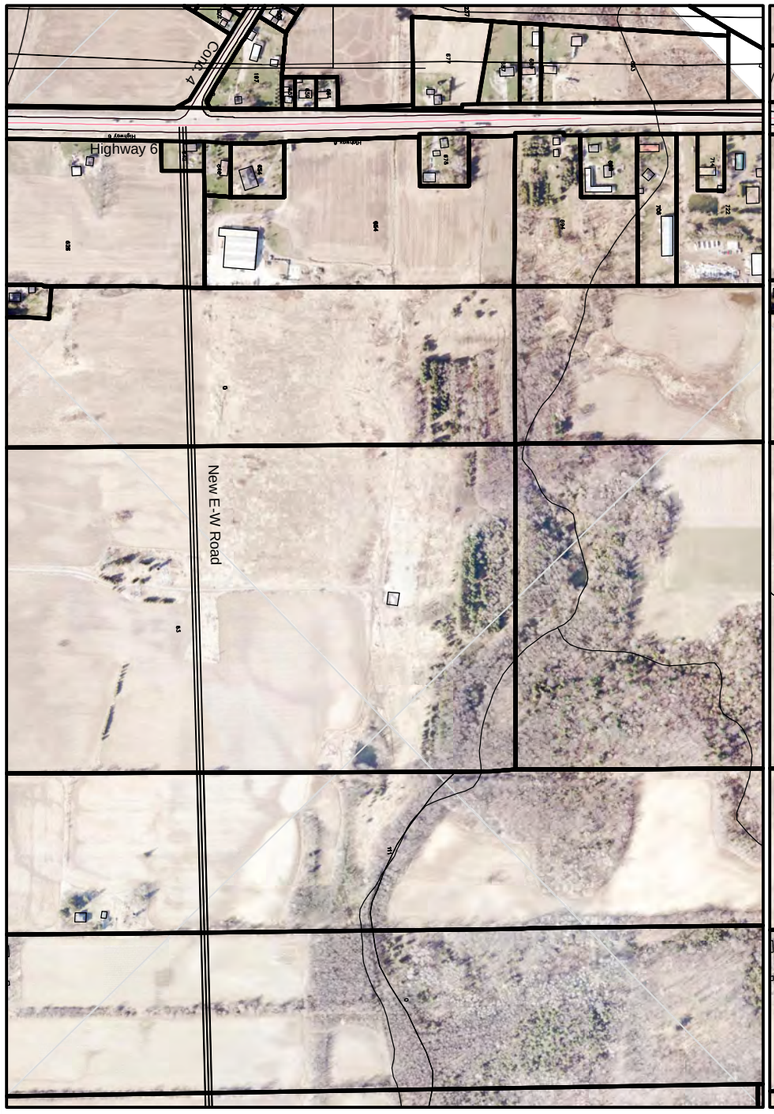
TECHNICALLY PREFERRED DESIGN

DILLON CONSULTING

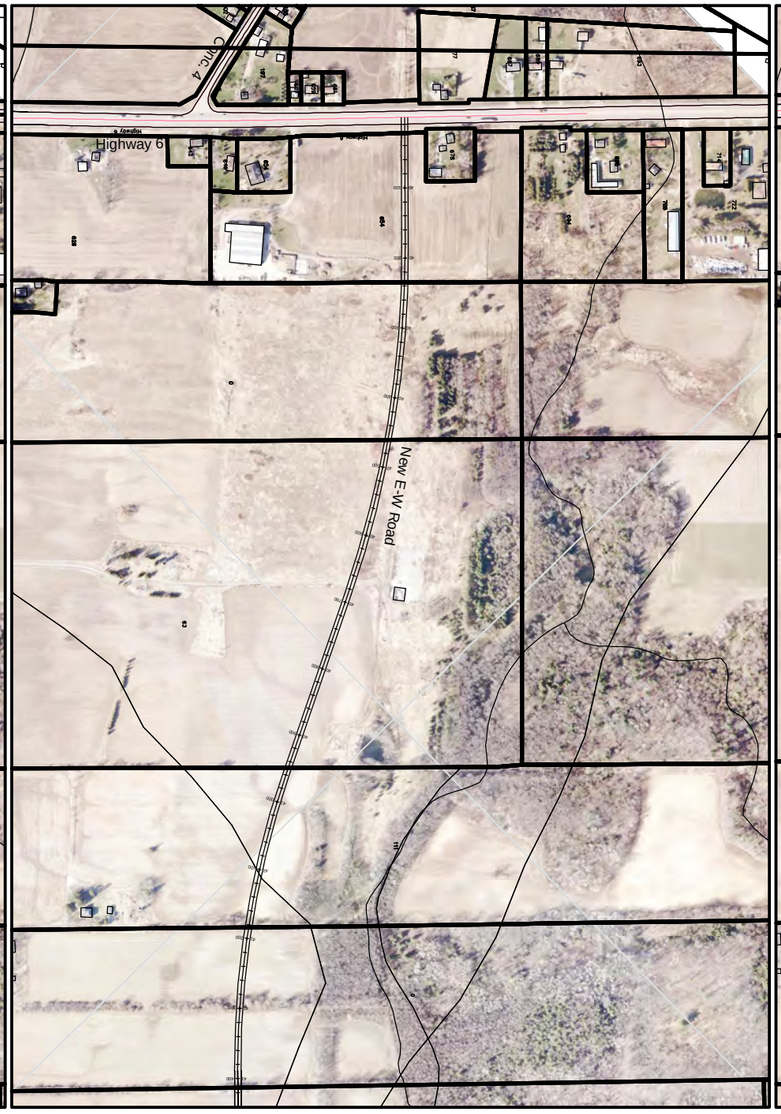
CHECKED BY: ---	
DESIGN BY: ---	
DRAWN BY: ---	
SCALE: ---	
DATE: April 10, 2008	
PROJECT No. 08-9020	

NEW E-W ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HWY 6 TO BRANT STREET

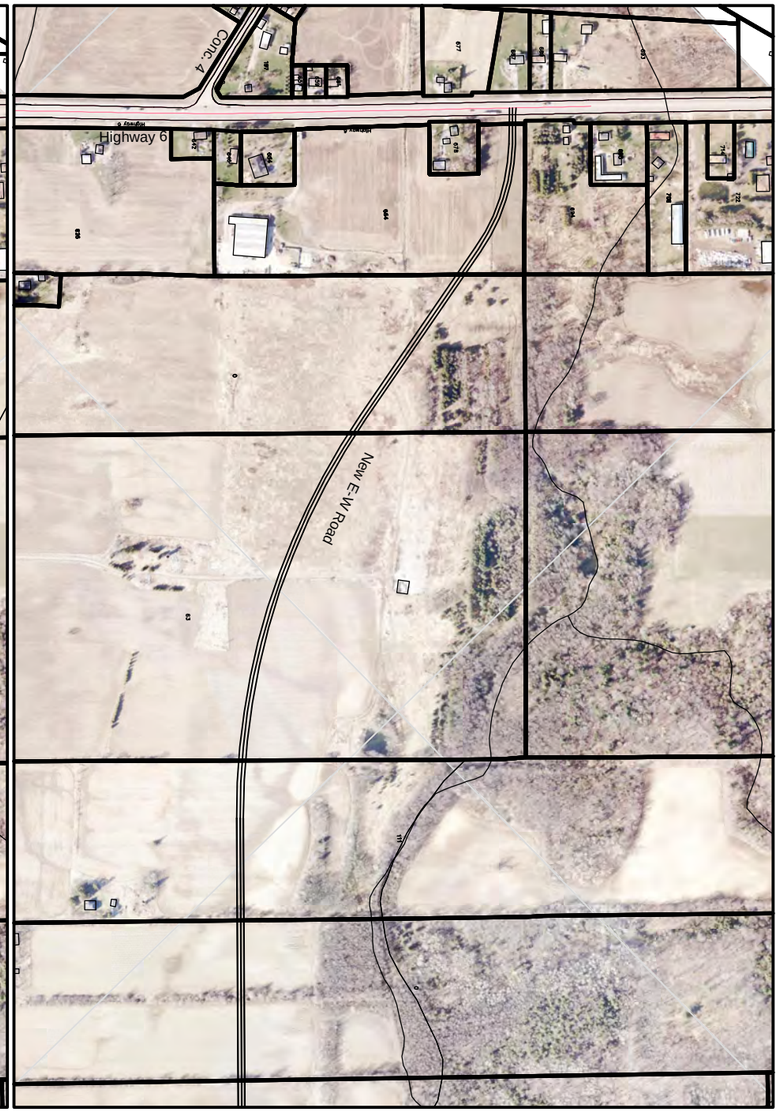
LAYOUT 1



Alternative A-C



Alternative B-C



Alternative A2-C

PRELIMINARY

Data Sources

Data provided by the Regional Municipality of Halton - Planning and Transportation Services

PRELIMINARY
WIDENING ALTERNATIVE
OPTIONS

NEW EAST - WEST ARTERIAL
CLASS ENVIRONMENTAL ASSESSMENT
HIGHWAY 6 TO BRANT STREET

ALIGNMENT AND INTERSECTION LAYOUT AT

Filename: G:\CAD\08902D Waterdown E-W Roads\LDD-Parkside\dwg\E-W Road Borer's Crossing\[E-W Road] Alignment Comparisons For Highway 6 End [B].dwg Modified: October 16, 2008

Ontario Realty Corporation
Société immobilière de l'Ontario

1 Dundas Street West,
Suite 2000, Toronto, Ontario
M5G 2L5

November 3, 2008

To Whom It May Concern,

RE: ORC Initial Comments on Notice of PIC Class EA, New east-west corridor and Waterdown Road corridor

Thank you for circulating Ontario Realty Corporation (ORC) on your Public Information Centre. The ORC is the strategic manager of the government's real property with a mandate of maintaining and optimizing value of the portfolio, while ensuring real estate decisions reflect public policy objectives of the government.

Our preliminary review of your notice and supporting information indicates that ORC-managed property is directly in the study area. As a result, your proposal may have the potential to impact this property and/or the activities of tenants present on ORC-managed lands. Attached please find a map that identifies this property to assist you in identifying and avoiding potential impacts.

Potential Negative Impacts to ORC Tenants and Lands

General Impacts
Negative environmental impacts associated with the project design and construction, such as the potential for dewatering, dust, noise and vibration impacts, and impacts to natural heritage features/habitat and functions, should be avoided and/or appropriately mitigated in accordance with applicable regulations best practices and MNR and MOE standards. Avoidance and mitigation options that characterize baseline conditions and quantify the potential impacts should be present as part of the EA project file. Details of appropriate mitigation, contingency plans and triggers for implementing contingency plans should also be present.

Impacts to Land holdings
Negative impacts to land holdings, such as the taking of developable parcels of ORC managed land or fragmentation of utility or transportation corridors, should be avoided. If the potential for such impacts is present as part of this undertaking, you should contact the undersigned to discuss these issues at the earliest possible stage of your study.

If takings are suggested as part of any alternative these should be appropriately mapped and quantified within EA report documentation. In addition, details of appropriate mitigation and or next steps related to compensation for any required takings should be present. ORC requests circulation of the draft EA report prior to finalization if potential impacts to ORC managed lands are present as part of this study.

Cultural Heritage Issues
If proposed alternatives may impact cultural heritage features on ORC managed lands, we would request that the examination of cultural heritage features be enhanced to include issues such as cultural landscapes, archaeology and places of sacred and secular value.

Potential Triggers Related to ORC's Class EA

The ORC Class Environmental Assessment (ORC Class EA) applies to a range of realty and planning activities including leasing or letting, planning approvals, selling, demolition and property maintenance/repair. For details on the ORC Class EA please visit the Environment and Heritage page of our website found at http://www.orc.on.ca/Page133.aspx. If the ORC Class EA is triggered, consideration should be given to explicitly referring to the ORC's undertaking in your EA study.

The purchase of ORC lands or disposal of rights and responsibilities (e.g. easement) for ORC lands triggers the ORC's Class EA. If any of these are being proposed as part of any alternative, please contact the Sales and Marketing Group through ORC's main line (Phone: 416-327-3937, Toll Free: 1-877-863-9672) at your earliest convenience to discuss next steps.

The undertaking of physical work on ORC lands also triggers the ORC Class EA. If any work is proposed on ORC lands, please contact the undersigned at your earliest convenience to discuss next steps.

Specific Comments

Please note that various government lands, managed by ORC and Hydro One, are in the study area. Please contact ORC and Hydro One for policies and processes.

Concluding Comments

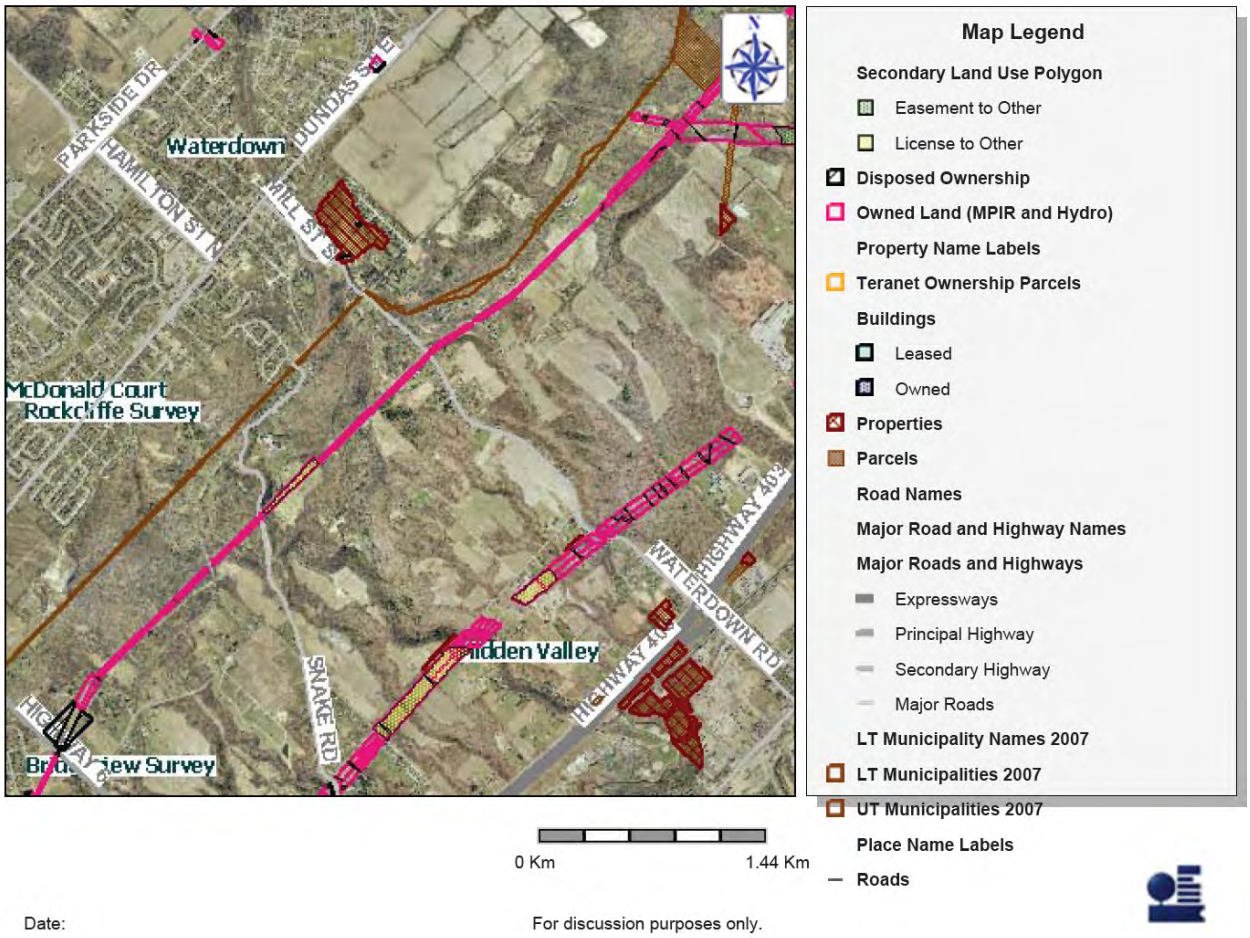
Thank you for the opportunity to provide initial comments on this undertaking. If you have any questions on the above I can be reached at the contacts below.

Sincerely,

L. Myslicki

Lisa Myslicki
Environmental Coordinator
Ontario Realty Corporation - Professional Services
1 Dundas Street West,
Suite 2000, Toronto, Ontario
M5G 2L5
(416) 212-3768
lisa.myslicki@ontariorealty.ca

Appendix 1: Location of ORC property



ID# 269 – Response sent on December 4, 2008

Dear Ms. Myslicki,

Thank you for your letter dated November 3, 2008. We have obtained a response to your inquiry from the Project Team, and have provided it in blue below.

Project Team Response: Thank you for your letter and interest in the Waterdown Road Class Environmental Assessment. In reviewing the information you provided, it would appear that Waterdown Road crosses two power transmission line corridors that are under the mandate of the Ontario Realty Corporation (ORC). We have not identified any other lands to be required from the ORC. As it is proposed that Waterdown Road be widened from two to four lanes, there could be the need for lands contained within these power transmission corridors. We are in the process of confirming property needs along the entire length of roadway. Once this has been confirmed, we will contact you to advise of the land requirement and to discuss the process to facilitate this.

Kind regards,
Patricia Halajski née Prokop on behalf of Sally Leppard,
Neutral Community Facilitator's Office
36 Hunter Street East, 6th Floor
Hamilton, ON L8N 3W8
Tel. (905) 818-8464
Fax (905) 528-4179
Email: info@waterdown-aldershot.ca

From: Mott-Allen, Nancy (MNR) [Nancy.Mott-Allen@ontario.ca]

Sent: November 12, 2008 12:59 PM

To: Waterdown-Aldershot Information

Subject: NEC comments on North/south, east/west roads

Good afternoon:

I attended both Public Information Centres regarding the proposed alignments of the East/west and North/south roads that are part of the Waterdown-Aldershot Transportation Master Plan. Our comments are as follows:

East/west

- Rock cut on north side of Dundas, west of Brant Street: more information required to understand extent of rock cut required for road widening and impact on the Escarpment
- Street lighting on Dundas: lighting should be directed downward to the roadway to minimize visual impact on the Escarpment
- Generally support the preferred route as it minimizes impact to environmental features in Waterdown

North/south

- Concern about any options which involve widening or improvements to King Road due to concern about negative impact on the Escarpment both environmental and visual
- Focus should be on widening Waterdown Road
- Request a meeting with City of Burlington, Conservation Halton and Project Team before the Environmental Study Report is finalized (I spoke to Paul Allen of the City of Burlington at the meeting and he indicated that it is the City's intent to contact us).

If you have any questions with respect to these comments, please contact me at the number below.

Nancy Mott-Allen, MCIP, RPP
Senior Planner
Niagara Escarpment Commission

Tel: 905-877-8363
Fax: 905-873-7452

ARCMAIL TECHNOLOGY

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From: "MacLeod, Paul" PMacLeod@dillon.ca
To: "089020" 089020@dillon.ca
Subject: FW: Hwy 6 access of Waterdown East West Bypass should be located approx 400 meters north of Concession 4 West and not connected to Concession 4 West.
Date: Mon, 13 Apr 2009 16:15:16 -0400
Message Status: Indexed, Body Indexed, Backed Up

Show Backups

Attachments: dillonEnglish.jpg

Paul MacLeod
Dillon Consulting Limited
235 Yorkland Blvd, Suite 800
Toronto, Ontario, M2J 4Y8
T - 416.229.4647 ext. 2317
M - 416.453.2018
F - 416.229.4692
PMacLeod@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

From: Szymanski, Frederic (MTO) [mailto:Frederic.Szymanski@ontario.ca]
Sent: Wednesday, November 12, 2008 10:37 AM
To: MacLeod, Paul
Cc: McKinnon, Don; Roszler, Greg (MTO); Jeganathan, Ayvun (MTO); sbanuri@hamilton.ca
Subject: FW: Hwy 6 access of Waterdown East West Bypass should be located approx 400 meters north of Concession 4 West and not connected to Concession 4 West.

Paul,
I am a little concerned with comments received from the public regarding last weeks PIC's and the material presented. In the email below from Mr.Oliver and Mr. Brezniks (attached) they are suggesting that MTO is not in favour of the East-West bypass accessing Hwy.6 north of existing Conc.4. In my previous email (attached) I had stated that the re-alignment of Conc. 4W to meet your proposed termination at Hwy.6 be included as part of the study. There would appear to be some confusion on MTO's position and your project development and I attribute this to a lack of communication with MTO.

Sept 17, 2008: Greg and myself attended a meeting in September but we have not yet received the minutes of that meeting to confirm if any of our comments were captured if so if they represented our intensions. – No minutes distributed to MTO.

October 24, 2008: MTO receives the technically preferred termination location at Hwy.6 from the 3 alternatives that were studied. In your email you were soliciting for comments from MTO.

October 30, 2008: Comments provided back to Dillon regarding technically preferred alignment and our position on access to Hwy.6

November 3, 2008: Concerns expressed over comments provided by MTO. You had requested to meet.

November 4, 2008: MTO requested minutes of meeting to be sent. Agreed to a meeting but left if for Dillon to set up.

At this time MTO has not yet received the minutes of meeting nor a request to meet. With all due respect MTO should have been supplied the presentation material prior to going out to the PIC and now you have gone out to the public with what I am concerned with as an inaccurate position by MTO.

Please include Greg, Ayvun, Joe and myself in your responses to Mr. Oliver and Breznik as well as supply us with the minutes of the meeting from September, that was sent out to the whole stakeholder team, for our review and files.

Thank you,
Frederic Szymanski
MTO - Project Manager
Planning & Design, Hamilton/Niagara

From: Steve Oliver [mailto:steve.oliver@cogeco.ca]
Sent: November 6, 2008 10:12 PM
To: McKinnon Don; Waterdown-Aldershot Information
Cc: Roszler, Greg (MTO); Szymanski, Frederic (MTO); Van Roon, Pauline (MTO); Rick Breznik; Al Seferiades; Slattery, Barbara (ENE); Slater, Carl (ENE)
Subject: Hwy 6 access of Waterdown East West Bypass should be located approx 400 meters north of Concession 4 West and not connected to Concession 4 West.

Dear Don and the Project Team.

I am very concerned to have been told last night at the Waterdown East West Bypass PIC Meeting for the Phase 3 & 4 plan, that MTO may not be in favour of the East West bypass accessing Hwy 6 some 400 meters north of Concession 4.

As you know, we have objected to the closure of Parkside Drive at Hwy 6 intersection and we have also opposed the connection of the East West Bypass to Concession 4/Hwy 6. We finally felt we had made some progress with the Project Team when it announced, in May 2008, at a Neighbourhood Advisory Meeting, that it was proposing an East West alignment that was further north of Concession 4. This proposal was going to allow Parkside Drive intersection to remain open and also provide a 2nd access to Waterdown North with a new northern intersection.

To turn the clock back and go back to the original Concession 4/Hwy6/East West Bypass intersection is not acceptable to us.

We do not want to see the bypass connected to Concession 4 West at all due to the close proximity of 3 large gravel quarries that exist a few kilometers west on Concession 4 near Brock Rd. If our bypass is connected to it, this link will provide a potentially shorter route for quarry trucks to travel through our residential community in order to get to Hwy 407. We have never agreed to have a road built that will support access to the quarries. The Dufferin/Lafarge quarries have been approved to produce over 3 Million tons of gravel per year and traffic studies have determined that truck traffic, during peak season, will exceed 80 trucks per hour during the day going in and out of the quarries. The majority of trucks need access to destinations east of here which would make our residential bypass very attractive to use for gravel trucks. There is no doubt in our minds that the quarries would seek approval to use the bypass as an alternate route. It is for this reason, that we do not want to see the bypass connected to Concession 4 West and we also want Parkside Drive to remain open at Hwy 6 as it is the preferred access route to residents who live near Parkside Drive as I do.

08-9020.

Ministry of Transportation

Highway Engineering –
Hamilton & Niagara
4th Floor, Bldg. D
1201 Wilson Avenue
Downsview ON M3M 1J8
Tel.: 416-235-4271
Fax.: 416-235-3576

Ministère des Transports

Génie Routier –
Hamilton et Niagara
4ieme étage, édifice D
1201 avenue Wilson
Downsview ON M3M 1J8
Tél.: 416-235-4271
Téléc.: 416-235-3576

Ontario

November 17, 2008

Syeda Basira Banuri
Senior Project Manager
Capital Planning & Implementation
Public Works, City of Hamilton
Email: sbanuri@hamilton.ca

Re: Phase 3 & 4 Municipal Class Environmental Assessment
New East-West Corridor and Waterdown Road Corridor

Dear Mrs. Banuri:

In response to your letter dated October 8, 2008, the Ministry is submitting our comments for this project as part of the Agency consultation process.

The Ministry of Transportation would like to take this opportunity to re-iterate our comments previously discussed at the September 17, 2008 Government Agency Technical Committee Meeting #2, of which Greg Roszler of the ministry's Corridor Management section and myself of our Planning & Design section attended, as well as in an email dated October 30, 2008 to Dillon Consulting.

The ministry's primary interest within our corridors is to maintain safe and efficiently operating highways. With respect to the City of Hamilton's proposed East-West project, our primary concern is with this roadway's termination with the introduction of a new intersection at Highway 6. As we understand, the City has been evaluating several termination options at Highway 6 and we did receive the technically preferred alternative location and layout. We have noticed that the technically preferred option does not take all our concerns listed below into consideration.

Here is our list of criteria, in order of precedence, which the City's study will have to consider for all options to connect the East-West Corridor to Highway 6:

1. The ministry does not want the introduction of an additional intersection at Highway 6. Two of the three options, one of which has been identified as the technically preferred option, show the terminus of the East-West roadway to be offset to the north of Concession Road 4W. This creates an additional and staggered T-intersection along Highway 6 which is not acceptable from the ministry's point of view;
2. Please look at optimizing intersection spacing with respect to other existing intersections as part of the analysis for the terminating intersection at Highway 6;
3. Please consider all highway geometric design features including horizontal and vertical alignments as they pertain to the intersection analyses in your study.

The ministry will require the technical analysis criteria, complete traffic study and highway geometrics analysis that will be done in determining the technically preferred option.

As part of the environmental study process please forward the ministry copies of the PIC display material for our review and records. In addition, the ministry has yet to receive copies of the minutes of meeting from the September 17, 2008 Technical Committee meeting to verify if our comments were accurately captured. I look forward to receiving this information.

Thank you,
Ministry of Transportation

Frederic Szymanski
Project Manager

cc: P. MacLeod, Dillon Consulting (email only)
J. Klowak, MTO – Head, Planning & Design Hamilton/Niagara (email only)
A. Jeganathan, MTO – Planning & Design Hamilton/Niagara (email only)
G. Roszler, MTO – Corridor Management (email only)

From: Faulkenham, Shari
Sent: Thursday, November 20, 2008 11:39 AM
To: 'JMarin@dillon.ca'; Banuri, Syeda
Cc: Jamieson, Nora
Subject: Waterdown E-W Corridor

Hello everyone,

I've just reviewed the latest alternatives for the crossings through the "Centre Road Woodlot", and I have some concerns:

1. In the Feb 08 TMP document, and in this latest document, it is not recognized that what is being called the "Centre Road Woodlot" candidate ESA is actually part of the North Waterdown Wetlands ESA (FLAM-47, ESA #8). I've attached the mapping from the 2003 Nature Counts document from the City of Hamilton and Hamilton Naturalists' Club. Why hasn't this been recognized?
2. In the TMP document, it is evident that no detailed ecological studies, both terrestrial or aquatic, have been completed, nor was any background information about the ecology of the area requested for review and inclusion in this document. The Nature Counts document and the City of Hamilton's Natural Heritage Database was also not used in the completion of this document. All of this information is owned by the City of Hamilton – why was it not utilized? Will any studies be completed to detail the ecology of the "Centre Road Woodlot"? I've also attached a document which I created for Mary-Lou Tanner 3 years ago detailing what ecological studies are required, at a minimum, to evaluate the baseline conditions of a natural area for a Class EA. This document was created to ensure that these studies are completed for all Class EA's that affect Hamilton's significant natural areas.

I look forward to your comments and reply,
s

Shari Faulkenham
Ecologist

Hamilton Conservation Authority
838 Mineral Springs Road, P.O. Box 7099
Ancaster, Ontario L9G 3L3

P: (905) 525-2181 x133
F: (905) 648-4622
E: sfaulken@conservationhamilton.ca

-----Original Message-----
From: Hamish Campbell [mailto:Hamish.Campbell@gotransit.com]
Sent: Monday, November 24, 2008 9:29 AM
To: Banuri, Syeda
Subject: Waterdown Road and Dundas West Class EA

Ms. Banuri,

Further to my voicemail of November 18th, there are a number of issues of interest to GO Transit related to the subject study. Specifically, we are interesting to find out more about:
- How the Waterdown road widening would function (if at all) with the new highway interchange that has been proposed off the 403?
- What pedestrian and cycling facilities would exist along the new north/south (Waterdown Road) and east/west (Dundas West) alignments, if any.
- Consideration and function of Dundas Street as a higher order inter-regional transit corridor. This portion of Dundas has been identified in Metrolinx's Draft Regional Transportation Plan as a corridor for Rapid Transit improvements (under the 15-year plan labeled as "Dundas West - Waterdown to Kipling Station).

Any additional information and specifics as they relate to the subject study on the above-noted issues would be greatly appreciated. I look forward to communicating with you further at your earliest convenience.

Best Regards,

Hamish Campbell
Transportation Planner - GO Transit
Transportation Planning and Development

Suite 600 - 20 Bay Street
Toronto, ON - M5J 2W3
P > 416.869.3600 x 5520
C > 416.518.1183
F > 416.869.1563

From: Waterdown-Aldershot Information
Sent: March 4, 2009 2:00 PM
To: 'hamish.campbell@gotransit.com'
Subject: ID# 335 - Waterdown Road and Dundas West Class EA

Dear Mr. Campbell,

Thank you for your voicemail November 18, and email dated November 24, 2008. We have received a response from the Project Team and provide it below. For ease of reference, we have included excerpts of your e-mail in italics, with the project team response following.

Further to my voicemail of November 18th, there are a number of issues of interest to GO Transit related to the subject study. Specifically, we are interesting to find out more about:

-How the Waterdown road widening would function (if at all) with the new highway interchange that has been proposed off the 403?

Project Team Response: Waterdown Road interchange is a City of Burlington project.

The Waterdown Road and the Highway 403 interchange is being built to tie into a future 4 lane Waterdown Road. Waterdown Road through the new highway interchange will have four lanes plus turn lanes. The City of Burlington is planning to start construction on the Waterdown Road interchange in 2009, to facilitate future increased vehicle capacities. The technical aspects of a four-lane roadway are currently being finalized along Waterdown Road. Once the preferred four-lane concept has been finalized the project team will develop and evaluate providing a three-lane option as the first stage in implementing the four-lane concept.

- What pedestrian and cycling facilities would exist along the new north/south (Waterdown Road) and east/west (Dundas West) alignments, if any.

Project Team Response: The proposed Pedestrian and Cycling facilities for both corridors are outlined below.

North-South Corridor:

Waterdown Road - Proposing a 4m wide Multi-Use Pathway for pedestrians and cyclists (off road, behind curb and boulevard) on the **west side of the road only** throughout the entire alignment. A 1.5m sidewalk on the east side is proposed from Flatt Road northerly for approximately 600m.

Mountain Brow Road - Proposing a 3.5m wide Multi-Use Pathway for pedestrians and cyclists (off road) on the **north side of the road only** from Waterdown Road to the new Mid-Block Road (Edworthy Road). No allowance is made on the south side of the road.

Mid-Block Road - Proposing 1.5m on-road bicycle lanes and 2.0m sidewalks on both sides of the road throughout the entire alignment.

East-West Corridor:

New E-W Road (Highway 6 to Waterdown North Development) - No allowance made as this is a rural section, though paved shoulders are included in design.

New E-W Road (through Waterdown North Development) - Proposing a 4m wide Multi-Use Pathway for pedestrians and cyclists (off-road) on the **south side of the road only** throughout entire development.

New E-W Road (From Centre Street to Parkside Drive) - Potential Multi-Use Pathway on south side from Centre Road connecting to Joe Sam's Park to be further assessed. No other allowances made through this rural section, though paved shoulders are included in the design.

Parkside Drive Widening - Proposing on-road bicycle lanes (1.2m) and 1.5m sidewalks on both sides of the road.

N-S Link through Upcountry Development - Proposing a 4m wide Multi-Use Pathway for pedestrians and cyclists (off-road) on the **west side of the road only** throughout the entire development.

Dundas Street (From new N-S Link to Kerns Road) - Proposing on-road bicycle lanes (1.5m) and 2.0m sidewalks on both sides of the road.

Dundas Street (From Kerns Road to Brant Street) - Proposing 4.2m wide shared curb lanes (both sides of the road) for traffic and cyclists and a 1.5m sidewalk on the **south side of the road only**.

The final recommended preferred option will be provided in the ESR

- Consideration and function of Dundas Street as a higher order inter-regional transit corridor. This portion of Dundas has been identified in Metrolinx's Draft Regional Transportation Plan as a corridor for Rapid Transit improvements (under the 15-year plan labelled as "Dundas West - Waterdown to Kipling Station).

Project Team Response: Dundas Street falls under the jurisdiction of the Region of Halton. It is the City of Hamilton's understanding that the Region of Halton, in regards to this project, is releasing a TOR early in the new year. We have forwarded your input to the Region of Halton for their consideration.

Kind regards,

Patricia Halajski on behalf of Sally Leppard,
Neutral Community Facilitator's Office
36 Hunter Street East, 6th Floor
Hamilton, ON L8N 3W8
Tel. (905) 818-8464
Fax (905) 528-4179
Email: info@waterdown-aldershot.ca

DRAFT MINUTES OF MEETING

PROJECT: City of Hamilton New East-West Road Class EA

PURPOSE: Meeting with MTO

DATE: November 25, 2008, 1:00 PM

LOCATION: MTO Offices, 3rd Floor Boardroom, Building D, 1201 Wilson Avenue

PRESENT:

City of Hamilton:	Syeda Banuri
	Christine Lee-Morrison
MTO:	Frederick Szymanski
	Greg Roszler
	Ayvun Jeganathan
Dillon Consulting:	Paul MacLeod

ITEM	MINUTES	ACTION BY
1	**Current Status of New East-West Road Corridor Class EA** • Final Phase 3 Public Information Centres will be held next week in Waterdown and Burlington • An evaluation of the alternatives being considered will be presented with a preliminary identification of the preferred alternative along with preliminary plans of this alternative.	
2	**Review of Draft Minutes of September 17, 2008 Technical Agency Committee Meeting** • MTO supplied mark-up changes to the draft Minutes of this meeting pertaining to their comments. • Dillon will re-issue these in draft form to MTO	Dillon
3	**Highway 6/New East-West Road Intersection Aspects** • Dillon reviewed the status of the current alternatives and their evaluation. The alternatives involve alignments that intersect with Highway 6 opposite existing Concession 4 Road and two alternatives north of this location. The two northerly alignments were developed in consultation with the E-W Road Corridor Neighbourhood Advisory Committee who were concerned with through traffic from the west (notably trucks) being provided with easy access across Highway 6. The thought was that a shift north of Concession 4 Road would address these concerns and for this reason the northern alternatives would be preferred.	

ITEM	MINUTES	ACTION BY
	• MTO indicated that the public has expressed recent concern with respect to Highway 6 operations and safety issues and that MTO's current policy is that no new intersections will be allowed onto the highway. This will require that, if a new intersection with the East-West corridor is established north of the existing Concession 4 Road intersection, Concession 4 Road be realigned on the west side of Highway 6 to intersect the highway opposite the new intersection (i.e. resulting in no additional intersections along this stretch of the highway).	
	• This will require that the alternatives be revised to reflect the requirement to realign Concession 4 Road to meet Highway 6 at the E-W Road location and a re-evaluation of the revised alternatives.	Dillon
	• In addition MTO indicated that an operations review will be required for all alternatives including intersection geometrics and the assessment of any traffic operations issues in the Highway 6 corridor between Parkside Drive and the new intersection.	Dillon
	•	Dillon
4	**Highway 6 Intersection at Parkside Drive**	
	• The City indicated that there are issues with some members of the public with respect to the City's interpretation of MTO's position on the future status of the Highway 6 – Parkside Drive intersection. MTO indicated that if Highway 6 is converted to a controlled access highway, as is currently planned/under construction from Dundas Street southerly, the Parkside Drive intersection will be closed. The treatment of Parkside Drive itself would be subject to further assessment (e.g. possible bridge over Highway 6). No studies have been initiated or are currently planned by MTO regarding the Highway 6 corridor north of Dundas Street.	
	• The conversion of the Highway 6 – Dundas Street intersection to a full access controlled interchange is currently not on MTO's 5-year construction program but they will be initiating the detailed design of this project that will include, as an addendum to the previously completed interchange Class EA, the assessment of local road issues including the possibility of extending Parkside Drive to the west.	
5	**Class EA Schedule**	
	• Once the public comment period has ended (end of November 2008) and comments from agencies and municipal technical staff have been received the recommendations will be reviewed and the technically preferred alternative finalized	Dillon
	• It is hoped that the technically preferred concept can be	

ITEM	MINUTES	ACTION BY
	identified by the end of the year with a draft Environmental Study report issued early in 2009	
6	**Other Business**	
	• MTO requested that they be copied on any correspondence with the public regarding the Highway 6 corridor.	Hamilton

DISTRIBUTION: Attendees
Project File

Please contact Paul MacLeod of Dillon Consulting with any errors or omissions.

Hamilton

Planning and Economic
Development Department

Memorandum

To: Syeda Banuri
Project Manager, Watershed Management
From: Cathy Plosz,
Natural Heritage Planner
Phone: Extension 1231

Date: January 6, 2009

Subject: Waterdown Aldershot Transportation Master Plan Environmental Assessment – Natural Environment Report.

Syeda,
Thank-you for providing the Community Planning and Design Section with the opportunity to review the Natural Environment Report from Dillon Consulting, dated December 2008. Natural Heritage Staff has the following comments:

Section 2.1, Page 3 – Vegetation surveys were carried out in the late summer/fall of 2007 and the early summer/fall of 2008. When doing botanical inventories, a spring inventory is needed to capture spring ephemeral plants. Staff recommends that a spring botanical study be carried out to provide a complete description of the plant communities.

Section 2.3, Page 4 – Breeding Bird Surveys - The methods and timing for field surveys for breeding birds is acceptable.

Section 2.4, Page 7 – Amphibian Surveys - The methods and timing for surveying amphibians was acceptable.

Figure 3 – The ELC map labels some communities incorrectly. The text on page 9 and in the Appendix shows FOD 4-2 (instead of FOD 4-3 as shown on the Figure) and FOD 5-1 is not shown on the Figure, but listed in the text and appendix. Figure 3 is not easily read, as the colours are too similar with the ELC communities. Also, it is not clear what the beige swath along the road corridor represents.

Staff questions why so little ELC was done at the Logies Creek - Parkside Drive PSW complex. Was this because the landowners denied permission to enter the properties?

On page 17, Table 2 refers to road alignments DE1 to DE5. These should be shown on a map in the report.

Section 3.2, Page 18 – Butternut - Since road alignment DE1 is considered the best option for minimizing impacts to the natural environment, it is important to know whether the Butternuts are truly a constraint. It is recommended that Tree ID #116 be DNA-tested, to determine whether it is a hybrid or not. If it is a hybrid, and MNR agrees it can be removed, then DE1 would likely be the best option from an environmental perspective.

Section 3.3, Page 19 – It is recommended that the data from the Halton Natural Areas Inventory and the Hamilton Natural Heritage Database also be used to characterize the breeding bird community. This data can also be used to provide information on plants, amphibians, butterflies, mammals, and reptiles.

Table 6, Page 28 – Staff agree with the suggestion (#3) that the Borer's Creek eastern tributary channel could be considered for realignment and natural channel design. This could remove the need for the creek crossing and would provide an opportunity to improve aquatic habitat.

Table 6, Page 30 – Waterdown Road Corridor - It is not clear from the table exactly where the channel realignment for Grindstone Creek Southern Branch (#2) would occur. Realignment works should not occur in the sensitive natural areas south of Mountain Brow Road, within the ESA and ANSI, and owned by Conservation Halton.

Section 4.0 – Page 37 – The Logee's Creek- Parkside Drive PSW Complex is also been identified in the City of Hamilton's draft Urban Official Plan Natural Heritage System map as an ESA. Boundaries for the proposed new ESA are available from the Community Planning and Design Section. This should also be noted in Section 4.1.

Also in Section 4.0, the bullet on the Sassafras Woods ANSI refers to the ESA in the Region of Hamilton-Wentworth. Please change this reference to the City of Hamilton.

Section 4.2 – Lake Medad Valley PSW – the second sentence implies that American Toad is a sensitive species. Staff assumes this is an error, as American Toad is abundant in Hamilton and not a sensitive species.

Appendix 1 – Tables 1 and 2 – Staff recommend that this data on breeding birds could be better organized to provide the information needed to assess impacts of the different road alignments. It would be useful to know which bird species occurred in each natural area (ELC community). If the bird (and plant) species found in each natural area/ELC community is listed, then staff can identify any areas which contain species of concern that may be affected by the road. This would help in weighing each road alignment option.

Generally, the level of field studies completed was adequate, with the exception of the following areas:

- There was no spring botanical survey to identify spring ephemerals.
- Ecological Land Classification (ELC) was not completed in all areas along the proposed road corridor. For example, little ELC was completed to the west of Centre Road, in the Logee's Creek Wetland Complex.
- No surveys of reptiles were completed.
- Since road kill of wildlife is one of the main impacts of roads, the assessment of road options should also identify areas where wildlife are crossing (by walking along roads and documenting road kills in areas where habitat exists close to roads and wildlife are likely to cross).

It is important to properly document existing natural conditions to ensure that possible impacts of the road on the natural environment are carefully assessed.

If you have any questions, please give me a call at extension 1231.

Cathy.

Shepley, Amanda

From: MacLeod, Paul
Sent: Wednesday, January 14, 2009 8:31 AM
To: Roszler, Greg (MTO)
Cc: Szymanski, Frederic (MTO); Ayvun.Jeganathan@ontario.ca; Banuri, Syeda; Shepley, Amanda
Subject: FW: City of Hamilton New East-West Road Class EA - Draft Minutes of Meeting Nov 25 2008
Attachments: 08-9020 Draft MTO Meeting Minutes Nov 25 2008.pdf; Alignment options at Highway 6.pdf

Greg:

Just re-sending this e-mail as a reminder to comment on the draft Minutes of our last meeting. I've also attached the alignment drawing for the alternatives that we are currently evaluating in the Highway 6 area (the thin red lines).

Paul

Paul MacLeod
Dillon Consulting
Phone: 416-229-4647 #2317
E-Mail: pmacleod@dillon.ca

From: MacLeod, Paul
Sent: Wednesday, December 17, 2008 8:43 AM
To: Roszler, Greg (MTO)
Cc: Lee-Morrison, Christine; 'Banuri, Syeda'; McKinnon, Don; Marin, Jackson; Shepley, Amanda
Subject: City of Hamilton New East-West Road Class EA - Draft Minutes of Meeting Nov 25 2008

Greg:

Greetings. Can you distribute these draft Minutes for review.

Thanks.

Paul

Paul MacLeod
Dillon Consulting
Phone: 416-229-4647 #2317
E-Mail: pmacleod@dillon.ca

DRAFT MINUTES OF MEETING

PROJECT: City of Hamilton New East-West Road Class EA

PURPOSE: Meeting with MTO

DATE: November 25, 2008, 1:00 PM

LOCATION: MTO Offices, 3rd Floor Boardroom, Building D, 1201 Wilson Avenue

PRESENT:

City of Hamilton:	Syeda Banuri
	Christine Lee-Morrison
MTO:	Frederick Szymanski
	Greg Roszler
	Ayvun Jeganathan
Dillon Consulting:	Paul MacLeod

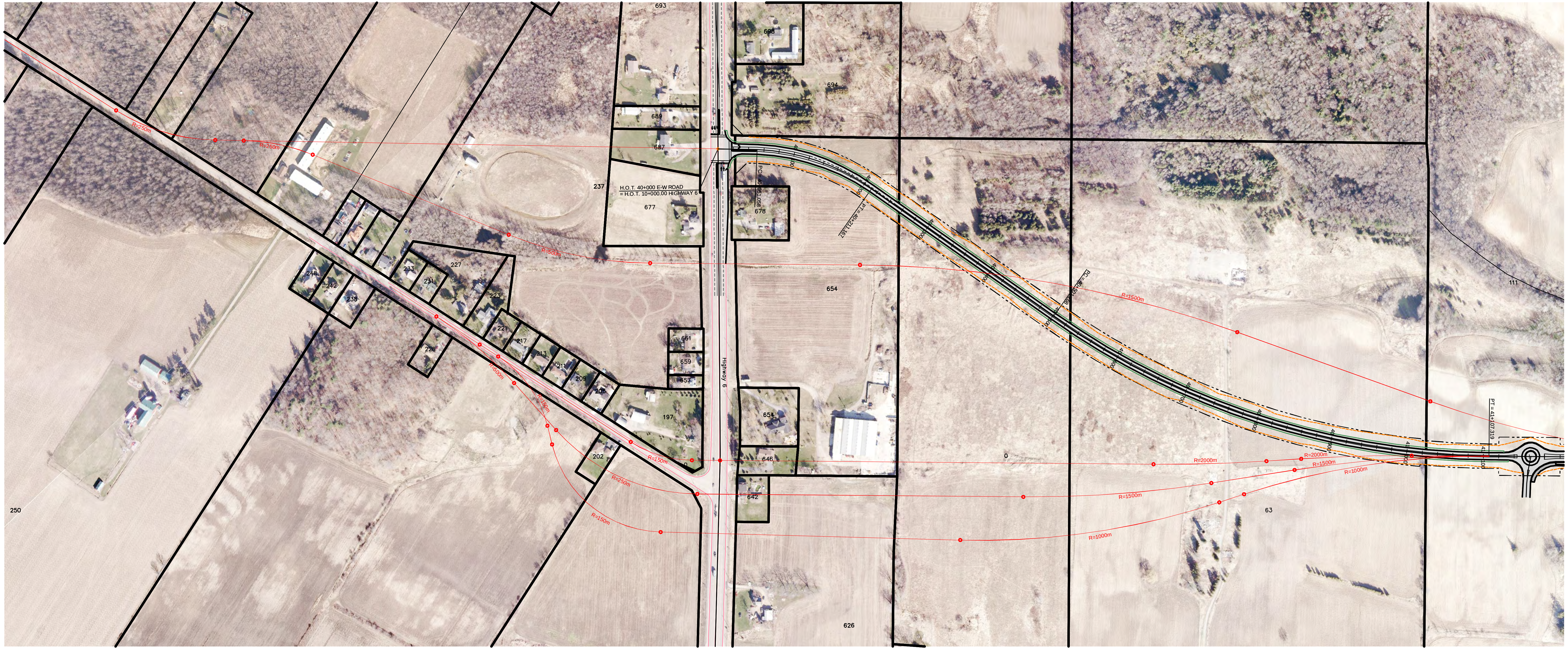
ITEM	MINUTES	ACTION BY
1	**Current Status of New East-West Road Corridor Class EA** • Final Phase 3 Public Information Centres will be held next week in Waterdown and Burlington • An evaluation of the alternatives being considered will be presented with a preliminary identification of the preferred alternative along with preliminary plans of this alternative.	
2	**Review of Draft Minutes of September 17, 2008 Technical Agency Committee Meeting** • MTO supplied mark-up changes to the draft Minutes of this meeting pertaining to their comments. • Dillon will re-issue these in draft form to MTO	Dillon
3	**Highway 6/New East-West Road Intersection Aspects** • Dillon reviewed the status of the current alternatives and their evaluation. The alternatives involve alignments that intersect with Highway 6 opposite existing Concession 4 Road and two alternatives north of this location. The two northerly alignments were developed in consultation with the E-W Road Corridor Neighbourhood Advisory Committee who were concerned with through traffic from the west (notably trucks) being provided with easy access across Highway 6. The thought was that a shift north of Concession 4 Road would address these concerns and for this reason the northern alternatives would be preferred.	

ITEM	MINUTES	ACTION BY
	• MTO indicated that the public has expressed recent concern with respect to Highway 6 operations and safety issues and that MTO's current policy is that no new intersections will be allowed onto the highway. This will require that, if a new intersection with the East-West corridor is established north of the existing Concession 4 Road intersection, Concession 4 Road be realigned on the west side of Highway 6 to intersect the highway opposite the new intersection (i.e. resulting in no additional intersections along this stretch of the highway).	
	• This will require that the alternatives be revised to reflect the requirement to realign Concession 4 Road to meet Highway 6 at the E-W Road location and a re-evaluation of the revised alternatives.	Dillon
	• In addition MTO indicated that an operations review will be required for all alternatives including intersection geometrics and the assessment of any traffic operations issues in the Highway 6 corridor between Parkside Drive and the new intersection.	Dillon
	•	Dillon
4	**Highway 6 Intersection at Parkside Drive**	
	• The City indicated that there are issues with some members of the public with respect to the City's interpretation of MTO's position on the future status of the Highway 6 – Parkside Drive intersection. MTO indicated that if Highway 6 is converted to a controlled access highway, as is currently planned/under construction from Dundas Street southerly, the Parkside Drive intersection will be closed. The treatment of Parkside Drive itself would be subject to further assessment (e.g. possible bridge over Highway 6). No studies have been initiated or are currently planned by MTO regarding the Highway 6 corridor north of Dundas Street.	
	• The conversion of the Highway 6 – Dundas Street intersection to a full access controlled interchange is currently not on MTO's 5-year construction program but they will be initiating the detailed design of this project that will include, as an addendum to the previously completed interchange Class EA, the assessment of local road issues including the possibility of extending Parkside Drive to the west.	
5	**Class EA Schedule**	
	• Once the public comment period has ended (end of November 2008) and comments from agencies and municipal technical staff have been received the recommendations will be reviewed and the technically preferred alternative finalized	Dillon
	• It is hoped that the technically preferred concept can be	

ITEM	MINUTES	ACTION BY
	identified by the end of the year with a draft Environmental Study report issued early in 2009	
6	**Other Business**	
	• MTO requested that they be copied on any correspondence with the public regarding the Highway 6 corridor.	Hamilton

DISTRIBUTION: Attendees
Project File

Please contact Paul MacLeod of Dillon Consulting with any errors or omissions.



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Hamilton Conservation Authority
Healthy Streams...Healthy Communities!

838 Mineral Springs Road, P.O. Box 7099
Ancaster, ON L9G 3L3

Tel: 905-648-4427
Fax: 905-648-4622

Fax

To:	Paul MacLeod, Dillon Consulting	**From:**	Nora Jamieson
Fax:	416-229-4692	**Phone:**	905-525-2181 Ext 132
Phone:		**Date:**	January 23, 2009
Re:	MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN, PHASE 3 CITY OF HAMILTON OUR FILE: CEA-MUN/03-11	**Pages:**	3 (Including Cover)

☐ Urgent ☒ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Please find attached our comments on the above noted files/properties.

Yours truly,

Nora Jamieson
Watershed Planner, Watershed Planning & Engineering

Hamilton
Conservation Authority

1958 • Celebrating 50 Years of Conservation • 2008

BY FAX AND MAIL

January 23, 2009 Our File: CEA-MUN/03-11

Ms. Syeda Banuri
Senior Project Manager
Environmental Planning
Capital Planning & Implementation Division
Public Works Department
City of Hamilton
77 James Street North, Suite 320
Hamilton, ON L8R 2K3

Dear: Ms. Banuri:

RE: MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN, PHASE 3
CITY OF HAMILTON

We acknowledge receipt of the Waterdown Aldershot Transportation Master Plan Environmental Assessment – Natural Environment Report, Draft Report, December 2008 prepared by Dillon Consulting Limited. Staff from the Hamilton Conservation Authority (HCA) have reviewed this report and now provide the following comments:

- Section 3.1.5 discusses the Centre Road Woodlot, located north of Parkside Drive and east of Centre Road. While the report indicates that this wetland community forms part of the Logies Creek – Parkside Drive Provincially Significant Wetland (PSW), it fails to recognize that it is also part of the Waterdown North Wetlands Environmentally Significant Area, FLAM-47, ESA #8. It is not referenced correctly throughout the document, and improperly mapped in Figure 5. In this regard, we recommend that the consultant contact either Shari Faulkenham, Ecologist at HCA or Cathy Plosz, Natural Heritage Planner at the City of Hamilton for correct mapping and designation.
- Section 3.2 indicates that two butternut trees were found along the southeast edge of the Centre Road Woodlot, with one being a non-retainable butternut in poor condition and the second being either a butternut or butternut hybrid in retainable or good condition. If not already done so, then the consultant should undertake the required DNA testing on the healthy butternut to determine whether it is a pure butternut or a hybrid. If it is a hybrid, then the tree does not meet the MNR retention guidelines and could be removed if necessary. This would also apply to the unhealthy pure butternut.
- The report does not indicate where fauna were specifically found within the study area, only provides a general list of species. The list needs to be broken down into lists of species encountered for each proposed corridor alignment affecting a specific natural area so that an impact assessment can be properly undertaken.
- Have any hydrology or hydrogeology studies been completed for this project? This is required in order to determine the impacts that the road will have on wetland ecology and geomorphology at the Centre Road crossing and to assess impacts on fish and wildlife, vegetation communities and habitats i.e. what considerations have been made for the Centre Road crossing through the PSW/ESA in order to minimize the ecological / hydrological / hydrogeological impacts?

- Local status lists for any flora or fauna do not appear to have been utilized. This should be included in the report, as well as data from the Hamilton Natural Heritage Database or the Hamilton NAI.

Overall, the studies and background research completed for this report are sufficient with the exception of the above noted deficiencies. However, it does not appear that a thorough impact assessment has been completed based on the data, nor have any recommendations to mitigate and/or compensate for any impacts been made. In this regard, we request that the most innovative and environmentally friendly roadway crossing through the ESA and PSW be considered due to the sensitivity of these natural areas, as opposed to simply filling in a solid granular bed using standard culverts to allow water passage. Should you have any questions regarding the above noted comments, please contact Nora Jamieson, Watershed Planner at ext. 132 or Shari Faulkenham, Ecologist at ext. 133.

Yours truly,

Katherine J. Menyes
Director of Watershed Planning & Engineering
SF/NJ/

cc: Elizabeth Panicker, City of Hamilton, Capital Planning & Implementation (by fax 905-546-4435)
Cathy Plosz, City of Hamilton, Community Planning & Design (by fax 905-643-7250)
John Morgante, City of Hamilton, Development Engineering (by fax 905-540-5611)
Monir Moniruzzaman, City of Hamilton, Development Engineering (by fax 905-546-4202)
Paul MacLeod, Dillon Consulting (by fax 416-229-4692
Jackson Marin, Dillon Consulting (by fax 416-229-4692)

DILLON
CONSULTING

MINUTES OF MEETING

FILE:	Waterdown Aldershot Transportation Master Plan (08 9020)	
DATE:	February 24, 2009	
LOCATION:	Hamilton Civic Centre	
PRESENT:	City of Hamilton:	Syeda Banuri
		Catherine Plosz
		Christine Lee-Morrison
	Hamilton Conservation Authority:	Nora Jamieson
		Shari Faulkenham
		George Stojanovic
		Kathy Menyez
	Dillon Consulting Limited:	Don McKinnon
		Ian Roul
		David Restivo
		Lijing Xu
DISTRIBUTION:	Attendees	
	Paul MacLeod (Dillon)	

ITEM **ACTION BY**

1. **Introductions**

   [Menyez] – Addition to agenda to include ecological impacts and discussion of drainage issues.

2. **Project Status Update**

- [Faulkenham] – Questioned the necessity for East-West corridor; cites Silverwood Homes OMB decision that called for expansion of Parkside Drive.
- [Lee-Morrison] – Refered to Phase II EA Report which comprehensively assessed a need for East-West corridor and details reasons that widening of Parkside Drive was not the preferred option. Also, states that East-West corridor has Hamilton/Burlington City Council approval. Suggested that collection of development charges for Parkside Drive was the basis of the aforementioned OMB decision. Parkside Drive issues with proximity to Highway #6 were another factor.
- [McKinnon] – Provided background of EA process and project status update. States access from Hwy #6 is still in Options Phase.

ITEM	ACTION BY
• [Jamieson] – Asked for reasons for north alignment off Hwy #6.	
• [McKinnon] – Cited residence impacts and traffic impacts (i.e. have two intersections in close proximity to Parkside Drive). The position of E-W road guided by crossing location of Borer's Creek and the need to keep the road alignment to the south, especially through Centre Road.	
• [Lee-Morrison] – ESR completion and presented to Council before summer break.	Dillon
3. Confirmation of Alignment though Centre Road Woodlot and Ecological Impacts	
• [Roul] – Detailed natural environment studies conducted in and around Centre Road Woodlot PSW unit.	
• [McKinnon] – Dillon's intention was to include impact and mitigation analysis in the ESR.	
• [Faulkenham] – Reaffirmed that DE1 was previously selected by HCA as the preferred alignment through Centre Road Woodlot if avoiding this feature or the option of an alignment further south was not possible.	
• [McKinnon] – Outlined factors in the selection of DE2 as the preferred alignment through Centre Road Woodlot; including, separation distance from Northlawn Drive and avoiding moving the culvert crossing of Centre Road.	
• [Faulkenham] – Stated that noise impacts on the PSW unit (Centre Road Woodlot) should be discussed in ESR.	Dillon
• [Xu] – Flow equalization culverts will be used to maintain hydrology of Centre Road Woodlot wetland unit.	
• [Faulkenham] – Queried if Centre Road culvert crossing at the woodlot could be moved north.	
• [Roul] – Responded that culvert could not be moved north due to gradient issues.	
• [Faulkenham] – HCA would prefer is flow equalization culverts could be passable by fauna (i.e. amphibians/small mammals). Use of wildlife barriers to prevent road kills like the ones used for Red Hill Creek Expressway and used in European countries.	
• [Stojanovic] – Questioned if road profile through Centre Road Woodlot is passable by wildlife.	
• [Xu] – Road profile and span structures determined by regional flood requirements established by MTO/City.	
• [Faulkenham] – HCA will provide something in writing stating that DE2 is an acceptable alignment through Centre Road Woodlot given the constraints.	HCA
4. Confirmation of Alignment/ESA Setback through Waterdown North Development Lands	
• [Menyez] – After Phase II, HCA issued a letter with the expectations for environmental studies around ESAs/PSWs/ANSIs.	
• [Roul] – Detailed natural environment studies conducted in and around	

ITEM	ACTION BY
Parkside Drive ESA.	
• [Faulkenham/Plosz] – Acknowledged that 30 m setback from ESA is sufficient to protection vegetation. Stated the HCA needs more clarification on wildlife impacts and mitigation.	Dillon
• [Banuri/Lee-Morrison] – Discussed need for noise impacts on wildlife to be addressed in ESR.	
• [Faulkenham] – Use of mitigation techniques to reduce impact on ESA/PSW lands (i.e. sound barriers, construction design techniques/materials and appropriate setbacks).	
• [Roul] – Use of vegetation buffers effective in mitigating impacts.	
• [Lee-Morrison] – Stated that City and HCA had an agreement for a 30 m buffer to ESAs/PSWs.	
• [Faulkenham/Jamieson] – Need for justification of 30 m buffer in ESR through discussion of ecological function of the ESA and confirmation of MC2's hydrological modelling.	Dillon
• [Xu] – Confirmed that hydrology of the area will be preserved.	
• [Stojanovic] – Indicated that site plans are at Master Drainage Plan (MDP) level of detail.	
• [Xu] – Has had consultation with Metropolitan (hydrology consulting firm).	
• [Banuri] – Suggested an addendum to MDP addresses SWM pond sizes north of road alignment.	
• [Stojanovic] – HCA would prefer a single span culvert at crossing to Borer's Creek due to less impact on fisheries. Questioned whether or not it would be cost effective?	Dillon
• [Xu] – Indicated that multi-cell culvert could be changed to single cell from hydrological design perspective.	
• [Faulkenham] – Stated that HCA prefers open-bottom or embedded culverts to close bottom culverts. Cites Garnter Lee report that recommended removal of Black's pond.	
• [Stojanovic] – Stated that removal of Black's pond may involved addendum to MDP.	
• [Lee-Morrison] – North Waterdown development will address MDP and conform to Planning Act.	
5. Expections for Mitigation and Monitoring	
• [Faulkenham] – Questioned if mitigation is possible for PSW crossing.	
• [Roul/Restivo] – Responded that compensation in another area of the wetland complex in order to provide net benefit will be highlighted in recommendations section of ESR.	Dillon
• [Jamieson] – Cited that HCA Generic Regulation applies.	
6. Future Discussions	
• [Restivo] – Requested a copy of the North Waterdown EIS.	City – Plosz

ITEM	ACTION BY
• [McKinnon] – Dillon will provide Draft sections of the ESR to City/HCA as they become available.	Dillon
• [Lee-Morrison] – Dillon has option to apply the new Environmental Management System developed for the Red Hill Creek Expressway. Will discuss providing document to Dillon with RHC Project Manager.	City – Lee Morrison

Please contact David Restivo of Dillon Consulting with any errors or omissions.

M:\PROJECTS\DRAFT\08\089020 WATMP Phases 3 & 4\Correspondence\Meetings\08-9020 Hamilton Conservation_City Meeting Minutes - February 24, 09

DRAFT MINUTES OF MEETING

PROJECT:	King Road Technical Feasibility Study/Waterdown Road & New East West Road EAs	
PURPOSE:	Project Status Review	
DATE:	February 27, 2009 1:30 PM	
LOCATION:	Burlington City Hall – Room 219	
PRESENT:	City of Burlington:	Paul Allen Kerry Davren Dan Ozimkovic Robin Van de Lande
	City of Hamilton:	Syeda Banuri Christine Lee-Morrison
	NEC:	Nancy Mott-Allen Linda Laflamme
	Conservation Halton:	Brenda Axon Lesley Matich Jennifer Lawrence
	Dillon Consulting:	Paul MacLeod Ian Roul Lijing Xu Amanda Shepley

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ITEM **ACTION BY**

1. Introductions

2. Background

Paul Allen presented a series of slides that provided background regarding the King Road corridor, including the Burlington council resolution. He referenced the Phase 2 Report where a 2-lane capacity on King Road was specified. Paul MacLeod indicated that the Phase 2 modeling determined that if King Road was closed, Waterdown Road could still handle the north-south traffic demand.

Ninety degree curves, poor sight lines, narrow lanes, and steep slopes on King Road may lead to safety concerns if traffic increases. King Road currently exhibits relatively few motor vehicle collisions because of its low volumes.

ITEM	ACTION BY

Burlington council would like to keep King Road open as a secondary option for traffic. Many of the trips on King Road are destined to employment lands south of Highway 403.

3. King Road Technical Feasibility Study

A Draft Technical Feasibility Study Report was distributed prior to the meeting for review. Five alternatives were developed and assessed in the Technical Feasibility Study. One of those options is to improve the road to a minimum standard (using the existing horizontal and vertical alignment) by implementing a 30 km/h design speed which includes 12% grades (same as existing), 6 meters of pavement width, a total cross section 11 meters wide, mountable curbs, and a posted speed of 20 km/h.

Jennifer Lawrence was concerned that if more vehicles use King Road after improvements are made and traffic travels faster, more accidents are likely to occur. The city may be forced to widen the road even further to address this.

NEC indicated that they are not comfortable cutting into the escarpment at all. A suggestion was made to close King Road during the winter months when accidents are more likely to occur. NEC felt that there is no clear justification for the improvements as increased capacity needs are not identified and, based on collision history, safety is also not a concern. Another option is to close King Road. This alternative would involve the closure of the road through the Escarpment only.

The work in the Technical Feasibility Study mirrors the work in a Phase 1 and 2 of an EA. At the end of the study, we will move into an EA if required. Road closures fall under Schedule A+ in the EA process.

NEC is concerned that some of the options will create visual change/impact. These impacts should be included in the evaluation.

The *Species at Risk Act* (SARA) has not been factored into the evaluation. Conservation Halton stated it is concerned about the Jefferson Salamander and would like mitigation to be included in the report. The wetlands and ANSIs are not displayed on the figures in the report.

Dillon will send the revised report with the suggested additions (statement of need and history of discussion) to the agencies and request comments. The report will contain a recommendation. — Dillon

The City of Hamilton will provide comments on the draft report. — Hamilton

ITEM	ACTION BY

4. Status of Waterdown Road Class EA

All of the environmental issues with the project have been addressed; Sassafras woods, Grindstone tributary, tributary south of the Mid-Block. Conservation Halton indicated that an alignment running through the south tributary north of Mountain Brow Road is acceptable. The creek can be re-channelized/intercepted.

The Waterdown Road alignment through the development lands has been moved closer to the existing road. The east ROW will be held and all of the widening will be done to the west (the east edge of proposed east side sidewalk is positioned at the existing east edge of pavement). The Paletta lands will be less impacted with this modification and the homes on the east side of the road will be further from the road. Burlington council has requested assessment of the cross section phasing from three lanes to four over time on Waterdown Road.

Two to three properties will be purchased along Waterdown Road due to their proximity to the road and driveway profile issues.

An internal ESR on Waterdown Road will be issued by the end of March/early April. Conservation Halton would like to wait until the ESR is completed before they give their comments. — Dillon

5. Status of New East West Road Class EA

Hamilton Conservation has agreed to the alignment through Centre Road woodlot and the 30 meter buffer between the ESA and the new road.

After meeting with the MTO, Dillon reassessed the alignment joining at Highway 6. An alignment lining up with 4th Concession is required, wherever the crossing location.

Dillon is recommending a larger structure crossing of the Grindstone Creek at Parkside Drive.

Flow equalization culverts are being proposed at the flood plain adjacent to the Upcountry development. Conservation Halton indicated that the east creek corridor was to be preserved and is concerned about the road and the creek running side by side. Dillon has mitigated the impact by allowing the flood plain to operate on both sides of the road.

The creek is being realigned at Dundas Street and the existing culvert will be replaced.

At the east end of the project limits, rock cut is required along a section of Dundas Street.

DISTRIBUTION: Attendees
Tom Eichenbaum
Melissa Green-Battiston

Please contact Amanda Shepley of Dillon Consulting with any errors or omissions.

M:\PROJECTS\DRAFT\08\089498 King Road Technical Feasibility Study\Correspondence\Meeting with NEC - Feb 2709.doc

January 28, 2009

DILLON
CONSULTING

235 Yorkland Blvd.
Suite 800
Toronto, Ontario
Canada
M2J 4Y8
Telephone
(416) 229-4646
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(416) 229-4692

Hamilton Conservation Authority
P.O. Box 7099, 838 Mineral Springs Road
Ancaster, ON L9G 3L3

Attention: Ms. Nora Jamieson

Plant Species in the Centre Road Provincially Significant Wetland Unit
Waterdown, Ontario

Dear Ms. Jamieson:

This letter is in response to the recent request from HCA for spatial information on the plant species inventoried as part of the Class EA work. The specific plant species found in the original three alternative road alignments (DE-1, DE 3 and DE-4) through the "Centre Road Woodlot" are presented in table form in Appendix B of the December 2008 Natural Environment Report.. For each of these three alignments, the area was walked by our botanist and all species encountered in the right-of-way were recorded.

When the original field survey work was conducted, only three road alignment alternatives were being considered. Since that time, an additional two alignment alternatives have been added to the evaluation. In order to provide plant data for these additional two alignments (DE-2 and DE-5), we have used the Ecological Land Classification data sheets that were compiled. In the process of completing Ecological Land Classification, a species list is required to be compiled by the biologist on site. The plant information compiled in these surveys provides a comprehensive listing of the species found within ecological communities that were identified. We have attached an updated table with this additional information. The updated table provides a list of all the species that are found within the vegetation communities that these alignments pass through. While these alignments were not walked specifically, this method provides a reasonable estimate of the species that would likely be encountered in these alignments. As the plant lists are for the entire communities that the alignments pass through, these lists may over-represent the actual diversity within the alignment.

With this information in hand, we are hopeful that the HCA can provide comment on our recommended preferred road alignment through the woodlot. We look forward to your comments.

Yours sincerely,

DILLON CONSULTING LIMITED

David Restivo, BSc.
Biologist

DR:mrb
Encl.
Our File: 08-9020
M:\PROJECTS\FINAL\08\089020 WAMP Phases 3&4\Correspondence\Letters\Rev Additional Table Letter - Januray 28 2009.doc

Appendix B-Table 5 (revised): Vegetation Inventories along the Five Proposed Road Alignment Options through the Centre Road Woodlot - PSW unit

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Acer rubrum	Red Maple	4	0	S5		X	X	X	X	
Acer saccharinum	Silver Maple	5	-3	S5			X		X	
Acer saccharum ssp. saccharum	Sugar Maple	4	3	S5		X	X			X
Acer spicatum	Mountain Maple	6	3	S5				X		X
Acer X freemanii	Freeman's Maple			S5		X	X			
Actaea rubra	Red Baneberry	5	5	S5						X
Agrimonia gryposepala	Tall Agrimony	2	2	S5				X		X
Aralia nudicaulis	Wild Sarsaparilla	4	3	S5				X	X	
Arisaema triphyllum ssp. triphyllum	Jack-in-the-pulpit	5	-2	S5		X	X	X	X	X
Asarum canadense	Wild Ginger	6	5	S5						X
Aster puniceus var. puniceus	Purple-stem Aster	6	-5	S5				X		
Athyrium filix-femina var. angustum	Northern Lady Fern	4	0	S5			X	X		X
Betula alleghaniensis	Yellow Birch	6	0	S5		X	X	X	X	X
Betula papyrifera	White Birch	2	2	S5		X	X	X	X	X
Bidens frondosa	Devil's Beggar-ticks	3	-3	S5						X
Boehmeria cylindrica	False Nettle	4	-5	S5		X	X	X		X
Caltha palustris	Marsh Marigold	5	-5	S5				X		
Carex bebbii	Bebb's Sedge	3	-5	S5					X	
Carex intumescens	Bladder Sedge	6	-4	S5				X		
Carex lacustris	Lakebank Sedge	5	-5	S5						X
Carex laevivaginata	Smooth-sheathed Sedge	8	-5	S4				X		

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Carex lupulina	Common Hop Sedge	6	-5	S5		X	X	X	X	X
Carex radiata	Radiate Sedge	4	5	S5					X	
Carex rosea	Stellate Sedge	5	5	S5						X
Carex stipata	Awl-fruited Sedge	3	-5	S5						X
Carex tenera	Slender Straw Sedge	4	-1	S5			X			
Carpinus caroliniana	Blue Beech	6	0	S5		X	X	X	X	X
Cicuta maculata	Spotted Water-hemlock	6	-5	S5			X	X	X	
Circaea lutetiana ssp. canadensis	Canada Enchanter's Nightshade	3	3	S5		X	X	X	X	X
Clematis virginiana	Virgin's Bower	3	0	S5				X		
Convallaria majalis	Lily-of-the-valley	0	5	SE5	I			X		
Cornus alternifolia	Alternate-leaved Dogwood	6	5	S5		X	X			X
Crataegus monogyna	One-seeded Hawthorn	0	5	SE5	I				X	
Crataegus punctata	Dotted Hawthorn	4	5	S5					X	
Dryopteris carthusiana	Spinulose Wood Fern	5	-2	S5		X	X	X	X	X
Dryopteris marginalis	Marginal Wood Fern	5	3	S5				X		
Epipactis helleborine	Helleborine	0	5	SE5	I		X			
Equisetum arvense	Field Horsetail	0	0	S5		X	X	X		X
Equisetum hyemale ssp. affine	Scouring Rush	2	-2	S5		X			X	
Equisetum sylvaticum	Woodland Horsetail	7	-3	S5				X		

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Eupatorium maculatum ssp. maculatum	Spotted Joe-pye-weed	3	-5	S5				X		X
Fragaria virginiana ssp. virginiana	Common Strawberry	2	1	S5		X	X	X	X	
Fraxinus nigra	Black Ash	7	-4	S5					X	
Fraxinus pennsylvanica	Red Ash	3	-3	S5		X	X	X	X	X
Galium palustre	Marsh Bedstraw	5	-5	S5		X				
Galium triflorum	Fragrant Bedstraw	4	2	S5						X
Geum canadense	White Avens	3	0	S5		X	X	X	X	
Geum sp.									X	
Glyceria striata	Fowl Manna Grass	3	-5	S5		X		X	X	X
Hamamelis virginiana	Witch-hazel	6	3	S5		X	X	X	X	
Impatiens capensis	Spotted Touch-me-not	4	-3	S5		X	X	X	X	X
Juglans cinerea	Butternut	6	2	S4		X			X	
Juglans nigra	Black Walnut	5	3	S4						X
Lactuca biennis	Tall Blue Lettuce	6	0	S5		X				
Lindera benzoin	Spicebush	6	-2	S5		X	X	X	X	
Lonicera tatarica	Tartarian Honeysuckle	0	3	SE5	I		X			X
Lycopus americanus	Cut-leaved Water-horehound	4	-5	S5		X		X		
Lycopus uniflorus	Northern Water-horehound	5	-5	S5					X	X
Lysimachia ciliata	Fringed Loosestrife	4	-3	S5						X

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Maianthemum canadense	Canada Mayflower	5	0	S5				X	X	
Maianthemum stellatum	Starry False Solomon's Seal	6	1	S5				X		
Matteuccia struthiopteris var. pensylvanica	Ostrich Fern	5	-3	S5						X
Medeola virginiana	Indian Cucumber-root	7	5	S5				X		
Mitchella repens	Partridge Berry	6	2	S5				X		
Oenothera biennis	Common Evening-primrose	0	3	S5		X				
Onoclea sensibilis	Sensitive Fern	4	-3	S5		X	X	X	X	X
Osmunda cinnamomea	Cinnamon Fern	7	-3	S5		X	X		X	
Parthenocissus inserta	Thicket Creeper	3	3	S5		X	X	X	X	X
Phalaris arundinacea	Reed Canary Grass	0	-4	S5		X	X	X		X
Phragmites australis	Common Reed	0	-4	S5		X				
Pilea pumila	Common Clearweed	5	-3	S5					X	
Pinus strobus	Eastern White Pine	4	3	S5				X	X	
Podophyllum peltatum	Mayapple	5	3	S5		X			X	X
Polystichum acrostichoides	Christmas Fern	5	5	S5			X			
Populus deltoides ssp. deltoides	Eastern Cottonwood	4	-1	S5		X	X		X	
Populus grandidentata	Largetooth Aspen	5	3	S5		X	X			X

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Populus tremuloides	Trembling Aspen	2	0	S5		X	X		X	
Prunus serotina	Black Cherry	3	3	S5		X	X		X	X
Prunus virginiana ssp. virginiana	Choke Cherry	2	1	S5						X
Pteridium aquilinum var. latiusculum	Eastern Bracken Fern	2	3	S5		X				X
Quercus macrocarpa	Bur Oak	5	1	S5			X		X	X
Quercus rubra	Red Oak	6	3	S5				X		
Ranunculus acris	Tall Buttercup	0	-2	SE5	I	X				
Rhamnus cathartica	Common Buckthorn	0	3	SE5	I		X	X	X	X
Rhus radicans ssp. rydbergii	Western Poison-ivy	0	0	S5		X	X	X	X	
Rhus typhina	Staghorn Sumac	1	5	S5		X	X			
Ribes americanum	Wild Black Currant	4	-3	S5					X	X
Ribes cynosbati	Prickly Gooseberry	4	5	S5		X	X	X		
Ribes triste	Swamp Red Currant	6	-5	S5					X	X
Rubus allegheniensis	Common Blackberry	2	2	S5			X			X
Rubus idaeus ssp. melanolasius	Wild Red Raspberry	0	-2	S5			X	X		X
Rubus occidentalis	Black Raspberry	2	5	S5					X	
Rubus odoratus	Purple Flowering Raspberry	3	5	S5				X	X	
Rubus pubescens	Dwarf Raspberry	4	-4	S5		X	X	X	X	X
Salix alba	White Willow	0	-3	SE4	I	X			X	
Sambucus canadensis	Common Elderberry	5	-2	S5		X			X	

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Sambucus canadensis	Common Elderberry	5	-2	S5				X		
Sambucus racemosa ssp. pubens	Red-berried Elderberry	5	2	S5						X
Scirpus atrovirens	Black Bulrush	3	-5	S5					X	
Smilax herbacea	Herbaceous Carrion Flower	5	0	S4					X	
Smilax hispida	Bristly Greenbrier	6	0	S4				X		
Solanum dulcamara	Bittersweet Nightshade	0	0	SE5	I	X	X	X	X	X
Solidago canadensis var. canadensis	Canada Goldenrod	1	3	S5						X
Solidago flexicaulis	Zig-zag Goldenrod	6	3	S5					X	
Solidago sp.	Goldenrod species									
Symplocarpus foetidus	Skunk Cabbage	7	-5	S5		X	X	X	X	X
Thuja occidentalis	Eastern White Cedar	4	-3	S5				X	X	X
Tilia americana	Basswood	4	3	S5			X	X		
Trillium grandiflorum	White Trillium	5	5	S5					X	
Tsuga canadensis	Eastern Hemlock	7	3	S5		X	X	X	X	X
Typha angustifolia	Narrow-leaved Cattail	3	-5	S5		X				
Ulmus americana	White Elm	3	-2	S5			X	X	X	X
Urtica dioica ssp. gracilis	Slender Stinging Nettle	2	-1	S5					X	
Viburnum acerifolium	Maple-leaved Viburnum	6	5	S5			X	X		
Viola sp.	Violet species								X	

Scientific Name	Common Names	Coefficient Conservation	Coefficient Wetness	SRank	Introduced	Alignment 1 (DE1)	Alignment 2 (DE3)	Alignment 3 (DE4)	Alignment 4 (DE2)*	Alignment 5 (DE5)*
Vitis riparia	Riverbank Grape	0	-2	S5			X		X	
					Total number of species	**48**	**50**	**56**	**59**	**52**
					Average CC	**3.8**	**3.9**	**4.4**	**3.8**	**3.8**
					# of introduced species	**3**	**4**	**3**	**4**	**3**
					Average Wetness Coefficient	**-0.5**	**0.2**	**-0.4**	**-0.3**	**-0.4**

* Note: For Alignments 4 (DE2) and 5 (DE5) vegetation inventories were derived from ELC community flora inventories and represent an approximation of the species located in that proposed road ROW.

Restivo, David

From: Faulkenham, Shari [sfaulken@conservationhamilton.ca]
Sent: January 29, 2009 1:46 PM
To: Restivo, David
Cc: Menyes, Kathy; Jamieson, Nora; Plosz, Catherine; Banuri, Syeda
Subject: North Waterdown TMP

Good afternoon David,

Thank you for forwarding the additional information regarding the proposed road alignments. What you have sent, however, has not addressed our concerns. Dillon has not yet identified where all flora and fauna were encountered throughout the entire natural heritage system – this is necessary in order to determine the impacts that the road will have on the ESA / PSW. In addition to this, no analysis has been done to address the impacts on wildlife corridors and linkages throughout the natural heritage system, nor has an assessment on the impacts that the increase of noise and light from the road will have on these natural systems. Overall, no impact assessment has been done.

So many issues have not been addressed in this study – it is best that we meet soon to discuss these issues to ensure they are addressed promptly.

In reference to a preferred alignment, HCA prefer the southern-most alignment (DE-1).

Thanks
s

Shari Faulkenham
Ecologist

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Restivo, David

From: Jamieson, Nora [njamieso@conservationhamilton.ca]
Sent: February 24, 2009 4:13 PM
To: Banuri, Syeda; Lee-Morrison, Christine
Cc: Plosz, Catherine; Menyes, Kathy; Stojanovic, George; Faulkenham, Shari; Restivo, David; Roul, Ian
Subject: New East-West Waterdown Road

Further to our discussions at our meeting this morning, although HCA staff had stated earlier that we would have preferred the most southerly road alignment i.e. DE-1, as it would result in less fragmentation of the PSW, we now understand the issues with respect to the DE-1 alignment (i.e. proximity to homes on Northlawn Ave and more importantly the interference with the creek channel), and now wish to advise that HCA staff are in general agreement with the 2nd southerly alignment, being DE-2 as the preferred alignment option, subject to mitigation and compensation measures being undertaken for the resulting loss of PSW feature and functions and the issuance of a permit by HCA pursuant to our *Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Regulation 161/06 under Ontario Regulation 97/04.*

In addition, it is our understanding that your consultant, Dillon Consulting will be preparing Draft ESRs later this winter and early spring, containing the ecologicial field study information and hydrological assessments. requested by HCA staff for our review and approval.

Nora Jamieson
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March 6, 2009

Ms. Syeda Banuri
Senior Project Manager
Public Works Department
City of Hamilton
320-77 James Street N
Hamilton ON L8R 2K3

Dear Ms. Banuri:

Re: Waterdown Aldershot Transportation Master Plan (TMP)
Environmental Assessment-Natural Environment (Draft Report January 2009)
CH File: MPR 341

Staff of Conservation Halton have reviewed the above noted report and we offer the following comments:

Section 1.0 Introduction

1. Within this section there is no mention of karst however, karst has been found within the Study Area as part of the South Waterdown Subwatershed Study. Karst is normally considered a natural hazard and, as such, staff question whether there will be a natural hazard component to the EA? If not, then natural hazards, including karst, flood plains, steep slopes, etc., should be included in the natural environment component.

Figure 1 Study Area and Preferred Route

2. Staff note that the wooded area associated with the upper end of the Grindstone Creek Valley ESA, within the South Waterdown lands, does not appear to be identified on this figure. This requires revision.

Section 2.0 Methods

3. Staff request that all field data sheets be included as an appendix to the Natural Environment Inventory Report and should include all Ecological Land Classification (ELC) and wildlife data sheets.

4. We note that there is no discussion of the weather conditions during the wildlife surveys.

5. The local status of birds within Subsection 2.3 Breeding Birds was obtained from the Conservation Priorities for the Birds of Southern Ontario (1999). Given that both Conservation Halton and Hamilton Conservation Authority have completed more recent

Natural Area Inventories that provide locally rarity, staff suggest that the Halton Natural Areas Inventory (NAI) (2006) and the Nature Counts Hamilton NAI (2003) be used as the most current sources of rarity.

6. It is unclear why no further wildlife data was collected as there is no discussion of incidental mammal observations, insects or reptile surveys that were completed. Given that this project is to expand an existing road network and the number of mammals and reptiles potentially using this area for crossings, nesting and for basking, please clarify if these surveys were completed. Staff note that without this information, we consider the Natural Environment Inventory Report incomplete with respect to wildlife.

7. All reference within the EA to the South Waterdown Subwatershed Study should reflect the fact that the Study, with the exception of the Stage 1 Report, is considered draft and not approved by the Technical Steering Committee.

Figure 2 Breeding Bird and Amphibian Point Count and Area Search Locations

8. Within the South Waterdown lands, was this information surveyed independently as part of the EA process or is it taken from the Subwatershed Study? If done independently, has the data been cross-referenced with the information collected as part of the Subwatershed Study?

Section 3.0 Results

9. Subsection 3.1.1 ELC: Not all of the ELC communities listed on pages 9 and 10 appear to be illustrated on Figures 3 and 4. For example, FOD 2-2, FOD4-2, SWD2-1 and SWD4-2 are not listed in the legend nor do they appear on the figures. The figures include FOD4-3, OAO and SWD4-3 which are not listed in the report text. In addition, Appendix B which is to provide further information on the vegetation communities does not include discussions on MAM2-10, SWD2-1, FOD4-3, OAO and SWD4-3. Please confirm the actual vegetation communities within the study area and submit ELC field data sheets for review so that these can be further confirmed.

10. Subsection 3.1.2 Vegetation: This section states that there were no federal or provincial Species at Risk (SAR) identified during the field surveys, however butternut (*Juglans cinerea*) is listed both federally and provincially as Endangered and was observed during the surveys. Please revise this section to reflect the SAR in the study area. It should be noted that according to the Natural Heritage Information Centre (NHIC) butternut is also listed as S3 not S4 as presented in the report.

11. Subsection 3.1.3 Sassafras Wood Edge Vegetation Survey: The Environmental Assessment (EA) completed for potentially similar areas identified the presence of flowering dogwood (*Cornus florida*) in the vicinity of interchange and road works. Flowering dogwood is currently listed as Endangered by the MNR and is proposed to be designated as Endangered by COSEWIC. Given the sensitivities associated with this species, please confirm if flowering dogwood was observed during surveys.

12. Also, within Subsection 3.1.3, staff note that MNR has indicated that all lands south of Mountain Brow Road are Jefferson Salamander habitat and fall under the regulations of the new Endangered Species Act. There is no further discussion within the report as to what the implications of this is on the EA. Further discussion within the EA is requested.

13. Subsection 3.1.5 NHIC Flora Query: The report states that one significant vegetation community (FOD 2-2 listed as S3S4) was observed in the study area, however the report indicates that FOD7-4 (Fresh-Moist Black Walnut Lowland Deciduous Forest), listed as S2S3 or "very rare" to "rare to uncommon" is also present in several locations within the study area. The report should be revised to include these communities and discussion regarding potential impacts and mitigation should be included. It should be noted that staff are unable to locate the FOD2-2 on either Figures 3 or 4.

14. Subsection Section 3.4 Amphibian Surveys: There should be a discussion regarding Jefferson salamander habitat within the study area in this section of the report. In addition, amphibian surveys appear to have been completed for frogs only based on the results presented in Table 3, although the methods section indicates that wetlands and vernal pools in potential habitat were surveyed as well as using secondary source information. Please clarify if other amphibians were observed. Also, within Table 3, the footnote numbering should be reviewed.

15. Staff defer discussion with respect to western chorus frog at this time as consultation with COSEWIC is currently ongoing to determine the status of the population within Conservation Halton's watershed.

16. Subsection 3.5.1 Historical Fish Species Information – staff note that the Grindstone Creek tributary (identified as GS-1 within the South Waterdown Subwatershed Study) is being managed as a coldwater watercourse given the sensitive coldwater species immediately downstream. This means that buffers to the watercourse are based on the coldwater setbacks of 30 metres.

17. Subsection 3.5.3 Field Work Results – Unknown Creek (Crossing #13) – this is the Upper Hager Creek.

Figure 3 – East-West Corridor ELC and Significant Plant Species

18. Staff note that the flood plain and riparian vegetation associated with the Grindstone Creek tributary that flows immediately adjacent to the Upcountry Estates land is shown as agricultural on this figure. Please verify that this is an appropriate ELC classification for this area.

19. In addition, the wetland that was identified in the South Waterdown Subwatershed Study as Wetland 4 has not been identified on this figure. Staff recommend that the Study Team refer to the SWS for additional information in this regard.

Section 4.0 Significant Natural Areas

20. Staff recommend that the Waterdown Woods Resource Management Area (owned by Conservation Halton) be included in the list of Significant Natural Areas.

21. Staff continue to recommend that the road expansion be completed away from the natural heritage features within the study area. According to the Halton Natural Areas Inventory, Sassafras-Waterdown Woods ANSI and ESA is one of the few remaining sizable woodlots typical of the dry broadleaf forests that once covered Halton Region below the Niagara Escarpment. It contains a high number of native plant communities, of which some are considered rare within the Niagara Escarpment Biosphere Reserve. In addition to the ANSI and ESA designation, this area is designated as a Carolinian Canada site, one of only 38 in Canada and the ***only*** designated site in Halton Region. This area also contains numerous species listed as nationally, provincially and locally rare. We recommend that the Mountain Brow Road expansion be shifted to the north and be incorporated into the urban development that is proposed in this area given the level of disturbance that will be associated with this development, while maintaining the ESA/ANSI to the south. We also recommend that the widening of Waterdown Road be shifted to the west to limit the impact to the ESA/ANSI. For these reasons, we do not support any works being undertaken that will impact Sassafras-Waterdown Woods ANSI/ESA.

22. Subsection 4.5 Provincial Life/Earth Science ANSI-Grindstone (Creek) Valley ESA – this section recommends that the new crossing of the Grindstone Creek tributary will have minimal impacts on fish habitat and other natural heritage resources. Staff recommend that this is not an accurate description of the potential impacts on the ESA in this vicinity. Based on the proposed location of the road it will remove a portion of the upper limit of the Grindstone Creek Valley ESA. Given that only a few areas within Hamilton and Halton merit an ESA designation, the loss of any portion of such an environmentally sensitive area should not be considered minimal. Also, this section does not address the impacts that will occur as a result of the need to realign the tributary in order to facilitate the crossing. Additional discussion is warranted on the potential impacts, mitigation and compensation for the losses.

Section 5.0 Natural Environment Summary

23. While staff agree that restoration and enhancement of key natural features should occur, we recommend the planting of only locally common, native, non-invasive species.

Figure 5 – Aquatic Features Map

24. This figure identifies a number of watercourse crossings. Although it may be related to the scale of the mapping, it does not appear that there will be a crossing required at points #4 and #14. Please clarify. Also, point #5 is shown as a crossing however, it is our understanding that the road will likely cross the flood plain rather than the watercourse in this location. Please clarify.

Table 5 – WATMP Existing Fish and Fish Habitats Conditions Summary Table

25. Within the portion of the chart related to the East-West Corridor from Highway 6 east to Cedar Springs Road, Row 4 (Grindstone Creek – Northwest Branch) – within the Column "Fish observed (species)" it is stated "none" however, under the Column "Rationale for Sensitivity/Recommendation" it is stated that largemouth bass are present. Please clarify.

26. Within the portion of the chart related to the Waterdown Road Corridor from Dundas Street south to Highway 403, Row 1 (Grindstone Creek – Northeast Branch) – staff assume this is the GS-1 tributary in the South Waterdown Subwatershed Study. The vegetation is described as emergent grass vegetation along margins with sporadic shrubs however, this tributary is within the Grindstone Creek Valley ESA and is well treed. Please clarify the description. In addition, the recommended crossing method is listed as "culvert installation" however, due to the sensitivity of this area, the chart should be clear that the preferred crossing is a span bridge and/or span open bottom culvert. Finally, staff recommend that the "sensitivity" should be ranked as "high" given the presence of coldwater fish species immediately downstream, groundwater discharge within the immediate area, karst features within the crossing area and the presence of the ESA.

Appendix A

27. The appendix includes the breeding bird evidence codes, however these have not been included in the species tables. Currently the evidence provided is only from the Dillon survey or the Ontario Breeding Bird Atlas, and no breeding evidence is provided. Please clarify.

28. As previously stated, staff recommend that the Halton NAI and the Nature Counts Hamilton NAI be used for local rarity of species. The following lists the species that have been identified as rare/uncommon in the study area:
    - Great blue heron – uncommon Hamilton
    - Turkey vulture – uncommon Hamilton
    - Yellow-billed cuckoo – rare Halton, rare Hamilton
    - Eastern Screech-owl – uncommon Hamilton
    - Red-bellied woodpecker – uncommon Halton, uncommon Hamilton
    - Hairy woodpecker– uncommon Hamilton
    - Horned lark – uncommon Hamilton
    - Eastern towhee – uncommon Halton, uncommon Hamilton
    - Vesper sparrow – uncommon Halton, uncommon Hamilton
    - Bank swallow – uncommon Hamilton
    - Northern rough-winged swallow – uncommon Halton
    - Brown thrasher – uncommon Hamilton
    - Chestnut-sided warbler – uncommon Halton, uncommon Hamilton
    - Mourning warbler – uncommon Halton, uncommon Hamilton
    - Blue-gray gnatcatcher – uncommon Halton, uncommon Hamilton
    - Eastern phoebe – uncommon Hamilton

Appendix B

29. In addition to those species identified in the appendix, according to the Halton and Hamilton NAIs, *Crataegus mollis* and *Scirpus atrovirens* are rare in Hamilton while, according to the NHIC, *Juglans cinerea* should be listed as S3?.

The following comments are provided as aquatic ecology input into the detailed design stage:

30. Culvert replacements are favoured over culvert extensions, especially where the existing culvert is undersized or perched. Any crossing works that involve an extension are requested to use an open bottom design.

31. It is requested that all new culverts and culvert extensions be designed and implemented as open bottom structures for the following reasons:

    - To prevent future barriers to fish passage due to long term down cutting of the creek invert.
    - To allow fish to have access to natural stream bottom substrate, which is likely to contain a more productive food source than substrate placed inside a closed bottom culvert.
    - The maintenance of fish passage through crossings will facilitate dispersal of fish and other aquatic organisms in the event of large disturbances such as road construction work adjacent to the creek or the occurrence of a toxic spill in the creek.
    - Fish need to swim through culverts to migrate to spawning areas that have higher productivity or fewer predators, such as flood plains and headwater streams.
    - Culverts that block the upstream movement of fish will isolate fish populations above these crossings. Areas with relatively small amounts of habitat upstream of the crossing will be most vulnerable to population loss. This can lead to negative genetic effects on local fish populations.
    - To facilitate effective sediment transport, which will prevent or reduce excessive stream bank erosion and/or stream profile flattening in the vicinity of the culvert.
    - To facilitate groundwater recharge when/if the creek is "losing" water.
    - To prevent any blockage or rerouting of groundwater seepage (where applicable).

32. It is requested that all creek crossings be designed to convey a minimum 2 year or bankfull channel flow. Where feasible, it is requested that creek crossing designs be designed to accommodate larger flows for the following reasons:

    - To prevent velocity barriers to fish passage during high flow events. If a culvert is undersized, water pressure in the culvert will be too high for a fish to swim through the culvert during a high flow event.
    - To facilitate effective sediment transport through culverts to minimize or prevent excessive erosion or aggradation (build up) of sediments in the vicinity of culverts. Larger culvert diameters also prevent plugging of culvert with debris,

which can be a safety issue for road integrity if water backs up on one side of the road.

- To prevent scouring of the bed of the creek downstream of the culvert (over time) to the point where a barrier to fish passage is created.

33. It is requested that any opportunities to plant native, non invasive trees and/or shrubs along the banks of the creek within the road right of way be investigated and pursued. Priority tree planting areas include:

    - Bank areas located between the creek and an adjacent parallel road.
    - Bank areas on the south or west side of a creek.
    - Any other unvegetated sections of a watercourse that are feasible for tree planting.

Comments Regarding Specific Crossings:

Crossing #	Specific Comments
4. Grindstone Creek NW Branch	According to our best available information, Pike have been demonstrated to be present at this location and the construction timing window must accommodate northern pike: No in water work between March 1 and June 30 of any year. Standard sediment and erosion controls, work area isolation and flow maintenance procedures will be necessary.
5. Grindstone Creek NE Branch	No crossing work proposed. No mitigation necessary.
6. Grindstone Creek, NE Branch	• Request a full culvert replacement. • Request use of open bottom structure. • Standard sediment and erosion controls, work area isolation and flow maintenance procedures will be necessary. • Warm water timing window is applicable.
7. - 12. : Tributary of Grindstone Creek	• Fish passage must be established or maintained as a result of culvert extensions. • Culvert replacements that result in larger diameter, open bottom culverts are preferred over culvert extensions. • Warm water timing window applies.
13. Unknown Creek.	• Request collection of fish community and thermal regime data at this location.
14. Grindstone Creek	• Request that culvert consist of an open bottom design. It is requested that the culvert be designed to convey a minimum 25 year flow. • Warm water timing window applies. • Standard sediment and erosion control, work area isolation, flow maintenance and fish removal guidelines apply.
Waterdown Road Corridor (from Dundas south to Highway 403)	
1. Grindstone Creek	• Request that culvert consist of an open bottom design. It is requested that the culvert be designed to convey a minimum 25 year

NE Branch	flow. • Warm water timing window applies at this time. This system is classified as having a cold water thermal regime, however no fall spawning fish species (that would trigger the cold water timing window) have been demonstrated to exist here.
2. Grindstone Creek S Branch	• A site visit is required to determine if channel realignment will require an authorization by DFO. • Standard sediment and erosion controls, work area isolation and flow maintenance procedures will be necessary.
3. Grindstone Creek S Branch	• Standard sediment and erosion controls, work area isolation and flow maintenance procedures will be necessary. A culvert replacement would be more desirable over an extension. Is this a feasible option? • Warm water timing window applies here.
4. Grindstone Creek S Branch	• One larger diameter culvert is preferable over two smaller diameter culverts to facilitate effective sediment transport and to prevent potential downcutting of the creek on the downstream sides of the culverts. • Standard sediment and erosion controls, work area isolation and flow maintenance procedures will be necessary.

We trust the above is of assistance. If you require additional information please contact the undersigned at extension 266.

Yours truly,

Jennifer Lawrence
Manager, Environmental Planning

cc: Ms Cathy Plosz, City of Hamilton, Planning, fax
Ms Kirsten McCauley, City of Hamilton, Planning, fax
Mr. Tom Eichenbaum, City of Burlington, Engineering, fax
Mr. Paul Allen, City of Burlington, Engineering, fax
Ms Nancy Mott-Allen, NEC, fax
Ms Kathy Menyes, Hamilton CA, fax

jl/devl planning\ea\hamilton\watmp\draft natural heritage\review of draft natural heritage study.doc

Shepley, Amanda

From: MacLeod, Paul
Sent: Monday, April 20, 2009 3:24 PM
To: Roszler, Greg (MTO)
Cc: Lee-Morrison, Christine; Banuri, Syeda; Shepley, Amanda; McKinnon, Don; Marin, Jackson
Subject: New East-West Class EA: Highway 6 Traffic Operations Assessment
Attachments: Hwy 6 signal assessment 2009-04-20 Final.pdf

Greg:

Greetings.

Attached to this e-mail is Dillon's Traffic Operations Assessment for the Highway 6 corridor between Parkside Drive and Concession 4 Road. This is background to our evaluation materials that were sent to you earlier in March.

Could you please have a look at this and the original draft evaluation package and provide us with MTO's comments on the alternatives and the evaluation. We would like to receive you comments in 2 weeks (by May 4th) if possible.

If you have any questions or need follow-up please get in touch.

Regards.

Paul

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MEMO

DILLON CONSULTING

TO: File

FROM: Brent Hooton

DATE: April 20, 2009

SUBJECT: **New East-West Road Class EA**
Traffic Operations Assessment of Alternatives East/West Road Intersections with Highway 6

OUR FILE: 08-9020

1.0 Introduction

As part of the Waterdown / Aldershot Transportation Master Plan (WATMP), a new east/west arterial road has been recommended north of Parkside Drive to provide additional capacity for planned development in Waterdown North. A municipal Class Environmental Assessment for this new roadway is currently underway and the alignment is being finalized. An evaluation package was prepared and submitted to the Ministry of Transportation of Ontario (MTO) on March 9, 2009, outlining the preferred overall alignment for the new East/West Road in the vicinity of Highway 6. In their response MTO had requested that additional traffic operations documentation be provided for the Highway 6 corridor. This memorandum has been prepared to address this request and to provide background information on the anticipated traffic operations along Highway 6 to assist in the evaluation of the alternative intersection locations. It should be read in conjunction with the overall evaluation package dated March 5, 2009 which considered all the environmental factors.

2.0 Existing Conditions

2.1 Existing Road Network

The study area consists of Highway 6 and its intersections with Parkside Drive and with the 4th Concession, northwest of the existing developed area of Waterdown. The general Highway 6 study area is illustrated in ***Figure 1***. ***Highway 6*** is a provincial highway extending between Highway 403 west of Burlington and Highway 401 near Guelph. (Separate sections of Highway 6 continue north to the Bruce Peninsula and south to Lake Erie.) The majority of this section of Highway 6 is a four-lane highway with a posted speed limit of 80 km/h. It is designated by the Ministry of Transportation of Ontario (MTO) as a Class 2B Arterial Highway north of Dundas Street, and a freeway south of Dundas Street to Highway 403. There are traffic signals at the following intersections in the study area and beyond:

- Millgrove Sideroad / 6th Concession (3.1 km north of 4th Concession)
- Parkside Drive (435 m south of 4th Concession)
- Dundas Street (1.2 km south of Parkside Drive)

Figure 1 — Highway 6 Study Area

Other concession grid roads intersect with Highway 6 at unsignalized intersections. While the concession roads are generally spaced at 1.75 to 2.0 km intervals, the grids west and east of Highway 6 are not aligned and therefore the actual intersection spacing is lower and varies throughout the Highway 6 corridor. There are also a number of low-volume private driveways in the area, particularly in the vicinity of Millgrove.

The section of Highway 6 south of Dundas Street to Highway 403 is currently being reconstructed as a fully controlled-access facility, including a new interchange at York Road (1.6 km south of Dundas Street) with the closure of all intermediate intersections and driveways. As a subsequent construction phase, MTO plans to build a grade separation and full interchange at Dundas Street. This construction is not on MTO's current 5-year program. Once this construction is in place, Parkside Drive (1.2 km north of Dundas Street) will be the first signalized intersection encountered by northbound traffic.

Parkside Drive is a two-lane arterial road under the jurisdiction of the City of Hamilton. It extends easterly from Highway 6 through Waterdown along the current northern limits of development; at Evans Road it turns to the north as a local road, connecting to Millborough Line (1st Sideroad in Burlington). In most sections it has a rural cross-section, with a sidewalk along the south side through most of the developed / urbanized area. In addition to providing an access route to development on the north side of Waterdown, it also serves as a bypass of Dundas Street, which experiences peak period congestion due to limited capacity through the central business district (CBD). It is currently classified by the City of Hamilton as a truck route.

The ***4th Concession*** is a two-lane rural collector roadway that formed part of the original concession road network parallel to Dundas Street (Highway 5) and continues to serve local traffic demands. It has a

lower design standard consistent with its roadway classification, including narrower shoulders. It intersects with Highway 6 approximately 440 m north of Parkside Drive at an angle of approximately 60 degrees.

2.2 Existing Traffic Volumes

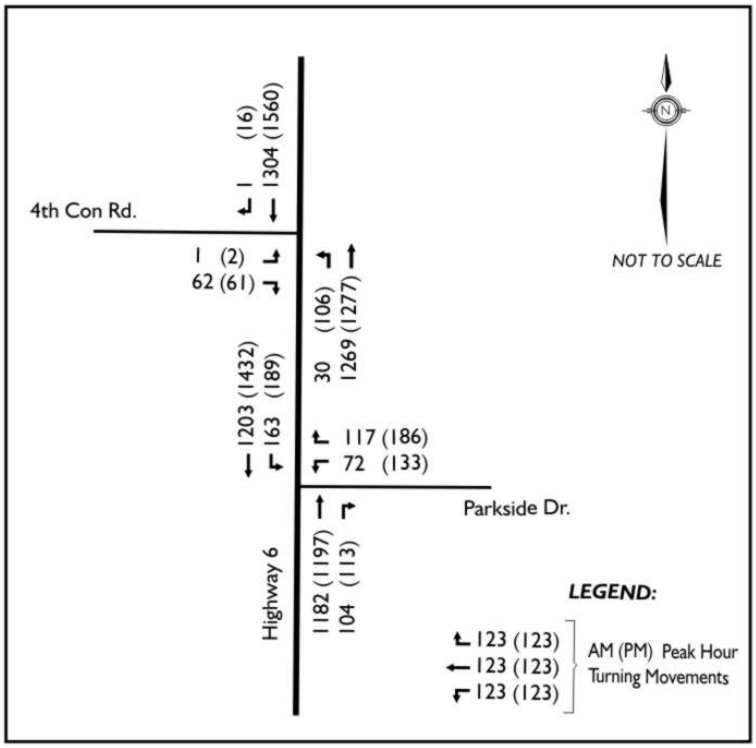
Existing traffic volumes at the study area intersections were obtained from the MTO and from the City of Hamilton. The survey details are shown in ***Table 1***.

Table 1 — Traffic Survey Dates

Highway 6 at:	Survey Date	Source
4th Concession	Thursday, July 7, 2005	MTO
Parkside Drive	Tuesday, May 6, 2008	City

These volumes were balanced based on the volumes surveyed north of the Parkside Drive intersection, since that survey is more up-to-date. The existing traffic volumes are illustrated in ***Figure 2***.

Figure 2 — Existing Traffic Volumes



2.3 Existing Intersection Operations

The operations of the two existing intersections were assessed based on the methodology prescribed in the Highway Capacity Manual (HCM), 2000 edition. The analyses were facilitated using the Synchro software package (version 6), which is based on the HCM methodology. Operations at Parkside Drive are based on existing signal timings obtained from MTO.

For each intersection, the intersection level of service (LOS), average vehicle delay, and volume to capacity (v/c) ratio were noted. For the signalized Parkside Drive intersection, these measures relate to the intersection as a whole, whereas for the unsignalized 4th Concession intersection, they relate to the minor approach movements.

The signalized Parkside Drive intersection was also monitored for any critical movements (i.e., movements with a v/c ratio greater than 0.85). No critical movements were identified under existing conditions.

Table 2 — Existing Intersection Operations

Highway 6 at:	Peak Hour	Movement	LOS	Delay *(sec/veh)*	v/c
Parkside Drive	AM	*(overall intersection)*	B	10.1	0.57
	PM		B	14.7	0.73
4th Concession	AM	EB Left	F	105	0.03
		EB Right	C	16.6	0.18
	PM	EB Left	F	>200	0.16
		EB Right	C	20.1	0.22

The intersection with Parkside Drive is currently operating at a good overall level of service, with no critical movements identified.

The 4th Concession intersection is currently operating at a poor level of service for the eastbound left turn movement; however, this movement experiences negligible volumes (less than five vehicles per hour). The eastbound right turn movement is operating at a reasonable level of service (LOS C) and well under capacity.

3.0 Future Traffic Projections

During Phases 1 and 2 of the WATMP, the City's EMME/2 long-range transportation model was used to project traffic volumes on the existing and proposed future road network. The future volumes were based on the land use (population and employment) projected at the 2021 horizon, and included planned development areas in Waterdown. A model of 2006 volumes was also generated for a check of baseline conditions.

A review of the EMME/2 model results suggested that they may not be appropriate for use in this present analysis. The model generated link volumes at a high level; when focusing on specific intersections it appears to have understated existing and future traffic both on Highway 6 and on Parkside Drive, and overstated traffic on the 4th Concession. In addition, the EMME/2 future conditions modeling did not

include a scenario in which both Parkside Drive and the new East/West Road were open. As a result, a second set of future traffic volumes was generated from first principles, based on traffic projections for various development proposals near the study area, and with some existing and future development traffic on Parkside Drive diverted to the new East/West Road.

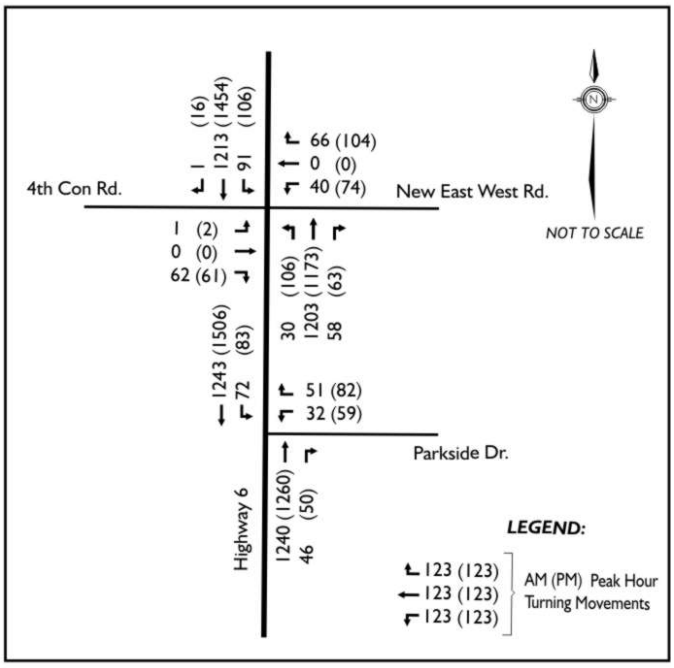
The new traffic projections include the following components:

3.1 Reassignment of Existing Traffic to Future Network

The new East/West Road will provide an alternate route across Waterdown for some traffic currently using Parkside Drive. Existing traffic on Parkside Drive consists of two components. Locally-generated traffic (i.e., traffic turning at intersections west of Hamilton Street) comprises approximately 30% of the traffic turning to/from Highway 6, and is unlikely to be attracted to the new East/West Road, since Parkside Drive will provide a more direct route. However, some of the remaining "through" traffic (i.e., vehicles traveling the full distance between Highway 6 and Hamilton Street) may be attracted to the new East/West Road.

It has been assumed that 80% of the through traffic on Parkside Drive east of Highway 6 will be attracted to the new East/West Road, and that Parkside Drive will serve the remaining through traffic along with all local traffic. There would be no change to existing turning movements to/from the 4th Concession. ***Figure 3*** illustrates the reassignment of existing traffic on the new road network.

Figure 3 — Reassignment of Existing Traffic on New Network



3.2 Through Traffic Growth

A background traffic growth rate of 1.5% per year, over a 15-year period, was applied to through traffic on Highway 6 to account for general growth in traffic due to external development. This equates to a 25% increase over existing through volumes. When combined with traffic generated by specific developments explicitly included in the total traffic projections, the effective growth on Highway 6 is estimated at 52% to 55% south of Parkside Drive, or approximately 3% per year (over a 15-year period).

3.3 Background Development Traffic

A number of significant developments are planned in the Waterdown area, and traffic from these developments will impact volumes both on Highway 6 and on the intersecting roadways.

3.3.1 Waterdown North

Approximately 2,000 residential units are planned in the area bounded approximately by Highway 6, Hamilton Street / Centre Road, Parkside Drive, and the new East/West Road. Two traffic impact studies have been prepared to date for development applications in this area:

- MC2 Homes, consisting of 206 units north of Parkside Drive and west of Centre Street. A traffic study was prepared in June 2005 by Read, Voorhees & Associates.
- Parkside Hills, consisting of 185 units north of Parkside Drive and west of Centre Street. A traffic study was prepared in October 2006 by Delcan Consulting.

Both of these studies assigned site trips to the Highway 6 / Parkside Drive intersection. However, these studies only account for 391 residential units, or approximately 20% of the ultimate planned development yield for Waterdown North. As a result, the combined site traffic projected in the two studies was expanded proportionally to the anticipated level of additional development.

The two studies assigned traffic to the existing road network only. However, the overall development area is situated between Parkside Drive and the new East/West Road and will have access to both roads, and therefore it is reasonable to assume some level of Waterdown North traffic will divert to the new East/West Road. The exact split will depend on factors such as the number and location of site accesses, the internal street network, and perceived travel time and congestion on the two routes to Highway 6; for analysis purposes, it was assumed that 70% of site traffic would use the new East/West Road, and the remaining 30% would use Parkside Drive.

3.3.2 Waterdown Bay

Waterdown Bay is a residential subdivision planned on the south side of Dundas Street east of the Waterdown CBD, generally south of the existing subdivision accessed via Burke Street and Pamela Street. Read, Voorhees & Associates (RVA) prepared a traffic impact study (May 2005) documenting the trips generated by 1,058 residential units. The RVA study area did not address the Highway 6 / Parkside Drive intersection. It was assumed that trips to the north would use Parkside Drive to access Highway 6, and that all other trips (local trips; trips to the southwest, southeast, east and west) would use other routes outside of the study area. Traffic traveling to/from Highway 6 was then assigned to Parkside Drive and the new East/West Road in the same proportion as existing “through” trips (70% on the new East/West Road; 30% on Parkside Drive).

3.3.3 Upcountry Estates

Upcountry Estates is a planned residential subdivision located east of Waterdown's current eastern limit of residential development between Dundas Street and Parkside Drive. There is a total of 619 units either approved or planned/submitted for future phases. Anticipated development-generated traffic was estimated using methodologies prescribed by the ITE publication, *Trip Generation* (7th edition, 2003), based on the published average rate for single-family homes (ITE Land Use Code 210).

Table 3 — Upcountry Estates Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	***Out***	***Total***	***In***	***Out***	***Total***
Trip Generation Rate	0.19	0.56	0.75	0.64	0.37	1.01
Site Trips (619 units)	120	345	465	395	230	625

Traffic was assigned to the study area intersections similarly to the Waterdown Bay trips. North-oriented trips comprise 4% of total trips and were divided 70% via the new East/West Road to Highway 6, and 30% via Parkside Drive to Highway 6. The remainder of trips would use other routes and would not travel in the study area.

3.3.4 Parkside Drive Industrial Park

An industrial park is proposed in the southeast corner of the Highway 6 / Parkside Drive intersection, consisting of prestige employment space accommodating approximately 500 employees. Trips for this development were generated based on the published average rate for industrial parks (ITE Land Use Code 130); the total number of generated trips is outlined in ***Table 4***. Trips were then distributed to the road network based on data from the *Transportation Tomorrow Survey* (TTS), as summarized in ***Table 5***.

Table 4 — Industrial Park Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	***Out***	***Total***	***In***	***Out***	***Total***
Trip Generation Rate	0.40	0.07	0.47	0.09	0.37	0.46
Site Trips (500 employees)	200	35	235	45	185	230

Table 5 — Industrial Park Trip Distribution

	AM In	AM Out	PM In	PM Out
Highway 6 North	2%	13%	3%	5%
Highway 6 South	69%	36%	41%	75%
Parkside Drive East	29%	51%	56%	20%

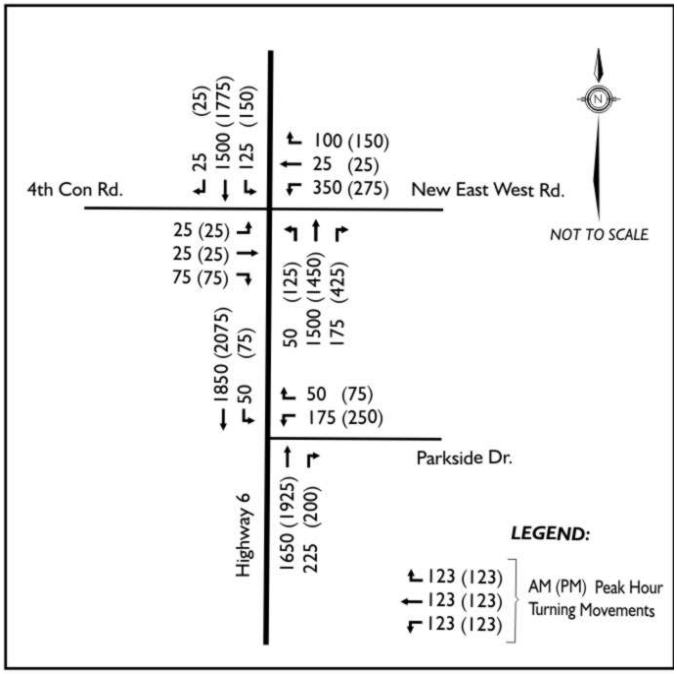
3.4 Total Future Traffic Volumes

The total future traffic volumes applied to the future intersection analyses consisted of all elements outlined above, including:

- Reassignment of existing traffic to new East/West Road, where appropriate;
- Through traffic growth of 1.5% per year on Highway 6; and
- Traffic generated by future development, including the Waterdown North, Waterdown Bay and Upcountry Estates residential developments, and the proposed industrial park south of Parkside Drive.

The resulting total future traffic volumes (rounded to the nearest 25 vehicles) are illustrated in ***Figure*** below.

Figure 4 — Total Future Traffic Volumes



4.0 Traffic Operations Assessment of Alternative Alignments

4.1 Alternatives Under Consideration

There are five alternate alignments for the East/West Road under consideration (illustrated in ***Attachment 1***). All five alignments would form a full (four-leg) intersection with Highway 6 opposite a realignment of the 4th Concession. From the perspective of the traffic assessment, the five alignments are primarily differentiated by their distance from Parkside Drive. Three of the alignments are generally in the vicinity of the existing intersection, while two of them would shift the 4th Concession intersection more significantly to the north. The five options under consideration are as follows:

- Option 1: 880 m north of Parkside Drive
- Option 2: 730 m north of Parkside Drive
- Option 3: 475 m north of Parkside Drive
- Option 4: 430 m north of Parkside Drive
- Option 5: 380 m north of Parkside Drive

The assessment of the five options is based on intersection spacing to Parkside Drive, and therefore assumes that Parkside Drive will remain open. If Parkside Drive is closed (including a sub-scenario in which an interchange is provided at the East-West Road), there is no difference between the five scenarios from a traffic perspective.

4.2 Signal Spacing – Ministry Policy

North of Dundas Street, Highway 6 is designated by MTO as a Class 2B Arterial. Based on the MTO's draft Access Management Guideline (July 2007), the preferred signal spacing for this type of facility is 1.6 km or greater, with a minimum spacing of 800 metres. Only Option 1 meets this criterion, being located 880 metres from the traffic signals at Parkside Drive. Option 2 falls slightly below this criterion, whereas Options 3 through 5 fall further below this criterion (signal spacing of approximately 400 to 500 metres). Note that the distance between 4th Concession Road and Dundas Street is approximately 1.6 km.

4.3 Signal Spacing – Left Turn Lane Requirements

The five alignments were also observed from the standpoint of whether the spacing is sufficient to accommodate left turn lanes in both directions along Highway 6. A northbound left turn lane will be required at the 4th Concession / East/West Road intersection, and a southbound left turn lane will be required at Parkside Drive. The spacing between the two intersections would need to accommodate the required storage, parallel (deceleration) lane, and taper requirements for these back-to-back left turn lanes.

Parallel lane and taper requirements were determined based on MTO standards for design speeds of 90 and 100 km/h. Left turn storage was calculated based on the MTO methodology, using the estimated left turn volumes, a 120-second cycle length, and an assumed standard of LOS A (i.e., storage to accommodate a 95th percentile queue). Under this methodology, 60 metres of northbound left turn storage would be required at the 4th Concession, and 37.5 metres of southbound left turn storage would be required at Parkside Drive.

Table 6 below summarizes the spacing that would be required to accommodate all intersection elements.

Table 6 — Minimum Intersection Spacing to Accommodate Left Turn Lanes

Item	Required Distance	
	90 km/h design speed	***100 km/h design speed***
Stop bar offset from 4th Concession centre line	15 m	15 m
Storage length – northbound left turn	60 m	60 m
Parallel lane – northbound left turn	80 m	95 m
Taper (shared between northbound/southbound)	75 m	80 m
Parallel lane – southbound left turn	80 m	95 m
Storage length – southbound left turn	37.5 m	37.5 m
Stop bar offset from Parkside Drive centre line	15 m	15 m
Minimum intersection spacing:	**362.5 m**	**397.5 m**

As outlined in ***Table 6*** above, an intersection spacing of at least 400 metres would be required to accommodate full-standard back-to-back left turn lanes at a 100 km/h design speed. Option 5 (380-metre spacing) would therefore fall slightly below this level, meaning that either storage, taper, or parallel lane length would need to be reduced somewhat at one or both intersections.

All other options can accommodate the full storage and parallel lane / taper requirements.

4.4 Traffic Signal Progression

The Parkside Drive signal currently operates under fully-actuated control, resulting in a variable cycle length depending on traffic activity and green time demands on the side street. A new traffic signal installed at 4th Concession and the new East/West Road would be close enough to Parkside Drive that it would be desirable to operate the two signalized intersections together as a pair of co-ordinated signals, at least during peak times.

On this basis, the five options were reviewed to assess the potential for the intersection spacing to accommodate traffic progression. In the best case, a platoon of traffic leaving the upstream intersection would be able to proceed through the downstream intersection without stopping at a red signal. In the worst case, the platoon would arrive at a downstream traffic signal as it turns to red; this would result in increased delays and queues along the highway, and could potentially impact operations at the upstream intersection depending on intersection spacing and through volumes.

The feasibility of signal co-ordination was reviewed using the Synchro (version 6) traffic analysis software package. A network was set up consisting of the two subject intersections, and five versions of the network were assessed with intersection spacing corresponding to the five alignment options under consideration. (The next signalized intersection to the north is at Millgrove Sideroad, 3.1 km north of the 4th Concession, and is far enough away as to not impact progression. There will be no other signalized intersections to the south once the Dundas Street interchange has been completed.) A cycle length of 120 seconds was assumed based on individual intersection requirements, and intersection offsets were optimized. The progression assumes the existing posted speed limit of 80 km/h. The time-space diagrams are shown in ***Attachment 2***, and indicate the quality of traffic progression through the two intersections.

During the AM peak hour, progression has been set up to favour southbound traffic. Option 1 (880-metre spacing) affords the best opportunity for signal progression in both directions. Options 3, 4, and 5 can provide good southbound progression but northbound platoons will be interrupted at 4th Concession. In Option 2 (730-metre spacing), traffic platoons would be disrupted in both directions (or, if progression is optimized for southbound traffic, the northbound platoon would reach 4th Concession at the start of the red signal).

During the PM peak hour, progression tends to favour northbound traffic, but otherwise similar patterns are evident. Option 1 (880-metre spacing) affords the best opportunity for signal progression in both directions. Options 3, 4, and 5 can provide good northbound progression but southbound platoons will be interrupted at Parkside Drive. In Option 2 (730-metre spacing), good progression can be provided northbound, but southbound traffic would be more significantly impacted.

These analyses indicate that traffic progression can be most easily accommodated in Option 1 (880-metre spacing). Options 3, 4, and 5 (ranging from 380 metres to 475 metres) can accommodate progression in the predominant direction but with moderate impacts in the opposite direction. Option 2 would provide longer intersection spacing than Options 3, 4 or 5, but would be the least suitable from the perspective of accommodating two-way traffic progression.

4.5 Intersection Level of Service

For each of the five alternatives, the level of service and average delay were noted for the intersection as a whole and for the northbound and southbound through movements. These measures are sensitive to the quality of signal co-ordination and traffic progression (e.g., if signals are perfectly co-ordinated, most traffic will not have to stop and the average delay will be low, whereas if signals are poorly co-ordinated, most traffic will have to stop at intermediate signals and consequently the average delay will be high). ***Table 7*** and ***Table 8*** compare the level of service and delays during the AM and PM peak hours, respectively, at both the East/West Road intersection and at the Parkside Drive intersection.

Table 7 — AM Peak Hour Intersection Operations

Hwy. 6 at:	Option	Overall Intersection Operations		Through Traffic Operations			
				Northbound		Southbound	
		LOS	Delay *(s/veh)*	LOS	Delay *(s/veh)*	LOS	Delay *(s/veh)*
4th Concession / East/West Road	1 *(880 m spacing)*	D	35.7	C	30.1	D	37.1
	2 *(730 m spacing)*	D	38.2	C	34.5	D	38.1
	3 *(475 m spacing)*	D	38.2	C	34.5	D	38.1
	4 *(430 m spacing)*	D	37.8	C	33.7	D	38.0
	5 *(380 m spacing)*	D	37.7	C	33.6	D	38.0
Parkside Drive	1 *(880 m spacing)*	B	15.6	B	15.2	B	13.3
	2 *(730 m spacing)*	B	16.1	B	15.8	B	13.9
	3 *(475 m spacing)*	B	12.8	B	15.5	A	6.9
	4 *(430 m spacing)*	B	12.7	B	15.5	A	6.7
	5 *(380 m spacing)*	B	12.2	B	15.5	A	5.8

Table 8 — PM Peak Hour Intersection Operations

Hwy. 6 at:	Option	Overall Intersection Operations		Through Traffic Operations			
				Northbound		Southbound	
		LOS	Delay *(s/veh)*	LOS	Delay *(s/veh)*	LOS	Delay *(s/veh)*
4th Concession / East/West Road	1 *(880 m spacing)*	C	30.0	B	14.8	D	39.4
	2 *(730 m spacing)*	C	29.3	B	12.9	D	39.4
	3 *(475 m spacing)*	C	29.2	B	12.7	D	39.4
	4 *(430 m spacing)*	C	29.2	B	12.7	D	39.4
	5 *(380 m spacing)*	C	29.2	B	12.6	D	39.4
Parkside Drive	1 *(880 m spacing)*	C	25.6	C	27.5	B	19.8
	2 *(730 m spacing)*	C	28.4	C	27.5	C	26.2
	3 *(475 m spacing)*	C	24.4	C	27.5	B	17.2
	4 *(430 m spacing)*	C	23.7	C	27.5	B	15.6
	5 *(380 m spacing)*	C	23.1	C	27.5	B	14.1

In addition to intersection level of service, queues were reviewed along Highway 6 on the link between the two intersections. Queue length can be another indicator of the quality of progression, and also was noted to determine the potential for queues to impact traffic flow at the upstream intersection. Queues were obtained through simulation using the SimTraffic software package, to account for signal co-ordination, vehicle acceleration and deceleration, and traffic interaction between the two intersections. Traffic was simulated over a 30-minute period. ***Table 9*** indicates the simulated 95th percentile through queues between the two intersections (i.e., southbound queues at Parkside Drive; northbound queues at 4th Concession and the East/West Road) in comparison to the link distance (i.e., storage distance) between the two intersections.

Table 9 — Comparison of Simulated Queues

Option	Storage (m)*	95th Percentile Through Queue (m)			
		Southbound at Parkside Dr.		Northbound at 4th Concession	
		AM	PM	AM	PM
1	850	60	65	295	135
2	700	160	240	285	300
3	445	145	160	265	375
4	400	130	160	290	175
5	350	125	175	250	265

**Link distance between intersections, not including 15-metre centre-line offsets*

The table above illustrates that, for southbound traffic, Option 1 results in the shortest queues (and, therefore, a lower number of stopped vehicles), while Option 2 results in the longest queues. This is generally consistent with the time-space diagrams, which found that Option 2 resulted in the poorest potential for signal co-ordination.

For northbound traffic, the five options are comparatively similar during the AM peak hour, with Option 5 resulting in slightly shorter queues, and are more variable during the PM peak hour, with Options 1 and 4 resulting in the shortest queues, and Options 2 and 4 resulting in the longest queues.

It should be noted that the side street green time demands are higher at the 4th Concession intersection than at Parkside Drive, and therefore southbound traffic may have a greater potential to be metered. This may account for some of the wider variability in projected southbound queues, particularly during the PM peak hour.

No queues were observed to block the upstream intersection. However, in the three options with spacing less than 500 metres, there is potential that some vehicles may need to decelerate through the upstream intersection during the AM and/or PM peak hours. (Outside of the peak hours, when volumes are lower, queues will be shorter and will be accommodated under all design options.)

4.6 Summary of Traffic Operations at Intersection Alternatives

There are five alternate alignments for the new East-West Road in the vicinity of Highway 6. The alignments would result in a range of intersection spacing, from 880 metres (Option 1) to 380 metres (Option 5).

The MTO typically requires a spacing of 800 metres between signalized intersections on its arterial highways. Only Option 1 exceeds this distance (Option 2 nearly meets it, at 730 metres). Notwithstanding, intersection traffic analyses were undertaken for each option to determine the potential for shorter intersection spacing to operate at an acceptable level.

All options have sufficient spacing to accommodate back-to-back left turn lanes at a design speed of 100 km/h, with the exception of Option 5, which is slightly shorter than the required distance (by approximately 20 metres). In that case, the storage, taper, or parallel lane length would need to be reduced somewhat at one or both intersections.

Time-space diagrams prepared using Synchro indicate that Option 1 has the best opportunity for signal co-ordination, followed by Options 3, 4 and 5. Option 2 results in the poorest opportunity for signal co-ordination.

The quality of signal progression has a corresponding impact on intersection performance (delays and queues). Option 2 generally results in the highest level of delay for the overall intersections and for the through movements on Highway 6. Options 3, 4, and 5 generally result in the lowest level of delay. The differential between the five options is comparatively low (approximately 5 seconds per vehicle or less for overall intersection delay). Option 2 also generally results in the longest queues, whereas for the most part Option 1 results in the shortest queues.

There is minimal difference between the five alternatives in terms of intersection capacity.

5.0 Conclusions

Based on the above, Option 1 (880-metre intersection spacing) is preferred from a traffic perspective; it meets typical MTO spacing standards, has the best opportunity for signal co-ordination, and therefore tends to result in the best intersection and corridor operations (LOS / delays; queues).

Options 3, 4 and 5 involve reduced intersection spacing (ranging from 380 to 475 metres), but can operate in a satisfactory manner from a signal co-ordination and intersection operations perspective. Option 5 would require a minor reduction in left turn lane geometry at one or both intersections to accommodate back-to-back left turn lanes.

Option 2 is least preferred from the perspective of signal co-ordination and traffic operations. The spacing of 730 metres is the least conducive to two-way traffic progression at the posted speed of 80 km/h.

Attachment 1
Alternative Alignments

OPTION 1

OPTION 2

OPTION 3

OPTION 4

OPTION 5

R=280m

R=500m

R=250m

R=150m

R=1500m

R=1000m

R=2000m

CONCESSION 4

HIGHWAY 6

PARKSIDE DRIVE

H.O.T. 40+000 E-W ROAD
= H.O.T. 10+000.00 HIGHWAY 6

PRELIMINARY

Hamilton
Public Works

ALIGNMENT ALTERNATIVE AT HIGHWAY 6 (WITH WEST SIDE CONECTION)

DILLON CONSULTING

NEW E-W ROAD
CLASS ENVIRONMENTAL ASSESSMEN
HWY 6 TO BRANT STREET

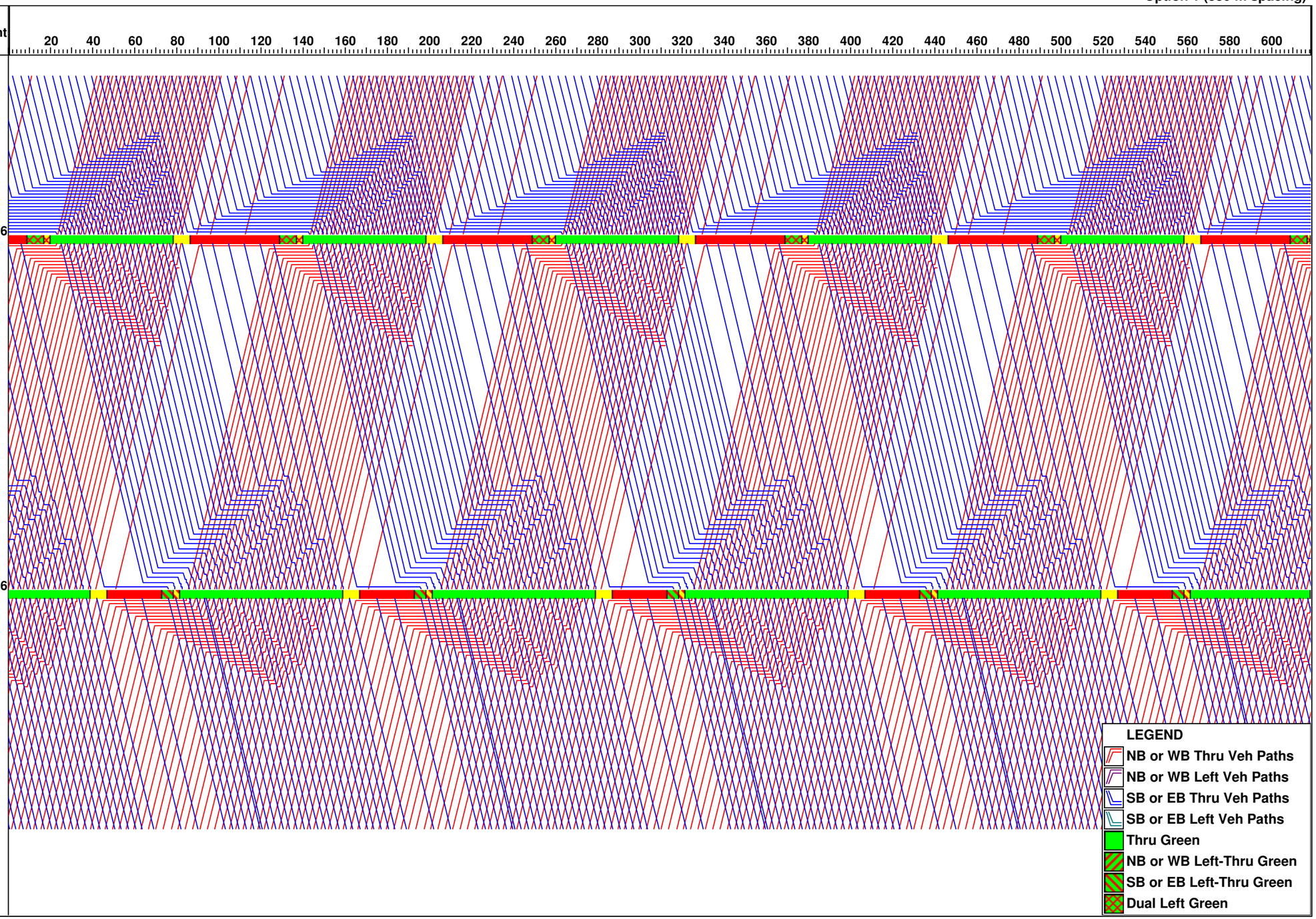
CHECKED BY: ---
DESIGN BY: ---
DRAWN BY: ---
SCALE: NTS
DATE: FEB. 5, 2009
PROJECT No. 08-9020

FIGURE 1

Attachment 2
Time-Space Diagrams

AM Peak Hour
Option 1 (880 m spacing)

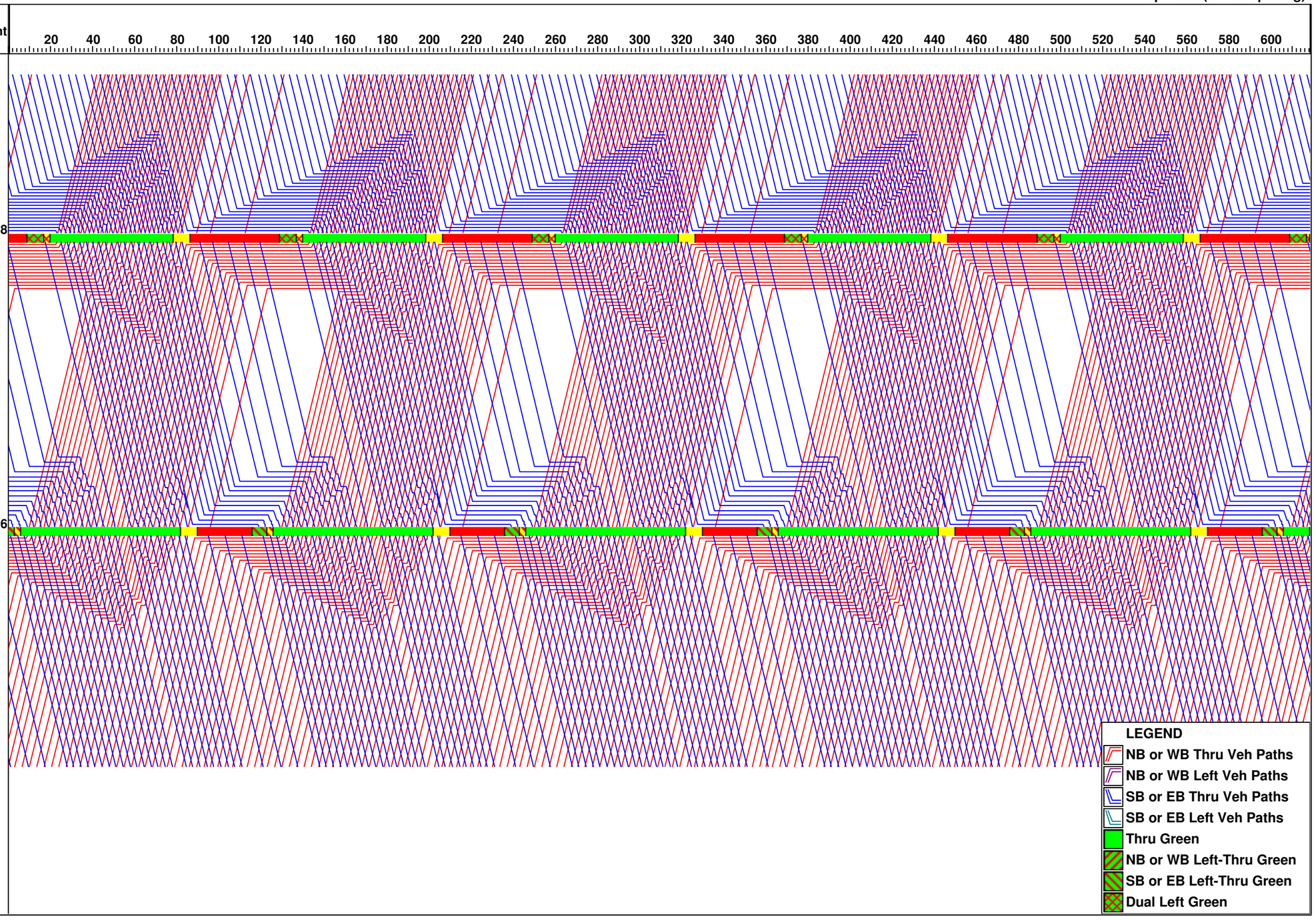
Main Street / Cross Street / Offset	Approach	Lt	Th	Rt	Int
Highway # 6	↓	74	37	7	36
@ New East West Road	↑	18	30	2	
20					
Highway # 6	↓	10	13		16
@ Parkside Drive	↑		15	1	
83					



Dillon Consulting

AM Peak Hour
Option 2 (730 m spacing)

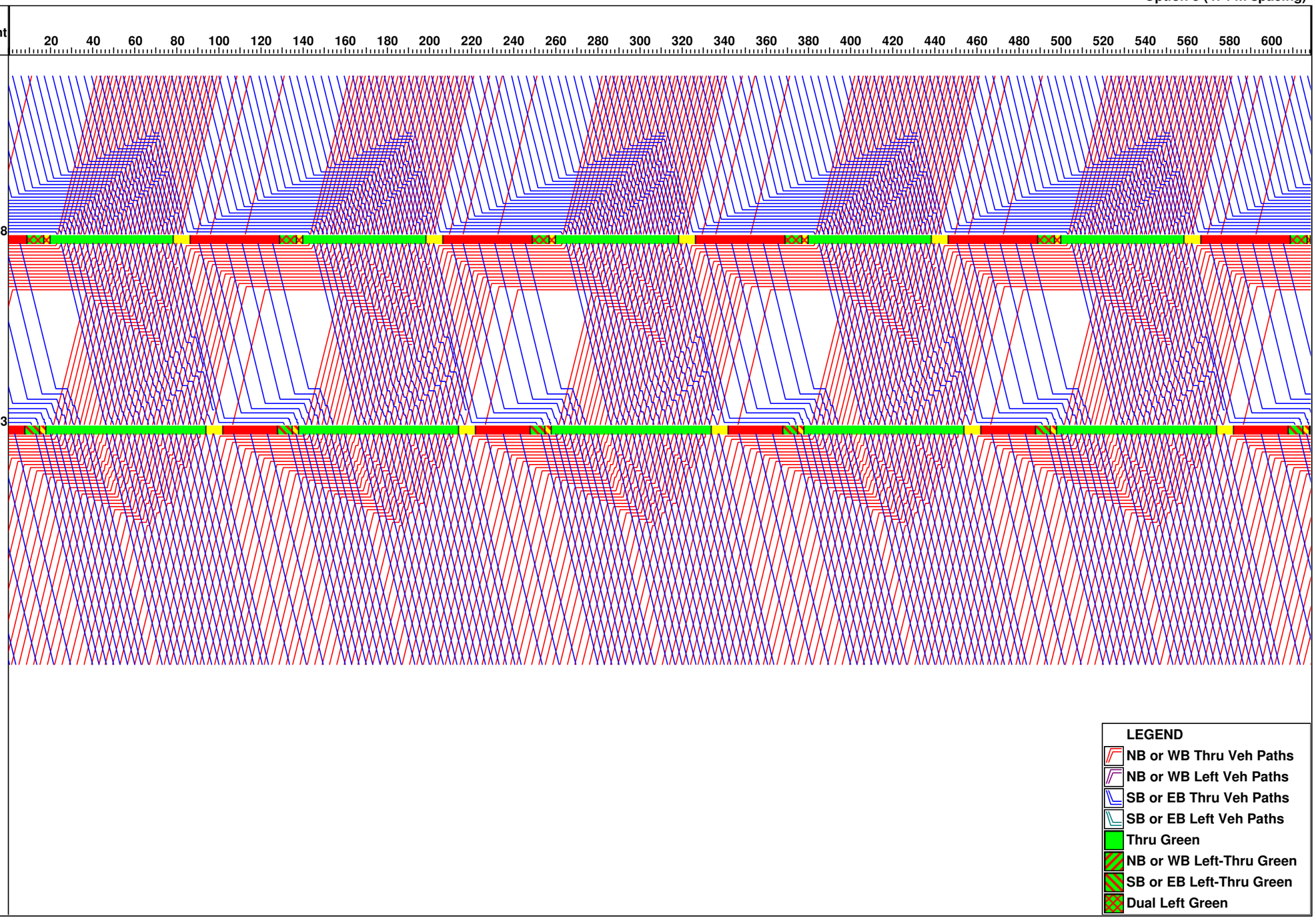
Main Street / Cross Street / Offset	Approach	Delays (s.) Lt	Th	Rt	Int
Highway # 6	↓	75	38	7	38
@ New East West Road	↑	22	34	5	
20					
Highway # 6	↓	13	14		16
@ Parkside Drive	↑		16	1	
6					



Dillon Consulting

AM Peak Hour
Option 3 (474 m spacing)

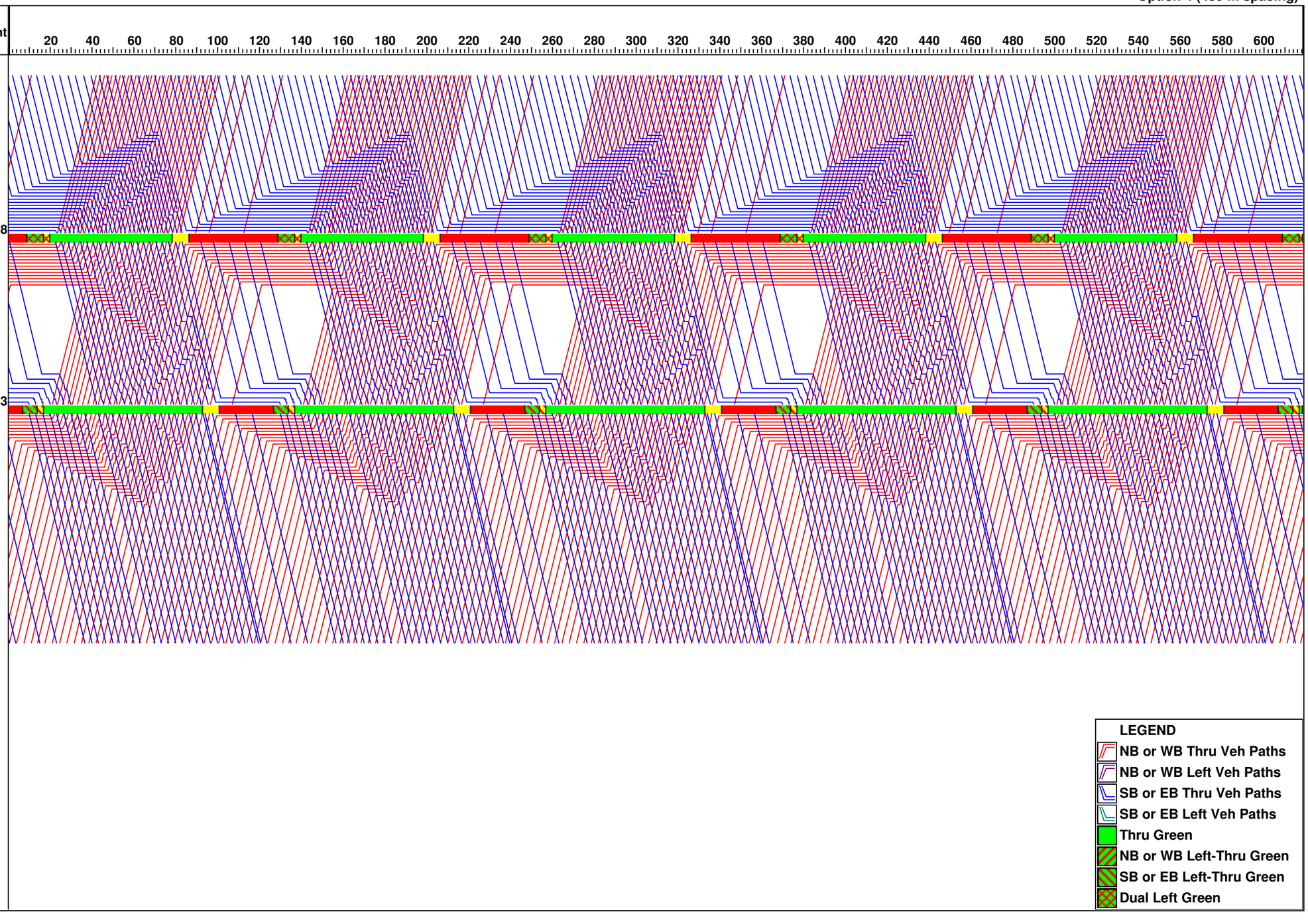
Main Street / Cross Street / Offset	Approach	Lt	Th	Rt	Int
Highway # 6		75	38	7	38
@ New East West Road		22	34	5	
20					
Highway # 6		13	7		13
@ Parkside Drive			16	1	
18					



Dillon Consulting

AM Peak Hour
Option 4 (430 m spacing)

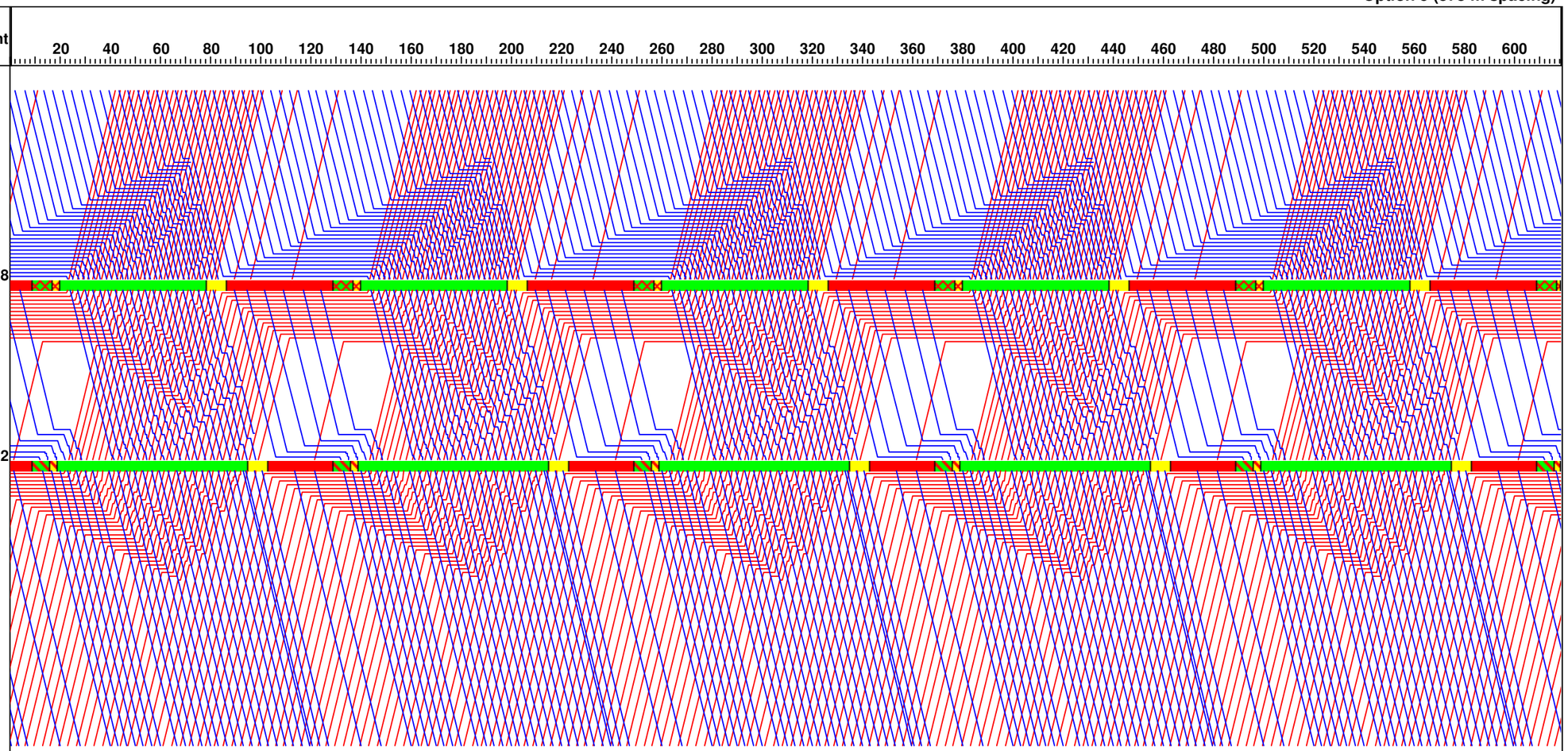
Main Street / Cross Street / Offset	Approach	Delays (s.) Lt	Th	Rt	Int
Highway # 6		75	38	7	38
@ New East West Road		22	34	5	
20					
Highway # 6		13	7		13
@ Parkside Drive			16	1	
17					



Dillon Consulting

AM Peak Hour
Option 5 (378 m spacing)

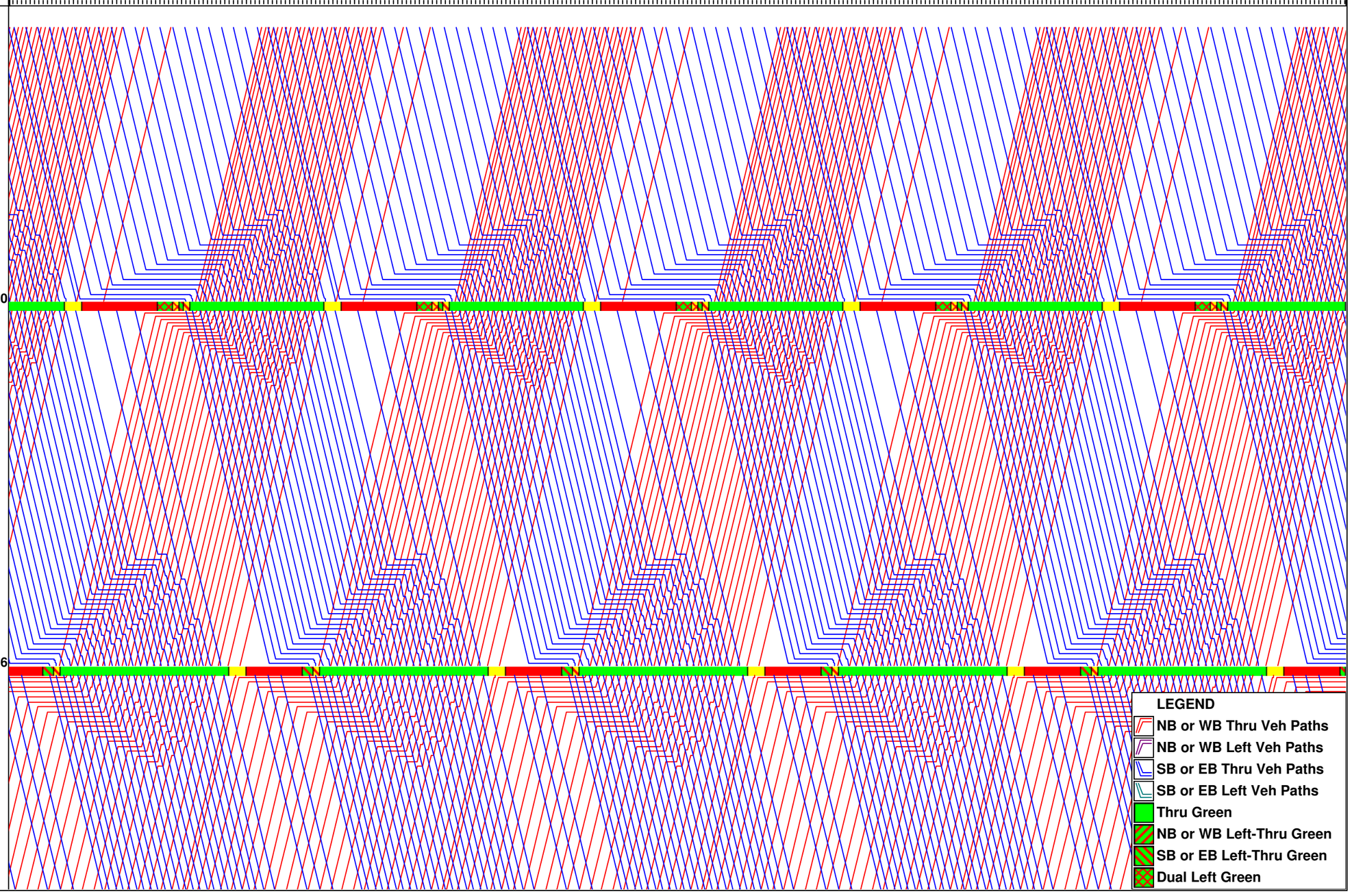
Main Street / Cross Street / Offset	Approach	Delays (s.) Lt	Th	Rt	Int
Highway # 6	↓	75	38	7	38
@ New East West Road	↑	22	34	5	
20					
Highway # 6	↓	13	6		12
@ Parkside Drive	↑		15	1	
19					



Dillon Consulting

PM Peak Hour
Option 1 (880 m spacing)

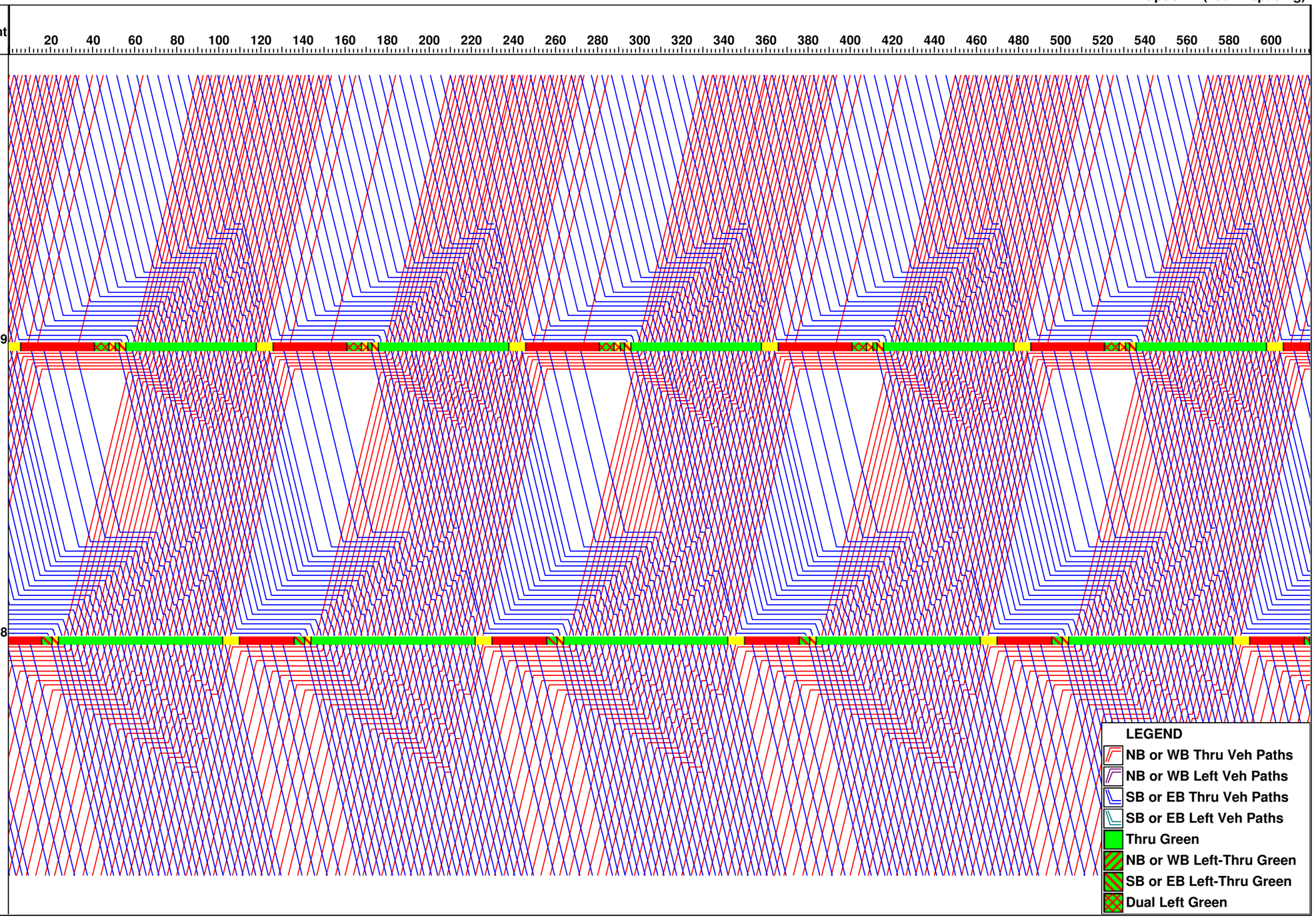
Main Street / Cross Street / Offset	Approach	Delays (s.) Lt	Th	Rt	Int
Highway # 6		53	39	5	30
@ New East West Road		62	15	2	
84					
Highway # 6		23	20		26
@ Parkside Drive			28	1	
24					



Dillon Consulting

PM Peak Hour
Option 2 (730 m spacing)

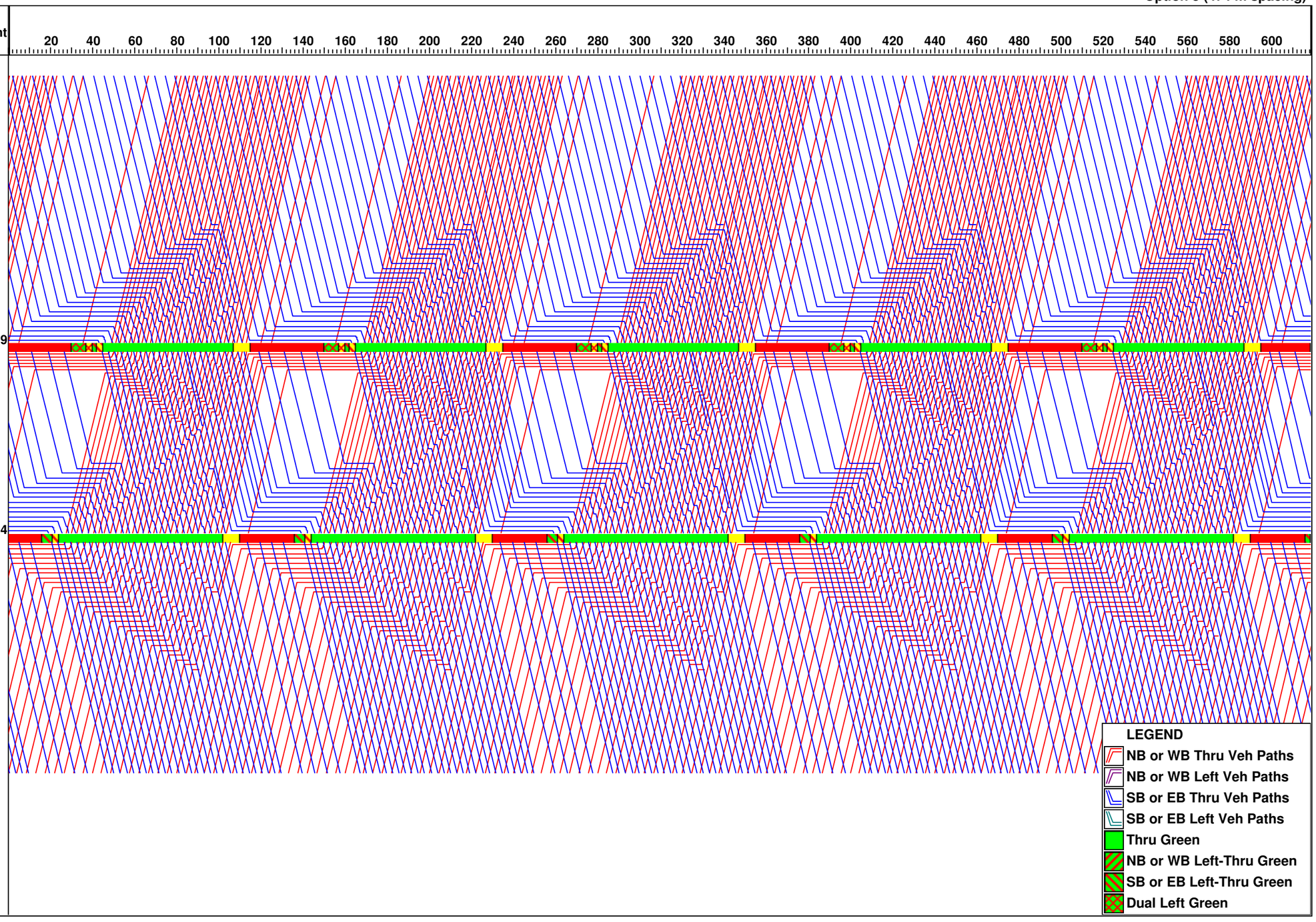
Main Street / Cross Street / Offset	Approach	Lt	Th	Rt	Int
Highway # 6		53	39	5	29
@ New East West Road		60	13	1	
56					
Highway # 6		17	26		28
@ Parkside Drive			28	1	
24					



Dillon Consulting

PM Peak Hour
Option 3 (474 m spacing)

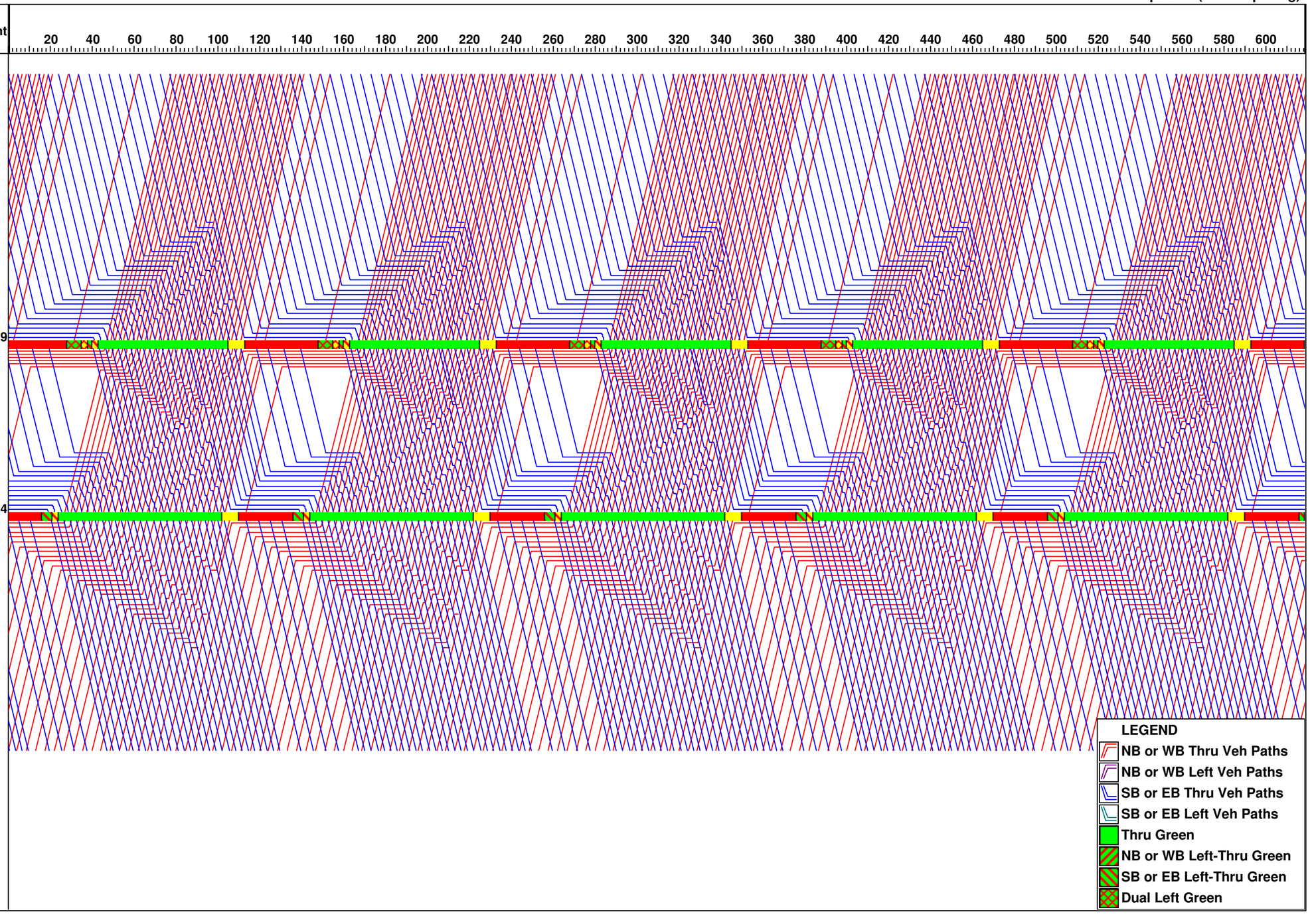
Main Street / Cross Street / Offset	Approach	Delays (s.) Lt	Th	Rt	Int
Highway # 6		53	39	5	29
@ New East West Road		60	13	1	
45					
Highway # 6		22	17		24
@ Parkside Drive			28	1	
24					



Dillon Consulting

PM Peak Hour
Option 4 (430 m spacing)

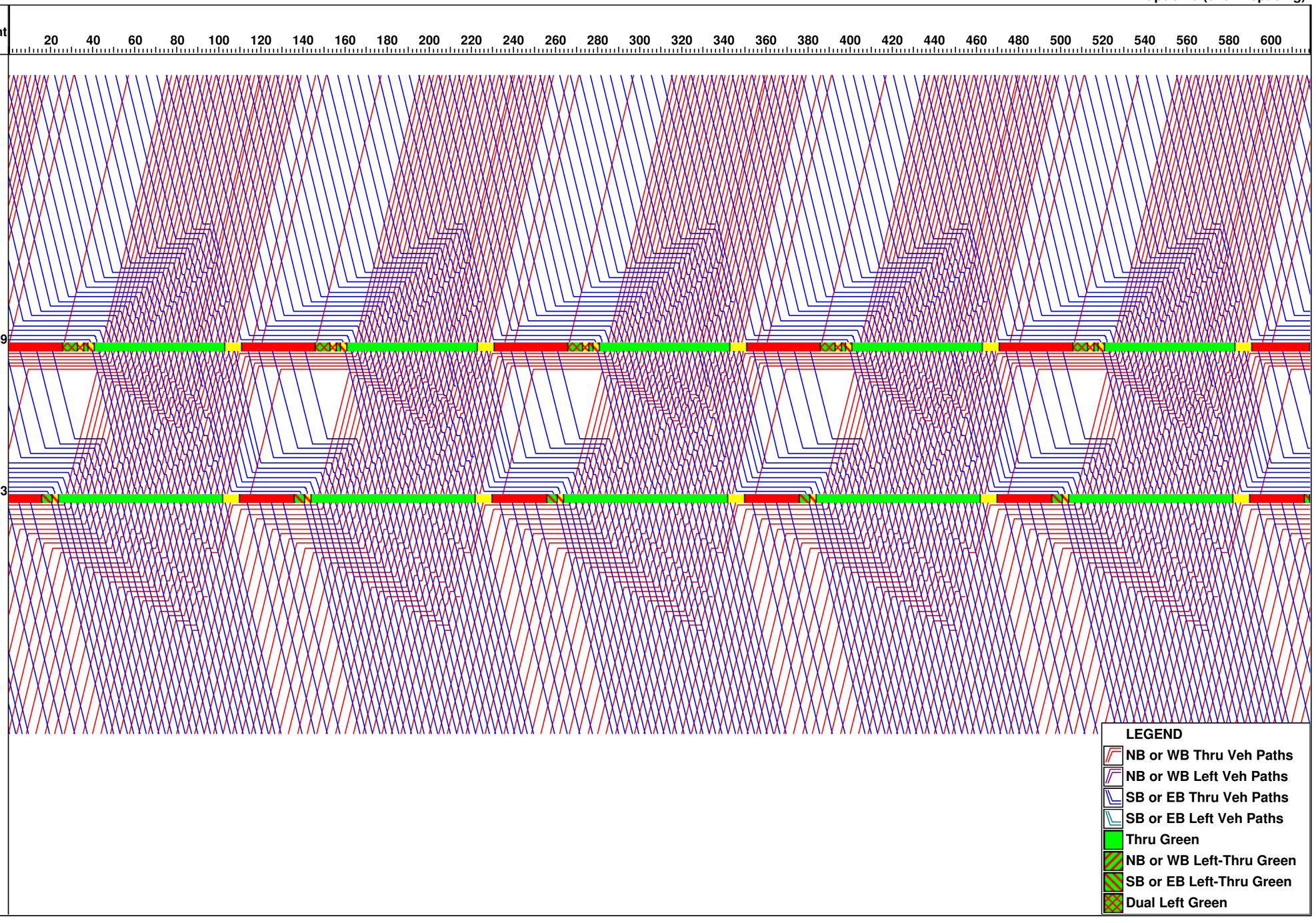
Main Street / Cross Street / Offset	Approach	Lt	Th	Rt	Int
Highway # 6		53	39	5	29
@ New East West Road		60	13	1	
43					
Highway # 6		23	16		24
@ Parkside Drive			28	1	
24					



Dillon Consulting

PM Peak Hour
Option 5 (378 m spacing)

Main Street / Cross Street / Offset	Approach	Lt	Th	Rt	Int
Highway # 6		53	39	5	29
@ New East West Road		60	13	1	
41					
Highway # 6		24	14		23
@ Parkside Drive			28	1	
24					



Dillon Consulting

Attachment 3
Synchro Analysis Worksheets

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	1	62	30	1269	1304	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	67	33	1379	1417	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2172	709	1418			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2172	709	1418			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	82	93			
cM capacity (veh/h)	37	377	476			

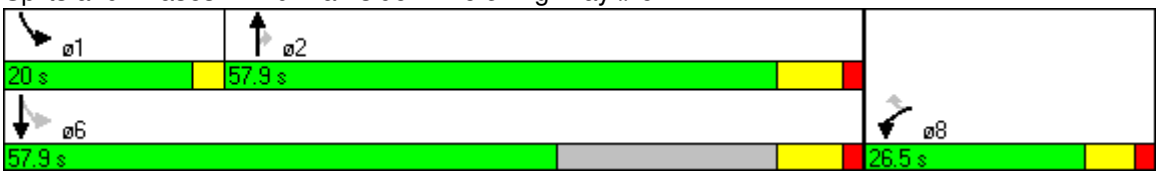
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	1	67	33	690	690	709	709	1
Volume Left	1	0	33	0	0	0	0	0
Volume Right	0	67	0	0	0	0	0	1
cSH	37	377	476	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.18	0.07	0.41	0.41	0.42	0.42	0.00
Queue Length 95th (m)	0.7	5.1	1.8	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	105.1	16.6	13.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C	B					
Approach Delay (s)	18.0		0.3			0.0		
Approach LOS	C							

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	180.0	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.950				0.100	
Satd. Flow (perm)	1736	1568	3282	1538	184	3252
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		127		113		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			437.1
Travel Time (s)	82.4		26.8			19.7
Volume (vph)	72	117	1182	104	163	1203
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Adj. Flow (vph)	78	127	1285	113	177	1308
Lane Group Flow (vph)	78	127	1285	113	177	1308
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.5	26.5	57.9	57.9	20.0	57.9
Total Split (%)	25.4%	25.4%	55.5%	55.5%	19.2%	55.5%
Maximum Green (s)	20.0	20.0	50.0	50.0	17.0	50.0
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	12.4	12.4	54.7	54.7	62.6	63.7
Actuated g/C Ratio	0.15	0.15	0.67	0.67	0.75	0.78
v/c Ratio	0.31	0.38	0.59	0.11	0.73	0.52
Control Delay	35.2	10.2	11.7	2.0	26.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	10.2	11.7	2.0	26.8	5.4
LOS	D	B	B	A	C	A
Approach Delay	19.7		10.9			8.0
Approach LOS	B		B			A

Intersection Summary	
Area Type:	Other
Cycle Length: 104.4	
Actuated Cycle Length: 82	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 10.1	Intersection LOS: B
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

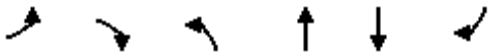
Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.95	1.00	1.00	1.00	0.15	1.00
Satd. Flow (perm)	1736	1568	3282	1538	275	3252
Volume (vph)	72	117	1182	104	163	1203
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	127	1285	113	177	1308
RTOR Reduction (vph)	0	111	0	41	0	0
Lane Group Flow (vph)	78	16	1285	72	177	1308
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	8.9	8.9	50.8	50.8	60.4	60.4
Effective Green, g (s)	10.4	10.4	53.7	53.7	63.3	63.3
Actuated g/C Ratio	0.12	0.12	0.64	0.64	0.76	0.76
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	216	195	2106	987	289	2459
v/s Ratio Prot	c0.04		0.39		0.03	c0.40
v/s Ratio Perm		0.01		0.05	c0.43	
v/c Ratio	0.36	0.08	0.61	0.07	0.61	0.53
Uniform Delay, d1	33.6	32.4	8.8	5.6	6.3	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2	0.8	0.1	2.7	0.4
Delay (s)	34.6	32.6	9.6	5.7	9.0	4.6
Level of Service	C	C	A	A	A	A
Approach Delay (s)	33.4		9.3			5.1
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	2	61	106	1277	1560	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	66	115	1388	1696	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2620	848	1713			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2620	848	1713			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	78	69			
cM capacity (veh/h)	13	305	366			

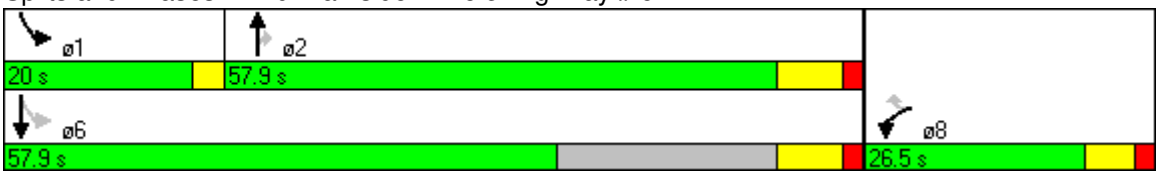
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	2	66	115	694	694	848	848	17
Volume Left	2	0	115	0	0	0	0	0
Volume Right	0	66	0	0	0	0	0	17
cSH	13	305	366	1700	1700	1700	1700	1700
Volume to Capacity	0.16	0.22	0.31	0.41	0.41	0.50	0.50	0.01
Queue Length 95th (m)	3.5	6.5	10.6	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	320.0	20.1	19.3	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	C	C					
Approach Delay (s)	29.6		1.5			0.0		
Approach LOS	D							

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	180.0	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.950				0.110	
Satd. Flow (perm)	1770	1495	3312	1583	203	3343
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		202		123		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			438.2
Travel Time (s)	82.4		26.8			19.7
Volume (vph)	133	186	1197	113	189	1432
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Adj. Flow (vph)	145	202	1301	123	205	1557
Lane Group Flow (vph)	145	202	1301	123	205	1557
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.5	26.5	57.9	57.9	20.0	57.9
Total Split (%)	25.4%	25.4%	55.5%	55.5%	19.2%	55.5%
Maximum Green (s)	20.0	20.0	50.0	50.0	17.0	50.0
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	Min	Min	None	Min
Act Effct Green (s)	14.0	14.0	42.2	42.2	58.5	53.4
Actuated g/C Ratio	0.17	0.17	0.53	0.53	0.73	0.67
v/c Ratio	0.47	0.47	0.75	0.14	0.63	0.70
Control Delay	38.5	9.3	18.6	2.8	18.6	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	9.3	18.6	2.8	18.6	10.4
LOS	D	A	B	A	B	B
Approach Delay	21.5		17.2			11.3
Approach LOS	C		B			B

Intersection Summary	
Area Type:	Other
Cycle Length: 104.4	
Actuated Cycle Length: 80.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 14.7	Intersection LOS: B
Intersection Capacity Utilization 65.6%	ICU Level of Service C
Analysis Period (min) 15	

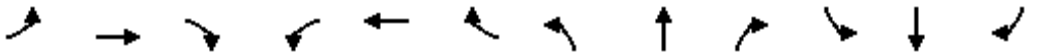
Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.95	1.00	1.00	1.00	0.13	1.00
Satd. Flow (perm)	1770	1495	3312	1583	247	3343
Volume (vph)	133	186	1197	113	189	1432
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	202	1301	123	205	1557
RTOR Reduction (vph)	0	167	0	58	0	0
Lane Group Flow (vph)	145	35	1301	65	205	1557
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	13.0	13.0	41.3	41.3	52.4	52.4
Effective Green, g (s)	14.0	14.0	42.3	42.3	58.3	53.4
Actuated g/C Ratio	0.18	0.18	0.53	0.53	0.73	0.67
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	311	262	1756	839	352	2237
v/s Ratio Prot	c0.08		c0.39		0.07	c0.47
v/s Ratio Perm		0.02		0.04	0.36	
v/c Ratio	0.47	0.14	0.74	0.08	0.58	0.70
Uniform Delay, d1	29.5	27.8	14.5	9.2	7.6	8.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.2	2.1	0.1	1.6	1.2
Delay (s)	30.7	28.0	16.6	9.3	9.2	9.4
Level of Service	C	C	B	A	A	A
Approach Delay (s)	29.1		16.0			9.4
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	19.3
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

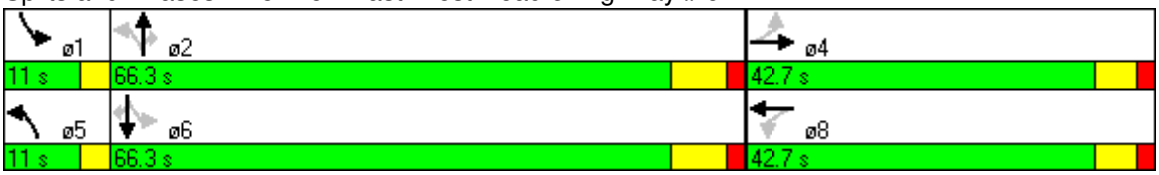
c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.880				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1736	1626	0	1770	3282	1538	1752	3252	1583
Flt Permitted	0.639			0.681			0.065			0.065		
Satd. Flow (perm)	1190	1652	0	1244	1626	0	121	3282	1538	120	3252	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			109				158			22
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		469.5			1387.8			880.3			417.5	
Travel Time (s)		28.2			83.3			39.6			18.8	
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
Lane Group Flow (vph)	27	109	0	380	136	0	54	1630	190	136	1630	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.2	17.2		17.2	17.2		11.0	28.6	28.6	11.0	28.6	28.6
Total Split (s)	42.7	42.7	0.0	42.7	42.7	0.0	11.0	66.3	66.3	11.0	66.3	66.3
Total Split (%)	35.6%	35.6%	0.0%	35.6%	35.6%	0.0%	9.2%	55.3%	55.3%	9.2%	55.3%	55.3%
Maximum Green (s)	36.2	36.2		36.2	36.2		8.0	58.4	58.4	8.0	58.4	58.4
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	37.7	37.7		37.7	37.7		65.6	61.3	61.3	69.5	64.7	64.7
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.55	0.51	0.51	0.58	0.54	0.54
v/c Ratio	0.07	0.19		0.97	0.23		0.43	0.97	0.22	0.90	0.93	0.03
Control Delay	29.7	10.7		80.4	9.6		18.4	30.1	2.2	74.4	37.1	6.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	10.7		80.4	9.6		18.4	30.1	2.2	74.4	37.1	6.6
LOS	C	B		F	A		B	C	A	E	D	A
Approach Delay		14.5			61.8			27.0			39.4	
Approach LOS		B			E			C			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 20 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 110		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay: 35.9	Intersection LOS: D	
Intersection Capacity Utilization 86.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1736	1626		1770	3282	1538	1752	3252	1583
Flt Permitted	0.64	1.00		0.68	1.00		0.07	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1191	1653		1244	1626		122	3282	1538	115	3252	1583
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
RTOR Reduction (vph)	0	56	0	0	75	0	0	0	77	0	0	10
Lane Group Flow (vph)	27	53	0	380	61	0	54	1630	113	136	1630	17
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.2	36.2		36.2	36.2		63.6	58.4	58.4	69.2	61.2	61.2
Effective Green, g (s)	37.7	37.7		37.7	37.7		64.5	61.3	61.3	70.1	64.1	64.1
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.54	0.51	0.51	0.58	0.53	0.53
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	519		391	511		110	1677	786	149	1737	846
v/s Ratio Prot		0.03			0.04		0.01	0.50		c0.05	c0.50	
v/s Ratio Perm	0.02			c0.31			0.25		0.07	0.49		0.01
v/c Ratio	0.07	0.10		0.97	0.12		0.49	0.97	0.14	0.91	0.94	0.02
Uniform Delay, d1	28.9	29.2		40.6	29.3		22.2	28.5	15.5	29.9	26.1	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.10	0.58	0.49	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		37.9	0.1		2.2	12.3	0.2	48.4	11.2	0.0
Delay (s)	29.0	29.2		78.5	29.4		26.6	28.9	7.8	78.4	37.3	13.2
Level of Service	C	C		E	C		C	C	A	E	D	B
Approach Delay (s)		29.2			65.6			26.7			40.1	
Approach LOS		C			E			C			D	

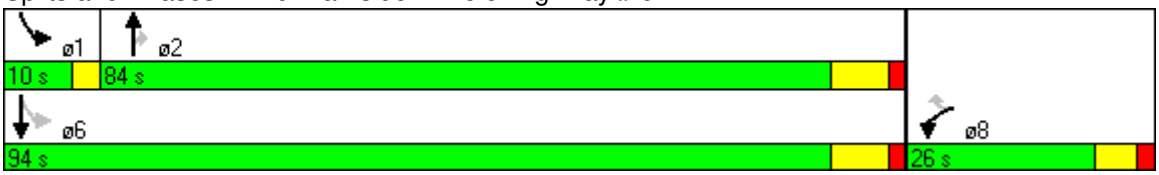
Intersection Summary			
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.950				0.059	
Satd. Flow (perm)	1736	1568	3282	1538	109	3252
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		54		245		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			880.3
Travel Time (s)	82.4		26.8			39.6
Volume (vph)	175	50	1650	225	50	1850
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Adj. Flow (vph)	190	54	1793	245	54	2011
Lane Group Flow (vph)	190	54	1793	245	54	2011
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	84.0	84.0	10.0	94.0
Total Split (%)	21.7%	21.7%	70.0%	70.0%	8.3%	78.3%
Maximum Green (s)	19.5	19.5	76.1	76.1	7.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	18.3	18.3	85.2	85.2	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.71	0.71	0.76	0.76
v/c Ratio	0.72	0.19	0.77	0.21	0.43	0.81
Control Delay	63.6	12.8	15.2	1.3	9.8	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	12.8	15.2	1.3	9.8	13.3
LOS	E	B	B	A	A	B
Approach Delay	52.4		13.5			13.2
Approach LOS	D		B			B

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 83 (69%), Referenced to phase 2:NBT and 6:SBTL, Start of Green		
Natural Cycle: 75		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay: 15.6		Intersection LOS: B
Intersection Capacity Utilization 69.2%		ICU Level of Service C
Analysis Period (min) 15		

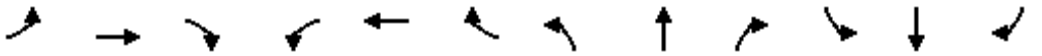
Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.95	1.00	1.00	1.00	0.07	1.00
Satd. Flow (perm)	1736	1568	3282	1538	134	3252
Volume (vph)	175	50	1650	225	50	1850
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	54	1793	245	54	2011
RTOR Reduction (vph)	0	46	0	72	0	0
Lane Group Flow (vph)	190	8	1793	173	54	2011
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	16.8	16.8	81.7	81.7	88.8	88.8
Effective Green, g (s)	18.3	18.3	84.6	84.6	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.76	0.76
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	265	239	2314	1084	131	2485
v/s Ratio Prot	c0.11		0.55		0.01	c0.62
v/s Ratio Perm		0.01		0.11	0.31	
v/c Ratio	0.72	0.03	0.77	0.16	0.41	0.81
Uniform Delay, d1	48.4	43.3	11.5	5.9	11.7	8.7
Progression Factor	1.00	1.00	1.00	1.00	1.42	1.24
Incremental Delay, d2	8.9	0.1	2.6	0.3	0.3	1.2
Delay (s)	57.3	43.4	14.1	6.2	16.8	12.0
Level of Service	E	D	B	A	B	B
Approach Delay (s)	54.2		13.2			12.2
Approach LOS	D		B			B

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

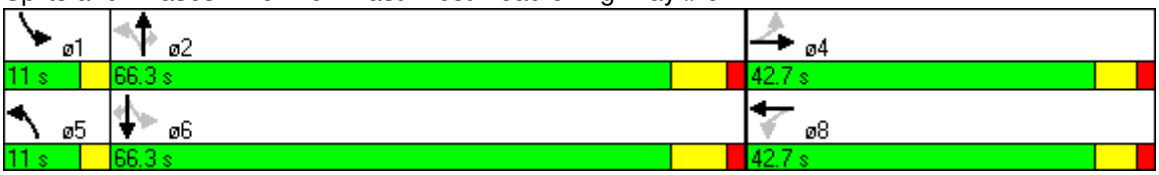
c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.880				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1736	1626	0	1770	3282	1538	1752	3252	1583
Flt Permitted	0.639			0.681			0.065			0.065		
Satd. Flow (perm)	1190	1652	0	1244	1626	0	121	3282	1538	120	3252	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			109				158			22
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		469.5			1381.2			730.0			417.5	
Travel Time (s)		28.2			82.9			32.9			18.8	
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
Lane Group Flow (vph)	27	109	0	380	136	0	54	1630	190	136	1630	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.2	17.2		17.2	17.2		11.0	28.6	28.6	11.0	28.6	28.6
Total Split (s)	42.7	42.7	0.0	42.7	42.7	0.0	11.0	66.3	66.3	11.0	66.3	66.3
Total Split (%)	35.6%	35.6%	0.0%	35.6%	35.6%	0.0%	9.2%	55.3%	55.3%	9.2%	55.3%	55.3%
Maximum Green (s)	36.2	36.2		36.2	36.2		8.0	58.4	58.4	8.0	58.4	58.4
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	37.7	37.7		37.7	37.7		66.0	61.3	61.3	69.1	64.3	64.3
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.55	0.51	0.51	0.58	0.54	0.54
v/c Ratio	0.07	0.19		0.97	0.23		0.41	0.97	0.22	0.90	0.94	0.03
Control Delay	29.7	10.7		80.4	9.6		22.4	34.5	5.4	75.5	38.1	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	10.7		80.4	9.6		22.4	34.5	5.4	75.5	38.1	6.7
LOS	C	B		F	A		C	C	A	E	D	A
Approach Delay		14.5			61.8			31.2			40.5	
Approach LOS		B			E			C			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 20 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 110		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay: 38.2	Intersection LOS: D	
Intersection Capacity Utilization 86.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1736	1626		1770	3282	1538	1752	3252	1583
Flt Permitted	0.64	1.00		0.68	1.00		0.07	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1191	1653		1244	1626		122	3282	1538	116	3252	1583
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
RTOR Reduction (vph)	0	56	0	0	75	0	0	0	77	0	0	10
Lane Group Flow (vph)	27	53	0	380	61	0	54	1630	113	136	1630	17
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.2	36.2		36.2	36.2		64.0	58.4	58.4	68.8	60.8	60.8
Effective Green, g (s)	37.7	37.7		37.7	37.7		64.9	61.3	61.3	69.7	63.7	63.7
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.54	0.51	0.51	0.58	0.53	0.53
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	519		391	511		115	1677	786	149	1726	840
v/s Ratio Prot		0.03			0.04		0.01	0.50		c0.05	c0.50	
v/s Ratio Perm	0.02			c0.31			0.24		0.07	0.48		0.01
v/c Ratio	0.07	0.10		0.97	0.12		0.47	0.97	0.14	0.91	0.94	0.02
Uniform Delay, d1	28.9	29.2		40.6	29.3		22.2	28.5	15.5	29.8	26.5	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.57	0.75	1.32	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		37.9	0.1		2.0	12.2	0.2	48.4	12.0	0.0
Delay (s)	29.0	29.2		78.5	29.4		36.8	33.5	20.7	78.2	38.5	13.4
Level of Service	C	C		E	C		D	C	C	E	D	B
Approach Delay (s)		29.2			65.6			32.3			41.1	
Approach LOS		C			E			C			D	

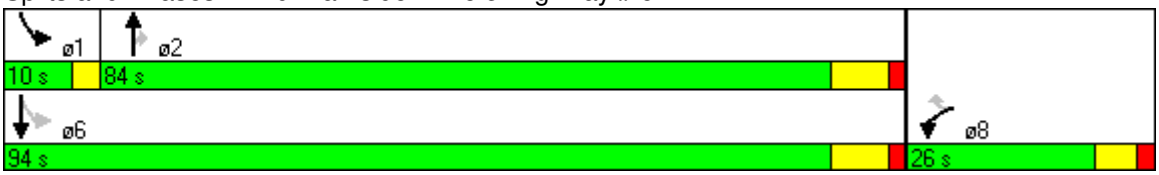
Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.950				0.059	
Satd. Flow (perm)	1736	1568	3282	1538	109	3252
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		54		245		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			730.0
Travel Time (s)	82.4		26.8			32.9
Volume (vph)	175	50	1650	225	50	1850
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Adj. Flow (vph)	190	54	1793	245	54	2011
Lane Group Flow (vph)	190	54	1793	245	54	2011
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	84.0	84.0	10.0	94.0
Total Split (%)	21.7%	21.7%	70.0%	70.0%	8.3%	78.3%
Maximum Green (s)	19.5	19.5	76.1	76.1	7.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	18.3	18.3	84.6	84.6	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.76	0.76
v/c Ratio	0.72	0.19	0.77	0.21	0.41	0.81
Control Delay	63.6	12.8	15.8	1.4	12.8	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	12.8	15.8	1.4	12.8	13.9
LOS	E	B	B	A	B	B
Approach Delay	52.4		14.0			13.9
Approach LOS	D		B			B

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 6 (5%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 16.1	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

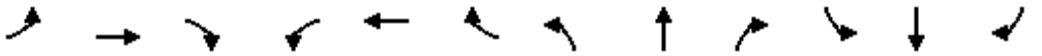
Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.95	1.00	1.00	1.00	0.07	1.00
Satd. Flow (perm)	1736	1568	3282	1538	131	3252
Volume (vph)	175	50	1650	225	50	1850
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	54	1793	245	54	2011
RTOR Reduction (vph)	0	46	0	74	0	0
Lane Group Flow (vph)	190	8	1793	172	54	2011
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	16.8	16.8	81.1	81.1	88.8	88.8
Effective Green, g (s)	18.3	18.3	84.0	84.0	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.76	0.76
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	265	239	2297	1077	137	2485
v/s Ratio Prot	c0.11		0.55		0.01	c0.62
v/s Ratio Perm		0.01		0.11	0.29	
v/c Ratio	0.72	0.03	0.78	0.16	0.39	0.81
Uniform Delay, d1	48.4	43.3	11.9	6.1	11.9	8.7
Progression Factor	1.00	1.00	1.00	1.00	2.33	1.30
Incremental Delay, d2	8.9	0.1	2.7	0.3	0.3	1.2
Delay (s)	57.3	43.4	14.6	6.4	28.1	12.6
Level of Service	E	D	B	A	C	B
Approach Delay (s)	54.2		13.6			13.0
Approach LOS	D		B			B

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

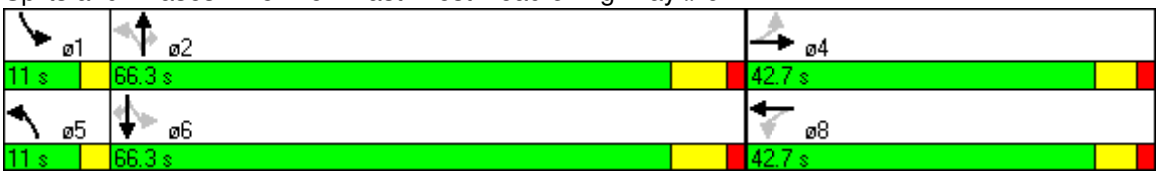
c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.880				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1736	1626	0	1770	3282	1538	1752	3252	1583
Flt Permitted	0.639			0.681			0.065			0.065		
Satd. Flow (perm)	1190	1652	0	1244	1626	0	121	3282	1538	120	3252	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			109				158			22
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		469.5			1373.9			474.0			417.5	
Travel Time (s)		28.2			82.4			21.3			18.8	
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
Lane Group Flow (vph)	27	109	0	380	136	0	54	1630	190	136	1630	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.2	17.2		17.2	17.2		11.0	28.6	28.6	11.0	28.6	28.6
Total Split (s)	42.7	42.7	0.0	42.7	42.7	0.0	11.0	66.3	66.3	11.0	66.3	66.3
Total Split (%)	35.6%	35.6%	0.0%	35.6%	35.6%	0.0%	9.2%	55.3%	55.3%	9.2%	55.3%	55.3%
Maximum Green (s)	36.2	36.2		36.2	36.2		8.0	58.4	58.4	8.0	58.4	58.4
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	37.7	37.7		37.7	37.7		66.0	61.3	61.3	69.1	64.3	64.3
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.55	0.51	0.51	0.58	0.54	0.54
v/c Ratio	0.07	0.19		0.97	0.23		0.41	0.97	0.22	0.90	0.94	0.03
Control Delay	29.7	10.7		80.4	9.6		22.3	34.5	5.3	75.5	38.1	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	10.7		80.4	9.6		22.3	34.5	5.3	75.5	38.1	6.7
LOS	C	B		F	A		C	C	A	E	D	A
Approach Delay		14.5			61.8			31.2			40.5	
Approach LOS		B			E			C			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 20 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 110		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay: 38.2	Intersection LOS: D	
Intersection Capacity Utilization 86.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1736	1626		1770	3282	1538	1752	3252	1583
Flt Permitted	0.64	1.00		0.68	1.00		0.07	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1191	1653		1244	1626		122	3282	1538	116	3252	1583
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
RTOR Reduction (vph)	0	56	0	0	75	0	0	0	77	0	0	10
Lane Group Flow (vph)	27	53	0	380	61	0	54	1630	113	136	1630	17
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.2	36.2		36.2	36.2		64.0	58.4	58.4	68.8	60.8	60.8
Effective Green, g (s)	37.7	37.7		37.7	37.7		64.9	61.3	61.3	69.7	63.7	63.7
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.54	0.51	0.51	0.58	0.53	0.53
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	519		391	511		115	1677	786	149	1726	840
v/s Ratio Prot		0.03			0.04		0.01	0.50		c0.05	c0.50	
v/s Ratio Perm	0.02			c0.31			0.24		0.07	0.48		0.01
v/c Ratio	0.07	0.10		0.97	0.12		0.47	0.97	0.14	0.91	0.94	0.02
Uniform Delay, d1	28.9	29.2		40.6	29.3		22.2	28.5	15.5	29.8	26.5	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.56	0.75	1.31	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		37.9	0.1		2.0	12.2	0.2	48.4	12.0	0.0
Delay (s)	29.0	29.2		78.5	29.4		36.7	33.5	20.6	78.2	38.5	13.4
Level of Service	C	C		E	C		D	C	C	E	D	B
Approach Delay (s)		29.2			65.6			32.3			41.1	
Approach LOS		C			E			C			D	

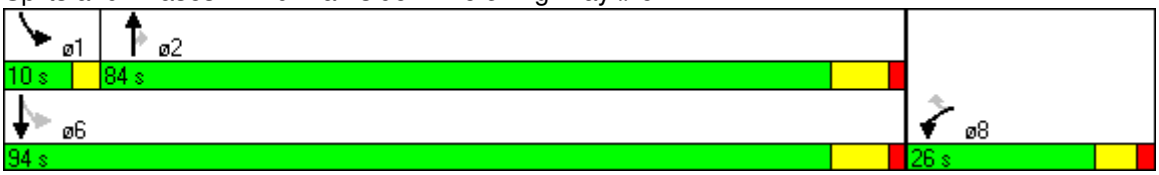
Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.950				0.059	
Satd. Flow (perm)	1736	1568	3282	1538	109	3252
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		54		245		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			474.0
Travel Time (s)	82.4		26.8			21.3
Volume (vph)	175	50	1650	225	50	1850
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Adj. Flow (vph)	190	54	1793	245	54	2011
Lane Group Flow (vph)	190	54	1793	245	54	2011
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	84.0	84.0	10.0	94.0
Total Split (%)	21.7%	21.7%	70.0%	70.0%	8.3%	78.3%
Maximum Green (s)	19.5	19.5	76.1	76.1	7.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	18.3	18.3	84.9	84.9	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.71	0.71	0.76	0.76
v/c Ratio	0.72	0.19	0.77	0.21	0.42	0.81
Control Delay	63.6	12.8	15.5	1.3	13.2	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	12.8	15.5	1.3	13.2	6.9
LOS	E	B	B	A	B	A
Approach Delay	52.4		13.8			7.1
Approach LOS	D		B			A

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 18 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

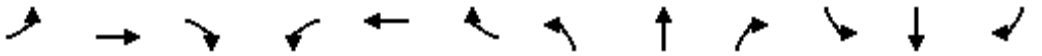
Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.95	1.00	1.00	1.00	0.07	1.00
Satd. Flow (perm)	1736	1568	3282	1538	133	3252
Volume (vph)	175	50	1650	225	50	1850
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	54	1793	245	54	2011
RTOR Reduction (vph)	0	46	0	73	0	0
Lane Group Flow (vph)	190	8	1793	172	54	2011
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	16.8	16.8	81.4	81.4	88.8	88.8
Effective Green, g (s)	18.3	18.3	84.3	84.3	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.76	0.76
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	265	239	2306	1080	134	2485
v/s Ratio Prot	c0.11		0.55		0.01	c0.62
v/s Ratio Perm		0.01		0.11	0.30	
v/c Ratio	0.72	0.03	0.78	0.16	0.40	0.81
Uniform Delay, d1	48.4	43.3	11.7	6.0	11.8	8.7
Progression Factor	1.00	1.00	1.00	1.00	2.37	0.59
Incremental Delay, d2	8.9	0.1	2.7	0.3	0.3	1.2
Delay (s)	57.3	43.4	14.4	6.3	28.2	6.3
Level of Service	E	D	B	A	C	A
Approach Delay (s)	54.2		13.4			6.9
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

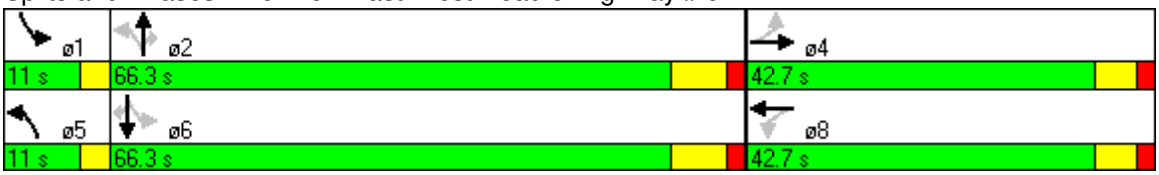
c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.880				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1736	1626	0	1770	3282	1538	1752	3252	1583
Flt Permitted	0.639			0.681			0.065			0.065		
Satd. Flow (perm)	1190	1652	0	1244	1626	0	121	3282	1538	120	3252	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			109				158			22
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		469.5			1373.0			430.1			417.5	
Travel Time (s)		28.2			82.4			19.4			18.8	
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
Lane Group Flow (vph)	27	109	0	380	136	0	54	1630	190	136	1630	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.2	17.2		17.2	17.2		11.0	28.6	28.6	11.0	28.6	28.6
Total Split (s)	42.7	42.7	0.0	42.7	42.7	0.0	11.0	66.3	66.3	11.0	66.3	66.3
Total Split (%)	35.6%	35.6%	0.0%	35.6%	35.6%	0.0%	9.2%	55.3%	55.3%	9.2%	55.3%	55.3%
Maximum Green (s)	36.2	36.2		36.2	36.2		8.0	58.4	58.4	8.0	58.4	58.4
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	37.7	37.7		37.7	37.7		66.0	61.3	61.3	69.1	64.3	64.3
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.55	0.51	0.51	0.58	0.54	0.54
v/c Ratio	0.07	0.19		0.97	0.23		0.41	0.97	0.22	0.90	0.94	0.03
Control Delay	29.7	10.7		80.4	9.6		22.2	33.7	4.7	75.2	38.0	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	10.7		80.4	9.6		22.2	33.7	4.7	75.2	38.0	6.7
LOS	C	B		F	A		C	C	A	E	D	A
Approach Delay		14.5			61.8			30.4			40.3	
Approach LOS		B			E			C			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 20 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 110		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay: 37.8	Intersection LOS: D	
Intersection Capacity Utilization 86.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1736	1626		1770	3282	1538	1752	3252	1583
Flt Permitted	0.64	1.00		0.68	1.00		0.07	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1191	1653		1244	1626		122	3282	1538	116	3252	1583
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
RTOR Reduction (vph)	0	56	0	0	75	0	0	0	77	0	0	10
Lane Group Flow (vph)	27	53	0	380	61	0	54	1630	113	136	1630	17
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.2	36.2		36.2	36.2		64.0	58.4	58.4	68.8	60.8	60.8
Effective Green, g (s)	37.7	37.7		37.7	37.7		64.9	61.3	61.3	69.7	63.7	63.7
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.54	0.51	0.51	0.58	0.53	0.53
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	519		391	511		115	1677	786	149	1726	840
v/s Ratio Prot		0.03			0.04		0.01	0.50		c0.05	c0.50	
v/s Ratio Perm	0.02			c0.31			0.24		0.07	0.48		0.01
v/c Ratio	0.07	0.10		0.97	0.12		0.47	0.97	0.14	0.91	0.94	0.02
Uniform Delay, d1	28.9	29.2		40.6	29.3		22.2	28.5	15.5	29.8	26.5	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.54	0.72	1.13	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		37.9	0.1		2.0	12.2	0.2	48.4	12.0	0.0
Delay (s)	29.0	29.2		78.5	29.4		36.1	32.7	17.7	78.2	38.5	13.4
Level of Service	C	C		E	C		D	C	B	E	D	B
Approach Delay (s)		29.2			65.6			31.3			41.1	
Approach LOS		C			E			C			D	

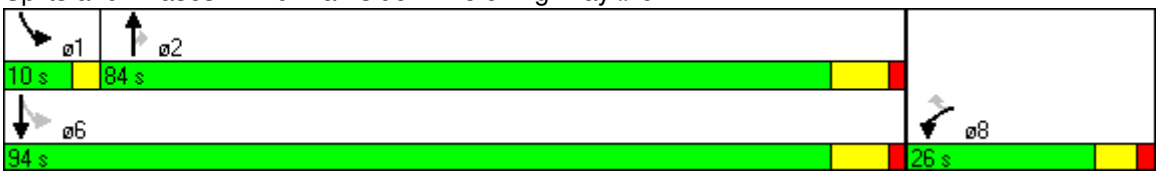
Intersection Summary			
HCM Average Control Delay	39.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.950				0.059	
Satd. Flow (perm)	1736	1568	3282	1538	109	3252
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		54		245		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			430.1
Travel Time (s)	82.4		26.8			19.4
Volume (vph)	175	50	1650	225	50	1850
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Adj. Flow (vph)	190	54	1793	245	54	2011
Lane Group Flow (vph)	190	54	1793	245	54	2011
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	84.0	84.0	10.0	94.0
Total Split (%)	21.7%	21.7%	70.0%	70.0%	8.3%	78.3%
Maximum Green (s)	19.5	19.5	76.1	76.1	7.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	18.3	18.3	84.9	84.9	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.71	0.71	0.76	0.76
v/c Ratio	0.72	0.19	0.77	0.21	0.42	0.81
Control Delay	63.6	12.8	15.5	1.3	13.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	12.8	15.5	1.3	13.2	6.7
LOS	E	B	B	A	B	A
Approach Delay	52.4		13.8			6.8
Approach LOS	D		B			A

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 17 (14%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.95	1.00	1.00	1.00	0.07	1.00
Satd. Flow (perm)	1736	1568	3282	1538	133	3252
Volume (vph)	175	50	1650	225	50	1850
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	54	1793	245	54	2011
RTOR Reduction (vph)	0	46	0	73	0	0
Lane Group Flow (vph)	190	8	1793	172	54	2011
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	16.8	16.8	81.4	81.4	88.8	88.8
Effective Green, g (s)	18.3	18.3	84.3	84.3	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.76	0.76
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	265	239	2306	1080	134	2485
v/s Ratio Prot	c0.11		0.55		0.01	c0.62
v/s Ratio Perm		0.01		0.11	0.30	
v/c Ratio	0.72	0.03	0.78	0.16	0.40	0.81
Uniform Delay, d1	48.4	43.3	11.7	6.0	11.8	8.7
Progression Factor	1.00	1.00	1.00	1.00	2.37	0.56
Incremental Delay, d2	8.9	0.1	2.7	0.3	0.3	1.2
Delay (s)	57.3	43.4	14.4	6.3	28.2	6.1
Level of Service	E	D	B	A	C	A
Approach Delay (s)	54.2		13.4			6.7
Approach LOS	D		B			A

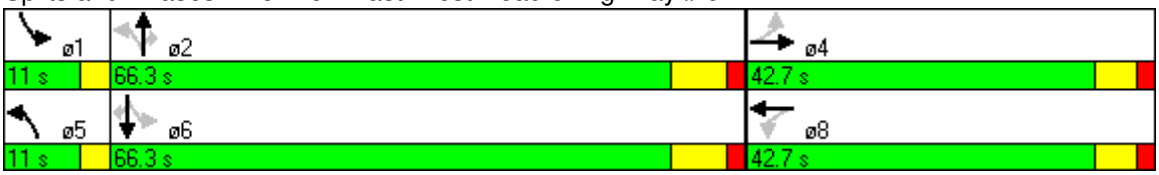
Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

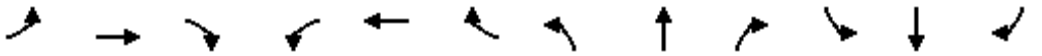
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.880				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1736	1626	0	1770	3282	1538	1752	3252	1583
Flt Permitted	0.639			0.681			0.065			0.065		
Satd. Flow (perm)	1190	1652	0	1244	1626	0	121	3282	1538	120	3252	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			109				158			22
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		469.5			1371.7			378.1			417.5	
Travel Time (s)		28.2			82.3			17.0			18.8	
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
Lane Group Flow (vph)	27	109	0	380	136	0	54	1630	190	136	1630	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	17.2	17.2		17.2	17.2		11.0	28.6	28.6	11.0	28.6	28.6
Total Split (s)	42.7	42.7	0.0	42.7	42.7	0.0	11.0	66.3	66.3	11.0	66.3	66.3
Total Split (%)	35.6%	35.6%	0.0%	35.6%	35.6%	0.0%	9.2%	55.3%	55.3%	9.2%	55.3%	55.3%
Maximum Green (s)	36.2	36.2		36.2	36.2		8.0	58.4	58.4	8.0	58.4	58.4
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	37.7	37.7		37.7	37.7		66.0	61.3	61.3	69.1	64.3	64.3
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.55	0.51	0.51	0.58	0.54	0.54
v/c Ratio	0.07	0.19		0.97	0.23		0.41	0.97	0.22	0.90	0.94	0.03
Control Delay	29.7	10.7		80.4	9.6		22.1	33.6	4.5	75.2	38.0	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	10.7		80.4	9.6		22.1	33.6	4.5	75.2	38.0	6.7
LOS	C	B		F	A		C	C	A	E	D	A
Approach Delay		14.5			61.8			30.3			40.3	
Approach LOS		B			E			C			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 20 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 110		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay: 37.7	Intersection LOS: D	
Intersection Capacity Utilization 86.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.88		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1736	1626		1770	3282	1538	1752	3252	1583
Flt Permitted	0.64	1.00		0.68	1.00		0.07	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	1191	1653		1244	1626		122	3282	1538	116	3252	1583
Volume (vph)	25	25	75	350	25	100	50	1500	175	125	1500	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	380	27	109	54	1630	190	136	1630	27
RTOR Reduction (vph)	0	56	0	0	75	0	0	0	77	0	0	10
Lane Group Flow (vph)	27	53	0	380	61	0	54	1630	113	136	1630	17
Heavy Vehicles (%)	2%	2%	2%	4%	2%	3%	2%	10%	5%	3%	11%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.2	36.2		36.2	36.2		64.0	58.4	58.4	68.8	60.8	60.8
Effective Green, g (s)	37.7	37.7		37.7	37.7		64.9	61.3	61.3	69.7	63.7	63.7
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.54	0.51	0.51	0.58	0.53	0.53
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	519		391	511		115	1677	786	149	1726	840
v/s Ratio Prot		0.03			0.04		0.01	0.50		c0.05	c0.50	
v/s Ratio Perm	0.02			c0.31			0.24		0.07	0.48		0.01
v/c Ratio	0.07	0.10		0.97	0.12		0.47	0.97	0.14	0.91	0.94	0.02
Uniform Delay, d1	28.9	29.2		40.6	29.3		22.2	28.5	15.5	29.8	26.5	13.3
Progression Factor	1.00	1.00		1.00	1.00		1.53	0.71	1.10	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		37.9	0.1		2.0	12.2	0.2	48.4	12.0	0.0
Delay (s)	29.0	29.2		78.5	29.4		36.0	32.6	17.3	78.2	38.5	13.4
Level of Service	C	C		E	C		D	C	B	E	D	B
Approach Delay (s)		29.2			65.6			31.1			41.1	
Approach LOS		C			E			C			D	

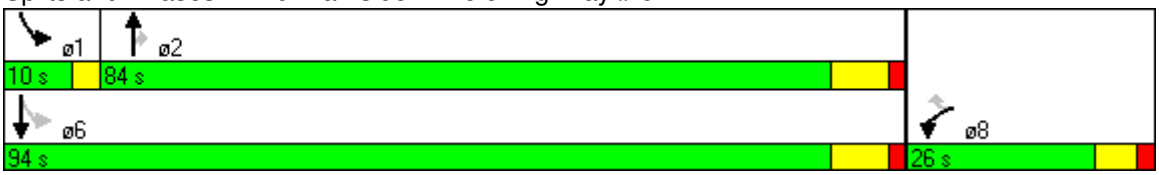
Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.950				0.059	
Satd. Flow (perm)	1736	1568	3282	1538	109	3252
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		54		245		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			378.1
Travel Time (s)	82.4		26.8			17.0
Volume (vph)	175	50	1650	225	50	1850
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Adj. Flow (vph)	190	54	1793	245	54	2011
Lane Group Flow (vph)	190	54	1793	245	54	2011
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	84.0	84.0	10.0	94.0
Total Split (%)	21.7%	21.7%	70.0%	70.0%	8.3%	78.3%
Maximum Green (s)	19.5	19.5	76.1	76.1	7.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	18.3	18.3	84.9	84.9	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.71	0.71	0.76	0.76
v/c Ratio	0.72	0.19	0.77	0.21	0.42	0.81
Control Delay	63.6	12.8	15.5	1.3	13.2	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.6	12.8	15.5	1.3	13.2	5.8
LOS	E	B	B	A	B	A
Approach Delay	52.4		13.8			6.0
Approach LOS	D		B			A

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 19 (16%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1736	1568	3282	1538	1752	3252
Flt Permitted	0.95	1.00	1.00	1.00	0.07	1.00
Satd. Flow (perm)	1736	1568	3282	1538	133	3252
Volume (vph)	175	50	1650	225	50	1850
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	54	1793	245	54	2011
RTOR Reduction (vph)	0	46	0	73	0	0
Lane Group Flow (vph)	190	8	1793	172	54	2011
Heavy Vehicles (%)	4%	3%	10%	5%	3%	11%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	16.8	16.8	81.4	81.4	88.8	88.8
Effective Green, g (s)	18.3	18.3	84.3	84.3	91.7	91.7
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.76	0.76
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	265	239	2306	1080	134	2485
v/s Ratio Prot	c0.11		0.55		0.01	c0.62
v/s Ratio Perm		0.01		0.11	0.30	
v/c Ratio	0.72	0.03	0.78	0.16	0.40	0.81
Uniform Delay, d1	48.4	43.3	11.7	6.0	11.8	8.7
Progression Factor	1.00	1.00	1.00	1.00	2.35	0.47
Incremental Delay, d2	8.9	0.1	2.7	0.3	0.3	1.2
Delay (s)	57.3	43.4	14.4	6.3	28.0	5.3
Level of Service	E	D	B	A	C	A
Approach Delay (s)	54.2		13.4			5.9
Approach LOS	D		B			A

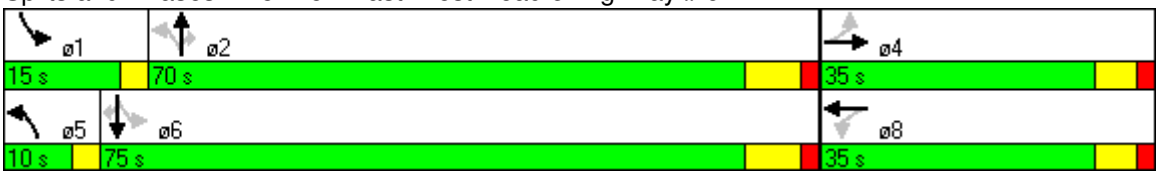
Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.871				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1545	0	1770	3312	1583	1752	3343	1583
Flt Permitted	0.504			0.648			0.061			0.057		
Satd. Flow (perm)	939	1652	0	1207	1545	0	114	3312	1583	105	3343	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			158				432			23
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		410.9			1387.5			880.2			684.6	
Travel Time (s)		24.7			83.3			39.6			30.8	
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
Lane Group Flow (vph)	27	109	0	299	190	0	136	1576	462	163	1929	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	16.5	16.5		16.5	16.5		9.0	27.9	27.9	9.0	27.9	27.9
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	10.0	70.0	70.0	15.0	75.0	75.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	0.0%	8.3%	58.3%	58.3%	12.5%	62.5%	62.5%
Maximum Green (s)	28.5	28.5		28.5	28.5		7.0	62.1	62.1	12.0	67.1	67.1
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.1	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
v/c Ratio	0.11	0.22		0.96	0.37		0.89	0.85	0.43	0.80	0.98	0.03
Control Delay	35.6	12.8		86.1	10.7		62.0	14.8	2.1	53.1	39.4	4.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	12.8		86.1	10.7		62.0	14.8	2.1	53.1	39.4	4.5
LOS	D	B		F	B		E	B	A	D	D	A
Approach Delay		17.3			56.8			15.0			40.0	
Approach LOS		B			E			B			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 84 (70%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 30.0	Intersection LOS: C	
Intersection Capacity Utilization 87.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1770	1545		1770	3312	1583	1752	3343	1583
Flt Permitted	0.50	1.00		0.65	1.00		0.06	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	939	1653		1207	1545		111	3312	1583	109	3343	1583
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
RTOR Reduction (vph)	0	61	0	0	117	0	0	0	190	0	0	9
Lane Group Flow (vph)	27	48	0	299	73	0	136	1576	272	163	1929	18
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	28.5	28.5		28.5	28.5		70.4	63.4	63.4	77.1	67.1	67.1
Effective Green, g (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.7	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	427		312	399		151	1857	888	206	1978	937
v/s Ratio Prot		0.03			0.05		0.05	0.48		c0.06	c0.58	
v/s Ratio Perm	0.03			c0.25			0.51		0.17	0.47		0.01
v/c Ratio	0.11	0.11		0.96	0.18		0.90	0.85	0.31	0.79	0.98	0.02
Uniform Delay, d1	34.0	34.0		43.9	34.6		31.4	22.1	14.0	31.5	23.7	10.1
Progression Factor	1.00	1.00		1.00	1.00		1.62	0.55	0.90	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		39.4	0.2		23.5	2.1	0.4	18.4	15.2	0.0
Delay (s)	34.2	34.1		83.2	34.9		74.5	14.2	13.0	50.0	38.8	10.2
Level of Service	C	C		F	C		E	B	B	D	D	B
Approach Delay (s)		34.1			64.4			17.7			39.3	
Approach LOS		C			E			B			D	

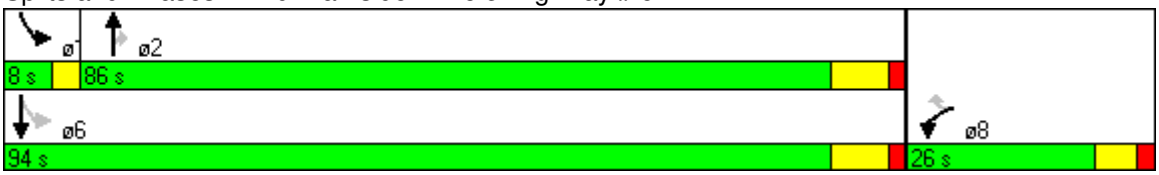
Intersection Summary			
HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1770	1495	3312	1583	87	3343
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		79		217		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			880.2
Travel Time (s)	82.4		26.8			39.6
Volume (vph)	250	75	1925	200	75	2075
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Adj. Flow (vph)	272	82	2092	217	82	2255
Lane Group Flow (vph)	272	82	2092	217	82	2255
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	86.0	86.0	8.0	94.0
Total Split (%)	21.7%	21.7%	71.7%	71.7%	6.7%	78.3%
Maximum Green (s)	19.5	19.5	78.1	78.1	5.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	20.2	20.2	81.0	81.0	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.68	0.68	0.77	0.73
v/c Ratio	0.91	0.26	0.94	0.19	0.55	0.93
Control Delay	83.4	12.3	27.5	1.4	23.2	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.4	12.3	27.5	1.4	23.2	19.8
LOS	F	B	C	A	C	B
Approach Delay	66.9		25.1			19.9
Approach LOS	E		C			B

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 25.6	Intersection LOS: C
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1770	1495	3312	1583	85	3343
Volume (vph)	250	75	1925	200	75	2075
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	82	2092	217	82	2255
RTOR Reduction (vph)	0	66	0	72	0	0
Lane Group Flow (vph)	272	16	2092	145	82	2255
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.2	19.2	79.4	79.4	86.4	86.4
Effective Green, g (s)	20.2	20.2	80.4	80.4	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.67	0.67	0.77	0.73
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	298	252	2219	1061	135	2435
v/s Ratio Prot	c0.15		0.63		0.03	c0.67
v/s Ratio Perm		0.01		0.09	0.44	
v/c Ratio	0.91	0.06	0.94	0.14	0.61	0.93
Uniform Delay, d1	49.0	42.0	17.7	7.2	23.9	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.31	1.17
Incremental Delay, d2	30.5	0.1	9.7	0.3	1.9	3.0
Delay (s)	79.5	42.1	27.4	7.5	33.3	18.9
Level of Service	E	D	C	A	C	B
Approach Delay (s)	70.8		25.6			19.4
Approach LOS	E		C			B

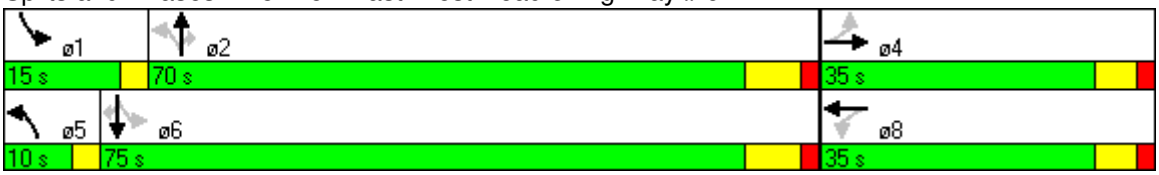
Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

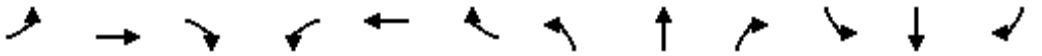
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.871				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1545	0	1770	3312	1583	1752	3343	1583
Flt Permitted	0.504			0.648			0.061			0.057		
Satd. Flow (perm)	939	1652	0	1207	1545	0	114	3312	1583	105	3343	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			158				432			23
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		410.9			1378.0			730.2			684.6	
Travel Time (s)		24.7			82.7			32.9			30.8	
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
Lane Group Flow (vph)	27	109	0	299	190	0	136	1576	462	163	1929	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	16.5	16.5		16.5	16.5		9.0	27.9	27.9	9.0	27.9	27.9
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	10.0	70.0	70.0	15.0	75.0	75.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	0.0%	8.3%	58.3%	58.3%	12.5%	62.5%	62.5%
Maximum Green (s)	28.5	28.5		28.5	28.5		7.0	62.1	62.1	12.0	67.1	67.1
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.1	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
v/c Ratio	0.11	0.22		0.96	0.37		0.89	0.85	0.43	0.80	0.98	0.03
Control Delay	35.6	12.8		86.1	10.7		60.0	12.9	1.2	53.1	39.4	4.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	12.8		86.1	10.7		60.0	12.9	1.2	53.1	39.4	4.5
LOS	D	B		F	B		E	B	A	D	D	A
Approach Delay		17.3			56.8			13.4			40.0	
Approach LOS		B			E			B			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 56 (47%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 29.3	Intersection LOS: C	
Intersection Capacity Utilization 87.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1770	1545		1770	3312	1583	1752	3343	1583
Flt Permitted	0.50	1.00		0.65	1.00		0.06	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	939	1653		1207	1545		111	3312	1583	109	3343	1583
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
RTOR Reduction (vph)	0	61	0	0	117	0	0	0	190	0	0	9
Lane Group Flow (vph)	27	48	0	299	73	0	136	1576	272	163	1929	18
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	28.5	28.5		28.5	28.5		70.4	63.4	63.4	77.1	67.1	67.1
Effective Green, g (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.7	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	427		312	399		151	1857	888	206	1978	937
v/s Ratio Prot		0.03			0.05		0.05	0.48		c0.06	c0.58	
v/s Ratio Perm	0.03			c0.25			0.51		0.17	0.47		0.01
v/c Ratio	0.11	0.11		0.96	0.18		0.90	0.85	0.31	0.79	0.98	0.02
Uniform Delay, d1	34.0	34.0		43.9	34.6		31.4	22.1	14.0	31.5	23.7	10.1
Progression Factor	1.00	1.00		1.00	1.00		1.51	0.47	0.39	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		39.4	0.2		23.5	2.1	0.4	18.4	15.2	0.0
Delay (s)	34.2	34.1		83.2	34.9		71.1	12.4	5.8	50.0	38.8	10.2
Level of Service	C	C		F	C		E	B	A	D	D	B
Approach Delay (s)		34.1			64.4			14.6			39.3	
Approach LOS		C			E			B			D	

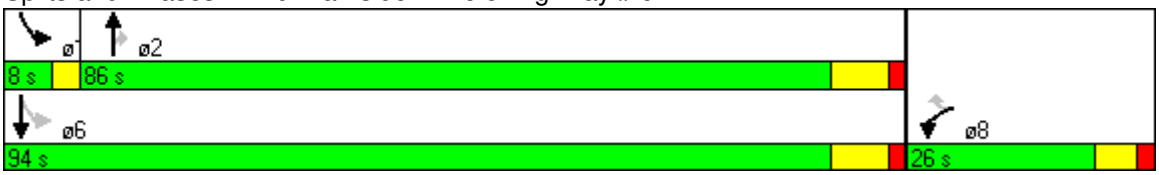
Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1770	1495	3312	1583	87	3343
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		79		217		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			730.2
Travel Time (s)	82.4		26.8			32.9
Volume (vph)	250	75	1925	200	75	2075
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Adj. Flow (vph)	272	82	2092	217	82	2255
Lane Group Flow (vph)	272	82	2092	217	82	2255
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	86.0	86.0	8.0	94.0
Total Split (%)	21.7%	21.7%	71.7%	71.7%	6.7%	78.3%
Maximum Green (s)	19.5	19.5	78.1	78.1	5.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	20.2	20.2	81.0	81.0	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.68	0.68	0.77	0.73
v/c Ratio	0.91	0.26	0.94	0.19	0.55	0.93
Control Delay	83.4	12.3	27.5	1.4	16.7	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.4	12.3	27.5	1.4	16.7	26.2
LOS	F	B	C	A	B	C
Approach Delay	66.9		25.1			25.9
Approach LOS	E		C			C

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

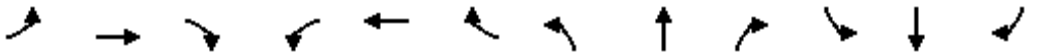
Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1770	1495	3312	1583	85	3343
Volume (vph)	250	75	1925	200	75	2075
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	82	2092	217	82	2255
RTOR Reduction (vph)	0	66	0	72	0	0
Lane Group Flow (vph)	272	16	2092	145	82	2255
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.2	19.2	79.4	79.4	86.4	86.4
Effective Green, g (s)	20.2	20.2	80.4	80.4	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.67	0.67	0.77	0.73
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	298	252	2219	1061	135	2435
v/s Ratio Prot	c0.15		0.63		0.03	c0.67
v/s Ratio Perm		0.01		0.09	0.44	
v/c Ratio	0.91	0.06	0.94	0.14	0.61	0.93
Uniform Delay, d1	49.0	42.0	17.7	7.2	23.9	13.6
Progression Factor	1.00	1.00	1.00	1.00	0.85	1.64
Incremental Delay, d2	30.5	0.1	9.7	0.3	1.9	3.0
Delay (s)	79.5	42.1	27.4	7.5	22.2	25.3
Level of Service	E	D	C	A	C	C
Approach Delay (s)	70.8		25.6			25.2
Approach LOS	E		C			C

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

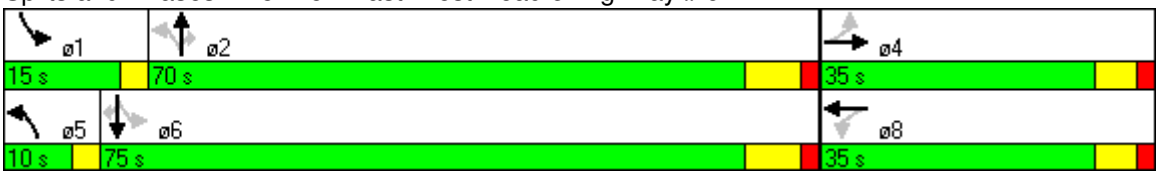
c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.871				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1545	0	1770	3312	1583	1752	3343	1583
Flt Permitted	0.504			0.648			0.061			0.057		
Satd. Flow (perm)	939	1652	0	1207	1545	0	114	3312	1583	105	3343	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			158				432			23
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		410.9			1370.8			474.0			684.6	
Travel Time (s)		24.7			82.2			21.3			30.8	
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
Lane Group Flow (vph)	27	109	0	299	190	0	136	1576	462	163	1929	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	16.5	16.5		16.5	16.5		9.0	27.9	27.9	9.0	27.9	27.9
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	10.0	70.0	70.0	15.0	75.0	75.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	0.0%	8.3%	58.3%	58.3%	12.5%	62.5%	62.5%
Maximum Green (s)	28.5	28.5		28.5	28.5		7.0	62.1	62.1	12.0	67.1	67.1
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.1	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
v/c Ratio	0.11	0.22		0.96	0.37		0.89	0.85	0.43	0.80	0.98	0.03
Control Delay	35.6	12.8		86.1	10.7		60.1	12.7	1.1	53.1	39.4	4.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	12.8		86.1	10.7		60.1	12.7	1.1	53.1	39.4	4.5
LOS	D	B		F	B		E	B	A	D	D	A
Approach Delay		17.3			56.8			13.2			40.0	
Approach LOS		B			E			B			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 45 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 29.2	Intersection LOS: C	
Intersection Capacity Utilization 87.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1770	1545		1770	3312	1583	1752	3343	1583
Flt Permitted	0.50	1.00		0.65	1.00		0.06	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	939	1653		1207	1545		111	3312	1583	109	3343	1583
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
RTOR Reduction (vph)	0	61	0	0	117	0	0	0	190	0	0	9
Lane Group Flow (vph)	27	48	0	299	73	0	136	1576	272	163	1929	18
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	28.5	28.5		28.5	28.5		70.4	63.4	63.4	77.1	67.1	67.1
Effective Green, g (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.7	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	427		312	399		151	1857	888	206	1978	937
v/s Ratio Prot		0.03			0.05		0.05	0.48		c0.06	c0.58	
v/s Ratio Perm	0.03			c0.25			0.51		0.17	0.47		0.01
v/c Ratio	0.11	0.11		0.96	0.18		0.90	0.85	0.31	0.79	0.98	0.02
Uniform Delay, d1	34.0	34.0		43.9	34.6		31.4	22.1	14.0	31.5	23.7	10.1
Progression Factor	1.00	1.00		1.00	1.00		1.52	0.46	0.35	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		39.4	0.2		23.5	2.1	0.4	18.4	15.2	0.0
Delay (s)	34.2	34.1		83.2	34.9		71.3	12.2	5.3	50.0	38.8	10.2
Level of Service	C	C		F	C		E	B	A	D	D	B
Approach Delay (s)		34.1			64.4			14.4			39.3	
Approach LOS		C			E			B			D	

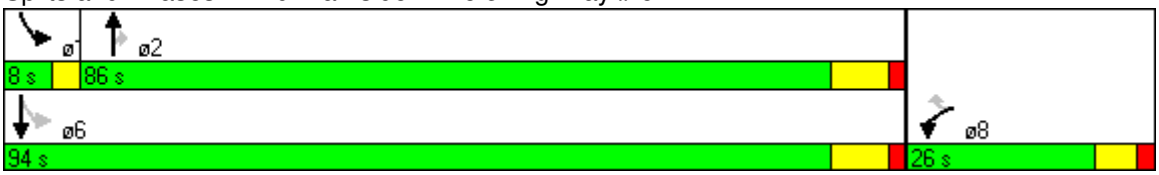
Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1770	1495	3312	1583	87	3343
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		79		217		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			474.0
Travel Time (s)	82.4		26.8			21.3
Volume (vph)	250	75	1925	200	75	2075
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Adj. Flow (vph)	272	82	2092	217	82	2255
Lane Group Flow (vph)	272	82	2092	217	82	2255
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	86.0	86.0	8.0	94.0
Total Split (%)	21.7%	21.7%	71.7%	71.7%	6.7%	78.3%
Maximum Green (s)	19.5	19.5	78.1	78.1	5.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	20.2	20.2	81.0	81.0	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.68	0.68	0.77	0.73
v/c Ratio	0.91	0.26	0.94	0.19	0.55	0.93
Control Delay	83.4	12.3	27.5	1.4	21.8	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.4	12.3	27.5	1.4	21.8	17.2
LOS	F	B	C	A	C	B
Approach Delay	66.9		25.1			17.3
Approach LOS	E		C			B

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 24 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.94		
Intersection Signal Delay: 24.4		Intersection LOS: C
Intersection Capacity Utilization 84.9%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1770	1495	3312	1583	85	3343
Volume (vph)	250	75	1925	200	75	2075
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	82	2092	217	82	2255
RTOR Reduction (vph)	0	66	0	72	0	0
Lane Group Flow (vph)	272	16	2092	145	82	2255
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.2	19.2	79.4	79.4	86.4	86.4
Effective Green, g (s)	20.2	20.2	80.4	80.4	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.67	0.67	0.77	0.73
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	298	252	2219	1061	135	2435
v/s Ratio Prot	c0.15		0.63		0.03	c0.67
v/s Ratio Perm		0.01		0.09	0.44	
v/c Ratio	0.91	0.06	0.94	0.14	0.61	0.93
Uniform Delay, d1	49.0	42.0	17.7	7.2	23.9	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.21	0.98
Incremental Delay, d2	30.5	0.1	9.7	0.3	1.9	3.0
Delay (s)	79.5	42.1	27.4	7.5	30.9	16.3
Level of Service	E	D	C	A	C	B
Approach Delay (s)	70.8		25.6			16.8
Approach LOS	E		C			B

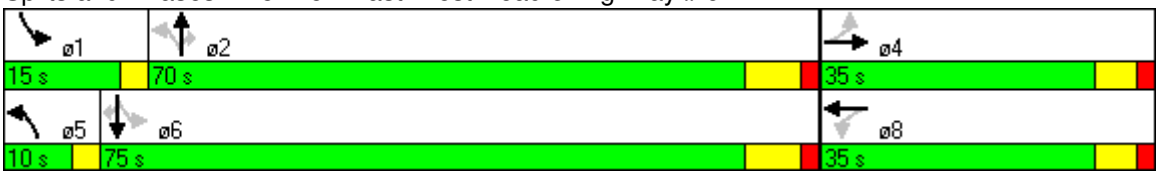
Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.871				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1545	0	1770	3312	1583	1752	3343	1583
Flt Permitted	0.504			0.648			0.061			0.057		
Satd. Flow (perm)	939	1652	0	1207	1545	0	114	3312	1583	105	3343	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			158				432			23
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		410.9			1372.8			430.1			684.6	
Travel Time (s)		24.7			82.4			19.4			30.8	
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
Lane Group Flow (vph)	27	109	0	299	190	0	136	1576	462	163	1929	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	16.5	16.5		16.5	16.5		9.0	27.9	27.9	9.0	27.9	27.9
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	10.0	70.0	70.0	15.0	75.0	75.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	0.0%	8.3%	58.3%	58.3%	12.5%	62.5%	62.5%
Maximum Green (s)	28.5	28.5		28.5	28.5		7.0	62.1	62.1	12.0	67.1	67.1
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.1	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
v/c Ratio	0.11	0.22		0.96	0.37		0.89	0.85	0.43	0.80	0.98	0.03
Control Delay	35.6	12.8		86.1	10.7		60.1	12.7	1.1	53.1	39.4	4.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	12.8		86.1	10.7		60.1	12.7	1.1	53.1	39.4	4.5
LOS	D	B		F	B		E	B	A	D	D	A
Approach Delay		17.3			56.8			13.2			40.0	
Approach LOS		B			E			B			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 43 (36%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 29.2	Intersection LOS: C	
Intersection Capacity Utilization 87.9%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1770	1545		1770	3312	1583	1752	3343	1583
Flt Permitted	0.50	1.00		0.65	1.00		0.06	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	939	1653		1207	1545		111	3312	1583	109	3343	1583
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
RTOR Reduction (vph)	0	61	0	0	117	0	0	0	190	0	0	9
Lane Group Flow (vph)	27	48	0	299	73	0	136	1576	272	163	1929	18
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	28.5	28.5		28.5	28.5		70.4	63.4	63.4	77.1	67.1	67.1
Effective Green, g (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.7	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	427		312	399		151	1857	888	206	1978	937
v/s Ratio Prot		0.03			0.05		0.05	0.48		c0.06	c0.58	
v/s Ratio Perm	0.03			c0.25			0.51		0.17	0.47		0.01
v/c Ratio	0.11	0.11		0.96	0.18		0.90	0.85	0.31	0.79	0.98	0.02
Uniform Delay, d1	34.0	34.0		43.9	34.6		31.4	22.1	14.0	31.5	23.7	10.1
Progression Factor	1.00	1.00		1.00	1.00		1.52	0.46	0.36	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		39.4	0.2		23.5	2.1	0.4	18.4	15.2	0.0
Delay (s)	34.2	34.1		83.2	34.9		71.2	12.2	5.4	50.0	38.8	10.2
Level of Service	C	C		F	C		E	B	A	D	D	B
Approach Delay (s)		34.1			64.4			14.4			39.3	
Approach LOS		C			E			B			D	

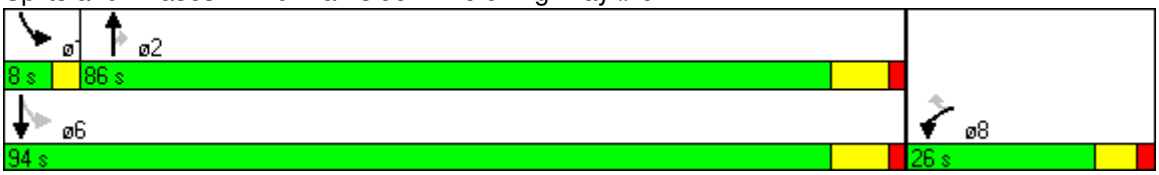
Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1770	1495	3312	1583	87	3343
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		79		217		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			430.1
Travel Time (s)	82.4		26.8			19.4
Volume (vph)	250	75	1925	200	75	2075
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Adj. Flow (vph)	272	82	2092	217	82	2255
Lane Group Flow (vph)	272	82	2092	217	82	2255
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	86.0	86.0	8.0	94.0
Total Split (%)	21.7%	21.7%	71.7%	71.7%	6.7%	78.3%
Maximum Green (s)	19.5	19.5	78.1	78.1	5.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	20.2	20.2	81.0	81.0	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.68	0.68	0.77	0.73
v/c Ratio	0.91	0.26	0.94	0.19	0.55	0.93
Control Delay	83.4	12.3	27.5	1.4	22.8	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.4	12.3	27.5	1.4	22.8	15.6
LOS	F	B	C	A	C	B
Approach Delay	66.9		25.1			15.9
Approach LOS	E		C			B

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 23.7	Intersection LOS: C
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1770	1495	3312	1583	85	3343
Volume (vph)	250	75	1925	200	75	2075
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	82	2092	217	82	2255
RTOR Reduction (vph)	0	66	0	72	0	0
Lane Group Flow (vph)	272	16	2092	145	82	2255
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.2	19.2	79.4	79.4	86.4	86.4
Effective Green, g (s)	20.2	20.2	80.4	80.4	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.67	0.67	0.77	0.73
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	298	252	2219	1061	135	2435
v/s Ratio Prot	c0.15		0.63		0.03	c0.67
v/s Ratio Perm		0.01		0.09	0.44	
v/c Ratio	0.91	0.06	0.94	0.14	0.61	0.93
Uniform Delay, d1	49.0	42.0	17.7	7.2	23.9	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.29	0.86
Incremental Delay, d2	30.5	0.1	9.7	0.3	1.9	3.0
Delay (s)	79.5	42.1	27.4	7.5	32.6	14.7
Level of Service	E	D	C	A	C	B
Approach Delay (s)	70.8		25.6			15.3
Approach LOS	E		C			B

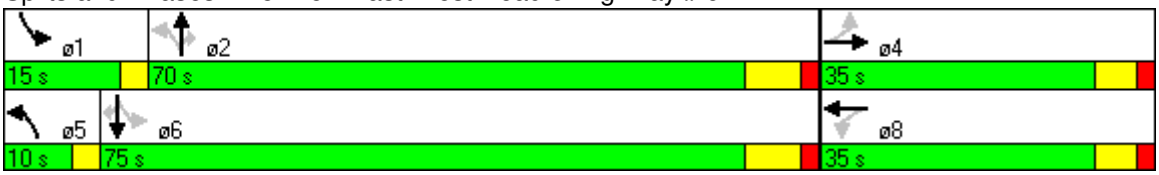
Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	155.0		85.0	170.0		85.0
Storage Lanes	1		0	1		0	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.0	15.0		15.0	15.0		15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.887			0.871				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1652	0	1770	1545	0	1770	3312	1583	1752	3343	1583
Flt Permitted	0.504			0.648			0.061			0.057		
Satd. Flow (perm)	939	1652	0	1207	1545	0	114	3312	1583	105	3343	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82			158				432			23
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		410.9			1371.4			378.0			684.6	
Travel Time (s)		24.7			82.3			17.0			30.8	
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
Lane Group Flow (vph)	27	109	0	299	190	0	136	1576	462	163	1929	27
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	4	4		8	8		5	2	2	1	6	6
Minimum Initial (s)	10.0	10.0		10.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	16.5	16.5		16.5	16.5		9.0	27.9	27.9	9.0	27.9	27.9
Total Split (s)	35.0	35.0	0.0	35.0	35.0	0.0	10.0	70.0	70.0	15.0	75.0	75.0
Total Split (%)	29.2%	29.2%	0.0%	29.2%	29.2%	0.0%	8.3%	58.3%	58.3%	12.5%	62.5%	62.5%
Maximum Green (s)	28.5	28.5		28.5	28.5		7.0	62.1	62.1	12.0	67.1	67.1
Yellow Time (s)	4.5	4.5		4.5	4.5		3.0	5.9	5.9	3.0	5.9	5.9
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Min	C-Min	None	C-Min	C-Min
Act Effct Green (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.1	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
v/c Ratio	0.11	0.22		0.96	0.37		0.89	0.85	0.43	0.80	0.98	0.03
Control Delay	35.6	12.8		86.1	10.7		60.3	12.6	1.1	53.1	39.4	4.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	12.8		86.1	10.7		60.3	12.6	1.1	53.1	39.4	4.5
LOS	D	B		F	B		E	B	A	D	D	A
Approach Delay		17.3			56.8			13.1			40.0	
Approach LOS		B			E			B			D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 41 (34%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 29.2		Intersection LOS: C
Intersection Capacity Utilization 87.9%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 5: New East West Road & Highway # 6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1653		1770	1545		1770	3312	1583	1752	3343	1583
Flt Permitted	0.50	1.00		0.65	1.00		0.06	1.00	1.00	0.06	1.00	1.00
Satd. Flow (perm)	939	1653		1207	1545		111	3312	1583	109	3343	1583
Volume (vph)	25	25	75	275	25	150	125	1450	425	150	1775	25
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	27	82	299	27	163	136	1576	462	163	1929	27
RTOR Reduction (vph)	0	61	0	0	117	0	0	0	190	0	0	9
Lane Group Flow (vph)	27	48	0	299	73	0	136	1576	272	163	1929	18
Heavy Vehicles (%)	2%	2%	2%	2%	2%	8%	2%	9%	2%	3%	8%	2%
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	28.5	28.5		28.5	28.5		70.4	63.4	63.4	77.1	67.1	67.1
Effective Green, g (s)	31.0	31.0		31.0	31.0		73.3	67.3	67.3	80.7	71.0	71.0
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.61	0.56	0.56	0.67	0.59	0.59
Clearance Time (s)	6.5	6.5		6.5	6.5		3.0	7.9	7.9	3.0	7.9	7.9
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	427		312	399		151	1857	888	206	1978	937
v/s Ratio Prot		0.03			0.05		0.05	0.48		c0.06	c0.58	
v/s Ratio Perm	0.03			c0.25			0.51		0.17	0.47		0.01
v/c Ratio	0.11	0.11		0.96	0.18		0.90	0.85	0.31	0.79	0.98	0.02
Uniform Delay, d1	34.0	34.0		43.9	34.6		31.4	22.1	14.0	31.5	23.7	10.1
Progression Factor	1.00	1.00		1.00	1.00		1.53	0.45	0.34	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1		39.4	0.2		23.5	2.1	0.4	18.4	15.2	0.0
Delay (s)	34.2	34.1		83.2	34.9		71.6	12.0	5.1	50.0	38.8	10.2
Level of Service	C	C		F	C		E	B	A	D	D	B
Approach Delay (s)		34.1			64.4			14.3			39.3	
Approach LOS		C			E			B			D	

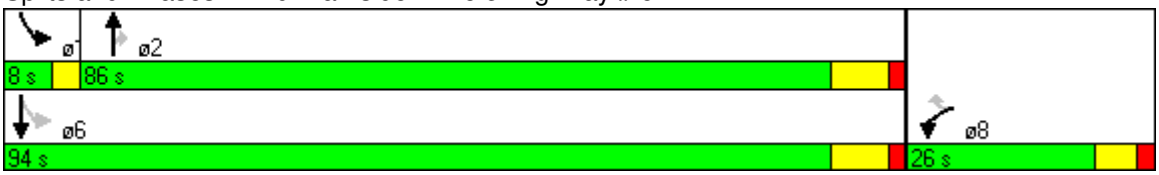
Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	115.0	0.0		105.0	132.5	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Leading Detector (m)	15.0	15.0	15.0	15.0	15.0	15.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	25	15		15	25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.950				0.047	
Satd. Flow (perm)	1770	1495	3312	1583	87	3343
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		79		217		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (k/h)	60		80			80
Link Distance (m)	1373.4		596.0			378.0
Travel Time (s)	82.4		26.8			17.0
Volume (vph)	250	75	1925	200	75	2075
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Adj. Flow (vph)	272	82	2092	217	82	2255
Lane Group Flow (vph)	272	82	2092	217	82	2255
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Detector Phases	8	8	2	2	1	6
Minimum Initial (s)	10.0	10.0	20.0	20.0	5.0	20.0
Minimum Split (s)	16.5	16.5	27.9	27.9	8.0	27.9
Total Split (s)	26.0	26.0	86.0	86.0	8.0	94.0
Total Split (%)	21.7%	21.7%	71.7%	71.7%	6.7%	78.3%
Maximum Green (s)	19.5	19.5	78.1	78.1	5.0	86.1
Yellow Time (s)	4.5	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	0.0	2.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Recall Mode	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	20.2	20.2	81.0	81.0	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.68	0.68	0.77	0.73
v/c Ratio	0.91	0.26	0.94	0.19	0.55	0.93
Control Delay	83.4	12.3	27.5	1.4	23.9	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.4	12.3	27.5	1.4	23.9	14.1
LOS	F	B	C	A	C	B
Approach Delay	66.9		25.1			14.4
Approach LOS	E		C			B

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 24 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Parkside Drive & Highway # 6



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.9	6.9	2.0	6.9
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1495	3312	1583	1752	3343
Flt Permitted	0.95	1.00	1.00	1.00	0.05	1.00
Satd. Flow (perm)	1770	1495	3312	1583	85	3343
Volume (vph)	250	75	1925	200	75	2075
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	82	2092	217	82	2255
RTOR Reduction (vph)	0	66	0	72	0	0
Lane Group Flow (vph)	272	16	2092	145	82	2255
Heavy Vehicles (%)	2%	8%	9%	2%	3%	8%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.2	19.2	79.4	79.4	86.4	86.4
Effective Green, g (s)	20.2	20.2	80.4	80.4	92.3	87.4
Actuated g/C Ratio	0.17	0.17	0.67	0.67	0.77	0.73
Clearance Time (s)	6.5	6.5	7.9	7.9	3.0	7.9
Vehicle Extension (s)	3.0	3.0	5.0	5.0	1.5	5.0
Lane Grp Cap (vph)	298	252	2219	1061	135	2435
v/s Ratio Prot	c0.15		0.63		0.03	c0.67
v/s Ratio Perm		0.01		0.09	0.44	
v/c Ratio	0.91	0.06	0.94	0.14	0.61	0.93
Uniform Delay, d1	49.0	42.0	17.7	7.2	23.9	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.36	0.75
Incremental Delay, d2	30.5	0.1	9.7	0.3	1.9	3.0
Delay (s)	79.5	42.1	27.4	7.5	34.5	13.2
Level of Service	E	D	C	A	C	B
Approach Delay (s)	70.8		25.6			13.9
Approach LOS	E		C			B

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Attachment 4
SimTraffic Queue Reports

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	10.4	26.2	170.7	63.8	162.5	336.4	294.2	92.9	64.3	405.1	261.4	7.9
Average Queue (m)	2.0	9.9	121.3	19.1	23.0	159.6	156.2	32.3	34.7	159.2	151.2	2.5
95th Queue (m)	6.4	23.2	159.9	43.9	85.7	299.0	285.9	91.7	62.8	299.0	237.9	8.4
Link Distance (m)	441.7	441.7	1368.5	1368.5		857.0	857.0			394.7	394.7	
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						7	18	0		4	20	
Queuing Penalty (veh)						4	35	0		5	5	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	122.8	159.1	596.6	590.8	112.8	21.4	60.1	84.1
Average Queue (m)	55.4	34.0	321.0	99.2	16.5	10.7	28.2	33.9
95th Queue (m)	112.4	110.6	741.1	324.6	59.8	20.3	54.2	68.5
Link Distance (m)		1355.9	586.2	586.2			857.0	857.0
Upstream Blk Time (%)			2	0				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)	6			1				
Queuing Penalty (veh)	3			4				

Nework Summary

Network wide Queuing Penalty: 57

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	10.4	25.2	181.7	147.0	162.5	350.5	317.7	98.5	64.5	405.2	252.4	8.2
Average Queue (m)	1.7	8.9	150.9	43.9	34.7	162.1	170.2	35.7	35.3	148.8	145.5	2.6
95th Queue (m)	6.1	22.1	187.6	125.0	117.9	286.5	281.6	94.4	63.4	278.9	228.5	8.7
Link Distance (m)	441.7	441.7	1362.6	1362.6		707.7	707.7			394.8	394.8	
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						11	29	0		2	19	
Queuing Penalty (veh)						6	55	1		3	5	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	82.5	24.5	596.6	590.8	110.2	140.2	157.7	177.5
Average Queue (m)	44.9	12.0	281.9	102.1	17.3	27.0	119.3	128.8
95th Queue (m)	80.1	21.4	700.2	321.4	59.5	100.7	157.8	166.7
Link Distance (m)		1355.9	586.2	586.2			707.7	707.7
Upstream Blk Time (%)			2	0				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)				1	0		3	
Queuing Penalty (veh)				3	0		2	

Nework Summary

Network wide Queuing Penalty: 75

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	16.9	25.8	218.6	188.3	18.9	319.9	279.6	91.3	177.1	405.2	375.3	8.2
Average Queue (m)	2.2	8.7	189.8	99.7	10.2	144.2	132.1	25.5	45.1	198.1	188.5	3.0
95th Queue (m)	9.0	22.3	221.9	220.3	19.5	275.1	250.9	69.1	109.6	380.4	338.5	9.2
Link Distance (m)	441.7	441.7	1356.1	1356.1		453.4	453.4			394.9	394.9	
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						6	24	0		12	27	
Queuing Penalty (veh)						3	45	0		17	7	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	95.2	19.3	596.6	590.8	15.1	136.7	164.5	163.9
Average Queue (m)	58.6	11.8	269.4	154.6	9.4	19.9	84.7	82.1
95th Queue (m)	103.7	19.9	704.3	515.3	12.8	72.3	146.3	138.9
Link Distance (m)		1355.9	586.2	586.2			453.4	453.4
Upstream Blk Time (%)			1	1				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)						0	1	
Queuing Penalty (veh)						0	0	

Nework Summary

Network wide Queuing Penalty: 73

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	16.9	20.2	206.2	189.5	161.7	329.9	303.6	92.6	177.4	405.3	360.9	8.2
Average Queue (m)	2.2	8.5	179.9	87.1	20.3	152.3	155.8	20.1	53.2	188.4	181.7	3.1
95th Queue (m)	9.0	21.5	215.5	205.2	83.4	287.1	297.2	53.4	137.7	363.8	325.2	9.4
Link Distance (m)	441.7	441.7	1355.4	1355.4		409.7	409.7			394.9	394.9	
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						8	25	0		11	26	
Queuing Penalty (veh)						4	48	0		16	7	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	95.2	25.3	596.6	590.8	14.8	22.0	147.3	151.4
Average Queue (m)	50.5	12.2	239.6	124.6	9.8	11.2	75.2	75.4
95th Queue (m)	90.4	21.6	651.7	428.5	13.7	22.1	130.4	129.8
Link Distance (m)		1355.9	586.2	586.2			409.7	409.7
Upstream Blk Time (%)			1	0				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Nework Summary

Network wide Queuing Penalty: 75

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	16.9	20.2	202.2	189.7	162.6	285.1	273.7	92.9	177.7	405.3	362.0	8.1
Average Queue (m)	2.2	8.3	176.2	95.9	20.9	134.3	133.9	28.8	42.9	209.5	187.5	3.0
95th Queue (m)	9.0	20.6	206.1	212.6	83.9	246.1	253.5	82.1	107.8	411.8	334.0	9.1
Link Distance (m)	441.7	441.7	1354.3	1354.3		357.9	357.9			394.9	394.9	
Upstream Blk Time (%)										0		
Queuing Penalty (veh)										0		
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)					0	5	26	0		13	26	
Queuing Penalty (veh)					0	3	50	0		17	7	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	101.0	25.3	590.8	590.8	15.6	22.0	155.1	152.0
Average Queue (m)	55.8	12.2	233.9	129.4	10.5	11.7	63.2	63.5
95th Queue (m)	101.4	21.7	651.5	432.2	14.7	21.5	128.0	122.8
Link Distance (m)		1355.9	586.2	586.2			357.9	357.9
Upstream Blk Time (%)			1	0				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)				1			1	
Queuing Penalty (veh)				2			0	

Nework Summary

Network wide Queuing Penalty: 79

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	17.8	34.7	278.4	264.6	51.2	143.2	181.3	92.9	177.5	492.6	481.5	92.8
Average Queue (m)	4.0	17.8	192.1	146.2	23.5	89.7	80.1	32.8	41.0	341.1	321.3	8.3
95th Queue (m)	12.8	32.6	313.5	309.8	41.1	138.2	130.9	82.0	131.3	538.8	501.7	46.0
Link Distance (m)	386.4	386.4	1368.2	1368.2		856.8	856.8			665.4	665.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)							3	0		25	34	
Queuing Penalty (veh)							12	0		41	9	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	122.8	173.0	596.6	367.8	112.9	33.6	66.4	72.1
Average Queue (m)	119.0	82.7	343.1	217.5	36.1	17.0	34.4	36.8
95th Queue (m)	129.7	194.6	654.8	383.8	111.1	30.2	59.8	65.6
Link Distance (m)		1355.9	586.2	586.2			856.8	856.8
Upstream Blk Time (%)			1					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)	28			18	0			
Queuing Penalty (veh)	23			39	1			

Nework Summary

Network wide Queuing Penalty: 125

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	10.5	28.8	286.5	298.6	162.6	348.7	348.7	96.1	177.7	497.5	432.3	8.3
Average Queue (m)	2.7	18.0	198.0	149.5	42.7	152.3	149.9	46.8	43.9	339.1	325.8	2.2
95th Queue (m)	7.8	28.8	302.9	327.8	121.3	300.9	300.4	98.1	133.3	545.5	493.9	8.1
Link Distance (m)	386.4	386.4	1359.4	1359.4		707.9	707.9			665.4	665.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						6	21	0		24	34	
Queuing Penalty (veh)						8	97	1		38	9	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	122.8	166.4	590.8	326.3	112.8	140.1	224.5	220.8
Average Queue (m)	118.7	82.2	352.0	212.8	27.6	47.1	158.7	160.2
95th Queue (m)	129.4	189.0	640.9	352.6	97.0	140.1	243.5	234.5
Link Distance (m)		1355.9	586.2	586.2			707.9	707.9
Upstream Blk Time (%)			1					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)	27			18	0	0	7	
Queuing Penalty (veh)	22			39	0	0	6	

Nework Summary

Network wide Queuing Penalty: 221

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	11.0	41.3	243.1	216.8	160.0	410.3	415.4	92.9	177.7	516.4	482.0	14.3
Average Queue (m)	2.7	19.9	176.4	109.4	31.4	165.8	166.2	63.6	67.0	346.6	332.8	3.0
95th Queue (m)	8.9	39.7	258.7	254.8	91.0	374.2	376.2	120.0	179.0	585.3	559.1	10.7
Link Distance (m)	386.4	386.4	1353.0	1353.0		453.4	453.4			665.4	665.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						6	18	0	0	23	31	
Queuing Penalty (veh)						8	82	1	0	38	9	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	122.6	49.2	596.6	590.8	112.8	33.8	149.7	159.5
Average Queue (m)	93.7	15.1	310.3	200.0	35.2	14.9	123.1	130.9
95th Queue (m)	122.5	34.3	641.2	390.9	111.5	27.2	156.0	165.2
Link Distance (m)		1355.9	586.2	586.2			453.4	453.4
Upstream Blk Time (%)			1	0				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)	4			12	0		3	
Queuing Penalty (veh)	3			26	0		3	

Nework Summary

Network wide Queuing Penalty: 169

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	11.0	41.2	236.3	217.4	38.0	209.7	180.8	92.8	177.8	522.2	491.6	14.2
Average Queue (m)	2.3	19.6	171.8	108.1	20.0	101.8	97.2	40.7	50.0	334.5	315.4	2.6
95th Queue (m)	8.5	39.2	247.8	250.2	32.3	181.8	165.5	94.2	136.8	556.6	528.6	10.1
Link Distance (m)	386.4	386.4	1355.1	1355.1		409.6	409.6			665.5	665.5	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						1	13	0		22	32	
Queuing Penalty (veh)						2	61	0		36	9	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	122.7	179.6	596.6	590.8	112.9	27.8	152.4	153.7
Average Queue (m)	116.8	73.2	343.6	226.3	36.3	14.9	110.2	108.7
95th Queue (m)	129.9	184.7	688.9	492.8	112.6	26.3	158.0	163.9
Link Distance (m)		1355.9	586.2	586.2			409.6	409.6
Upstream Blk Time (%)			2	0				
Queuing Penalty (veh)			0	0				
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)	23			13	0		1	
Queuing Penalty (veh)	19			28	0		1	

Nework Summary

Network wide Queuing Penalty: 156

Intersection: 5: New East West Road & Highway # 6

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (m)	11.0	53.4	263.4	235.7	50.7	316.5	369.5	92.8	177.7	540.0	524.2	14.4
Average Queue (m)	2.3	18.7	186.1	112.8	24.0	121.9	127.0	54.6	59.1	332.2	320.7	2.3
95th Queue (m)	8.5	44.8	279.0	265.0	45.2	248.0	283.6	107.6	159.1	577.6	555.6	9.3
Link Distance (m)	386.4	386.4	1353.9	1353.9		357.8	357.8			665.5	665.5	
Upstream Blk Time (%)							1					
Queuing Penalty (veh)							6					
Storage Bay Dist (m)					155.0			85.0	170.0			85.0
Storage Blk Time (%)						2	16	0		22	31	
Queuing Penalty (veh)						3	72	1		36	8	

Intersection: 10: Parkside Drive & Highway # 6

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	L	T	T
Maximum Queue (m)	104.1	49.2	596.6	333.5	112.8	27.2	202.9	216.7
Average Queue (m)	83.0	14.6	317.1	201.6	35.7	14.4	118.5	119.7
95th Queue (m)	109.3	33.6	604.5	315.4	110.9	23.4	170.4	179.8
Link Distance (m)		1355.9	586.2	586.2			357.8	357.8
Upstream Blk Time (%)			1					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)	115.0				105.0	132.5		
Storage Blk Time (%)				15	0		2	
Queuing Penalty (veh)				33	0		2	

Nework Summary

Network wide Queuing Penalty: 161

08-9020

MacLeod, Paul

From: Morreale, Diana [dmorreal@hamilton.ca]

Sent: Wednesday, April 23, 2008 5:08 PM

To: McKinnon, Don; Almuina, Alvaro; MacLeod, Paul; Sally Leppard; Allen, Paul; Head, Andrew; Green-Battiston, Melissa

Subject: FW: City of Hamilton MOE Response- Waterdown/Aldershot Transportation Master Plan - next steps

For your files and information.
DM

-----Original Message-----
From: Morreale, Diana
Sent: Wednesday, April 23, 2008 5:02 PM
To: 'Barbara.Slattery@ontario.ca'
Cc: Lee-Morrison, Christine; Banuri, Syeda
Subject: City of Hamilton MOE Response- Waterdown/Aldershot Transportation Master Plan - next steps

Good Afternoon Barb,
Thank you for taking the time to provide the project team with some suggestions on our next steps for the Waterdown/Aldershot Transportation Master Plan (WATMP). The project team wanted to provide you with an update on the two items you have raised in your March 27, 2008 e-mail.

1. The Project Team for the WATMP has agreed to a further evaluation of the Option 5, a route adjustment suggested by the North East Parkside Drive Residential Community. Option 5 involves a northerly alignment shift to the identified preferred solution for the New East – West Road in the area starting east of Centre Road to Robson Road, avoiding the widening of a section Parkside Drive . The shifting of the alignment will result in impacts to two business properties (OPTA Minerals and Connon Nursery). As indicated in the Phase 2 WATMP Final Report, Option 5 was suggested as an alternate to widening a section of Parkside Drive. It is noted that Parkside Drive is an identified arterial roadway and road right-of-way has been set aside for future widening. During the previous Transportation Master Plan work, this option was evaluated against the preferred alternative. The evaluation confirmed the originally preferred alternative. It was noted that the high costs of business displacement (an industrial minerals processing facility and a tree nursery) were not included in the original evaluation as business impacts of this nature were not encountered with any of the original alternatives As the routes were designed to avoid such impacts. This is a significant, new consideration not included in the original evaluation. A follow-up meeting with the industrial facility (OPTA Minerals Inc.) in summer 2007, and more recently April 2008 confirmed that the development of a new roadway through their facility would result in significant effects to their operations as it would remove lands that are used for their processing. OPTA are unsure as to whether they could continue to operate at this location should the road pass through their lands. As part of the economic valuation of these impacts, the ability of OPTA to continue to operate at this location with a new roadway passing through their property will be investigated. The study team has met with North East Parkside Drive Residential Community representatives (who suggested Option 5) to explain the evaluation results. The City of Hamilton has agreed to review the decision to widen Parkside Drive in more detail and consider alternate feasible routing options as part of the future Phase 3 Class EA work. This work is to be undertaken with the input of the community and affected businesses in the area. The steps to be undertaken include:

   - Collect additional information from OPTA Minerals and Connon Nursery to help Assess Business impacts and costs,
   - Determine the costs of business property acquisition, removal of existing assets, and possibly business relocation, that would arise from the implementation of the Option 5 alignment,
   - Assess feasibility to develop a new access to the OPTA facility off of the new north Waterdown Roadway,

- Assess soil contamination potential/extent on the OPTA Minerals property,
- Determine the feasibility/acceptability of an alternative alignment. If feasible, proceed to evaluation of this option (with stakeholder input) against the preferred Parkside Drive alignment option.

It has always been the intent of the Project Team to develop the evaluation criteria for Phases 3 & 4 for the Waterdown Road Class EA and the East-West Road Class EA with the assistance of the Neighbourhood Advisory Committees (NAC). We have established two NACs:

- NAC-E/W to work with the Project on the East- West Road Class EA
- NAC-N/S to work with the Project team on the Waterdown Road Class EA

The Project team hosted the first set of NAC meetings on April 22, 2008. The first NAC meeting was a joint NAC meeting and at this meeting the project team presented the NAC with preliminary evaluation criteria for Phase 3 & 4. We have asked for their input on the evaluation criteria and will be further discussing this issue at the next NAC meeting. One of the items we will be discussing is how we plan to develop the weighting criteria for the evaluation and whether we will be incorporating the qualitative approach into evaluation assessment as well.

The Project Team is also looking for input on the evaluation criteria from the general public, stakeholders and government agencies.

Once again thank you for your input on this project. We look forward to receiving any further insights you may have on Phase 3 & 4.

Take care and have a great day,

Diana

-----Original Message-----
From: Slattery, Barbara (ENE) [mailto:barbara.slattery@ontario.ca]
Sent: Thursday, March 27, 2008 10:50 AM
To: Morreale, Diana
Cc: Steve Oliver
Subject: Waterdown/Aldershot Transportation Master Plan - next steps

Good Morning,

Having had the opportunity to review the emails that have been recently sent between the City and Messrs. Oliver and Breznik, I have had two thoughts that I wish to share, in the hopes that it may provide some assistance in resolving the issues surrounding this project.

1. Re-evaluation of various route options. It is my understanding that some level of re-evaluation of routes is to be undertaken as part of phases 3&4. In doing so, will the cost/benefit associated with allowing Opta Minerals to create a northern entrance be considered? If not, why not as this is being argued as an indicator of social impact. Similarly, will the evaluation attempt to assess the impacts that would occur should Dufferin Aggregates seek a change to their permitted haul route?
2. What is the role of the neighbourhood advisory committees? Has any thought been given to allowing stakeholder input in determining whether the evaluation criteria should be weighted vs equal weighting? I have had experience with a very controversial project in another jurisdiction where the stakeholder group reached consensus as to the weighting of the evaluation criteria

As I said, just a few thoughts that arose upon reading the more recent emails....

MINUTES OF MEETING - Draft

PROJECT: City of Hamilton New East-West Road Corridor Class EA

PURPOSE: Discussion of Highway 6 Connection Issues and Requirements

DATE: June 4, 2009, 10:00 A.M.

LOCATION: Hamilton City Centre, Room 320A

PRESENT:

City of Hamilton:	Diana Morreale
	Christine Lee-Morrison
MTO:	Frederick Szymanski
	Greg Roszler
	Dan Stala
▪	Jason Worron
Dillon Consulting:	Paul MacLeod
	Don McKinnon

ITEM	MINUTES	ACTION BY
1	Following introductions, Paul MacLeod reviewed the results of last night's residents' meeting held to review the Highway 6 connection options with the directly affected property owners. Invitation notices were mailed out to approximately 70 residents in the area. Copies of the display panels were handed out (see attached). Included in this package was a preliminary evaluation matrix that now needs to be finalized with updated property owner and MTO input. No preference for an alignment alternative was indicated at the residents' meeting	Dillon
2	At the residents' meeting there was some local support for the closing of Concession 4 Road at Highway 6 due to public safety concerns. Some residents indicated that they avoid using this intersection all together. Dillon would like to document and evaluate a sub-option to each of Options 1 and 2 involving closing existing Concession 4 Road and not extending the East-West Road west of Highway 6.	Dillon
3	MTO will supply Dillon with additional documentation of the options in order to fill out the evaluations matrix. This will include pros and cons of the alternatives. The main trade offs that exist in this evaluation will be Highway 6 traffic service, operations and safety versus property impacts, impacts to the natural environment and cost.	MTO

ITEM	MINUTES	ACTION BY
4	The current route for gravel trucks is Brock Road south to Dundas Street. Concession 4 is not an approved haul route. Residents do not believe that trucks will follow the approved haul routes. It is noted that Parkside Drive is currently a designated truck route with 5-6% trucks.	
5	It was thought that the closing of the Concession 4 intersection could be beneficial in improving Highway 6 corridor traffic operations in this area. The next signalized intersection to the north is at Millgrove Sideroad.	
6	MTO indicated that the evaluation documentation should include the consideration of a roundabout.	Dillon
7	The possibility of a future interchange at this general location was discussed. This might be a requirement in the future and, if so, would be part of major overall corridor improvements that would require an MTO Class EA. Future major corridor changes such as these would likely affect the alignment of any East-West Corridor alignment that is provided on the east side of Highway 6 as part of this current study. Dillon indicated that a shift of the curved alignment portion of Option 1 away from Highway 6 would place it in or much closer to an environmentally sensitive area. Dillon will add in a "Flexibility" factor in the evaluation matrix that will be used to address the flexibility for the implementation of future Highway 6 corridor changes/upgrades.	Dillon
8	Options 1 and 2 are preferred by MTO due to Highway 6 operations concerns. The southerly 3 options are problematic due to their proximity to Parkside Drive. These options may not be possible or may require the closure of Parkside Drive or elimination of the southbound left turn lane at Parkside Drive. MTO will provide detailed comments. MTO may need additional traffic data to comment and will get in touch with Dillon if this is so.	MTO
9	MTO is undertaking a Human Safety Study that takes into account the entire Hwy 6 Corridor. The work is being completed by IBI. Dillon has asked if there was any information regarding safety concerns for this area that IBI could pass along.	MTO
10	MTO will provide their comments/input to the evaluation the week of June 15th.	MTO

DISTRIBUTION: Attendees
Project File

Please contact Paul MacLeod of Dillon Consulting with any errors or omissions.

MEMO

DILLON CONSULTING

TO: File

CC: Christine Lee-Morrison, Diana Morreale (City of Hamilton)
Greg Roszler **(**MTO)

FROM: Dillon Consulting Team

DATE: July 16/09

SUBJECT: **Waterdown New East-West Road Highway 6 Connection Evaluation Update – Draft For Comment**

OUR FILE: 08-9020

The following presents the results of the updated comparative evaluation of alternative alignments/connection points with Highway 6 for the proposed new East-West Road through the Waterdown area. This memo has been prepared for comment by interested agencies and stakeholders.

The recommended alignment is to be confirmed after interested stakeholders have been consulted with.

Identification of Alternative Alignments

Figure 1 presents the 3 alternative alignments for the western termination of the proposed new east-west that are now being considered. These options were developed based on input received from the public and MTO. All 3 options assume that existing Concession 4 road will be closed just west of Highway 6 as per MTO direction that the number of intersections along Hwy 6 cannot be increased. Some changes have been made to the alternative alignments that were previously presented to the MTO and the public in June 2009. These changes include:

- Options 1 and 2 no longer extend to the west side of Highway 6. The significance of the effects to natural features, agricultural land and residents on the west side of Hwy 6 cannot be justified at this time. Concession 4 Road will now be closed with these options with no connection to the New East-West Road.
- Three southern alignments were previously presented and considered. The two most northern alignments of these offered minimal traffic operational advantages over the most southern location (now Option 3) with significantly greater property impacts. As such, only one alignment is now being considered in this area (Option 3). It is noted that for Option 3, there is the opportunity to either terminate at Hwy 6 or extend westerly to connect with the Old Concession 4 Rd. The connection to the Old Concession 4 Rd. can be made with minimal effects. This opportunity is considered in the evaluation.

Evaluation Results

The alternative alignments were evaluated on the basis of the evaluation criteria that were developed for this Class EA study. The evaluation criteria are organized on the basis of 5 criteria groups (Social, Natural Environment, Economic, Cost and Transportation). The following summarizes the results by criteria group:

Social Environment:

None of the options will result in the removal of residences or residential property. All of the alignments have some potential for disruption effects to residents in the area. Option 2 will restrict the access to Hwy 6 (right turn only) for two residences while the other options will restrict access to one residence each (due to the centre median that would be required at the new intersection). Option 3 has the advantage of offering the opportunity to reconnect the Old Concession 4 Road to Hwy 6 which would reestablish access for residents along this roadway. However, allowing for this direct connection to the west was of concern to Waterdown residents to the east at they felt it would encourage truck traffic usage through their community. All three options have some residences in proximity to them, as such, they all could increase traffic related nuisance effects to these residences. Although given high background traffic volumes on Hwy 6, these effects are not likely to be overly noticeable to residents. For the Social Environment Criteria group, Option 3 was considered to have a slight preference over the other two alignments due to its greater separation distance from residences.

Natural Environment

None of the options will result in the removal of any sensitive terrestrial natural habitat. Options 1 and 2 are in proximity to ESA lands but should be well enough removed to not result in substantial disturbance effects. Option 2 parallels in close proximity a creek/swale and this would likely result in effects to aquatic habitat. For this reason, Option 2 is considered to be less preferred than the other two options. Overall, there is a slight preference for Option 3 over Option 1 as it is further removed from any natural habitat. Option 2 is considered to be least preferred.

Economic Environment

There are no businesses in proximity to the alignments. The main considerations in this grouping relates to impacts to agricultural land. Options 1 and 2 will result in less agricultural land being removed than Option 3. Option 2 however, is considered to have the greatest land parcel fragmentation effects. The fragmentation effects are considered to be important as additional amounts of land could be taken out of production as it may no longer be economically viable to farm these smaller parcels that are split off. As such, Option 1 is preferred for this grouping (least amount of agricultural land being removed and least fragmentation effects). Option 2 is considered to be least preferred due to the parcel fragmentation effects associated with it.

Cost

The costs for the three options (up to the Hwy 6 connection point) including an allowance for property acquisition costs are the following:

- Option 1: $3.57 million
- Option 2: $5.88 million (including property severance costs)
- Option 3: $3.38 million (not including any construction west of Highway 6)

Transportation

While all of the options address road capacity requirements, there is some variation among them with respect to effects on traffic operations – specifically how the new intersection locations would work with the existing Parkside Dr. intersection located to the south. In regards to coordination of traffic signals, the order of preference is Option 1, 3 and 2. While there is variation among the options with respect to the radius of curves/design speeds of the roadway in proximity to the intersections, all are considered to be acceptable. Also considered was the spacing distance between the new intersection and the Parkside Dr. intersection. Options 1 and 2 meet MTO's minimum required separation distance from existing intersections. Option 5 does not meet the minimum spacing distance and would require the closure of the Parkside Dr intersection if it were to be selected.

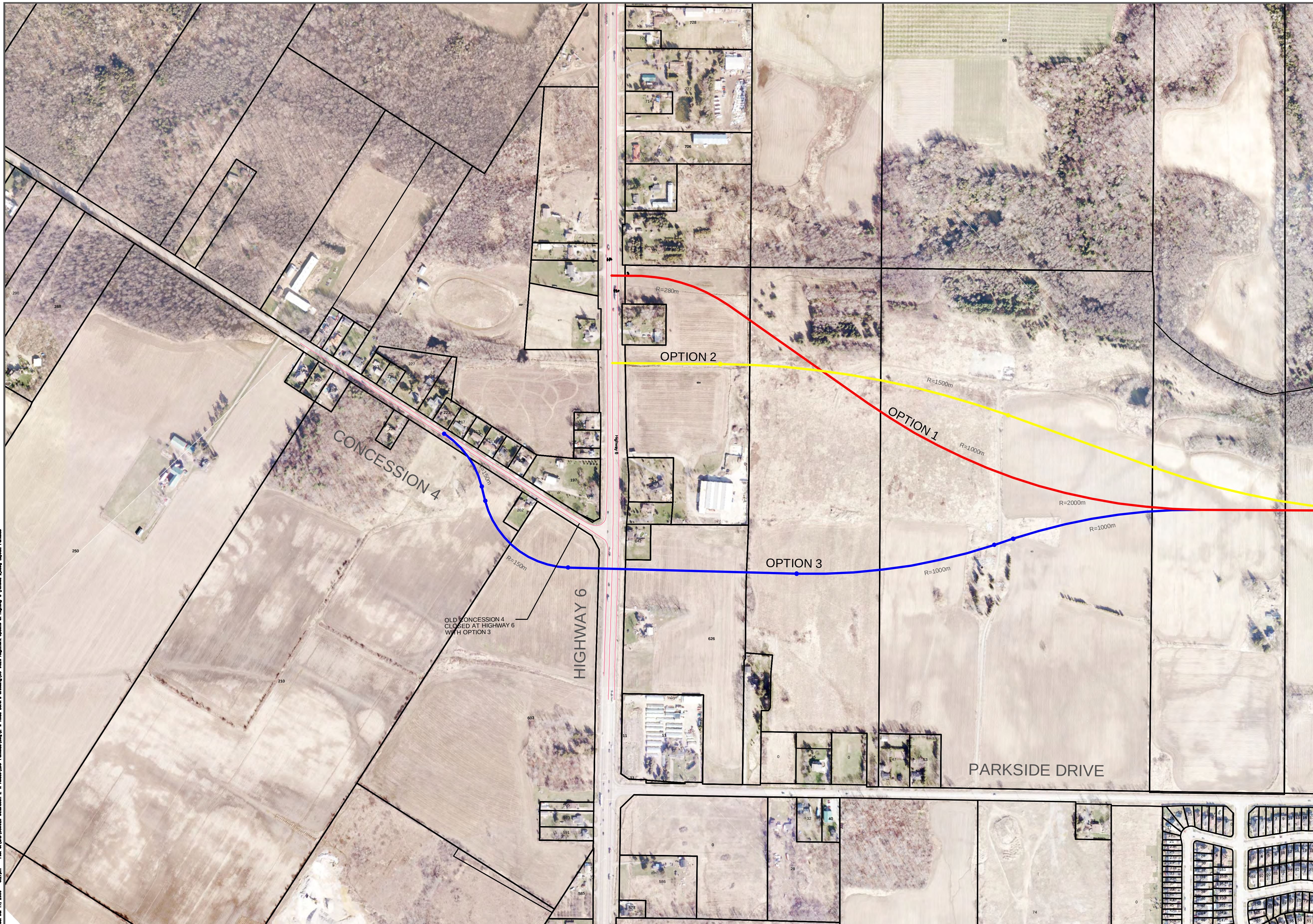
Conclusion:

In reviewing the assessment results by criteria group, due to MTO's concerns with respect to the to the spacing of Alignment 3 from the Parkside Dr intersection, this option could not be considered any further (the closure of the Parkside Dr intersection to allow the development of Alignment 3 could not be justified by the project team at this time). The remaining 2 options were considered to be similar with respect to the Social and Transportation criteria groups. However, Option 2 was considered to have greater natural environment effects (from effects associated with the creek), greater economic effects (due to farm land parcel fragmentation effects) and is significantly more expensive. **As a result, Option 1 was identified as the preferred alignment overall.**

New East West Road Phase 3 Class EA
Hwy 6 Connection Alignments
Evaluation Summary – July 16, 2009

Criteria Group	Criteria	Indicators	Option 1	Option 2	Option 3
Social Environment	Potential for impact on residents	Number of residences displaced	None	None	None
		Amount of residential property removed (ha)	None	None	None
		Change in access to residential property	Access to residential property on west side of Highway 6 (immediately north of new intersection) will be limited to right-in, right-out access only, due to the need for a raised median island for traffic lights. Full access may be possible for residence on west side of highway opposite the intersection. This needs to be confirmed during detailed design. Old Concession 4 Road at Highway 6 to be closed affecting access to approximately 20 properties. Some of these residents have indicated that they do not use this intersection due to safety concerns.	Access to two residential properties on either side of Highway 6, immediately north of the new intersection will be restricted to right-in, right-out access only due to the need for a raised median island for traffic lights. Old Concession 4 Road at Highway 6 to be closed affecting access to approximately 20 properties. Some of these residents have indicated that they do not use this intersection due to safety concerns.	Access to one residential property on the east side of Highway 6, north of the new intersection will be restricted to right-in, right-out access only due to the need for a raised median island for traffic lights. Old Concession 4 Road at Highway 6 could be closed affecting access to approximately 20 properties. Some of these residents have indicated that they do not use this intersection due to safety concerns. If Concession 4 Road were closed, will result in disturbance to entrances for approximately 6 residences on Concession 4 Road.
		Potential for change in air quality and noise	Five residences within 100 m of the new roadway. Due to high volume traffic conditions along Hwy 6, effects of the roadway are unlikely to be noticeable.	Five residences within 100 m of the new roadway. Due to high volume traffic conditions along Hwy 6, effects of the roadway are unlikely to be noticeable.	Five residences within 100 m of the new roadway. Due to high volume traffic conditions along Hwy 6, effects of the roadway are unlikely to be noticeable.
Natural Environment	Potential for impact on terrestrial features	Amount, nature and significance of natural habitat removed	As option is predominantly in agricultural land, no forested habitat will be removed.	As option is predominantly in agricultural land, no forested habitat will be removed.	As option is predominantly in agricultural land, no forested habitat will be removed.
		Number of significant trees along existing roadway removed	Minimal	Minimal	Minimal.
		Potential for effects to adjacent habitat	Higher potential due to close proximity to the Logies Creek Wetland ESA/PSW to the north of the alignment.	Higher potential due to close proximity to the Logies Creek Wetland ESA/PSW to the north of the alignment.	No sensitive habitat in close proximity to the alignment
		Fragmentation of natural areas	None	None	None
		Effect on terrestrial corridor connectivity / linkages	Minimal effects. Option predominantly runs through agricultural land.	Minimal effects. Option predominantly runs through agricultural land.	Minimal effects. Option predominantly runs through agricultural land.
	Potential for Impact on aquatic features	Amount and quality of aquatic habitat altered/disturbed/removed	Limited	Some disturbance will result as the alignment runs adjacent to a watercourse. This may impact aquatic habitat in this stream.	Limited
Economic Environment	Potential for impact on business enterprises	Area of commercial properties required (ha)	None	None	None
		Potential for change to property values	No businesses in proximity to the road way.	No businesses in proximity to the road way.	No businesses in proximity to the road way.

Criteria Group	Criteria	Indicators	Option 1	Option 2	Option 3
		Potential for change (disruption or enhancement) to business operations	No disruption (see agricultural effects)	No disruption (see agricultural effects)	No disruption (see agricultural effects)
	Potential for impact on residential property value	Potential for change to property values	Limited due to proximity to Hwy 6 and high traffic volumes. Change in access may affect property values (Concession 4 properties)	Limited due to proximity to Hwy 6 and high traffic volumes. Change in access may affect property values (Concession 4 properties)	Limited due to proximity to Hwy 6 and high traffic volumes. Change in access may affect property values (Concession 4 properties). Option to leave intersection to Concession 4 Road open preserving existing access.
	Potential for impact on agricultural land	Area of designated agricultural land removed (ha)	Least amount of agricultural land being removed (4.3 hectares). Some limited amount of farm parcel fragmentation on east side of Highway 6.	Amount of agricultural land removed is approximately 9.6 hectares assuming severed parcel to the north will no longer be a viable farmed parcel of land High fragmentation of one parcel on east side of Hwy 6.	Amount of agricultural land removed is approximately 4.6 hectares. Assumes no extension west of Highway 6. Greater parcel fragmentation that Option 1 but less than Option 2.
Cost	Capital Cost (million $)	Estimated capital cost (including land acquisition)	Construction Cost: $2,236,445 Property Cost: $1,337,500 Total: $3,573,945	Construction Cost: $2,911,235 Property Cost: $2,966,250 Total: $5,877,485	Construction Cost: $1,966,530 Property Cost: $1,412,500 Total: $3,379,030 (east of Hwy 6 only)
Transportation	Change in traffic operations, delay and capacity	Potential to increase level of traffic service	All alternatives address capacity needs equally. Offers the best opportunity to implement co-ordinated traffic signals with Parkside Drive. The closure of Concession 4 Road will create the redistribution of traffic to other road sections and Highway 6 intersections to the north and the south. The existing volumes at this intersection are relatively low and the impact of this diverted traffic is not of concern.	All alternatives address capacity needs equally. Offers the poorest opportunity to implement co-ordinated traffic signals with Parkside Drive. The closure of Concession 4 Road will create the redistribution of traffic to other road sections and Highway 6 intersections to the north and the south. The existing volumes at this intersection are relatively low and the impact of this diverted traffic is not of concern	All alternatives address capacity needs equally. Potential for signal co-ordination with Parkside Drive is less than Option 1, but better than Option 2. There will be sufficient intersection spacing to accommodate projected peak hour queues, but the shorter intersection spacing would likely result in some deceleration through the intersection in anticipation of downstream queues. The closure of Concession 4 Road will create the redistribution of traffic to other road sections and Highway 6 intersections to the north and the south. The existing volumes at this intersection are relatively low and the impact of this diverted traffic is not of concern
	Potential for change to traffic and public safety levels	Potential to improve roadway operations, geometry and sightlines	Minimum Radius of 250m is consistent with a design speed of 80km/hr. Provides best spacing (881m) to Parkside Drive.	Minimum radius of 250m is consistent with a design speed of 80km/hr. Provides less spacing (731m) to Parkside Drive.	Minimum radius of 150m is a substandard radius for a design speed of 80km/hr. Radius corresponds to a design speed of 65km/hr. Provides reduced spacing (380m) to Parkside Drive. Slightly below required distance to accommodate back-to-back MTO left turn storage, parallel lane and taper requirements (total 390 to 397.5 m required). MTO has expressed concern with this alignment as it does not meet minimum geometric design requirements for intersection spacing (from Parkside Dr.) including back-to-back left turn lanes. Further, MTO is concerned that the alignment does not provide minimum requirements for stopping sight distance and sight triangles. MTO has advised that they would only support this alternative if the existing Parkside Dr. intersection was closed.



PRELIMINARY

Hamilton Public Works

ALIGNMENT ALTERNATIVE AT HIGHWAY 6 (WITH WEST SIDE CONNECTION)

DILLON CONSULTING

NEW E-W ROAD
CLASS ENVIRONMENTAL ASSESSMENT
HWY 6 TO BRANT STREET

CHECKED BY: ---
DESIGN BY: ---
DRAWN BY: ---
SCALE: NTS
DATE: July 17, 09
PROJECT No. 08-9020

FIGURE 1

PROTECTING THE NATURAL ENVIRONMENT FROM LAKE TO ESCARPMENT

2596 Britannia Road West
RR2, Milton, Ontario L9T 2X6
905.336.1158 Fax 905.336.7014
www.conservationhalton.on.ca

April 29, 2010

Ms Syeda Banuri
City of Hamilton
Public Works Department
City of Hamilton
320-77 James Street N
Hamilton, ON
L8R 2K3

Dear Ms Banuri:

Re: Draft New East-West Road Corridor Class EA
August 2009
CH File: MPR 341

Staff of Conservation Halton have reviewed the above noted draft document, prepared by Dillon Consulting Limited and offer the following comments. A portion of the study area is within Hamilton Conservation Authority's jurisdiction and, as such, our comments pertain only to the portion of the Study Area within the Grindstone Creek watershed. We note however that the Hamilton Conservation Authority has raised significant issues with respect to the conclusions, particularly as they relate to impacts to a Provincially Significant Wetland. Although outside of our watershed, staff support the Hamilton Conservation Authority's comments as they relate to the importance of protecting and maintaining Provincially Significant Wetlands. Given the historical loss of wetlands in Southern Ontario we recommend that every effort should be made to avoid the loss of any wetland features, especially wetlands that have been identified as having Provincial significance.

Conservation Halton staff provided comments on a previous draft of the Natural Heritage components of the study. As a result, our comments below are divided between outstanding comments from our previous letter and comments on the draft ESR.

Outstanding Comments from July 6, 2008 CH letter regarding Natural Environment Report

It is unclear whether the following comments on the draft Natural Environment Report have been taken into account in the preparation of the ESR:

1. Section 2.0 (Methods) - Staff questioned whether the following sources were consulted for terrestrial species information:

   - *Terrestrial Resource Comments on North Service Road/Waterdown Road Interchange Design Alternatives, City of Burlington, Ontario, prepared by Dougan and Associates and dated October 11, 2007*
   - *Tree Inventory Report, Waterdown Road – Hwy 403 Interchange, prepared by Wendy Shearer Landscape Architect Limited and dated August 22, 2007*
   - *South Waterdown Subwatershed Study Stage 1 Report (Volumes I and II), prepared by Ecoplans Limited and dated March 2006*

- *South Waterdown Subwatershed Study Stage 2 Report Management Strategy, prepared by Ecoplans Limited and dated March 2008*
- *South Waterdown Subwatershed Study Stage 3 Report Implementation and Monitoring Plan, Second Draft, prepared by Ecoplans Limited and dated May 2008*
- *CUMIS Group Property, Burlington, Scoped Environmental Impact Study, prepared by Natural Resource Solutions Inc. and dated May 2006.*

Although the references cite the South Waterdown Subwatershed Study (Ecoplans Limited and MRC, 2006), and the Halton Natural Areas Inventory (Dwyer, 2006), it is not clear that the actual species lists from these references were incorporated into the current document, as there is no column for Ecoplans' or NAI data in the species tables. The original species lists within the above documents should be examined for reference to any significant species not already known to the Dillon study team.

2. Section 3.0 (Results) - Ecological Land Classification - In response to a previous comment that FOD2-2 was listed but not mapped, the vegetation type has been removed from the list. However, the ELC data sheets for FOD2-2 (polygon 026) are included in Appendix B, and butternut is on the species list. Please clarify the location of this community and, specifically, the location of the butternut.

3. Section 3.4 (Incidental Wildlife) - The putative bobcat vocalization is highly significant for Halton/Hamilton. Special surveys should be undertaken to determine whether this species is actually present.

4. Appendix A - ELC Plant Species Lists for Sites 006, 007b and 026 - Butternut is noted within these communities (SWD3-2, SWD2-2 and FOD2-2), but not shown on Figure 4 or discussed in relevant sections of the main document.

5. Previous comments with respect to Crossings #6 – 14 have not been addressed.

Staff request a written response indicating how the above comments were addressed.

Comments on Draft ESR

6. Staff continue to recommend that natural hazards, including karst, flood plains, stable top of bank and meander belt should be discussed in the ESR as they each could have implications on a preferred alignment design. Staff note that this was raised in our letter of July 6, 2009 and has not yet been addressed.

7. Please consider a consistent approach to labelling the various figures/tables and exhibits and ensure they are all listed in the Table of Contents for ease of reference.

8. Page XVIII – the first paragraph references a Section of the report that has not been assigned (Section XX).

9. Table 3-2 – Criteria should be expanded to "Potential for impact on terrestrial features *and* functions". Potential impacts on species at risk should be included as an indicator, given that they are identified as one of the "main natural environmental issues of concern" on page 4-3. Potential impacts to wildlife movement should also be included as indicators.

10. Section 3.4.1 (Hybrid Option – Dundas to Parkside Connection Options), page 3-11 – The use of the terminology "Options 1-5" for the hybrid options is somewhat confusing given that the main Options for the east-west road are labelled Options 1-4. Perhaps a different type of terminology could be used for the Dundas to Parkside Connection Options (i.e., Options A-E).

    Also, within this section, it is stated that Option 2 (connection along the eastern limit of Upcountry Estates) is the most preferred option for a number of reasons. One of the impacts is listed as the removal of 0.64 ha of "other woodlot". Staff could not locate a table within the study that clearly outlines the ranking evaluation of these connection options and would prefer to review this information in advance of agreeing to the selection process. The text does not address the proximity of Option 2 to the Grindstone Creek tributary and the impacts to the flooding hazards, erosion hazards, fish habitat and the watercourse that would occur with Option 2. This requires further discussion and analysis.

11. Page 4-9 - The provincial rank for butternut is identified in the first paragraph as S4, then as S3? in the subsequent paragraph. Please clarify. Please ensure that MNR is involved in any discussions related to endangered species. Staff have copied Melinda Thompson-Black, MNR-Aurora, for her information.

12. Figure 4.2 - Staff question why ELC and vegetation surveys were not completed for the natural area along Grindstone Creek, south and north of Parkside Drive? We note that the observation of the nationally Threatened chorus frog was in this vicinity.

13. Figure 4.2 - It was noted in the Natural Environment Report that property access was restricted in the lands east of the Upcountry Estates. As such, staff recommended that additional field surveys be undertaken at detailed design as necessary. The area northeast of Upcountry Estates labelled as "Forest" appears to be a swamp, based on an air photo review. This could result in additional mitigation requirements pertaining to maintenance of the hydrologic regime of the wetland. The ESR should provide for future commitments to undertake this work.

14. Figure 4.2 - Wetlands identified in the South Waterdown Subwatershed Study (particularly Wetland 5 in the vicinity of Dundas Street) should be included on this figure.

15. Page 4-10 - On the basis of Figures 2 and 4 in the *COSEWIC Assessment and Update Status Report on the Western Chorus Frog (*Pseudacris triseriata*) in Canada*, staff are of the opinion that all chorus frog populations within Conservation Halton's jurisdiction belong to the Great Lakes/St. Lawrence – Canadian Shield population and as such should be considered members of a nationally Threatened species.

16. Section 4.3.6 (Aquatic Resources – Field Work Results), page 4-14 – this section references Figure 4.5 however, Figure 4.5 identifies watercourse crossings within the north-south road corridor. Staff note that Figure 6.1 appears to identify the watercourse crossings within the east-west corridor.

17. Section 4.3.6, page 4-15 – Crossing #4 - During a site visit to this crossing location on Oct. 14, 2009, it was noted that a defined channel was present here with an obvious channel that had been scoured clean of vegetation. It is staff's opinion that this feature falls under the definition of a watercourse pursuant to the *Conservation Authorities Act* and that it provides direct fish habitat during certain parts of the year when runoff levels are sufficient. In addition, this watercourse is located within a hedgerow and is surrounded on both sides by mature trees with a fairly dense understory of woody and herbaceous vegetation. This vegetation is providing a variety of useful functions that benefit the watercourse.

On site, CH staff estimated that the bankfull channel on this watercourse would be up to two metres in width. Dillon's fisheries biologist who was also present during this site visit agreed to that width during the visit. As such, it is requested that any transportation crossing structure placed here span a minimum of two metres over the width of the watercourse. It is also requested that the length of the culvert/bridge be kept to the minimum possible to reduce disturbance to the watercourse and hedgerow. It is also requested that the crossing structure be designed as an open bottom structure to minimize disturbance to the interaction between the hyporheic zone and the bed of the watercourse. An open bottom structure would also allow for long term provision of natural substrate on the bed of the creek as this part of the creek contributes to the productivity of aquatic invertebrates which provide food for fish.

This section of Grindstone Creek is a headwater creek and one of its main functions is to provide primary and secondary productivity to downstream reaches. The bottom of the creek in this headwater reach provides functionality with respect to the provision of allochthonous inputs to the downstream reaches of the watercourse. The construction of an open bottom structure at crossing # EW4 would be helpful in facilitating long term secondary productivity to occur at the location of the crossing structure. The use of an open bottom structure allows the functional connectivity between the hyporheic zone and the invert of the creek bottom to remain intact. Staff request that this be included as a commitment in the final ESR and that the description throughout the document be revised accordingly.

18. Section 4.3.6 (Grindstone Creek – Northwest Branch Crossing #5) Page 4-16 – the tributary of Grindstone referred to in the report as the 'Northwest Branch' is considered to be the 'Main Branch' of Grindstone Creek

19. Section 4.3.6 (Grindstone Creek – Northeast Branch Crossing #6) – Please indicate the date (including the day, month and year) when the survey was completed for this crossing location.

20. Section 4.3.6 (Drainage Conveyance Crossing #10) - Please provide the following data regarding the drainage feature located at EW # 10: photographs of the upstream and downstream ends of the existing water conveyance structure, details regarding the presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish.

21. Section 4.3.6 (Upper Hager Creek Crossing #11) - No indication is provided in the habitat description here regarding the following habitat parameters: presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish. Staff request that this information be provided.

    In addition, within this section, there is reference to Crossing #13 which staff assume should be Crossing #11. Please clarify.

22. Section 4.3.9 (Hydraulic Assessment), page 4-19 – Reference is made to Figure 4.5 however, as noted above, this figure relates to the north-south corridor. Also, this section of the report makes reference to detailed hydraulic and hydrologic modeling outputs that are provided in Appendix C. Staff note that Appendix C was not included in the document. Please provide digital and hard copies of this information at the earliest opportunity

Also, reference is made to 12 crossing structures however, only 11 are shown on Figure 4.4 and described within the text.

23. Section 4.5.2 (Hydrogeology – Geological Setting), page 4-25 – reference is made in the first paragraph to Cross Section A-A in Figure 4-6 however, Cross Section A-A is found on Figure 3. Please revise.

    This section also states that Cross Section A-A was constructed using MOE well records. Staff question whether the individual borehole results were also used to further refine this figure?

    With respect to Figure 3 (Cross Section A-A) – Based on this figure it would appear that the water table is at the level of the invert of two watercourses within the study area, although the watercourses have not been labelled on the figure. Please identify the names of the watercourses as well as the month and year when the water table elevations were measured.

    Will the borehole information be included in the final ESR? This information would be helpful in assessing the analysis within the document.

24. Section 4.5.2 (Hydrogeology – Potential Impacts of Road Construction), page 4-30 - Staff note that the road construction includes dewatering activities associated with the installation of various services and bridge and culvert footings. More detailed assessment of hydrogeologic conditions within the project limits, and the potential impacts of dewatering activities, must be completed in conjunction with the detailed design of the road.

25. Section 4.5.2 (Hydrogeology – Potential Impacts on Groundwater Quality), page 4-31 – it is stated that the construction of the proposed corridor will not have any foreseeable impacts on groundwater quantity because the construction activities will not involve any groundwater extraction. It has been our experience that the construction of watercourse crossings sometimes requires dewatering in the event that the installation of the crossing foundations intercepts groundwater. This should be taken into consideration when evaluating potential impacts to private wells in the vicinity of watercourse crossings.

26. Section 5 – please ensure that all figures, maps and Tables are labelled for ease of reference. There are at least two figures with alignment options/design drawings that are not labelled within this section.

27. Page 5-2, Section N4 - As identified in the Grindstone Creek Watershed Study, the valley provides an ecological linkage and linkage restoration opportunity for natural areas north and south of Parkside Drive. As such, proposed works in this area should seek to improve wildlife passage and habitat connectivity.

28. Table 5-1 - "Potential for impact on terrestrial features" is listed as "High-medium" importance to Project Partners. Please note Conservation Halton staff consider this to be a criterion of high importance. Similarly, "Potential for Impact on aquatic features" is given an importance of Medium from the Project Partners. Given the existence of direct fish habitat, Conservation Halton would have likely assigned a High importance ranking to this criterion. Although it would appear that the Study Team solicited advice from the Neighbourhood Advisory Council, Conservation Halton staff cannot recall being requested to provide criteria importance to the Study Team. Please provide clarification as to how the relative importance was determined by the Project Partners. Additional analysis may be required upon further review of the criteria rankings.

The Indicators under "Natural Environment" are slightly different from the Indicators used when assessing the connection between Dundas Street and Parkside Drive. Please explain why different indicators were chosen for the overall corridor versus the Dundas – Parkside connection.

In the "Natural Environment" Criteria Group, there is only one criteria relating to impacts on aquatic features. In this table, all potential impacts need to be considered to evaluate the potential risks and impacts associated with the project on all affected aquatic features. Some examples of indicators that should be listed include: (1) Impacts on baseflow of all affected creeks; (2) Impacts on flow velocities and fish passage in all affected creeks; (3) Impacts on surface and groundwater quality in all affected creeks; (4) Potential for removal or creation of any existing or non existing barriers to fish passage; (5) Potential to cause excessive erosion or aggradation of sediments upstream and downstream of all proposed crossing alterations; (6) Will any channel realignments take place? What will the effects and risks of proposed channel realignments be?; (7) What in-stream aquatic habitat changes (e.g. loss of pools, flattening of riffles, widening of wetted width of existing channels, reductions in low flow water depths) are expected as a result of the proposed crossing replacements?; and, (8) How much natural riparian vegetation will be lost from around the affected flow features and what effect will this have on aquatic habitat in these features? Will efforts be made to reduce losses of riparian (waterside) vegetation during the construction phase of the project? Will all removed riparian vegetation be replaced with appropriate regionally native riparian species?

Also, Table 5.1 does not include the requirement to mitigate the impacts to the flood plain through the North-South (N5) portion of the road adjacent to the Upcountry lands. Additionally, the meander belt of the existing watercourse must be determined such that the road can be set back an appropriate distance from the erosion hazard. These issues are critical as they will likely impact the road alignment and the property impacts for the Upcountry lands to the west.

29. Table 5-4 (Hydro Line Alignments) – It would be helpful if this section of the road corridor had a detailed air photo and alignment options shown. Based on our previous comments with respect to Crossing #4, please revise the portion of the Table that identifies the potential for impact on aquatic features accordingly.

30. Table 1 (New Waterdown East-West Road – Option 4 vs. 5 Review), after page 5-30 – under "Potential for impact on Aquatic Features" please complete the number of metres of flood plain that will be crossed in this Option. Currently the text reads, "xxx m of flood plain".

31. Section 5.6 (Sawtooth Option), page 5-35 – this section references Figure 5.8 however staff could not locate this figure in the report.

32. Section 5.8 (N5 – Upcountry Development), page 5-38 – this section states that a reserve for this road was determined by the developer and adopted as the most appropriate alignment. Staff are concerned with this statement given that we have requested that the EA review the most appropriate alignment given the constraints associated with the tributary of Grindstone Creek that parallels the eastern lot line of Upcountry Estates and the associated flood plain that occurs on the Upcountry lands. It is our understanding that this phase of development on the Upcountry lands has not been draft plan approved and, as such, the location of the road should not be limited to that which has been reserved by the developer to date. The impacts of the proposed road alignment on the storage and conveyance functions of the flood plain must be addressed prior to the road alignment being determined as acceptable. Additional analysis of this issue, and determination of the meander belt/erosion hazard, must be completed prior to the road alignment being finalized

In addition, this section references Figure 5-9. Such a figure could not be found in the report however, there is an air photo with road pattern overlays on the page immediately following this section which staff assume is meant to be Figure 5-9. The figure identifies two proposed road locations/roundabouts however, there is no labelling on the figure so it is difficult to determine which one is the preferred alignment. Based on the text on page 5-38, it would appear that the study team is recommending the most easterly alignment of the road. This alignment would impact the woodlot/wetland at the northeastern property boundary of Upcountry Estates. Staff require further justification for the shift to the east as being the preferred alignment. Staff recommend that the "triangle" of land that would be left as a result of the westerly alignment could be used for tree planting to compensate for the loss of trees along the road alignment and to provide additional buffering to the existing woodlot/wetland.

33. Section 6.3.1 - Exhibit 6-3 (East Parkside Drive Roundabout) – this exhibit appears to be identifying the preferred location of the roundabout at Parkside Drive however, this differs from the text in Section 5.8 which seems to indicate that a more easterly alignment is the preferred location. Staff prefer the alignment as shown in Exhibit 6-3 for the reasons outlined earlier in this letter. Please confirm which alignment is the ultimate preferred alignment for the roundabout at the north end of Upcountry.

34. Section 6.3.1 - Page 6-13 (Upcountry Link) – this section of the report indicates that the proposed alignment is generally situated at the eastern limit of the subdivision with the exception of the mid-way point where the proposed centre line turns west in order to avoid impacts to a tributary of Grindstone Creek. It is important to note that the road alignment must not only address impacts to the creek, but must also mitigate impacts to the Regional Storm flood plain, erosion hazards and fish habitat associated with the creek. This is an important issue as both technical and policy requirements must be satisfied in order for Conservation Halton to be in a position to issue a permit under Ontario 162/06 for the proposed road. Additional comments are provided below under "Preferred Design Concept".

35. Section 6.3.4 (Stormwater Management & Hydraulics), page 6-18 – staff recommend that reference be made to the South Waterdown Subwatershed Study as it relates to stormwater quality and quantity controls as well as hydraulics for that portion of the study area that is immediately adjacent to this area (i.e., along Dundas Street). In addition, as noted previously, reference is made to Appendix C however the appendix was not provided with the draft ESR.

    Section 6.3.4, page 6-19 – it is stated that the new corridor crosses two watersheds (Borer's and Grindstone) however, the most easterly portion of the corridor also crosses the Hager Creek watershed within Conservation Halton's jurisdiction. Please add this to this section.

    As previously noted, this section makes reference to 12 crossings whereas the figures and text only evaluate 11 crossings. Please clarify.

36. Section 6.3.4, Crossing EW4, page 6-25 - The second sentence of the second paragraph states "It is not a permanent watercourse but a natural depression area associated with wetland features". We recommend that this statement be revised as it is not entirely inaccurate. It is our opinion that this feature is a watercourse with a defined bed and banks. The bed of this channel was devoid of vegetation, indicating that a substantial enough volume of flow traverses this stretch of the watercourse to prevent vegetation from growing in the bed of the watercourse. When water is flowing in this channel, it is assumed that this channel provides direct fish habitat. Please modify this section and other portions of the document (i.e., Table X) to reflect this change.

In addition, within this section, a box culvert is proposed for Crossing EW4. As previously noted, staff request that the crossing be an open bottom culvert that is embedded. Please carry this forward in the Commitment section of the final ESR.

37. Table 6-10, page 6-25 – staff note that the water surface elevations for both the 5 year and 10 year storm events are the same. Please confirm whether or not this is an error.

38. Crossing EW5, page 6-26 – staff are supportive of the proposed improvements to the hydraulic performance of the bridge structure in order to reduce the backwater impacts upstream of the structure and improve the safety of the road under flood conditions. The proposed bridge alignment, and the preferred direction of any widening, will be determined at the detail design stage. The design must take into account fluvial geomorphology, fisheries, terrestrial features, valley and floodplain grades on both the upstream and downstream sides of the bridge, etc.

39. Page 6-27 – staff note that this section did not include a hydraulic analysis for the floodplain within the N5 portion of the proposed road. Please include this analysis as part of the final report.

40. Page 6-28, Stormwater Management and Hydraulics: Hydraulic Evaluation of Road Crossing Structures – Crossing EW6 – staff are supportive of the proposed improvements to the hydraulic performance of Culvert Crossing EW6 in order to reduce the backwater impacts upstream of Dundas Street and improve the safety of the road under flood conditions. Any realignment of the culvert must be based on a fluvial geomorphic assessment of the creek in conjunction with any fisheries requirements. The following information is provided for **detailed design:**

    Please ensure that any rock protection material used to protect the new structure be round and appropriately sized for the channel. It is requested that oversized rock material not be added to the channel, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water may flow on either side of the oversized rock and could create new bank erosion or it may exacerbate existing erosion if the large rock is still located anywhere near the edge of the creek.

    Staff note that for the majority of the document the future crossing at EW6 is referred to as an open bottom culvert however, there are a couple of locations in the text and on figures within the document that it is shown or referred to as a closed bottom culvert. Please revise as necessary for consistency.

41. Section 6.3.4, Crossing EW11, page 6-30 – It appears from the photograph on page 4-17 that the existing CSP culvert is narrower than the wetted width of the watercourse at the time the photo was taken. Given the surrounding vegetation in the photograph staff have assumed that the photo was likely taken during the late spring or summer months. It could then be assumed that the flow in the creek at the time the photo was taken is less than would be expected during the annual spring freshet. As such, it is requested that the existing culvert be replaced with a larger crossing that will more effectively:

    - allow fish passage during higher flow events
    - convey sediment to downstream reaches of the creek
    - allow infiltration of groundwater (if present)
    - prevent the formation of a perched culvert which would prevent fish passage

Based on the above, it is requested that the existing culvert be replaced with an open bottom creek crossing that will convey a minimum 2-year frequency flow event. Staff request that this be added to the Commitment section of the final ESR.

42. Section 6.3.4, Floodplain Storage Analysis, page 6-31 – this section indicates that the proposed road construction will result in the loss of approximately 4200 m^3 in floodplain storage and recommends that this storage be maintained. The report further recommends that additional dynamic modeling be undertaken at the detailed design stage to finalize the sizing of the equalization culverts. This approach is not satisfactory to staff. The maintenance of storage discharge relationships for the flood plain must be maintained for the full range of storm events without increasing the flood plain limits on adjacent lands. This is a design constraint for the road and will be a requirement of Permit approval. Additional analysis is required prior to EA approval as satisfying this requirement may have impacts on road alignment and property requirements on the Upcountry lands. Perhaps flood storage requirements could be achieved on the east side of the proposed road by reconfiguring the floodplain grades and shifting the road further to the west. This would have the benefit of removing the floodplain designation from the Upcountry lands and saves the costs of installing large equalization culverts. It is also more in-line with the concept that was approved within the 1996 Paragon report. The EA should confirm whether this approach would be feasible. Staff are not prepared to leave this issue until detailed design for the above reasons.

    In addition to the above, the second paragraph of Section 6.3.4 suggests that the hydraulic analysis results have taken into consideration the proposed stream rehabilitation plan as outlined in the *Upcountry Estates Environmental Implementation Report*, dated May 1996. Please note that this report is no longer considered current and the proposed stream rehabilitation measures likely do not meet current standards for watercourse works. The ESR should be evaluating the most appropriate treatment for this tributary as part of the road alignment alternatives.

43. Section 6.3.4, Roadway Stormwater Management Alternatives, page 6-32 – please include the Hager Creek Watershed when outlining criteria for stormwater quality and quantity controls.

44. Figure 6.2 (Road Drainage Areas and Outlet) – staff note that the legend colours and text do not align.

45. Page 6-41 'Outlet EW5' – this section of the report indicates 'East of the outlet a new roadway is proposed while west of the outlet, the existing 4 lane road (Parkside Drive) is proposed to be widened to a 6 lane road'. Is this correct? Staff understood that Parkside Drive was going to be widened to a 4 land road. Please confirm.

    This section also recommends the use of Oil Grit Separators for quality treatment. Staff are supportive of this and require that they be sized to provide Level 1/Enhanced treatment. Mitigating the thermal impacts of stormwater must also be discussed within this section of the document and carried forward to detailed design.

46. Section 6.3.5, Outlet EW6, page 6-42 – two possible stormwater treatment systems are proposed: (1) an OGS; or, (2) directing the stormwater to the Upcountry Estates stormwater management facilities. Staff would prefer that the stormwater be directed to the Upcountry Estates facility as this is likely the most effective method of treatment. Can any of the stormwater be directed to the existing stormwater facility in the Gatesbury subdivision? We request that this be identified as the most preferred management method. Please consider revising this on page 6-47 also (Stormwater Management Summary).

47. Page 6-43 – first paragraph – staff recommend that this section require the direction of a portion of stormwater flows from the road into the Upcountry stormsewer system such that treatment can be provided for by the existing stormwater management pond

48. Section 6.3.5, Outlet EW7, page 6-44 – staff question why directing stormwater to proposed facilities in the future South Waterdown lands is not identified as a possible option for stormwater treatment? Please consider revising this on page 6-47 also (Stormwater Management Summary).

49. Section 6.3.5, Structures, page 6-49 – it would be helpful if the crossing structures in this section were labelled as per the numbers used in Figure 6.1 for cross reference purposes.

    It is noted that flow velocities will be greater than 3.8 m/s during the design and regional storm events. Staff recommend that, at detailed design, a shear stress/tractive force analysis be undertaken. Further, we recommend that bioengineering be considered for bank treatments.

50. Section 6.3.5 (Grindstone Creek Tributary Branch Crossing), page 6-49 and Plate 8 – the text in Section 6.3.5 states that this crossing will be replaced with an open bottom concrete culvert however, the diagram on Plate 8 shows a closed bottom box culvert. Please revise Plate 8 accordingly.

51. Section 6.3.6 - For a number of utilities (e.g. Union Gas, Bell Canada, Imperial Oil and Sun-Canadian Pipelines) test pits are proposed at detailed design to confirm potential conflicts, relocation strategies and grading requirements. What is the magnitude of additional impacts on natural areas that could reasonably be anticipated? Will any disturbance to the creek be required as a result of the relocation of the underground gas main or other utilities? Should some or all of this work be undertaken prior to detailed design to ensure that the selection of the preferred alternative takes all grading/disturbance requirements into account?

    Also within this section, given that groundwater elevations have been observed to be approximately 1 metre below ground surface, it is advisable that a hydrogeological study be undertaken to examine the effects that the construction of utilities such as the new storm sewers will have on the base flows of the creek. This study should also look at impacts to the creeks within the study area from dewatering that will be necessary to construct/install utilities such as the storm sewers. Please include such a study in the Commitment section of the final ESR.

52. Page 6-58 'Watermains' – This section of the report should be clarified to indicate that Upcountry installed a watermain along Parkside Drive underneath the Main Branch of Grindstone Creek. Locates will be required as part of detailed design.

53. Page 6-61 - Staff support the consideration of solar powered lighting, both as a means of minimizing impacts to natural areas through reduction of associated electrical infrastructure, and reducing the overall carbon footprint of the project. We note that all lighting, but especially that adjacent to natural areas, should be designed so as to minimize spill onto adjacent areas or above the horizon.

54. Section 6.3.7 'Landscaping/Streetscaping' – this section should be expanded to include the use of Low Impact Development (LID) stormwater management measures (i.e. tree pits, bioretention areas, etc.) within the streetscaping for the road.

55. Section 6.3.8, Geotechnical, page 6-91 – please provide a map of all borehole locations to provide greater clarity with respect to the proximity of each borehole to natural features such as watercourses, woodlands and wetlands. Specifically, additional detail with respect to the location of Borehole #13 and its proximity to nearby watercourses is requested.

Also, more discussion with respect to the type of foundation to be used at this crossing location is required. At this point, the H-pile driven into bedrock may be a preferred installation method because it is thought that the enhanced stability of this approach will reduce the amount of in-channel or near channel hardening required to prevent scouring or undermining of the abutments. However, staff question what the construction impacts will be with respect to hydrogeology and groundwater and request additional discussion in the report.

56. Table 6.41 and Section 6.4.1 - Under "Description of Effect" for "Amount, nature and significance of natural habitat removed", several areas of natural habitat loss are not addressed. These include:

    - Grindstone Creek crossing at Parkside Drive
    - North side of Dundas Street, at approximately Station 10+450
    - Southwest intersection of Dundas Street and Evans Road
    - Grindstone Creek crossing at Dundas Street, between new East-West Road and Evans Road
    - East of roundabout at Parkside Drive and New East-West Road

    Please prescribe restoration/mitigation measures for these areas.

57. Table 6.41 and pages 6-115 to 6-116 - Staff support the proposed mitigation measures for Lake Medad Valley Swamp PSW and Nelson Escarpment Woods ESA under the "Potential for effects to adjacent habitat" section. The development and implementation of the EMP should be added to the first phase of the project, as outlined on page 6-99, to ensure that buffer vegetation is well established prior to the commencement of any site alteration associated with the project.

58. Table 6.41 - Under "Effect on terrestrial corridor connectivity/linkages", the Grindstone Creek crossing at Parkside Drive should be addressed.

59. Table 6.41 – this table should include a section regarding the potential impact of the road construction as it relates to sediment and erosion issues

60. Table 6.41 - The number of indicators listed in this table related to aquatic impacts is insufficient. The description of the effect, mitigation and net effects sections are correspondingly insufficient. All of these sections need to be effectively presented including all potential effects on all of the watercourses. These effects should cover impacts to: fish communities, fish passage, aquatic invertebrate communities, water quality (including water temperature and chlorides), water quantity, sediment transport, provision of baseflow, flow permanency, bank erosion, channel scouring and/or aggradation, configuration of channel widths and depths, riparian habitat (including all riparian functions), and in stream habitat features including but not limited to pools, riffles, runs, overhanging banks, woody debris, substrate type and size etc.

    In addition to the above, the table indicates that the mitigation for the crossing of the northeast branch of Grindstone Creek (Crossing 6) will be the responsibility of the developer of the plan of subdivision. Staff note that Crossing 6 is outside of the Upcountry Estates draft plan. Is it anticipated that all of the work for Crossing 6 will be undertaken by the owners of the South Waterdown lands on the south side of Dundas Street? If not, the mitigation plan should be included in the ESR.

    Finally, this portion of the table only addresses Crossing 6. Additional information should be included for all watercourse crossings.

61. Page 6-108 - It should be clarified in the opening paragraph that the proposed works also have the potential to impact natural heritage *functions*, species at risk and significant wildlife habitat. Are there any potential impacts on locally rare species?

62. Section 6.4.1 (Natural Environment), page 6-110 – this section states that tree selection should be determined using Conservation Halton's Landscape Guidelines. While staff have no objection to the use of these guidelines we note that this portion of the document is addressing compensatory plantings within the Hamilton CA watershed. Staff defer to the Hamilton CA for appropriate planting guidelines within that area.

63. Page 6-112 – several paragraphs on this page reference a Section of the report that has not been assigned (Section X).

64. Page 6-115 – this page includes several incomplete references (Section X and Figure X).

65. Pages 6-118 and 6-119 – these pages include an incomplete reference (Table X)

66. Section 6.4.1, Aquatic Habitat Impacts and Mitigation, page 6-119 – Please provide definitions of Type 2 and Type 3 habitat as it is being referred to in this document. Reference is made in this section to Table X. Although staff could not find a table labelled as such, we assume it is the table found immediately after page 6-119. Please confirm.

67. Section 6.4.1, Aquatic Habitat Impacts and Mitigation – Stormwater Management, page 6-119 – reference is made to the provision of Level 2 (Normal) water quality treatment. The remainder of the document commits to providing Level 1 (Enhanced) water quality treatment. We assume this is a typographical error and that it is the intention that this section refer to Level 1 (Enhanced). As Enhanced is the most appropriate level of treatment please revise accordingly. In addition, Conservation Halton policy does not support the creation of on-line ponds so the reference to on-line ponds should be removed.

68. Page 6-120, Preferred Design Concepts – Please make revisions to the fisheries section related to Crossing EW4 as outlined previously in this letter.

    Notwithstanding the above, the "Potential Impacts" column appears to be insufficient. No reference has been made to impacts associated with groundwater, dewatering, increased levels of chlorides, cumulative impacts of transportation crossings on streams (with attention paid to the longitudinal connectivity of fish habitat), impacts to fish habitat associated with the typical impacts to channel form associated with transportation crossings (widening of channels, reductions in water depths in channels, changes to substrates, etc.). Staff request that this information be added to the Table.

69. Page 6-122, General Aquatic Design-Related Mitigation Measures - In the second sentence in the second paragraph on this page, "proper construction sighting" is referred to as a mitigation strategy. Was "proper construction staging" intended? Also, the last bullet of this section incorrectly references a stormwater management water quality treatment standard of Level 2. This must be revised to indicate Level 1/Enhanced.

    At **detailed design**, it is requested that all substrate or rock additions below the normal high water mark (2 year flow, bankfull channel flow) mimic the type of substrate present in the channel. For example, if the channel exhibits a lot of shale oriented substrate, it is requested that any rock added to the channel to reinforce abutments be of a similar (flat) shape. If the substrates are not shale oriented, then it is requested that any substrates added to the channel be round rather than angular in shape. It

is also requested that oversized rock material not be added to these channels, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water flow may flow on either side of the oversized rock and could create new bank erosion or it could exacerbate existing erosion if it is still located anywhere near the edge of the creek. Staff request that this be included in the mitigation measures.

Staff are supportive of the list of mitigation measures with the exception of the use of Level 2 versus Level 1 TSS removal and the use of closed bottom versus open bottom crossings. The reasons for this have already been included in this letter.

70. Page 6-123 'Future Aquatic Works Required' – this section should be expanded to include the requirement for a fluvial geomorphic assessment. Additionally, an MOE Permit to Take Water may be required if dewatering volumes for the project exceed 50 000 Litres/day.

71. Table 6-42 - Staff question whether costs associated with compensatory tree planting and restoration have been included in the project budget?

72. Pedestrian Underpass at Joe Sam's Park- The ESR should explore options that could allow the pedestrian underpass to also function as a wildlife crossing structure.

73. Due to the presence of significant natural areas throughout the study area, the use of invasive species for landscaping should be strictly prohibited. In general, native species should be used where possible, and in areas directly abutting significant natural areas, species should reflect those actually present in the natural communities, preferably from a local seed source.

74. All engineering alternatives that would reduce the footprint of disturbance through natural areas should be employed.

75. Preliminary Preferred Design, Grindstone Creek Crossing 1, General Arrangement – staff request that the station or crossing location numbering be consistent with the crossing location numbering on Figure 4.4 for ease of reference.

76. Preferred Design Concept Drawings – Upcountry Plate 2 – The limit of the right-of-way, associated grading and pavement are all extremely close to the edge of the tributary of Grindstone Creek. Please advise as to whether the road is within the meander belt of this watercourse. Conservation Halton policy requires that all new development, including infrastructure, be setback a minimum of 15 metres from the meander belt. Please advise as to how this affects the location of the road alignment.

    Upcountry Plates 1 and 2 will need to be revised once the meander belt assessment and the hydraulic analysis has been completed for the Regional Storm floodplain associated with the Grindstone Tributary and the storage and conveyance impacts of the road have been addressed. This cannot be left until detailed design as satisfying this requirement may have impacts on road alignment and property requirements on the Upcountry Lands.

77. Dundas Plate 5 and 6 – staff could not locate the existing Hager Creek culvert on these drawings. Please clarify.

78. It would be helpful if the Preferred Design Concept Drawings could include creek names and crossing location nomenclature consistent with Figure 6.1.

79. Page 7-18 'Parkside Drive Routing (Options 4, Option5-Opta, and Option 5-Sawtooth' – the second paragraph of this section references a Section of the report that has not been assigned (Section XX).

80. Staff note that the Appendices were not included in the document. Please provide for staff review.

It would be extremely helpful if a response chart was provided with the final ESR to enable a more efficient review of the final document.

We trust the above is of assistance. If you require additional information, please contact the undersigned at extension 266.

Yours truly,

Jennifer Lawrence
Manager, Environmental Planning

encl.

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April 16, 2010

Michael Stone
Ministry of Natural Resources, Guelph District
1 Stone Road West
Guelph, Ontario, N1G 4Y2
Tel: 519-826-4912
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Dear Michael Stone:

Subject: East-West Road Corridor Class EA
Draft Environmental Study Report
City of Hamilton - Waterdown

We have received the letter dated October 28, 2009 from the Ministry of Natural Resources (MNR) regarding comments on areas of concern for the above-mentioned report. To address the concerns, the following response table is provided.

I.D.#	Ministry of Natural Resources Comment	Response
1	It is understood that the purpose of the Schedule C class environmental assessment (EA) study is to examine options and alternatives for an additional east-west roadway and expansion of the north south corridor along Waterdown Rd, in the Waterdown in the Waterdown/Aldershot area in order for infrastructure needs to accommodate future growth. It is noted that the draft Environmental Study Report (ESR) is intended to address all four phases of the New East-West Road Corridor Class Environmental Assessment. More specifically, the current work, completed by Dillon Consulting Ltd, was to complete Phases 3 and 4 of the Municipal Class EA process for the required lane additions and improvements to the north-south corridor project covering Phases 1 through 4. It is understood that Phases 1	No response required.

	and 2 were carried out in previous studies identifying the overall problem and evaluating alternative solutions for addressing the problem. Phases 3 and 4 of the Municipal Class EA (Schedule C) focus on the examination of alternative methods of implementing the preferred solution identified in Phase 2 and detailing the requirements, impacts and mitigation measures associated with the preferred solution.	
2	The study area extends from west of Highway 6 to east of Brant Street and from Concession 5 in the north to south of Highway 403. It is further understood that the preferred alternative recommends the following components: a new road corridor connecting to Highway 6 in the vicinity of Concession 4 road and running easterly through the Waterdown North development lands and the centre Road Woodlot/PSW and connecting to existing Parkside Drive west of the Grindstone Creek Crossing; utilizing and widening a section of existing Parkside Drive to east of the Robson Road intersection for the corridor; a north-south connection to Dundas Street running along the east side of the upcountry development lands; and extending the east-west corridor easterly along Dundas Street to the Brant Street intersection.	No response required.
3	Greenbelt Plan As noted in the ESR the subject lands fall within the area subject to the Greenbelt Plan, 2005. More specifically, sections of the preferred alternative route fall within the protected countryside and natural heritage system, while others are within the Niagara Escarpment Planning Area. The location and construction of infrastructure within the protected countryside of the Greenbelt are required to minimize the amount of the Greenbelt, and particularly the natural heritage system, traversed and/or occupied by	The mitigation of impacts to terrestrial and aquatic natural heritage features is discussed in the ESR – Appendix J, Section 5.0. This discussion addresses the General Infrastructure Policies (e.g., minimization of impacts such as light intrusion, noise and road salts, avoidance of natural heritage features and maintenance of ecological connectivity) outlined in Section 4.2.1.2 of the Greenbelt Plan The Greenbelt Plan mapping was provided in the Phase 2 work. See Figure 5.2 Greenbelt Area and Niagara Escarpment Area.

	such infrastructure. Further Section 4.2.1.2 of the Greenbelt Plan also states that new or expanding infrastructure shall avoid key natural heritage features or key hydrologic features unless it has been demonstrated and established that there is reasonable alternatives. The Greenbelt Plan also requires that where infrastructure does cross the natural heritage system or intrude into or result in the loss of a key natural heritage feature or key hydrologic feature, including related landform features, planning design and construction and practices shall minimize negative impacts and disturbance on the features or their related functions, and where reasonable, maintain or improve connectivity. While the ESR acknowledges that parts of the study area are within the Greenbelt Planning Area, the report also needs to better describe how the requirements of the Plan have been addressed, including Section 4.2.1.2. Particularly, it should be demonstrated how the preferred route minimizes the amount of the natural heritage system being traversed and/or occupied by the proposed infrastructure; and how the planning design and construction practices shall minimize negative impacts and disturbance on the features of their related functions, and maintain or improve connectivity. In addition the Greenbelt natural heritage system boundaries should also appear on the area Key Plan , and on Figure 4.1 Significant Natural Areas Mapping	The following text has been added to Section 6.4.1 of the ESR: Requirements of the **Greenbelt Plan** have been addressed, including Section 4.2.1.2, by minimizing the amount of natural heritage system being traversed and/or occupied by the proposed new infrastructure and minimizing, to the extent possible, negative effects on the areas natural systems. This has been achieved by the following means: • The new road corridor avoids traversing Lggies Creek Swamp/Mill Grave South Woodlot ESA by recommending that the road not be extended west of Highway 6 • The new road corridor has been kept south of the Parkside Drive Woodlot/Candidate ESA and Parkside Drive Wetland Complex and it is recommended that a buffer of 30m be maintained between the new road north property line and the wetland forest drip line. • The road crosses Borer's Creek at its narrowest, minimizing the impact to the ESA • The new corridor crosses the Centre Road Woodlot ESA as far south as possible to minimize the amount of woodlot severed at a location where the width of woodlot is relatively narrow resulting in less removal of existing vegetation. This location does not directly impact the drainage outlet of this ESA. • The recommended location of the corridor along Parkside Drive avoids the need to traverse near the natural areas to the north and close to the Lake Medad Valley Swamp ESA/PSW. • Where the route passes adjacent to the Nelson Escarpment Woods

		ESA along Dundas Street west of Brant Street, the road has been kept as far south as possible and a retaining wall recommended to minimize direct impacts on the natural area • The completion of edge management plans has been recommended at specific locations throughout the road corridor • A minimum compensatory tree replacement plan based on the overall area of vegetation removed is recommended at a 3:1 replacement ratio.

If you have any questions, please do not hesitate to contact me.

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cc: April Nix, Ministry of Natural Resources
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June 4, 2010

Katherine Menyes
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Dear Ms. Menyes:

Subject: Comment and Response Table – Hamilton Conservation Authority Letter (April 23, 2010)
RE: New East-West Road Corridor Class EA ESR August 2009

The Project team for Waterdown Road Corridor Environmental Assessment (EA) has reviewed Hamilton Conservation Authority's comments dated April 23, 2010, and provide the following response.

I.D.#	Hamilton Conservation Authority Comment	Response
	We acknowledge receipt of the East-West Road Corridor & Waterdown Road Corridor Class Environmental Assessment (Highway 6 to Brant Street), Draft Environmental Study Report, dated August 2009 (received October 6, 2009) and the related Appendices (received March 26, 2010), prepared by Dillon Consulting Limited. Staff from the Hamilton Conservation Authority (HCA) has reviewed the report and appendices and now provide the following comments:	Please see responses below.
1	Executive Summary p. VII – bullet – states that there will be "minimal loss (0.2 ha) of provincial significant wetlands". According to our estimates, the actual area of the Logies Creek – Parkside Drive PSW that will be lost is considerably higher and we do not consider it to be "minimal". We request that the size of area be adjusted to reflect the true value. In addition, the impact of bisecting the PSW will lead to fragmentation that should be accounted for in the total lost area.	The text referred to is a summary taken directly from the Phase 2 Report of the project (completed in 2006) and provides a summary of the rationale for the selection of route Option 4. The main body of the ESR text includes this summary of Phase 1 and 2 work as the complete documentation had been released on the public record previously (and is included as reference in the ESR Appendices). At the time the work was completed, the Centre Road Woodlot was not designated as a PSW (it was a

I.D.#	Hamilton Conservation Authority Comment	Response
		Candidate PSW) and the only PSW lands directly affected were associated with the Borer's Creek crossing (approximately 0.2 ha). Text in the Executive Summary will be revised to clarify this and reference the change in status of the Centre Road woodlot. Chapters 5 and 6 contain more specific data related to this woodlot (and the impacts to it) that reflects work carried out during Phase 3 of this project. Minimizing the amount of woodlot fragmentation was a significant factor in the assessment of alternative alignments through the PSW. Of note is that the alternative solutions work done in Phase 2 to select the preferred corridor was re-examined at the end of that phase to determine if the conclusion would change if the Centre Road Woodlot was considered as a PSW rather than a Candidate PSW. This review, which was noted in the Dillon letter of February 10, 2006 to HCA, concluded that the decision would be the same.
2	Executive Summary p. VII – 4th bullet – states that Option 4 (being the preferred new east-west corridor) is significantly less expensive than Option 2 (widening of Parkside Drive), as the expansion of Parkside Drive would require replacement of existing infrastructure and utilities. Was the age of the existing infrastructure and future replacement cost considered in this analysis? Does the decision to reconstruct Parkside Drive affect the conclusions? Also, we note that new storm and sanitary sewers are already being installed in conjunction with the development of the MC2 and Parkside Hills Phase 1 subdivisions.	This analysis was done in Phase 2 and assumed that Parkside Drive would need total reconstruction as a new four lane urban road. The costing was based on typical construction costs for a four lane urban road that included the costs of a basic road storm sewer, but no sanitary sewers. It is possible that some sections of Parkside Drive may, in fact, require five lanes (addition of a centre left turn lane) due to the number of entrances. The possible need to reconstruct Parkside Drive in the future was not considered in the Phase 2 assessments when comparing the costs of the alternatives. Also refer to the response to ID #43 below. We note that as Cost was the lowest weighted and ranked last among the Criteria by most of the evaluators, it had a small influence in the selection of the preferred route option.
3	Executive Summary: Page IX – - states that a 30 m: buffer was provided between the wetland to the north and the new road based on consultation with HCA. To clarify this point, HCA staff advised that in accordance with the HCA's Planning and Regulation Policies and Guidelines, new development, including construction and grading activities, must maintain a minimum 30 metre buffer from the boundaries of a PSW. At no time did HCA staff agree that a 30 metre buffer was acceptable. This is the minimum only. We requested that appropriate assessments of the PSW be completed, including ecological,	Comments noted. Our review and assessment of buffer requirements (as summarized in Section 6.0 of the ESR) concluded that a 30 m buffer would be a sufficient minimum separation through the Waterdown North development area and that there was no reason to widen this beyond the 30m minimum. Of note is that the minimum 30 m buffer distance will exist only at a few isolated locations where the environmental features exhibit southerly oriented extensions. The majority of the separation of the new road north property limit and the PSW will be greater than the 30 m minimum. Also refer to the response to ID #11 below.

I.D.#	Hamilton Conservation Authority Comment	Response
	hydrological, and hydrogeological in order to ascertain what size of buffers would be required to adequately protect the features and functions of the PSW. In this regard, HCA is still unsure as to whether the appropriate field work was completed. As such, we believe the noted statement to be misleading and request that "in consultation with Hamilton Conservation Authority" be deleted.	The text will be amended to remove "in consultation with Hamilton Conservation Authority".
4	Executive Summary - This section should include a detailed list of all reports that were prepared in support of the proposed roadway including aspects of fieldwork undertaken.	All pertinent reports that were prepared during this project are provided in the Appendix (Drainage, Air Quality, Noise, Geotechnical. Environmental Site Assessment, Archaeology, Built Heritage, Wells and Groundwater, Phase 1 Report, Phase 2 Report). The list of Appendix materials is in the Table of Contents at the front of the report. A list will also be provided in the Executive Summary.
5	Page 2-11: Traffic summary indicates that background growth will result in an additional 254 vehicles per year (based on an assumed growth rate of 1 % per year). Please explain how this number was determined based on the 6,500 homes shown in the "bottom up" analysis.	This number is general background traffic growth and is not related to the 6,500 new homes in the area. The analysis indicated that the traffic generated from 6,500 new homes would, in itself, justify the need for one additional east-west lane in each direction. Consideration of background traffic growth, unrelated to the new development, would result in the addition of 254 more peak hour trips.
6	Page 3-8: Evaluation Method: Please provide additional supporting information on the weightings selected (Appendices show only results of this ranking exercise). Were provincially mandated goals (e.g. no development within PSW's) considered in the process? Were the public aware of all municipal, CA, and provincial policies when determining their weightings? HCA notes that the final scores determined separated the various options by about 5 points out of 100 and therefore small changes in the rankings of individual items could have completely changed the outcome e.g. costing issues identified in Comment No 2.	This text on page 3-8 references work carried out during Phase 2 of the EA process. The criteria ranking/weighting exercise was undertaken in this phase with members of the Stakeholder Advisory Committee (SAC) and members of the public. Data regarding the potential impacts of the alternatives was considered by the evaluators prior to assigning the final criteria weights. As with all evaluations, the results are influenced by the criteria used, the assigned relative importance of the criteria and data/impacts of the alternatives. The criteria that have the most influence on the evaluation were natural environment and social considerations. Further, as noted in the Phase 2 Report (page 67); *"The SAW results, along with the actual data, were then considered to rationalize the selection of the preferred option".* As such the SAW results were used in the rationalization of the preferred alternative which is described on page 70 of the Phase 2 Report.
7	Page 3-9: Report justifies the loss of habitat associated with Option 4 as "better than Option 1". While this is a correct statement, the loss of habitat should also be considered independent of the worst case scenario.	The Phase 2 work was a comparative evaluation exercise for the purpose of selecting the preferred road route. Impacts associated with each alternative (e.g. loss of habitat) were measured and this data provided the basis for

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		the comparative evaluation. The Phase 3 work then examined the impacts of the preferred route and in some cases (such as, for example, the crossing location of the Centre Road PSW) also examined further alternatives in more detail. Impacts of the road design in an absolute sense (not comparative) were then assessed and mitigation proposed.
8	Page 3-9: Cost: A full cost assessment of all options should be presented. HCA could not find this information within the Appendices.	Comparative costs in the Phase 2 evaluation work were based on a per kilometre construction cost. These costs are provided in the evaluation table in Appendix A of the Phase 2 Report. No detailed cost tables are available.
9	Please update Figure 4.1 such that the eastern tributary of Borer's Creek is mapped as Provincially Significant Wetland north of the MC2 Homes Phase 2 and Parkside Hills lands.	This figure has been updated.
10	Page 4-7: Please explain why only a 30 m displacement area was studied for the natural areas west of Center Road. It is well-documented in literature that the impacts of a roadway built adjacent to natural areas (especially core natural areas) can have impacts on the natural environment well beyond one (1) km. These areas have not been surveyed, nor have the impacts of the roadway been adequately assessed and addressed. See Comment No. 3 and 4 for related concerns about lack of field work.	An area generally within 50 m of the preferred road alignment was used to classify ecological communities. This was based on completing an inventory of directly affected vegetation and habitat only. The area west of Centre Road was basically all within existing agricultural lands (largely designated for urban development) and, other that the Borer's Creek crossing itself, no vegetation would be directly affected. We note that ELC investigations were conducted for a wider area than the 50 m for key locations including the Centre Road PSW. Providing a detailed inventory of all natural features within 1 km (or greater) from the corridor would be excessive and is not required to complete the Class EA. Further, it is unclear as to how information if collected up to 1 km from the roadway would be used to develop mitigation measures and provide input to the design of the roadway.
11	As noted in Comment No 3, the report does not explain why only a 30 meter buffer has been proposed from the roadway. The author of the report discusses that this buffer width will provide only minimal protection to the abutting natural area. This has not been properly addressed, nor has a proper assessment been completed to determine what an appropriate buffer would be to protect the natural area. The HCA requests that a proper assessment be undertaken and submitted to HCA for review and approval.	As noted above, our review of buffer requirements (summarized in Section 6.0) concluded that a 30 m buffer would be sufficient minimum separation through the Waterdown North development area and that there was no reason to widen this beyond 30m minimum. Of note is that the 30 m dimension will exist in this area only at a few isolated locations where the environmental features exhibit southerly oriented extensions. The majority of the separation from the new road north property limit to the abutting natural area will be greater than the 30 m minimum. More specifically, a minimum 30 metre buffer

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		was proposed based on an assessment of the natural features and deemed to be appropriate. The assessment included the following factors: direct impacts from construction, hydrology, root zone impacts, invasive species, changes to sunlight, salt and noise. On the basis of each of these parameters, the 30 metre buffer was shown to be appropriate. Each of is discussed briefly below. Direct impacts from construction – the most common direct impacts from construction that need to be managed and prevented are sedimentation of hydrologic features and impacts to vegetation. The impacts to vegetation could include tree removal or soil compaction that harms the trees. The potential for sedimentation in the wetland is low as the wetland is up-gradient from the proposed road construction. Additionally, effective sediment and erosion control planning, to be resolved at the detailed design stage, can prevent impacts to the wetland. Tree root protection zones can be conservatively estimated at 10 times the diameter of the tree. Since the average trees in this area are approximately 50cm, the root zone protection area can be conservatively set at 5 metres beyond the dripline. All work in this road construction will be taking place a minimum of 30 metres away from the dripline. Hydrology – The road is situated down-gradient of the wetland and surface flows in this area will be managed as per the overall stormwater management plan for the sub-division. The road does not require additional drainage into the wetland, nor does it lower the drainage into the wetland. As a result, the 30 metre buffer is more than sufficient to maintain the hydrology of the wetland. Invasive species – The roadway represents a low source for invasive species. Garden escape is a much more common pathway of introducing invasive species. To offset the limited potential for increased invasive species from the roadway, an Edge Management Plan will be developed in the design phase to limit the growth of invasive species. Changes to sunlight – As the existing area south of the natural feature is under active agricultural production, no changes in sunlight or exposure

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		of the edge is expected as a result of the roadway. The 30 metre buffer is more than sufficient to ensure that there will not be tree loss due to changes in light. The Edge Management Plan that will be prepared in the detailed design stage will enhance the edge condition, when compared with the current agricultural land use. Salt – Salt has been shown to cause adverse effects between 3 and 7 metres on the upslope side of a road and between 13 to 15 metres on the downslope side of a roadway. The 30 metre buffer is sufficient for both scenarios. Noise – Noise has been considered as part of the overall buffer distance and specifically for human receptors. The projected maximum noise levels at the wetland are approximately 58 dba. This is consistent with the noise level of normal speech. We considered the issue of noise as part of the overall change in land use and recommended a 30 metre buffer for the road, as well as increased planting density in the Edge Management Plan to attenuate some of the noise impacts.
12	The report should be updated to recognize that the healthy butternut found in the Centre Road Woodlot have been identified and confirmed by MNR as being pure butternut.	This has been added to the text.
13	Figure 5.4: Alignment alternatives: Options 1 and 2 do not appear to satisfy MTO's concerns regarding additional intersections on Hwy 6. Please clarify.	These options would both require the closure of 4th Concession Road at Highway 6, thereby keeping the number of intersections the same as existing conditions.
14	Were PSW compensation costs considered during costing of alternatives?	Phase 3 alternatives all crossed through the Centre Road Woodlot PSW and, as such, all would involve PSW impact compensation (this cost would therefore have no influence in the evaluation of the alternatives through the PSW). Costs for a series of crossing culverts and vegetation/re-planting have been included in the recommendations in addition to the completion of an Edge Management Plan for this area.
15	Page 6-68: Information is incomplete.	Text has been amended.
16	Figure 6-10: Please explain why the western-most culvert is so much longer than the other two. These culverts should only fall within the road ROW and not encroach further into the natural area.	The western most culvert is situated lower to carry the Borer's Creek channel. The other two are major storm relief culverts that are situated at a higher elevation and are therefore shorter in length. The ROW has been adjusted not to encroach into the natural area.
17	Page 6-89: Report states that there is a surficial layer of 300 to 500 mm of organic soil	This was done by use of a hand probe.

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	in the woodlot east of Centre Road. How was this determined?	
18	Section 6.4; Proposed mitigation measures for the Logies Creek - Parkside Drive Wetland Complex -the report indicates that the proposed mitigation strategy is to complete an Edge Management Plan (EMP). This EMP should be completed prior to finalizing the EA to determine whether appropriate mitigation measures can be developed. HCA staff note that creating a plan does not in itself constitute mitigation. The EMP has to acknowledge that the mitigation measures recommended and approved by the appropriate agencies must be carried out in a timely fashion. As such, HCA requests that an EMP be prepared and submitted to HCA for review at this time.	The completion of an Edge Management Plan (EMP) requires that detailed information be generated on the location and type of all recommended plant and tree species and related treatments. The preparation of this plan is appropriate at the detailed design stage as detailed topographic information, soil fertility, drainage and infrastructure planning all have the potential to impact species selection. The final plan will include landscape drawings with specific locations of all trees and shrubs at a scale that is appropriate for construction. The ESR contains a commitment to a series of EMPs. The EMPs will be submitted to the Conservation Authority for review.
19	Section 6.4: Proposed mitigation measures for impacts on aquatic features - report indicates the proposal to install six hydrology equalization culverts that will also serve as wildlife corridor passages. It is not sufficient to assume that the equalization culverts will serve as ecopassage. No dry ecopassage is being proposed under the roadway, nor has the author stated whether the culverts will function as dry passage during certain seasons or under certain hydrological conditions. Further study needs to be done to ensure proper passage for wildlife under the roadway. Please indicate what background modeling has been done to support the selection of these six culverts. This modeling should be submitted to HCA for review. In addition, will these culverts be specifically designed to support wildlife crossing needs?	Based on Dillon's observation of this wetland, it is classified as a mineral swamp. This type of swamp has an extended dry period and the wetland surface was found to be dry during most of the site visits that took place. The typical water level in a mineral swamp is high in the spring as a result of snow melt and seasonal rains, and the water level drops below the surface in the late spring or early summer. It remains below the surface during most of the year and re-floods the following spring. During these dry times the equalization culverts (six pipe–arch structures, each 1.2m x 1.0m) will provide dry passage for small mammals/amphibians. We note further that as the southern end of the PSW is isolated from other natural areas to due the presence of urban development to the south of the PSW and Centre Road to the west, the road is not bisecting a major wildlife corridor. During the short period of flooding, the equalization culverts will maintain the ponded areas that exist in the pre-construction condition. The road has been kept as low as possible through this area to reduce the grading impact and footprint on the wetland; larger culverts are not recommended. Hydraulic modelling has been completed and this has recently been provided to the Conservation Authority. Aspects of the detailed design to specifically promote their use by wildlife will include the substrate, entry design, and features to guide wildlife to the culverts.
20	Page 6-110: Report states that due to the large area of the Borer's Creek Watershed, road	Through this area the majority of the new road is within the Waterdown North Development

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	construction is not anticipated to affect the hydrology of the PSW and then indicates that the Waterdown North Master Drainage Plan (WNMDP) has addressed hydrology issues. HCA notes that the MDP did not consider impacts to the wetland feature as it falls outside the boundary of the Waterdown North development area. Further, it is not clear why a large watershed would prevent localized effects on the PSW. Please clarify this section.	(WND). The drainage from this section of the new road will be accommodated within the drainage facilities, including SWM ponds of the WND area. Drainage from road sections outside the WNMDP boundary will be treated using grassed swales. We note your reference to the WNMDP plan not addressing impacts to the wetland because the wetland falls outside the boundary of the development area. With the exception of the Borer's Creek Crossing, the new road is also outside the wetland area. Possible impacts (and mitigation) as a result of this crossing have been considered in the ESR. Further, in response to the potential for hydrology impacts it is noted that the PSW is upstream of the new road and will not be impacted by changes in flows from the road and that flows from the PSW to the south will all be accommodated by the proposed crossing structures/culverts and therefore not impacted.
21	Page 6-119: References the possible use of on-line ponds and a target total suspended solids (TSS) removal of 70 %, Please note that HCA does not support the use of on-line ponds and that the removal target is 80 % as noted in other sections of the report.	On-line ponds are not recommended. The text will be revised to clarify this and remove the 70% reference.
22	Page 6-123: Identifies the potential to make Black's Pond an offline feature as a potential HADD compensation project. Please provide additional details of this proposal.	This is not a proposal. The report is acknowledging a potential HADD at the crossing of Borer's Creek and indicating the potential for compensation at this location. This will be confirmed and, if required, assessed further in the design phase with the involvement of the CA and DFO.
23	Dillon does not specify in the ESR Natural Environmental report exactly when they undertook additional bobcat investigations within the East-West corridor lands, although it was mentioned in the report that bobcat investigations were done. Please identify when these surveys took place, what areas were surveyed, and the results of the survey for HCA to review and assess.	No bobcat investigations were completed during the study and none were considered required. We understand that the previous assessment (by MC-2 Homes) discussed the possibility of a bobcat and this has been re-issued indicating a mis-identification.
24	Report does not contain "Conclusions" or "Next Steps" sections.	Section 6-4 (Description of Potential Impacts, Proposed Mitigation and Commitments) includes a Net Effects Summary Table and an overall summary is provided regarding natural environment impacts and proposed mitigation. In the final report we will provide a Commitments table section dealing with commitments to future work dealing with the

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		natural environment.
25	Appendix B: Letter from Conservation Halton dated September 22, 2008. Only odd pages included.	Will be fixed in the final document.
26	Appendix C: Drainage: The Drainage Report provided in the Appendix does not include any of the drainage appendices or electronic copies of the modeling. All of the figures and some of the tables are also missing. Please provide this missing information.	This information has been recently provided to the conservation authority.
27	Appendix C: Drainage: Page 7: Crossing EW2 is based on a conceptual sketch completed by the Parkside Hills Development Group. Provide the basis for this creek sizing and determine whether it is appropriate.	Crossing EW2 was assessed using the HEC-RAS model to determine an approximate size to ensure sufficient allowance is incorporated into the road facilities. The final sizing and specific structural requirements for this crossing and creek works will be the responsibility of the developer as both elements will be integral parts of this development.
28	Appendix C: Drainage; Page 7: The flow determinations were based on a transposition process using flows determined for a 200 ha area included in the WNMDP report. Due to the level and complexity of this project, it would be appropriate for this large, coarsely defined area to be broken down into subcatchments to truly reflect the character of the lands contributing to each crossing.	This is in reference to crossings EW2 and EW3. The process used for preliminary sizing of these structures was considered appropriate for this stage of assessment. Although the overall watershed draining to the East Tributary is approximately 200 ha, considerably less area is tributary to EW2 and EW3 as the upper reach of their catchment area is just east of Centre Road. In addition, the watershed is relatively homogeneous and flows can be transposed from one location to another. Also refer to ID#27, above.
29	Appendix C: Drainage: Page 8: Report states that the span of the crossing is 7.2 m. This totals the combined diameter of the six equalization culverts. What is the spacing between these equalization culverts? Are they localized at the creek crossing? Equalization/wildlife crossings should be utilized over the entire length of the PSW, and spaced appropriately while maintaining major conveyance.	The culverts will be spread out over the length of the wetland. There distance apart will be confirmed in the detailed design stage of the project. There is no creek crossing in this area, it is a general low lying area that will typically only contain standing water in the spring and after major storm events. The combined opening will maintain the surface flow conveyance. The series of culverts are proposed to convey flows downstream and at the same time to connect the wetlands separated by the proposed roadway. A total of 6 arch shaped open bottom CSP pipes are recommended with the dimension of 1.2 m (span) x 1.0 m (rise). This series of culverts makes the total span of the crossing of 7.2 m. The provision of additional culverts can be assessed in the design phase.
30	Appendix C: Drainage: Page 29: It is noted that the level of development is small compared to	This text has been revised. We are recommending mitigation in the form of grassed

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	the size of the watershed. While true; appropriate controls are still required, particularly when considering the sensitive nature of the receiving watercourses. The report appears to indicate that mitigation is not possible due to the linear nature of the roadway.	swales to address potential water quality impacts.
31	Appendix C: Drainage: Page 31: Report indicates the potential use of grassed swales to help achieve stormwater management targets. Please quantify the length of swale required to achieve 'x' amount of sediment removal etc. so that we can determine the feasibility of this approach.	Specific lengths will be determined in the design stage of the project. Grassed swales on both sides of the road will be generally appropriate for use for sediment removal in the rural sections of the corridor. This includes the lands west of the west most roundabout to Highway 6 (approximately 1.25 km), east of Centre Road to the west Parkside Drive roundabout (approximately 1.25 km), along the east side of the Upcountry portion of the alignment (approximately 0.75 km) and for most of the Dundas Street portion of the corridor (approximately 2.5 km) where side ditches will exist.
32	Appendix C: Drainage: Page 33: Report indicates the need to complete a subwatershed study covering the roadway corridor. HCA agrees and believes that this requirement should be completed prior to EA approval	This text has been revised. The completion of a sub-watershed study to address the new road component is not required or appropriate.
33	Appendix C: Drainage: Page 33: Report states that due to property limitations, stormwater management ponds are not a practical treatment option for roadways. HCA notes that the roadway corridor section requires property acquisition; therefore opportunities exist to acquire additional property if necessary.	The need for SWM ponds was not identified as a requirement in the drainage assessments as SWM targets/criteria can be met without them.
34	Appendix C: Drainage: Page 34: Report indicates that the time to peak is greatly reduced as a result of flow interception by a new road side ditch. Please provide supporting calculations	This information will be provided.
35	Appendix C: Drainage: Page 34: Paragraph starting with "Without any stormwater management..." is unclear. Please review and revise.	In this paragraph we are describing the change in timing resulting from the road drainage system and comparing this change to the impacts at the watershed scale. The local time to peak will decrease and in turn peak flows will increase relative to existing conditions. This local increase in peak flow will not add to the in-stream peak flows generated from the watershed because the watershed peak flow will occur much later after the start of the rainfall event. Reference should be made to Table 16 and 17 and not Table 15 and Table 16.
36	Appendix C: Drainage: Page 38: Grassed swales are proposed to treat roadway through	As per MOE guidelines, TSS removal was used to size the grassed swales because removal of

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	the PSW with cleaned water being released to the PSW to help maintain flows. Please investigate the impact of oil, salt and other contaminants on the wetland system and quantify the removal efficacy of the grassed swales	other contaminants is associated with removal of TSS. Swales are providing 80% TSS removal; however they are not effective as salt removal facilities. Therefore non-structural mitigation measures should be implemented, including lower application of salt, winter maintenance techniques, use of alternative de-icing materials, etc.
37	Appendix E: Noise Assessment: The noise assessment was only completed for human thresholds, not ecological thresholds / impacts. HCA has requested on numerous occasions that a noise assessment be conducted to determine impacts of road corridor and increased noise on ESA / PSW features and functions, as well as ways to mitigate noise impacts.	We are not aware of any practical noise protocols or recognized procedures, criteria or guidelines for evaluating noise impacts to non-human receptors that would be appropriate for use on this project. Although undoubtedly some noise effects to animals from road traffic will exist as documented in numerous publications and academic papers, the level of significance is uncertain and subject to discussion and further research. The identification and implementation of practical mitigation measures for addressing such impact is also problematic. We note that we are recommending that the posted speed for this road be reduced to 50 km/h, well below the normal arterial road standard.
38	Appendix F: Geotechnical: Geotechnical report does not include any boreholes in the PSW, with only 13 boreholes advanced across the 9 km length of the project. Are there any special considerations for road construction through a wetland that should be considered in this report?	Additional boreholes will be placed in the PSW in the design stage to determine if there are any special considerations. Preliminary work completed to date did not identify any special considerations for construction through this location.
39	Appendix K: Hydrogeology Report: The hydrogeology report considers the impacts of road construction on private well construction. Impacts on sensitive environmental features should also be considered. In addition, field testing should be undertaken as use of the MOE Water Well database can be unreliable.	Comments noted. The majority of the road corridor will be constructed in fill with some short areas of minor road cut required. Hydrogeological impacts to sensitive environmental features are not anticipated throughout the corridor. A potential for impact exists at proposed structure/culvert locations where footings may require construction in the water table. Additional geotechnical work will be completed during the design phase at each structure location as input to the footing design and to address groundwater impacts and any dewatering requirements, including the need for a Permit To Take Water. The MOE Water well database was not used exclusively in the private well assessment. Letters were sent to residents along the corridor requesting detailed data on wells and, where feasible, site visits were conducted to locate each well and collect a water sample for testing.
40	As acknowledged in previous correspondence and at several meetings related to the Phase 3 part of the EA process, HCA has major	Development, as referred to in the Provincial Policy Statement (PPS) 2005, pertains to the creation of new lots and primarily addresses the

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	concerns about the road crossing through the Centre Road Woodlot / PSW. In accordance with the 2005 Provincial Policy Statement, No. 2.1.3 b) development and site alteration are not permitted in significant wetlands in Ecoregions 5E, 6E, and 7E. In support of the PPS, HCA's 2009 Planning and Regulation Policies and Guidelines, No. 3.1.7 b) states that no development, site alteration, and/or interference is permitted within a Provincially Significant Wetland, while No. 3.1.7 c) further restricts development within 30 in of any wetland. Despite these policies, the Option recommended by Dillon Consulting to the City of Hamilton, is to construct a 2 lane, 26-32 metre wide roadway (potential total width of 36 m with ROW), that would cross through a PSW for a distance of approximately 300 m. The wetland footprint alone is over 1 hectare of lost habitat, without even considering the further loss of wetland habitat function. No hydrological modeling has been completed to ensure that the orphaned, southern-most portion of the wetland will still function as it does today in a post-development situation. The Draft ESR has not demonstrated whether the construction of a granular roadway with embedded equalization culverts will allow this fragmented habitat from functioning as a wetland hydrologically, and if movement of wildlife will be jeopardized (as no consideration for appropriate ecopassage has been addressed), and whether the genetic flow of both flora and fauna between the two fragmented wetland units will be maintained post-development.	construction of buildings and structures requiring approval under the Planning Act. The policy specifically indicates that development does not include activities that create or maintain infrastructure authorized under an environmental assessment process. Infrastructure by definition in the PPS includes corridors that form the foundation for development. In addition, one of the policies of the PPS is to ensure that necessary infrastructure and public service facilities are or will be available to meet current and projected needs. The option recommended in this Class EA is consistent with these policies. As stated elsewhere in this table and as outlined in the draft ESR (in Chapter 6 and Appendix C – Drainage), the study has undertaken modeling (HEC-RAS model) of the Centre Road Woodlot and has recommended the implementation of 6 crossing culverts spaced evenly throughout the approximate 300 metre length through the woodlot, resulting in an average separation between culverts of 50 m. The provision of additional culverts could be assessed in the design phase, if considered warranted. These culverts will function as dry wildlife passage facilities for most of the year. The new roadway itself has been kept as low as possible through this area to minimize the footprint of impact and the recommended posted speed reduced to 50 km/h to reduce noise impacts.
41	In addition, HCA has concerns with the potential loss of fish habitat. The swamp is a contiguous feature with Borer's Creek, and therefore provides, at a minimum, an indirect fish habitat function, and possibly seasonal direct fish habitat depending on seasonal inundation levels in the swamp. The report should discuss how any losses of fish habitat function, especially the loss of function from the southern fragmented portion of the wetland, will be compensated for, and if the hydrological studies have shown that there will be no loss of hydrological function of the fragmented wetland unit	The Centre Road Wetland contributes indirectly to downstream fish habitat. As a result, wetland hydrology has an effect on the water quality and quantity of downstream aquatic resources (e.g., tributary to Borer's Creek). However, low water levels in the wetland and in the downstream intermittent tributary to Borer's Creek typically prevent fish from migrating into the Centre Road Woodlot annually from late spring to the following spring freshet. Further, the Centre Road culvert crossing structure, by observation, is perched, and thus acts as a permanent barrier to fish migration, even during periods of seasonal inundation. As such, the wetland does not contain seasonal direct fish habitat. For discussion of hydrologic connectivity, please refer to ID#40.

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42	In summary, the Draft August 2009 ESR has not satisfactorily addressed HCA's concerns. We do not believe that an appropriate level of study or development innovation has been put forth to ensure that environmental impacts are mitigated. As indicated above, the proposed new transportation corridor does not comply with the PPS and HCA's planning policies and our Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses Regulation 151/06 under Ontario Regulation 97/04, whereby a permit from HCA would be required.	The Project Team believes that an appropriate level of study has been completed to investigate and evaluate environmental impacts for the East-West Corridor EA as would have been done for other projects of this scale. Please see detailed responses provided for individual concerns throughout this table. The ESR review period will be extended to allow additional time to resolve outstanding issues with HCA. Further, as is typical for EA processes, more detailed investigations, where required and necessary, will be undertaken to support additional required permitting. HCA and other agencies would be consulted with in undertaking this work.
43	HCA continues to be opposed to the construction of a roadway through a PSW. We recommend that the City re-consider the widening of Parkside Drive (Option 2), an existing arterial road abutting an existing residential community on the south side and new residential subdivisions on the north side, instead of constructing a new road through core natural areas, involving watercourse crossings, loss of wetland function and wildlife habitat, which will be situated along the boundary of the Greenbelt lands and at the northern edge of the urban area.	As part of the Phase 2 TMP work, a comparative evaluation of four route options through the "north Waterdown area" was undertaken. The routes were evaluated on the basis of five comparative evaluation criteria (Natural Environment, Social Environment, Economic Environment, Cost and Transportation Service). Multiple indicators were developed for each criterion. While it is typical for the "alternative solution" level evaluations undertaken in Transportation Master Plans to be based on a qualitative "high level" analysis, for this route evaluation, more detailed quantitative measurements of impact (e.g. area of feature removed) were determined. Further, the relative importance of the criteria (weights) was determined with the input of the public, and the TAC was provided the opportunity to review these weightings. The bulk of the weight (out of a total of 100 points) was allocated to the Social Environment (32 points) and the Natural Environment (27 points). In comparing Option 4 (the selected route) to the widening of Parkside Drive (Option 2), Option 4 was preferred with respect to the Social Environment, Cost, and Transportation Service and Option 2 (Parkside Drive widening) was preferred with respect to the Natural Environment and Economic Environment. By far, the greatest difference between these options was with respect to the Natural Environment and the Social Environment. As described in the 2008 TMP Report, it was rationalized that Option 4 was preferred overall. Option 4 is somewhat of a compromise in that it would result in some impacts to the natural environment (Centre Road Woodlot PSW) and some impacts to the social environment

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		(widening of Parkside Drive east of Grindstone Creek). In contrast, Option 1 (Northern Option) would result in a large natural environment impacts (with few social impacts) and Option 2 and Option 3 (Dundas Street widening), would result in large social impacts (with few natural environment impacts). A key advantage of Option 4, is that for much of its length (west of Centre Road) it passes through lands designated for development and as such, results in few impacts (the exception being the crossing of Borers Creek – although mitigation commitments demonstrate that this crossing can be done with minimal impact). East of Centre Road impacts are isolated to the crossing of the Centre Road Woodlot PSW and the widening of Parkside Drive. Recognizing that Options 2 and 4 are common east of the Grindstone Creek crossing at Parkside Drive, it is useful to compare the options west of this point. The key tradeoffs then are the impacts associated with the crossing of the Centre Road Woodlot PSW to the social effects associated with the widening of Parkside Drive (from Hwy 6 to the Grindstone Creek crossing). West of Centre Road there are residences fronting on both side of Parkside Drive with some houses being located very close to the road (unlike the section of Parkside east of Grindstone Creek where only one side of the residences front onto the widened roadway). We optimistically identified 3 residences that would need to be removed along this section of Parkside Drive. In all likelihood, this number would increase with the road design now proposed for the section east of Grindstone Creek (e.g: with the addition of on-road bicycle lanes). Even if not removed, there were identified to be about 200 residences within 25 m of the road as compared to the approximate 50 residences for Option 2. As such, Option 2 clearly has the potential for some very large social impacts. In addition, Parkside Drive west of the Grindstone Creek contains community facilities (e.g. school, nursing home) that front on the road. Option 4 allows for the introduction of a future interchange at Highway 6 should Highway 6 in this area become a full access control highway as it is south from Highway 5. The Parkside Drive alternative (Option2) does not have this flexibility and, if MTO were to extend the access control to the north, the Parkside Drive intersection would have to be closed. This

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		would result in Dundas Street being the only access to the Waterdown community and greatly reduce the role and effectiveness of an expanded Parkside Drive with Option 2. In the end the key tradeoff includes the Centre Road woodlot/ PSW impacts (for Option 4) versus the social impacts along most of the length of Parkside Drive (for Option 2). The impacts to the woodlot are focused in one location and mitigation is available to minimize the effects. The committed mitigation measures are outlined in the draft ESR. There was no route option that clearly would result in minimal overall impacts. Based on the assessment that took into account all of the evaluation criteria and the issues, the magnitude of the impacts, and available mitigation measures, Option 4 is preferred over the widening of Parkside Drive. As outlined in the ESR the City is confident that this option can be developed with some impact to the environment but appropriate mitigation measures can be applied.
44	Should you have any questions regarding the above noted comments, please contact Nora Jamieson, Watershed Planner at ext. 132.	

If you have any questions, please do not hesitate to contact me.

Syeda Banuri
Senior Project Manager
Environment & Sustainable Infrastructure Division
Public Works Department, City of Hamilton
Phone: (905) 546-2424 x 4101 Fax: (905) 546-4435

cc: Mr. Gavin Norman, City of Hamilton
Ms. Cathy Plosz, City of Hamilton
Ms. Jill Stephen, City of Hamilton
Mr. Paul MacLeod, Dillon
Mr. Jackson Marin, Dillon
Ms. Jennifer Lawrence, Conservation Halton
Mr. Mike Stone, MNR
Mr. Andrew Head, Region of Halton

Hamilton Conservation Authority

BY FAX AND MAIL

June 29, 2010 Our File: CEA-MUN/03-11

Ms. Syeda Banuri
Senior Project Manager, Environment and Sustainable Infrastructure
Environmental Planning, Public Works Department
City of Hamilton
77 James Street North, Suite 320
Hamilton, ON L8R 2K3

Dear: Ms. Banuri:

RE: MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT
WATERDOWN/ALDERSHOT TRANSPORTATION MASTER PLAN, PHASE 3
CITY OF HAMILTON

In response to our letter of April 23, 2010, staff from the Hamilton Conservation Authority (Kathy Menyes, Shari Faulkenham, Patrick Ragaz, and Nora Jamieson) met on May 19, 2010 with City staff (Jillian Stephen, Christine Lee-Morrison, and Syeda Banuri) and staff from the Dillon team (Paul McLeod and Ian Roul). At that time, HCA staff again expressed concerns with the proposed construction of a transportation corridor through the Centre Road Woodlot, and the resulting fragmentation of the PSW, and the lack of ecopassage for wildlife. It was agreed at that meeting that the City of Hamilton would provide further clarification and confirmation regarding the field work completed by Dillon and respond to our 30 listed concerns and issues noted in the April 23, 2010 letter.

Subsequently, HCA staff (Kathy Menyes, Shari Faulkenham and Nora Jamieson) met with City staff (Christine Lee-Morrison, Syeda Banuri, and Gavin Norman) and members of the Dillon team (Bill Allison, Paul McLeod, Don McKinnon and Ian Roul) to discuss the June 4, 2010 Comment and Response Table prepared by Syeda Banuri. During that meeting Kathy Menyes indicated that Patrick Ragaz, our Water Resources Engineer had not yet completed his review of the Drainage and Hydrology Final Report prepared by Dillon, dated May 2010 as HCA had just received it on June 7, 2010, however comments would be forthcoming by the end of June. We quickly went over the response matrix provided by the City but agreed to review the comments in more detail and provide follow-up comments. In this regard, we provide the following:

Item No. 1 – In our letter of December 21, 2005, HCA asked Dillon "how much ESA/wetland will be lost from the Waterdown North Wetlands where the Option 4 realignment crosses Centre Road through the ESA? How much candidate ESA/wetland will be lost from the Parkside Drive Woodlot where the Option 4 alignment crosses Borer's Creek?" HCA again questioned in our letter of June 4, 2010 how much of the Logies-Creek – Parkside Drive PSW would be lost. Instead of responding this question, giving a size estimate, Dillon explained that the Centre Road Woodlot was not designated as a PSW during the Phase 1 and 2 Report. However, the Centre Road Woodlot was later designated as a PSW after Cathy Plosz at the City of Hamilton contacted Art Timmerman at the Guelph District

Office of MNR by letter dated January 18, 2006 asking MNR to evaluate the wetland on the east side of Centre Road. We noted that Dillon reported in their letter of February 10, 2006, that while Option 4 was still identified as the preferred option, should MNR reclassify the Centre Road Wetland, then this would be taken into account in the next phase of work (i.e. Phase 3 and 4). Why then was the Phase 3 and 4 Report not updated with current information instead of relying on outdated, incorrect information? This seems to be a recurring issue with the Phase 3 and 4 report, whereby information from the Phase 1 and Phase 2 was simply repeated.

Item No. 2 - It would be of assistance to have a chart containing a full cost analysis for both Option 2 and Option 4.

Item No. 3 - It was agreed at the June 4, 2010 meeting that Dillon would provide a Summary Chart of the entire field data compiled, indicating dates and locations where the field work was undertaken, with an accompanying detailed map.

Item No. 5 - Should be clarified in the report.

Item No. 6 – The evaluation indicates that all options fell within approximately 10 points of one another on a scale of 100. As a result, a sensitivity analysis should have been undertaken to understand how robust the preferred option was and what impact unknown factors could have.

Item No. 10 – Summary Chart and map to be provided as noted in Item No. 3.

Item No. 11 – In order to address the noise issues, the City agreed that an Edge Management Plan would be prepared.

Item No. 13 – This should be clarified by illustrating on a map.

Item No. 14 – Reference to Phase 3 should be changed to Phase 2.

Item No. 19 – Dillon indicates that the Centre Road Woodlot, being a mineral swamp, has an extended dry period with the wetland surface found to be dry during "most of the site visits that took place". We need to know when these site visits occurred i.e. during the spring freshet or extended dry period, etc. This information should be included in the Summary Chart noted in Item No. 3. With respect to the equalization culverts, preliminary calculations can now be undertaken, taking into consideration not only hydraulics and hydrology, but also appropriate sizing for wildlife passage. In this regard, there is an abundance of data available on ecopassage that can be utilized to design these crossings.

Item No. 22 – Please provide rationale for why a subwatershed study is not required for the new road.

Item No. 24 – As per our discussions on June 4th, Dillon will prepare a Commitment Table to be submitted with the Final Report, which includes but is not limited to, an Enhanced Management Plan, a Habitat Compensation Plan, and an Enhanced Ecopassage Design. With respect to the Habitat Compensation Plan, we have just received your email dated June 29, 2010 requesting assistance for locating suitable areas to undertake the compensation work. One recommendation, as stated at the June 4th meeting, is to utilize part of Joe Sams Flamborough Park.

Item No. 28 – Refer to hydrology comments noted below.

Item No. 39 - Comments indicate that the majority of the road corridor will be constructed in fill and that while hydrogeological impacts are not anticipated, there is a potential at the proposed structure/culver locations where footings may require construction in the water table. HCA acknowledge that similarly, there is potential within the PSW as well. It is also indicated that in order to supplement the data obtained from the MOE Water well database, letters were sent to residents along the corridor. However, we could find no landowner response records in the report.

Item No. 42 – In order for HCA staff to determine whether an appropriate level of study has been completed, we require the Summary Table, as noted in Item No. 3.

Noted below are HCA's comments related to our review of the Drainage and Hydrology Final Report, dated May 2010:

1. Further information is required to support the flow determinations for EW2 and EW3. The report indicates that the transposition occurred based on the total drainage area of approximately 200 ha; however the modeling by AMEC has delineated the area east of Centre Road into its own catchment of 60.6 ha. This catchment should be used for flow modeling.
2. Centre Road culvert and road profile are modelled differently in the pre and post-development scenarios. This results in a Regional flood elevation upstream of Centre Road being higher under the existing scenario than the proposed. Please explain the rationale for the modifications to Centre Road and the Centre Road culvert and discuss any impacts to the wetland feature.
3. Explain the rationale for the selected Manning's 'n' values through the PSW and throughout the rest of the modeling. Values appear low.
4. The proposed E-W corridor is modeled through the wetland with equalization culverts proposed throughout. The top of the road is modeled at a constant elevation throughout the 400 m section shown. This is unrealistic and should be revised to reflect the actual top of road to determine if any spill locations exist.
5. Contraction and Expansion coefficients require modification at proposed crossings.
6. VO2 modeling uses CN values 79 – 88. However, soils in a large portion of the area have been identified as Grimsby sandy loam, soil type A, with other portions having soil type BC. CN values for these soils and land conditions should range between 50 and 78 and would have a large impact on flow determinations. Some of these areas were identified in the Waterdown North Master Drainage Plan and it was recognized that these areas should remain as infiltration zones as they provide important groundwater inputs. As such, a review of the proposed strategy is required and additional infiltration strategies should be emphasized. As pollution is a concern, treatment train approaches should be recommended, e.g. OGS followed by infiltration trench.
7. The report indicates that water quality treatment will occur for EW3 through the use of grassed swales. However, grassed swales have not been shown to effectively treat stormwater to the required 80 % treatment level (contrary to statement on page 38). In addition, grassed swales provide the majority of treatment via infiltration. This is less likely to occur in the proposed area due to the high water table associated with the surrounding environment. As such, a revised stormwater management strategy is required.
8. Figure 2 in the report identifies catchment areas to each structure in the Grindstone Creek system. A similar delineation should be provided for the structures in the Borer's Creek system.

9. HEC-RAS model used sections developed through the use of a DEM. This strategy does not provide accurate information on the low flow channel characteristics. Also, DEM information should be verified by surveying some cross-sections in the field. It is our understanding that AMEC has completed additional sections through this area so there may be opportunity for Dillon to verify their work by acquiring this information.
10. Structure EW1: The report indicates that the two higher cells in this structure have a rise of 2.0 m; however they are modeled as 2.4 m in the HEC-RAS.
11. Report indicates that quantity controls in Borer's Creek watershed are generally not required. Please revise to state that quantity control requirements were determined in the Waterdown North Master Drainage Plan.
12. Report indicates that high sediment loading will reduce effectiveness of infiltration type stormwater management facilities. This statement highlights the need for quality controls. Infiltration strategies can be incorporated in a treatment train approach.

HCA also received a copy of the letter from MNR to the City of Hamilton, dated June 29, 2010 which indicates that the Centre Road Woodlot is an Area of Primary Concern for Jefferson Salamander (*Ambystoma jeffersonianum)*, with the area bounded by Concession 5 East on the north side, Centre Road on the east side, Parkside Drive on the south side, and Hwy. 6 on the west side being within an Area of Secondary Concern. As previously notified by MNR in their letter of October 28, 2009, the Jefferson Salamander (Threatened) being a Species at Risk (SAR) which has been recorded within the general study area, is protected as well as its habitat, under the *Endangered Species Act, 2007.* HCA supports MNR's recommendation that the entire area adjacent to the proposed East-West corridor, in both the primary and secondary areas of concern be studied in order to verify the presence of Jefferson Salamander. In this regard, we suggest that these areas be studied for Jefferson Salamander habitat during the breeding season in the spring of 2011 through visual surveys and drift net/pitfall trapping during the breeding season.

Should you have any questions regarding the above noted comments, please contact Nora Jamieson, Watershed Planner at ext. 132.

Yours truly,

Nora Jamieson

for Katherine J. Menyes
Director of Watershed Planning & Engineering
NJ/

cc: Jill Stephen, Director, Environment & Sustainable Infrastructure, City of Hamilton (fax 905-546-435)
Gavin Norman, Manager, Development Engineering, City of Hamilton (by fax 905-6511)
Cathy Plosz, Natural Heritage Planner, City of Hamilton, (by fax 905-643-7250)
Bill Allison, Dillon Consulting Limited (by fax 519-650-7424)
Paul MacLeod, Dillon Consulting Limited (by fax 416-229-4692)
Ian Roul, Dillon Consulting Limited (by fax 416-229-4692)
Jennifer Lawrence, Manager, Environmental Planning Conservation Halton (by fax 905-336-7014)
Mike Stone, District Planner, MNR, Guelph District (by fax 519-826-4929)

PROTECTING THE NATURAL ENVIRONMENT FROM LAKE TO ESCARPMENT

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July 16, 2010

Ms Syeda Banuri
City of Hamilton
Public Works Department
City of Hamilton
320-77 James Street N
Hamilton, ON
L8R 2K3

Dear Ms Banuri:

Re: New East-West Road Corridor Class EA Appendices
Drainage and Hydrology, Geotechnical and Hydrogeology
CH File: MPR 341

Further to our letter of April 29, 2010, staff of Conservation Halton have reviewed the following appendices, received June 8, 2010:

- *Drainage and Hydrology, Final Report* prepared by Dillon Consulting Ltd., dated May 2010;
- *Geotechnical Investigation, Class Environmental Assessment For Waterdown East-West Bypass, Highway 6 to Brant Street, Hamilton/Burlington, Ontario for City of Hamilton* prepared by Peto MacCallum Ltd., dated February 26, 2009;
- *Hydrogeology Report, Draft Report* prepared by Dillon Consulting Ltd., dated August 27, 2009; and,
- *Natural Environment Report* prepared by Dillon Consulting Ltd., dated August 2009.

Based on our review we offer the following comments.

Drainage and Hydrology Report

1. The original EA report makes reference to detailed hydraulic and hydrologic modeling outputs that are provided in Appendix C. Staff note that the submitted Drainage and Hydrology Report is the document within Appendix C however we note that the Appendices of the report did not include digital copies of the HEC-RAS hydraulic model for all of the Grindstone Creek crossings (only the EW4 crossing was included on the CD). Please provide all of the digital and hard copy information for the crossings at the earliest opportunity. Please also specify the version of HEC-RAS used in the modeling.

2. Crossing EW5 – last paragraph of page 20 – staff are supportive of the proposed improvements to the hydraulic performance of the bridge structure in order to reduce the backwater impacts upstream of the structure and improve the safety of the road under flood conditions. The proposed bridge alignment, and the preferred direction of any widening, will be determined at the detail design stage. The design must take into account fluvial geomorphology, fisheries, terrestrial features, valley and floodplain grades on both the upstream and downstream sides of the bridge, etc.

3. Section 2.4 – 'Floodplain Storage Analysis' – This section has not satisfactorily addressed the issues raised in our previous correspondence. Specifically:

   a) The increase in the Regional Storm flood elevations on private lands upstream of the proposed road is not acceptable to Conservation Halton. Please submit digital copies of the HEC-RAS model for the existing and proposed conditions of floodplain. Please add additional cross sections at the proposed culvert locations.
   b) The maintenance of riparian storage volumes for the full range of storm events has not been adequately assessed. Please include floodplain storage volumes within the summary tables in the report. Detailed modeling and discussion of this issue must be completed prior to finalization of the EA.
   c) The meander belt of the existing watercourse must be determined such that the road can be set back an appropriate distance from the erosion hazard and the recommendations of the Paragon report implemented.

   The above issues are critical as they will likely impact the road alignment and the property impacts for the UpCountry lands to the west of the road.

4. Section 3.3 'Recommended Stormwater Management Strategy' – this section of the report did not include any recommendations or proposed measures to mitigate thermal impacts of stormwater. This is important as several of the tributaries are classified as coldwater/coolwater watercourses (i.e. Outlets EW6 and EW7).

5. Page 40 'Outlet EW5' – staff note that the report did not include any discussion regarding the potential to direct some of the stormwater from Parkside Drive (east of the railway tracks) to the Gatesbury stormwater management facility. Was this possibility explored?

6. Page 41 'Outlet EW6' – staff recommend that this section require the direction of a portion of stormwater flows from the road into the UpCountry stormsewer system such that treatment can be provided for by the existing stormwater management pond.

7. Section 3.3 'Recommended Stormwater Management Strategy' – while staff acknowledge that increases in post development peak flows for the proposed road may appear to be negligible relative to the overall flows, effort should be made to direct road runoff to adjacent SWM facilities wherever possible to work toward mitigating the cumulative impacts of the road.

8. Appendix A – please include a 'storage' column within the HEC-RAS summary tables and please provide a digital copy of the HEC-RAS hydraulic modeling for each of the watercourse crossings (only the EW4 crossing was included on the CD).

Geotechnical Report

Overall the geotechnical report was well done.

9. Page 10 of the report indicates that within Borehole 9, cobbles and concrete pieces were observed in the upper 1.4 m of this material while charcoal and slag were observed below 1.4 m. Staff question whether any of this material requires removal during construction? Please confirm.

10. Given the recent findings of potential karst features on the UpCountry Estates subdivision, staff request that the consultant provide further direction on how any potential risks to the proposed road can be mitigated.

Hydrogeology Report

11. Staff request that the report be expanded to address whether the potential impacts of road construction could include diversion of shallow groundwater features resulting from proposed service trenches within the right-of-way. Please include recommendations for mitigating measures (i.e. trench plugs, etc.).

12. Staff note that the road construction includes dewatering activities associated with the installation of various services and bridge and culvert footings. A more detailed assessment of hydrogeologic conditions within the project limits, and the potential impacts of servicing and dewatering activities, must be completed in conjunction with the detailed design of the road.

13. Given the recent findings of potential karst features on the UpCountry Estates subdivision, staff request that the consultant provide further direction on how any impacts to karst features, as a result of road construction, can be mitigated. Staff recommend that a karst expert be retained to review the detailed design and prepare a Karst Contingency Plan if warranted.

Natural Environment Report

14. The report does not address any of Conservation Halton's outstanding comments that were outlined in our letter of July 6, 2008.

Based on the above, staff will be following up with the City of Hamilton to schedule a meeting to discuss the outstanding issues related to the East-West Corridor. Staff request that the modeling information and natural heritage information be submitted as soon as possible in advance of the meeting to provide staff with sufficient time to review the information. As previously discussed, staff recommend that the consultants should consider shifting the location

of the road further to the west within a portion of the UpCountry lands in order to provide appropriate setbacks to the watercourse (from a fish habitat and an erosion hazard perspective) and to enable the design to incorporate the required flood storage volumes.

We trust the above is of assistance. If you require additional information please contact the undersigned at extension 266.

Yours truly,

Jennifer Lawrence
Manager, Environmental Planning

cc: Ms Nora Jamieson, Hamilton CA, email
Ms Cathy Plosz, City of Hamilton, Planning, email

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Comment and Response Table – Conservation Halton Letter (April 29, 2010) Regarding the New East-West Road Corridor Class EA ESR - Draft August 2009

I.D.#	Conservation Halton Comment	Response
	Staff of Conservation Halton have reviewed the above noted draft document, prepared by Dillon Consulting Limited and offer the following comments. A portion of the study area is within Hamilton Conservation Authority's jurisdiction and, as such, our comments pertain only to the portion of the Study Area within the Grindstone Creek watershed. We note however that the Hamilton Conservation Authority has raised significant issues with respect to the conclusions, particularly as they relate to impacts to a Provincially Significant Wetland. Although outside of our watershed, staff support the Hamilton Conservation Authority's comments as they relate to the importance of protecting and maintaining Provincially Significant Wetlands. Given the historical loss of wetlands in Southern Ontario we recommend that every effort should be made to avoid the loss of any wetland features, especially wetlands that have been identified as having Provincial significance. Conservation Halton staff provided comments on a previous draft of the Natural Heritage components of the study. As a result, our comments below are divided between outstanding comments from our previous letter and comments on the draft ESR.	Comments noted. Discussions are ongoing with Hamilton Conservation Authority.

I.D.#	Conservation Halton Comment	Response
Outstanding Comments from July 6, 2008 CH letter regarding Natural Environment Report		
1	It is unclear whether the following comments on the draft Natural Environment Report have been taken into account in the preparation of the ESR: Section 2.0 (Methods) - Staff questioned whether the following sources were consulted for terrestrial species information: • *Terrestrial Resource Comments on North Service Road/Waterdown Road Interchange Design Alternatives, City of Burlington, Ontario, prepared by Dougan and Associates and dated October 11, 2007* • *Tree Inventory Report, Waterdown Road — Hwy 403 Interchange, prepared by Wendy Shearer Landscape Architect Limited and dated August 22, 2007* • *South Waterdown Subwatershed Studs. Stage I Report (Volumes I and II), prepared by Ecoplans Limited and dated March 2006* • *South Waterdown Subwatershed Study Stage 2 Report Management Strategy, prepared by Ecoplans Limited and dated March 2008* • *South Waterdown Subwatershed Study Stage 3 Report Implementation and Monitoring Plan, Second Draft, prepared by Ecoplans Limited and dated May 2008* • *CUMIS Group Property, Burlington. Scoped Environmental Impact Study, prepared by Natural Resource Solutions Inc. and dated Alai, 2006.*	Note that the reference should be to a CH letter of July 6, **2009** The 403/Waterdown Road Interchange is outside of the area of study for the East-West Road Corridor Class EA and south of the study area for the Waterdown Road Corridor Class EA. The reports related to the 403/Waterdown Road project were not used in the preparation of the Draft ESRs for either project. The South Waterdown study was reviewed as part of the Draft ESR. The study had very little overlap with the study area of the East-West Road as it was bounded to the north by Highway 5.

I.D.#	Conservation Halton Comment	Response
	Although the references cite the South Waterdown Subwatershed Study (Ecoplans Limited and MRC, 2006), and the Halton Natural Areas Inventory (Dwyer, 2006), it is not clear that the actual species lists from these references were incorporated into the current document, as there is no column for Ecoplans or NAI data in the species tables. The original species lists within the above documents should be examined for reference to any significant species not already known to the Dillon study team.	The Ecoplans study and the Halton Natural Areas Inventory were both reviewed for rare species in the region and the data was incorporated were appropriate.
2	Section 3.0 (Results) - Ecological Land Classification - In response to a previous comment that FOD2-2 was listed but not mapped, the vegetation type has been removed from the list. However, the ELC data sheets for FOD2-2 (polygon 026) are included in Appendix B, and butternut is on the species list. Please clarify the location of this community and, specifically, the location of the butternut.	The ELC sheet from Polygon 026 is for an area that is outside of the study area. It has been removed from the appendix. For butternut locations, please refer to response # 4.
3	Section 3.4 (Incidental Wildlife) - The putative bobcat vocalization is highly significant for Halton/Hamilton. Special surveys should be undertaken to determine whether this species is actually present.	We understand that the previous assessment that discussed the possibility of a bobcat has been re-issued indicating a mis-identification. As such, surveys for this species are not warranted.

I.D.#	Conservation Halton Comment	Response
4	Appendix A - ELC Plant Species Lists for Sites 006, 007b and 026 - Butternut is noted within these communities (SWD3-2, SWD2-2 and FOD2-2), but not shown on Figure 4 or discussed in relevant sections of the main document.	Possible butternut trees were identified in Sites 006 and 007b which form part of the Centre Road Woodlot. Subsequent field investigations with Terry Schwan of the MNR and DNA analysis confirmed two pure butternuts. The location of these is shown on the Figure 4 . Community 026 refers to a community that is west of King Road and outside the study area. This ELC sheet has been removed from the ESR.
5	Previous comments with respect to Crossings #6 — 14 have not been addressed.	The numbering referred to in the July 6, 2009 letter refers to an older figure. A brief description of each is provided below for clarity: Crossing 6 is the same on both Figures. This crossing is a CSP culvert draining roadside drainage and is proposed to be a CSP under the expanded road. Crossings 7 to 12 were replaced with three crossings 7 to 9 after further review of the site. All three crossings drain roadside water, while crossing 9 also receives water from a pond on the north side of the road. All three are CSP culverts and are proposed to be replaced with CSP culverts. Crossing 13 is now labeled as Crossing 11 and is described in more detail below in response to Comment 21. There is an existing CSP culvert and the future crossing is proposed to be a CSP culvert.

I.D.#	Conservation Halton Comment	Response
		Crossing 10 (April 2, 2009 Figure) did not show up on the original map. It is described in more detail in Comment 20 below. The existing crossing is a CSP culvert that is proposed to be replaced by a box culvert. Crossing 14 has been renamed Crossing 4 and is described in the ESR and in the response to Comment 17 below.
Comments on Draft ESR		
6	Staff continue to recommend that natural hazards, including karst, flood plains, stable top of bank and meander belt should be discussed in the ESR as they each could have implications on a preferred alignment design. Staff note that this was raised in our letter of July 6, 2009 and has not yet been addressed.	Text regarding these natural hazards will be added to the ESR. The implications of any of these features on the road design will be considered.
7	Please consider a consistent approach to labelling the various figure/tables and exhibits and ensure they are all listed in the Table of Contents for ease of reference.	This will/has been done.
8	Page XVIII the first paragraph references a Section of the report that has not been assigned (Section XX).	Reference added.
9	Table 3-2 --- Criteria should be expanded to "Potential for impact on terrestrial features and functions". Potential impacts on species at risk should be included as an indicator, given that they are identified as one of the "main natural	The criteria and indicators in Table 3-1were developed during Phase 2 work and used to compare broad corridor alternatives. All text in the ESR in Chapter 3 has been taken directly from the previously published Phase 2 Report and has not been altered.

I.D.#	Conservation Halton Comment	Response
	environmental issues of concern" on page 1-3. Potential impacts to wildlife movement should also be included as indicators,	The criteria “Potential for impact on terrestrial features” was carried forward into Phase 3 and 4 work to evaluate design alternatives. Where appropriate, additional or modified indicators were introduced to allow the consideration of issues specific to each alternative set being considered. For example, in the evaluation of alternatives through the Centre Road PSW, this criteria was expanded to include the following indicators: • Amount, nature and significance of natural habitat removed, • Number of significant trees along existing roadway removed, • Potential for effects to adjacent habitat • Fragmentation of natural areas, • Effects on terrestrial corridor connectivity/linkages, • Opportunity to enhance degraded natural areas Within these more localized indicators your suggested expanded criteria could be addressed, as the specific alternatives under more detailed evaluation demanded. Further, once the preferred alternative was selected and additional impacts and mitigation measures were investigated or discussed, even more detailed indicators could be introduced. That is why the “potential impacts on species at risk was identified on page 1-3 as a main natural environmental issue of concern.

I.D.#	Conservation Halton Comment	Response
10	Section 3.4.1 (Hybrid Option — Dundas to Parkside Connection Options), page 3-11 — The use of the terminology “Options 1-5” for the hybrid options is somewhat confusing given that the main Options for the east-west road are labelled Options 1-4. Perhaps a different type of terminology could be used for the Dundas to Parkside Connection Options (i.e., Options A-E). Also, within this section, it is stated that Option 2 (connection along the eastern limit of Upcountry Estates) is the most preferred option for a number of reasons. One of the impacts is listed as the removal of 0.64 ha of "other woodlot". Staff could not locate a table within the study that clearly outlines the ranking evaluation of these connection options and would prefer to review this information in advance of agreeing to the selection process. The text does not address the proximity of Option 2 to the Grindstone Creek tributary and the impacts to the flooding hazards, erosion hazards, fish habitat and the watercourse that would occur with Option 2. This requires further discussion and analysis.	As indicated above, all text in Section 3 of the draft ESR is taken directly from previously released documentation. The appendix materials contain the original documents and Section 3 contains a summary only of this information. Modifying the labeling of the Phase 2 alternatives at this point is not considered practical or a necessity. The tables that summarize the evaluation assessment for the Hybrid Option is contained in Appendix A of the Phase 2 Report. These have also been attached to this Comment – Response table.
11	Page 4-9 - The provincial rank for butternut is identified in the first paragraph as S4, then as S3? in the subsequent paragraph. Please clarify. Please ensure that MNR is involved in any discussions related to endangered species. Staff have copied Melinda Thompson-Black, MNR-Aurora, for her information	According to the most recent NHIC search, butternut is listed as S3? The MNR has been contacted regarding the butternuts and have conducted analysis to determine the purity of the these trees. During the detailed design stage, the MNR will continue to be involved to ensure that the

I.D.#	Conservation Halton Comment	Response
		Endangered Species Act is appropriately dealt with.
12	Figure 4.2 - Staff question why ELC and vegetation surveys were not completed for the natural area along Grindstone Creek, south and north of Parkside Drive? We note that the observation of the nationally Threatened chorus frog was in this vicinity.	ELC was not completed at the crossing at Grindstone Creek as the work proposed in this area involves replacement of the existing structure with a larger structure spanning the watercourse. An aquatic habitat assessment was conducted in the vicinity of this crossing location. City of Hamilton is working with MNR (Guelph District) about SAR in this area. MNR has provided a list of 36 species to carry out an assessment for potential habitat in this area. Threatened Chorus frog can also be added to the list. The work plan for assessment was also circulated to CH in August 2010 for information.
13	Figure 4.2 - It was noted in the Natural Environment Report that property access was restricted in the lands east of the Upcountry Estates. As such, staff recommended that additional field surveys be undertaken at detailed design as necessary. The area northeast of Upcountry Estates labelled as "Forest" appears to be a swamp, based on an air photo review. This could result in additional mitigation requirements pertaining to maintenance of the hydrologic regime of the wetland. The ESR should provide for future commitments to undertake this work.	Additional field work will be undertaken in this area during the detailed design. A commitment to this will be added to the ESR text.
14	Figure 4.2 - Wetlands identified in the South Waterdown Subwatershed Study (particularly Wetland 5 in the vicinity of Dundas Street) should be included on this figure.	Wetland 5 will be included on the Figure in the final ESR.

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15	Page 4-10 - On the basis of Figures 2 and 4 in the *COSEWIC Assessment and Update Status Report on the Western Chorus Frog* (Pseudacris triseriata) *in Canada*, staff are of the opinion that all chorus frog populations within Conservation Halton's jurisdiction belong to the Great Lakes/St. Lawrence —Canadian Shield population and as such should be considered members of a nationally Threatened species.	This note will be added to Section 4.3.4.
16	Section 4 3.6 (Aquatic Resources — Field Work Results), page 4-14 — this section references Figure 4.5 however, Figure 4.5 identifies watercourse crossings within the north-south road corridor. Staff note that Figure 6.1 appears to identify the watercourse crossings within the east-west corridor.	This has been addressed.
17	Section 4.3.6, page 4-15 — Crossing #4 - During a site visit to this crossing location on Oct. 14, 2009, it was noted that a defined channel was present here with an obvious channel that had been scoured clean of vegetation. It is staff's opinion that this feature falls under the definition of a watercourse pursuant to the Conservation Authorities Act and that it provides direct fish habitat during certain parts of the year when runoff levels are sufficient. In addition, this watercourse is located within a hedgerow and is surrounded on both sides by mature trees with a fairly dense understory of woody herbaceous vegetation. This vegetation is providing a variety of useful functions that benefit the watercourse.	The CA's recommendation regarding the design of the crossing at this location will be incorporated into the detailed design of this facility. This will be added in the commitments table.

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	On site, CH staff estimated that the bankfull channel on this watercourse would be up to two metres in width. Dillon's fisheries biologist who was also present during this site visit agreed to that width during the visit. As such, it is requested that any transportation crossing structure placed here span a minimum of two metres over the width of the watercourse. It is also requested that the length of the culvert/bridge be kept to the minimum possible to reduce disturbance to the watercourse and hedgerow. It is also requested that the crossing structure be designed as an open bottom structure to minimize disturbance to the interaction between the hyporheic zone and the bed of the watercourse. An open bottom structure would also allow for long term provision of natural substrate on the bed of the creek as this part of the creek contributes to the productivity of aquatic invertebrates which provide food for fish. This section of Grindstone Creek is a headwater creek and one of its main functions is to provide primary and secondary productivity to downstream reaches. The bottom of the creek in this headwater reach provides functionality with respect to the provision of allochthonous inputs to the downstream reaches of the watercourse. The construction of an open bottom structure at crossing # EW4 would be helpful in facilitating long term secondary productivity to occur at the location	

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	of the crossing structure. The use of an open bottom structure allows the functional connectivity between the hyporheic zone and the invert of the creek bottom to remain intact. Staff request that this be included as a commitment in the final ESR and that the description throughout the document be revised accordingly.	
18	Section 4.3.6 (Grindstone Creek — Northwest Branch Crossing #5) Page 4-16 — the tributary of Grindstone referred to in the report as the 'Northwest Branch' is considered to be the 'Main Branch' of Grindstone Creek.	This change will be made in the Final ESR.
19	Section 4.3.6 (Grindstone Creek — Northeast Branch Crossing #6) — Please indicate the date (including the day, month and year) when the survey was completed for this crossing location.	This survey was completed on July 11, 2008.
20	Section 4.3.6 (Drainage Conveyance Crossing #10) - Please provide the following data regarding the drainage feature located at EW # 10: photographs of the upstream and downstream ends of the existing water conveyance structure, details regarding the presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish.	The upstream and downstream photos are provided as an appendix to this Comment-Response table. No groundwater seepages were observed in the area of the new crossing. No baseflow was observed. The channel width varies; upstream of the crossing it is a road side ditch greater than 2 metres in width. Downstream of the crossing the width is less than 1 metre. The system is ultimately connected to the Upper Hager Creek through tributaries to the south.

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		As an intermittent road side ditch, the channel would have a hydrological regime typical of urban run off. In the area of the crossing the drainage feature is an intermittent road side ditch that flows into an intermittent dry flat channel. The channel was dry during the time of survey and it is not expected that this area will provide habitat for fish or aquatic invertebrates. This will be added to the commitments table.
21	Section 4.3.6 (Upper Hager Creek Crossing #11) - No indication is provided in the habitat description here regarding the following habitat parameters: presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish. Staff request that this information be provided. In addition, within this section, there is reference to Crossing 3 which staff assume should be Crossing #11. Please clarify.	The upstream and downstream photos are provided in an appendix to this Comment-Response table. The channel width varies; upstream of the crossing it is a road side ditch less than 2 metres in width. Downstream of the crossing the width is 1.5 to 2 metres. Upstream there is very limited flow, downstream the amount of flow increases indicating a baseflow source. The downstream hydrological regime would be less flashy than a typical urban runoff system due to the baseflow source. The upstream portion of the crossing is intermittent with limited flow while the downstream crossing has more sustained flows. The areas downstream would provide suitable habitat for fish and aquatic invertebrates.
22	Section 4.3.9 (Hydraulic Assessment), page 4-19 — Reference is made to Figure 4.5 however, as noted	Appendix C has been submitted to HCA (report dated May 2010) and will be included in the final ESR

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	above, this figure relates to the north-south corridor. Also, this section of the report makes reference to detailed hydraulic and hydrologic modeling outputs that are provided in Appendix C. Staff note that Appendix C was not included in the document. Please provide digital and hard copies of this information at the earliest opportunity. Also, reference is made to 12 crossing structures however, only 11 are shown on Figure 4.4 and described within the text.	package. The ESR text will be revised to reference 11 crossings.
23	Section 4.5.2 (Hydrogeology — Geological Setting), page 4-25 — reference is made in the first paragraph to Cross Section A-A in Figure 4-6 however, Cross Section A-A is found on Figure 3. Please revise. This section also states that Cross Section A-A was constructed using MOE well records. Staff question whether the individual borehole results were also used to further refine this figure? With respect to Figure 3 (Cross Section A-A) — Based on this figure it would appear that the water table is at the level of the invert of two watercourses within the study area, although the watercourses have not been labelled on the figure. Please identify the names of the watercourses as well as the month and year when the water table elevations were measured. Will the borehole information be included in the final ESR? This information would be helpful in assessing	References have been revised. Site visits and discussions with well owners were used to refine this figure. Agreed. This will be added t the text. Appendix materials will contain all borehole information generated as part of this study. Additional borehole work and geotechnical assessments will be completed during the design phase.

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	the analysis within the document.	
24	Section 4.5.2 (Hydrogeology — Potential Impacts of Road Construction), page 4-30 - Staff note that the road construction includes dewatering activities associated with the installation of various services and bridge and culvert footings. More detailed assessment of hydrogeologic conditions within the project limits, and the potential impacts of dewatering activities, must be completed in conjunction with the detailed design of the road.	We agree that more detailed hydrogeology is appropriate at the detailed design stage. This work includes dewatering planning.
25	Section 4.5.2 (Hydrogeology — Potential Impacts on Groundwater Quality), page 4-31 — it is stated that the construction of the proposed corridor will not have any foreseeable impacts on groundwater quantity because the construction activities will not involve any groundwater extraction. It has been our experience that the construction of watercourse crossings sometimes requires dewatering in the event that the installation of the crossing foundations intercepts groundwater. This should be taken into consideration when evaluating potential impacts to private wells in the vicinity of watercourse crossings.	Dewatering planning will be completed as part of the detailed design. This includes potential impacts to private wells.
26	Section 5 — please ensure that all figures, maps and Tables are labelled for ease of reference. There are at least two figures with alignment options/design drawings that are not labelled within this section.	Agreed – this has been addressed.
27	Page 5-2, Section N4 - As identified in the Grindstone Creek Watershed Study, the valley provides an ecological linkage and linkage	The new crossing of the Grindstone Creek will be wider than the existing crossing and facilitate increased wildlife use.

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	restoration opportunity for natural areas north and south of Parkside Drive. As such, proposed works in this area should seek to improve wildlife passage and habitat connectivity.	This will be further discussed with CH during the detailed design stage.
28	Table 5-1 - "Potential for impact on terrestrial features" is listed as "High-medium" importance to Project Partners. Please note Conservation Halton stall consider this to be a criterion of high importance. Similarly, "Potential for Impact on aquatic features" is given an importance of Medium from the Project Partners. Given the existence of direct fish habitat, Conservation Halton would have likely assigned a High importance ranking to this criterion. Although it would appear that the Study Team solicited advice from the Neighbourhood Advisory Council, Conservation Halton staff cannot recall being requested to provide criteria importance to the Study Team. Please provide clarification as to how the relative importance was determined by the Project Partners. Additional analysis may be required upon further review of the criteria rankings. The Indicators under "Natural Environment" are slightly different from the Indicators used when assessing the connection between Dundas Street and Parkside Drive. Please explain why different indicators were chosen for the overall corridor versus the Dundas — Parkside connection. In the "Natural Environment" Criteria Group, there is only one criteria relating to impacts on aquatic	As indicated in the text, both the East-West Corridor Neighbourhood Advisory Committee and the Project partners developed criteria importance. Other groups, such as Conservation Halton or business groups, were not involved in this. Please see the response to I.D. #9 for a further discussion on the evaluations indicators. The broad criteria were used for the evaluation of the design alternatives and, in most cases, more specific indicators were developed for each corridor section under evaluation, The specific indicators used in each evaluation were dependent on the environment potentially affected (i.e. there would be no point in including an indicator for a specific type of feature that was not present in the area. All potential impact

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	features. In this table, all potential impacts need to be considered to evaluate the potential risks and impacts associated with the project on all affected aquatic features. Some examples of indicators that should be listed include: (1) Impacts on baseflow of all affected creeks; (2) Impacts on flow velocities and fish passage in all affected creeks; (3) Impacts on surface and groundwater quality in all affected creeks; (4) Potential for removal or creation of any existing or non existing barriers to fish passage; (5) Potential to cause excessive erosion or aggradation of sediments upstream and downstream of all proposed crossing alterations; (6) Will any channel realignments take place? What will the effects and risks of proposed channel realignments be?; (7) What in-stream aquatic habitat changes (e.g. loss of pools, flattening of riffles, widening of wetted width of existing channels, reductions in low flow water depths) are expected as a result of the proposed crossing replacements?; and, (8) How much natural riparian vegetation will be lost from around the affected flow features and what effect will this have on aquatic habitat in these features? Will efforts be made to reduce losses of riparian (waterside) vegetation during the construction phase of the project? Will all removed riparian vegetation be replaced with appropriate regionally native riparian species? Also, Table 5.1 does not include the requirement to mitigate the impacts to the flood plain through the	differences were considered. Further consideration and description of impacts and mitigation of the selected undertaking is presented in Section 6 of the ESR. In addition to this, more detailed studies have been recommended for completion in the detailed design phase in some areas to address additional issues, such as those raised by Conservation Halton in this comment. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff. Further discussions with the Up-Country developer are also required to finalize what studies are required on his behalf to assess and mitigate the potential impacts to this feature.

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	North-South (N5) portion of the road adjacent to the Upcountry lands. Additionally, the meander belt of the existing watercourse must be determined such that the road can be set back an appropriate distance from the erosion hazard. These issues are critical as they will likely impact the road alignment and the property impacts for the Upcountry lands to the west.	
29	Table 5-4 (Hydro Line Alignments) — It would be helpful if this section of the road corridor had a detailed air photo and alignment options shown. Based on our previous comments with respect to Crossing #4, please revise the portion of the Table that identifies the potential for impact on aquatic features accordingly.	A figure will be provided showing the alternatives. The evaluation table will be modified to include reference to Crossing 4.
30	Table 1 (New Waterdown East-West Road — Option 4 vs. 5 Review), after page 5-30 — under "Potential for impact on Aquatic Features" please complete the number of metres of flood plain that will be crossed in this Option. Currently the text reads, "xxx m of flood plain".	This will be detailed in the Final ESR.
31	Section 5.6 (Sawtooth Option), page 5-35 — this section references Figure 5.8 however staff could not locate this figure in the report.	References to figures have been modified
32	Section 5.8 (N5 — Upcountry Development), page 5-38 -- this section states that a reserve for this road was determined by the developer and adopted as the most appropriate alignment. Staff are concerned with this statement given that we have requested that the EA review the most appropriate alignment given	We do recognize that the floodplain and erosion hazards must be addressed prior to finalizing the road alignment, which will take place during detailed design. Opportunities to adjust the road alignment will be considered during detailed design and in consultation with Conservation Halton and the developer. This issue

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	the constraints associated with the tributary of Grindstone Creek that parallels the eastern lot line of Upcountry Estates and the associated flood plain that occurs on the Upcountry lands. It is our understanding that this phase of development on the Upcountry lands has not been draft plan approved and, as such, the location of the road should not be limited to that which has been reserved by the developer to date. The impacts of the proposed road alignment on the storage and conveyance functions of the flood plain must be addressed prior to the road alignment being determined as acceptable. Additional analysis of this issue, and determination of the meander belt/erosion hazard, must be completed prior to the road alignment being finalized. In addition, this section references Figure 5-9. Such a figure could not be found in the report however, there is an air photo with road pattern overlays on	will need further discussions between the Conservation Halton and City staff. Concerns regarding the floodplain hazard were discussed with Halton CA during two meetings (July & August 2008). To address this concern, the Drainage and Hydrology report dated May 2010 included hydraulic analysis to demonstrate no negative impacts to flood levels associated with the roadway encroachment and to preliminarily size equalization culverts that connect the floodplain and maintain floodplain storage. The level of analysis completed confirms impacts to floodplain connection and conveyance can be addressed while recognizing that more studies are required at detailed design with considerations as noted in the report. HCA has established the meander belt/erosion hazard as part of the delineation of areas included in Ontario Regulation 162/06. Dillon reviewed the meander belt limits related to this section of the road and recommends detailed studies to refine this limit (i.e., fluvial geomorphology, geotechnical analysis) are to be completed during detailed design as the road alignment is being finalized. While the road alignment appears to be in the current meander belt limit, there is flexibility to move the alignment based on the detailed assessment of the meander belt width. In the event that the road alignment can not be located outside the meander belt width, opportunities to restore the original meander belt pattern (prior to creek realignment which occurred in

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	the page immediately following this section which staff assume is meant to be Figure 5-9. The figure identifies two proposed road locations/roundabouts however, there is no labelling on the figure so it is difficult to determine which one is the preferred alignment. Based on the text on page 5-38, it would appear that the study team is recommending the most easterly alignment of the road. This alignment would impact the woodlot/wetland at the northeastern property boundary of Upcountry Estates. Staff require further justification for the shift to the east as being the preferred alignment. Staff recommend that the "triangle" of land that would be left as a result of the westerly alignment could be used for tree planting to compensate for the loss of trees along the road alignment and to provide additional buffering to the existing woodlot/wetland.	the 1970's) can be met through the design of the culverts and stream rehabilitation works following current channel design methods. Reference to figures has be reviewed and adjusted where required. Additional text will be added to the ESR. This area can be assessed for tree planting compensation potential. Text will be added to the ESR in this regard. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.
33	Section 6.3.1 - Exhibit 6-3 (East Parkside Drive Roundabout) — this exhibit appears to be identifying the preferred location of the roundabout at Parkside Drive however, this differs from the text in Section 5.8 which seems to indicate that a more easterly alignment is the preferred location. Staff prefer the alignment as shown in Exhibit 6-3 for the reasons outlined earlier in this letter. Please confirm which alignment is the ultimate preferred alignment for the roundabout at the north end of Upcountry.	The easterly alignment is recommended. See response to comment #32.
34	Section 6.3.1 - Page 6-13 (Upcountry Link) — this section of the report indicates that the proposed alignment is generally situated at the eastern limit of	We believe that these issues can be appropriately addressed at detailed design when a permit submission will be made.

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	the subdivision with the exception of the midway point where the proposed centre line turns west in order to avoid impacts to a tributary of Grindstone Creek. It is important to note that the road alignment must not only address impacts to the creek, but must also mitigate impacts to the Regional Storm flood plain, erosion hazards and fish habitat associated with the creek. This is an important issue as both technical and policy requirements must be satisfied in order for Conservation Halton to be in a position to issue a permit under Ontario 162/06 for the proposed road. Additional comments are provided below under "Preferred Design Concept".	Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.
35	Section 6.3.4 (Stormwater Management & Hydraulics), page 6-18 — staff recommend that reference be made to the South Waterdown Subwatershed Study as it relates to stormwater quality and quantity controls as well as hydraulics for that portion of the study area that is immediately adjacent to this area (i.e., along Dundas Street). In addition, as noted previously, reference is made to Appendix C however the appendix was not provided with the draft ESR. Section 6.3.4, page 6-19 — it is stated that the new corridor crosses two watersheds (Borer's and Grindstone) however, the most easterly portion of the corridor also crosses the Hager Creek watershed within Conservation Halton's jurisdiction. Please add this to this section.	Appendix C has been submitted (report dated May 2010) and will be included in the final ESR package Reference t the Hager Creek watershed will be made in the ESR Figures and text are correct in indicating 11 crossings.

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	As previously noted, this section makes reference to 12 crossings whereas the figures and text only evaluate 11 crossings. Please clarify.	
36	Section 6.3.4, Crossing EW4, page 6-25 - The second sentence of the second paragraph states "It is not a permanent watercourse but a natural depression area associated with wetland features". We recommend that this statement be revised as it is not entirely inaccurate. It is our opinion that this feature is a watercourse with a defined bed and banks. The bed of this channel was devoid of vegetation, indicating that a substantial enough volume of flow traverses this stretch of the watercourse to prevent vegetation from growing in the bed of the watercourse. When water is flowing in this channel, it is assumed that this channel provides direct fish habitat. Please modify this section and other portions of the document (i.e. Table X) to reflect this change. In addition, within this section, a box culvert is proposed for Crossing EW4. As previously noted, staff request that the crossing be an open bottom culvert that is embedded. Please carry this forward in the Commitment section of the final ESR.	The watercourse is not permanent. Field observations have indicated that this crossing is dry most of the year and is considered to be an intermittent watercourse. An open bottom culvert will be carried forward in the commitments section of the report.
37	Table 6-10, page 6-25 — staff note that the water surface elevations for both the 5 year and 10 year storm events are the same. Please confirm whether or not this is an error.	The 5 year WL is 241.27 m, however the analysis focused on the 25 year event (design event) and the Regional event.
38	Crossing EW5, page 6-26 — staff are supportive of	These will all be considered in the detailed design

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	the proposed improvements to the hydraulic performance of the bridge structure in order to reduce the backwater impacts upstream of the structure and improve the safety of the road under flood conditions. The proposed bridge alignment, and the preferred direction of any widening, will be determined at the detail design stage. The design must take into account fluvial geomorphology, fisheries, terrestrial features, valley and floodplain grades on both the upstream and downstream sides of the bridge, etc	stage.
39	Page 6-27 — staff note that this section did not include a hydraulic analysis for the floodplain within the N5 portion of the proposed road. Please include this analysis as part of the final report.	See Item 32
40	Page 6-28, Stormwater Management and Hydraulics: Hydraulic Evaluation of Road Crossing Structures — Crossing EW6 — staff are supportive of the proposed improvements to the hydraulic performance of Culvert Crossing EW6 in order to reduce the backwater impacts upstream of Dundas Street and improve the safety of the road under flood conditions. Any realignment of the culvert must be based on a fluvial geomorphic assessment of the creek in conjunction with any fisheries requirements. The following information is provided for detailed design: Please ensure that any rock protection material used to protect the new structure be round and appropriately sized for the channel. It is requested	Comments noted.

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	that oversized rock material not be added to the channel, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water may flow on either side of the oversized rock and could create new bank erosion or it may exacerbate existing erosion if the large rock is still located anywhere near the edge of the creek. Staff note that for the majority of the document the future crossing at EW6 is referred to as an open bottom culvert however, there are a couple of locations in the text and on figures within the document that it is shown or referred to as a closed bottom culvert. Please revise as necessary for consistency	
41	Section 6.3.4, Crossing EW 11, page 6-30 — It appears from the photograph on page 4-17 that the existing CSP culvert is narrower than the wetted width of the watercourse at the time the photo was taken. Given the surrounding vegetation in the photograph staff have assumed that the photo was likely taken during the late spring or summer months. It could then be assumed that the flow in the creek at the time the photo was taken is less than would be expected during the annual spring freshet. As such, it is requested that the existing culvert be replaced with a larger crossing that will more effectively: • allow fish passage during higher flow events • convey sediment to downstream reaches of the	This will be added to the commitments section.

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	creek • allow infiltration of groundwater (if present) • prevent the formation of a perched culvert which would prevent fish passage. Based on the above, it is requested that the existing culvert be replaced with an open bottom creek crossing that will convey a minimum 2-year frequency flow event. Staff request that this be added to the Commitment section of the final ESR.	
42	Section 6.3.4, Floodplain Storage Analysis, page 6-31 - this section indicates that the proposed road construction will result in the loss of approximately 4200 m' in floodplain storage and recommends that this storage be maintained. The report further recommends that additional dynamic modeling be undertaken at the detailed design stage to finalize the sizing of the equalization culverts. This approach is not satisfactory to staff. The maintenance of storage discharge relationships for the flood plain must be maintained for the full range of storm events without increasing the flood plain limits on adjacent lands. This is a design constraint for the road and will be a requirement of Permit approval. Additional analysis is required prior to EA approval as satisfying this requirement may have impacts on road alignment and property requirements on the Upcountry lands. Perhaps flood storage requirements could be achieved on the east side of the proposed road by reconfiguring the floodplain grades and shifting the road further to the west. This	Based on the Paragon EIR (May 1996) the realigned channel is effective at conveying flows with a frequency of less than 100 years and that during large events such as the Regional the flows exceed the capacity of the realigned creek, resulting in the floodplain following the original creek alignment. For this reason, and because the road alignment does not encroach on the existing channel our analysis only considered the Regional event (i.e., storage for other events would not be effected by the road works). As noted in Item 32, the level of analysis completed confirms impacts from the road to floodplain connection and conveyance can be addressed. The proposed alignment poses no constraint in achieving floodplain storage for the Regional event. The capacity of the culverts is based on a conservative analysis. The required capacity for the Regional event can be readily met with the proposed two 1000 mm structures. There are opportunities to refine the analysis during detailed design, which may involve

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	would have the benefit of removing the floodplain designation from the Upcountry lands and saves the costs of installing large equalization culverts. It is also more in-line with the concept that was approved within the 1996 Paragon report. The EA should confirm whether this approach would be feasible. Staff are not prepared to leave this issue until detailed design for the above reasons. In addition to the above, the second paragraph of Section 6.3.4 suggests that the hydraulic analysis results have taken into consideration the proposed stream rehabilitation plan as outlined in the Upcountry Estates Environmental Implementation Report, dated May 1996. Please note that this report is no longer considered current and the proposed stream rehabilitation measures likely do not meet current standards for watercourse works. The ESR should be evaluating the most appropriate treatment for this tributary as part of the road alignment alternatives.	upsizing the culverts to provide sufficient capacity and flow equalization. Therefore, this is not considered a design constraint for the road which must be addressed prior to filing the EA. We acknowledge the recommendations to address flood storage, however as noted above, the use of culvert is still considered a viable option to mitigate impacts associated with the road alignment. Removing floodplain from the Up Country lands is beyond the scope of the EA for the E-W Corridor. Furthermore, evaluating the most appropriate treatment for the tributary is beyond the scope of the EA and would require detailed studies that are best addressed during detail design and as part of the Up-Country development application. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.
43	Section 6.3.4, Roadway Stormwater Management Alternatives, page 6-32 - please include the Hager Creek Watershed when outlining criteria for stormwater quality and quantity controls.	Comments noted and will be addressed.
44	Figure 6.2 (Road Drainage Areas and Outlet) - staff note that the legend colours and text do not align.	Comments noted and will be addressed.

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45	Page 6-41 'Outlet EW5' - this section of the report indicates 'East of the outlet a new roadway is proposed while west of the outlet, the existing 4 lane road (Parkside Drive) is proposed to be widened to a 6 lane road'. Is this correct? Staff understood that Parkside Drive was going to be widened to a 4 lane road. Please confirm. This section also recommends the use of Oil Grit Separators for quality treatment. Staff are supportive of this and require that they be sized to provide Level 1/Enhanced treatment. Mitigating the thermal impacts of stormwater must also be discussed within this section of the document and carried forward to detailed design.	This has been corrected in the ESR. Parkside Drive will be a 4 lane road. Comment noted, text will be added to the ESR.
46	Section 6.3.5, Outlet EW6, page 0-12 - two possible stormwater treatment systems are proposed: (1) an OGS; or, (2) directing the stormwater to the Upcountry Estates stormwater management facilities. Staff would prefer that the stormwater be directed to the Upcountry Estates facility as this is likely the most effective method of treatment. Can any of the stormwater be directed to the existing stormwater facility in the Gatesbury subdivision? We request that this be identified as the most preferred management method. Please consider revising this on page 6-47 also (Stormwater Management Summary).	Comments noted and will be considered during detailed design.
47	Page 6-43 -- first paragraph — staff recommend that this section require the direction of a portion of stormwater flows from the road into the Upcountry	Comments noted and will be considered during detailed design

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	stormsewer system such that treatment can be provided for by the existing stormwater management pond	
48	Section 6.3.5, Outlet EW7, page 6-44 — staff question why directing stormwater to proposed facilities in the future South Waterdown lands is not identified as a possible option for stormwater treatment? Please consider revising this on page 6-47 also (Stormwater Management Summary).	This was not recommended as a possible option based on the location of proposed ponds within the South Waterdown lands as shown on Figure 9 (Drainage and Hydrology Report) relative to the existing drainage outlet for the catchment tributary to EW7.
49	Section 6.3.5, Structures. page 6-49 — it would be helpful if the crossing structures in this section were labelled as per the numbers used in Figure 6.1 for cross reference purposes. It is noted that flow velocities will be greater than 3.8 m/s during the design and regional storm events. Staff recommend that, at detailed design, a shear stress/tractive force analysis be undertaken. Further, we recommend that bioengineering be considered for bank treatments.	Comments noted.
50	Section 6.3.5 (Grindstone Creek Tributary Branch Crossing), page 6-49 and Plate 8 — the text in Section 6.3.5 states that this crossing will be replaced with an open bottom concrete culvert however, the diagram on Plate 8 shows a closed bottom box culvert. Please revise Plate 8 accordingly.	Plate 8 will be revised.
51	Section 6.3.6 - For a number of utilities (e.g. Union Gas, Bell Canada, Imperial Oil and Sun-Canadian Pipelines) test pits are proposed at detailed design	All test pits will take place within the road alignment right-of-way and no additional disturbance to natural areas will occur as a result of their excavation.

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	to confirm potential conflicts, relocation strategies and grading requirements. What is the magnitude of additional impacts on natural areas that could reasonably be anticipated? Will any disturbance to the creek be required as a result of the relocation of the underground gas main or other utilities? Should some or all of this work be undertaken prior to detailed design to ensure that the selection of the preferred alternative takes all grading/disturbance requirements into account? Also within this section, given that groundwater elevations have been observed to be approximately 1 metre below ground surface, it is advisable that a hydrogeological study be undertaken to examine the effects that the construction of utilities such as the new storm sewers will have on the base flows of the creek. This study should also look at impacts to the creeks within the study area from dewatering that will be necessary to construct/install utilities such as the storm sewers. Please include such a study in the Commitment section of the final ESR.	Comments noted. The need for dewatering and a dewatering plan will be completed as part of the detailed design.
52	Page 6-58 `Watermains' — This section of the report should be clarified to indicate that Upcountry installed a watermain along Parkside Drive underneath the Main Branch of Grindstone Creek. Locates will be required as part of detailed design.	Locates for all utilities will be completed as the basis for the detailed design.
53	Page 6-61 - Staff support the consideration of solar powered lighting, both as a means of minimizing impacts to natural areas through reduction of associated electrical infrastructure, and reducing the	Lighting will be designed to minimize the spill into the adjacent natural areas during the detailed design.

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	overall carbon footprint of the project. We note that all lighting, but especially that adjacent to natural areas, should be designed so as to minimize spill onto adjacent areas or above the horizon,	
54	Section 6.3.7 landscaping/Streetscaping this section should be expanded to include the use of Low impact Development (LID) stormwater management measures (i.e. tree pits, bioretention areas, etc.) within the streetscaping for the road.	Low impact development measures can be incorporated into the landscaped areas of the road right-of-way during the detailed design stage.
55	Section 6 3.8. Geotechnical, page 6-91 - please provide a map of all borehole locations to provide greater clarity with respect to the proximity of each borehole to natural features such as watercourses, woodlands and wetlands. Specifically, additional detail with respect to the location of Borehole #13 and its proximity to nearby watercourses is required. Also, more discussion with respect to the type of foundation to be used at this crossing location is required. At this point, the H-pile driven into bedrock may be a preferred installation method because it is thought that the enhanced stability of this approach will reduce the amount of in-channel or near channel hardening required to prevent scouring or undermining of the abutments. However, staff question what the construction impacts will be with respect to hydrogeology and groundwater and request additional discussion in the report	Refer to Appendix F, Geotechnical. This contains a summary of the borehole work. Comments noted. We believe that this should be part of detailed design stage investigations. Further discussion will be held between CH and City of Hamilton staff during detailed design stage is recommended.
56	Table 6.41 and Section 6.4.1 - Under "Description of Effect" for "Amount, nature and significance of	Mitigation for all natural areas that have trees removed includes a minimum compensatory tree replacement

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	natural habitat removed", several areas of natural habitat loss are not addressed. These include: • Grindstone Creek crossing at Parkside Drive • North side of Dundas Street, at approximately Station 10+450 • Southwest intersection of Dundas Street and Evans Road • Grindstone Creek crossing at Dundas Street, between new East-West Road and Evans Road • East of roundabout at Parkside Drive and New East-West Road Please prescribe restoration/mitigation measures for these areas.	plan based on the area of the natural community removed is to be implemented at a rate of 3:1. Tree compensation plans will be developed during the detailed design stage. A statement regarding this will be added to the commitments table.
57	Table 6.41 and pages 6-115 to 6-116 - Staff support the proposed mitigation measures for Lake Medad Valley Swamp PSW and Nelson Escarpment Woods ESA under the "Potential for effects to adjacent habitat" section. The development and implementation of the EMP should be added to the first phase of the project, as outlined on page 6-99, to ensure that buffer vegetation is well established prior to the commencement of any site alteration associated with the project.	We agree that the development and implementation of the Environmental Management Plan should be completed early in the implementation process. This will be added to this commitments table.
58	Table 6.41 - Under "Effect on terrestrial corridor connectivity/linkages", the Grindstone Creek crossing at Parkside Drive should be addressed.	The crossing of Grindstone Creek at Parkside Drive includes a wider structure than is currently found there. This will provide improved passage compared to the existing condition.
59	Table 6.41 — this table should include a section regarding the potential impact of the road construction as it relates to sediment and erosion	Sediment and erosion will be mitigated through the design of an effective sediment and erosion control plan at the detailed design stage.

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	issues	
60	Table 6.41 - The number of indicators listed in this table related to aquatic impacts is insufficient. The description of the effect, mitigation and net effects sections are correspondingly insufficient. All of these sections need to be effectively presented including all potential effects on all of the watercourses. These effects should cover impacts to: fish communities, fish passage, aquatic invertebrate communities, water quality (including water temperature and chlorides), water quantity, sediment transport, provision of baseflow, flow permanency, bank erosion, channel scouring and/or aggradation, configuration of channel widths and depths, riparian habitat (including all riparian functions), and in stream habitat features including but not limited to pools, riffles, runs, overhanging banks, woody debris, substrate type and size etc.	The assessment of the quality and quantity of fish habitat took into account the variables mentioned where they were applicable. As the majority of the crossings are culverts connecting roadside drainage and do not have baseflow, aquatic invertebrate habitat or fish communities, these variables do not apply to the majority of the crossings. Where applicable, additional text will be added to the ESR.
	In addition to the above the table indicates that the mitigation for the crossing of the northeast branch of Grindstone Creek (Crossing 6) will be the responsibility of the developer of the plan of subdivision. Staff note that Crossing 6 is outside of the Upcountry Estates draft plan. Is it anticipated that all of the work for Crossing 6 will be undertaken by the owners of the South Waterdown lands on the south side of Dundas Street? If not, the mitigation plan should be included in the ESR.	Agreed, the ESR text will be amended. Mitigation for all crossings that are within the City owned property will be completed by the City. Mitigation includes the installation of open bottom structures where the crossings include permanent fish habitat, re-planting in riparian habitat if vegetation is removed and using effective stormwater techniques to mitigate the degradation of water quality.
	Finally. this portion of the table only addresses	Agreed. Text will be added to address all

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	Crossing 6. Additional information should be included for all watercourse crossings.	watercourses.
61	Page 6-108 - It should be clarified in the opening paragraph that the proposed works also have the potential to impact natural heritage functions, species at risk and significant wildlife habitat. Are there any potential impacts on locally rare species?	This will be addressed in the final ESR.
62	Section 6.4.1 (Natural Environment), page 6-110 — this section states that tree selection should be determined using Conservation Halton's Landscape Guidelines. While staff have no objection to the use of these guidelines we note that this portion of the document is addressing compensatory plantings within the Hamilton CA watershed. Staff defer to the Hamilton CA for appropriate planting guidelines within that area.	Acknowledged.
63	Page 6-112 — several paragraphs on this page reference a Section of the report that has not been assigned (Section X).	This has been addressed.
64	Page 6-115 — this page includes several incomplete references (Section X and Figure X).	This has been addressed.
65	Pages 6-118 and 6-119 these pages include an incomplete reference (Table X	This has been addressed.
66	Section 6.4.1, Aquatic Habitat Impacts and Mitigation, page 6-119 — Please provide definitions of Type 2 and Type 3 habitat as it is being referred to in this document. Reference is made in this section to Table X. Although staff could not find a table labelled as such, we assume it is the table	The habitat designation used is based on the following scale: • Type 1 habitat: Critical Habitat – Includes coldwater streams with little to no degradation • Type 2 habitat: Important Habitat – Includes somewhat degraded warmwater streams and

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	found immediately after page 6-119. Please confirm.	intermittent streams • Type 3 habitat: Marginal habitat – Includes ephemeral drains and degraded intermittent streams • Roadside drains: Drainage conveyance that does not meet the requirements of the above. This has been addressed.
67	Section 6.4.1, Aquatic Habitat Impacts and Mitigation — Stormwater Management, page 6-119 —reference is made to the provision of Level 2 (Normal) water quality treatment. The remainder of the document commits to providing Level 1 (Enhanced) water quality treatment. We assume this is a typographical error and that it is the intention that this section refer to Level 1 (Enhanced). As Enhanced is the most appropriate level of treatment please revise accordingly. In addition, Conservation Halton policy does not support the creation of on-line ponds so the reference to on-line ponds should be removed.	Level 1 treatment will be provided.
68	Page 6-120, Preferred Design Concepts — Please make revisions to the fisheries section related to Crossing EW4 as outlined previously in this letter. Notwithstanding the above, the "Potential Impacts" column appears to be insufficient. No reference has been made to impacts associated with groundwater, dewatering, increased levels of chlorides, cumulative impacts of transportation crossings on streams (with	The assessment of the impacts on fish habitat took into account the variables mentioned where they were applicable. As the majority of the crossings are culverts connecting roadside drainage and do not have baseflow, aquatic invertebrate habitat or fish communities, these variables do not apply to the majority of the crossings. The majority of the crossings are not new and the water

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	attention paid to the longitudinal connectivity of fish habitat), impacts to fish habitat associated with the typical impacts to channel form associated with transportation crossings (widening of channels, reductions in water depths in channels, changes to substrates, etc.). Staff request that this information be added to the Table.	entering the lower reaches is already primarily roadside drainage. Water quality will be treated to the Level 1 standard through the stormwater management plan.
69	Page 6-122, General Aquatic Design-Related Mitigation Measures - In the second sentence in the second paragraph on this page, "proper construction sighting" is referred to as a mitigation strategy. Was "proper construction staging" intended? Also, the last bullet of this section incorrectly references a stormwater management water quality treatment standard of Level 2. This must be revised to indicate Level 1. Enhanced. At detailed design, it is requested that all substrate or rock additions below the normal high water mark (2 year bankfull channel flow) mimic the type of substrate present in the channel. For, example, if the channel exhibits a lot of shale oriented substrate it is requested that any rock added to the channel to reinforce abutments be of a similar (flat) shape. If the substrates are not shale oriented, then it is requested that any substrates added to the channel be round rather than angular in shape. It is also requested that oversized rock material not be added to these channels, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the	Acknowledged. The wording has been clarified/modified. Agreed. Reference to these comments will be added in the commitments table.

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	water flow may flow on either side of the oversized rock and could create new bank erosion or it could exacerbate existing erosion if it is still located anywhere near the edge of the creek. Staff request that this be included in the mitigation measures. Staff are supportive of the list of mitigation measures with the exception of the use of Level 2 versus Level 1 TSS removal and the use of closed bottom versus open bottom crossings. The reasons for this have already been included in this letter	Agreed – ESR text will be modified
70	Page 6-123 'Future Aquatic Works Required' — this section should be expanded to include the requirement for a fluvial geomorphic assessment. Additionally, an MOE Permit to Take Water may be required if dewatering volumes for the project exceed 50 000 Litres/day.	Both a fluvial geomorphologic assessment and a dewatering assessment will take place during the detailed design.
71	Table 6-42 - Staff question whether costs associated with compensatory tree planting and restoration have been included in the project budget?	Restoration costs have been included in the project budget.
72	Pedestrian Underpass at Joe Sam's Park- The ESR should explore options that could allow the pedestrian underpass to also function as a wildlife crossing structure.	Agreed. The need/value for a wildlife passage structure in this general area will be assessed during the detailed design stage.
73	Due to the presence of significant natural areas throughout the study area, the use of invasive species for landscaping should be strictly prohibited. In general, native species should be used where possible, and in areas directly abutting significant natural areas, species should reflect those actually	Comments noted. We agree with these principles for landscaping. They will form the basis of edge management planning and landscaping near natural features along the new roadway.

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	present in the natural communities, preferably from a local seed source.	
74	All engineering alternatives that would reduce the footprint of disturbance through natural areas should be employed.	We agree. The current footprint has been minimized in all natural areas to the extent possible. This will be assessed further in the detailed design.
75	Preliminary Preferred Design, Grindstone Creek Crossing 1, General Arrangement — staff request that the station or crossing location numbering be consistent with the crossing location numbering on Figure 4.4 for ease of reference	Cross references will be added to the text.
76	Preferred Design Concept Drawings — Upcountry Plate 2 — The limit of the right-of-way, associated grading and pavement are all extremely close to the edge of the tributary of Grindstone Creek. Please advise as to whether the road is within the meander belt of this watercourse. Conservation Halton policy requires that all new development, including infrastructure, be setback a minimum of 15 metres from the meander belt. Please advise as to how this affects the location of the road alignment. Upcountry Plates 1 and 2 will need to be revised once the meander belt assessment and the hydraulic analysis has been completed for the Regional Storm floodplain associated with the Grindstone Tributary and the storage and conveyance impacts of the road have been addressed. This cannot be left until detailed design as satisfying this requirement may have impacts on road alignment and property requirements on the	Additional studies are recommended in this area in consultation with Conservation Halton and the developer as part of the EIS for the development. Meander belt analysis was not undertaken as part of this study. City and CH staff will discuss this further.

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	Upcountry Lands.	
77	Dundas Plate 5 and 6 — staff could not locate the existing Hager Creek culvert on these drawings. Please clarify.	Additional detail has been added on the plate.
78	It would be helpful if the Preferred Design Concept Drawings could include creek names and crossing location nomenclature consistent with Figure 6.1.	Additional detail has been added on the plate.
79	Page 7-18 `Parkside Drive Routing (Options 4, Options 5-Opta, and Option 5-Sawtooth' — the second paragraph of this section references a Section of the report that has not been assigned (Section XX).	This has been addressed.
80	Staff note that the Appendices were not included in the document. Please provide for staff review.	These have been provided.
81	It would be extremely helpful if a response chart was provided with the final ESR to enable a more efficient review of the final document.	Agreed, this will be provided.

Crossing 10 – Upstream entrance to the culvert

Crossing 10 – Downstream exit from the culvert

Crossing 11 – Upstream entrance to the culvert

Crossing 11 – Downstream exit from the culvert

Waterdown/Aldershot TMP
Preliminary Hybrid Option - Eastern Connection Routes Comparative Evaluation
Table A3: Hybrid Option - Eastern Connection Routes Evaluation - Data Standardization Method 1[1]

						Option 1			Option 2			Option 3			Option 4			Option 5		
Criteria Group	**Criteria Group Weight**	**Criteria**	**Criteria Weight**	**Indicators**	**Indicator Weight[2]**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**
Natural Environment	**27**	**Potential for impact on terrestrial features**	**17**	Area of provincially significant wetland removed (ha)	-	0			0			0			0			0		
				Area of core ANSIs removed *(not including provincially significant wetland)* (ha)	-	0			0			0			0			0		
				Area of edge ANSIs removed *(not including provincially significant wetland)* (ha)	7	0	0	0	0	0	0	0	0	0	0	0	0	0.64	1.00	7.00
				Area of core ESAs removed *(not including provincially significant wetland)* (ha)	-	0			0			0			0			0		
				Area of edge ESAs removed *(not including provincially significant wetland)* (ha)	4	0	0	0	0	0	0	0	0	0	0.263	0.43	1.72	0.35	0.57	2.28
				Length of corridor adjacent to ESAs & ANSIs *(on both sides of new road corridor)* (m)	3	0	0	0	0	0	0	0	0	0	0	0	0	446.27	1.00	3.00
				Area of other woodlots removed (non ESA/ANSI) (ha)	3	0.005	0.002	0.01	0.64	0.22	0.67	0.58	0	0.61	0.60	0.21	0.63	1.02	0.36	1.07
				Area of wetland removed (ha)	-	0			0			0			0			0		
				Area of other natural habitat removed (ha)	-	0			0			0			0			0		
				Number of new Niagara Escarpment crossings	-	0			0			0			0			0		
		Potential for impact on aquatic features	**10**	Number of watercourses crossed	10	2	0.12	1.18	3	0.2	1.8	7	0.4	4.1	3	0.2	1.8	2	0.1	1.2
Natural Environment Total								1.18			2.44			4.73			4.12			14.53
Social Environment	**32**	**Potential for impact on residents**	**19**	Number of residences displaced	7	0	0	0	2	0.2	1.6	6	0.7	4.7	0	0.0	0.0	1	0.1	0.8
				Number of residences within 25 m of the corridor *(widening of existing road)*	3	45	0.16	0.47	48	0.2	0.5	90	0.3	0.9	53	0.2	0.6	53	0.2	0.6
				Number of residences within 25 m of the corridor *(new road corridor)*	5	5	0.31	1.56	3	0.2	0.9	0	0	0	4	0.3	1.3	4	0.3	1.3
				Number of residences within 25-50 m of the corridor (widening of existing road)	1.5	39	0.13	0.19	46	0.2	0.2	70	0.2	0.3	73	0.2	0.4	73	0.2	0.4
				Number of residences within 25-50 m of the corridor (new road corridor)	1.5	4	0.22	0.33	1	0.1	0.1	0	0.0	0.0	6	0.3	0.5	7	0.4	0.6
				Number of residential properties required[3]	-	27			30			62			44			44		
				Area of residential properties required (ha)	1	0.193	0.03	0.03	1.13	0.2	0.2	3.06	0.5	0.5	1.07	0.2	0.2	1.07	0.2	0.2
		Potential for community character impacts	**5**	Length of route through existing residential communities (km)	5	0.70	0.26	1.29	0.70	0.26	1.29	1.31	0.48	2.42	0	0	0	0	0	0.00
		Potential for impact on community/ recreation features	**4**	Number of community/recreation features displaced (e.g. schools, churches, parks, etc.)	-	0			0			0			0			0		
				Number of community/recreation features within 25 m of the corridor	4	0	0	0	0	0	0	0	0	0	1	1.00	4.00	0	0	0
				Number of community/recreation features within 25-50 m of the corridor	-	0			0			0			0			0		
		Potential for impact on cultural features	**4**	Number of cultural features removed	2	1	0.50	1.00	0	0	0	0	0	0	0	0	0	1	0.50	1.00
				Number of cultural features within 25 m of the corridor	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1.00	2.00
Social Environment Total								4.88			4.77			8.84			6.83			6.69
Economic Environment	**18**	**Potential for impact on business enterprises**	**6**	Number of businesses displaced	-	0			0			0			0			0		
				Number of businesses within 25 m of the corridor	3	3	0.50	1.50	2	0.33	1.00	1	0.17	0.50	0	0.00	0.00	0	0.00	0.00
				Number of businesses within 25-50 m of the corridor	-	0			0			0			0			0		
				Number of commercial properties required[3]	-	1			1			2			1			1		
				Area of commercial properties required (ha)	3	0	0	0	0	0	0	2.00	0.996	2.99	0.00	0.00	0.00	0.00	0.00	0.00
		Potential for impact on downtown core business area	**5**	Length of route through downtown core business areas (m)	-	0			0			0			0			0		
		Potential for impact on future land use	**3**	Area of land designated for development removed (ha)	6	2.65	0.68	4.07	0.31	0.08	0.48	0	0	0	0.31	0.08	0.48	0.31	0.08	0.48
		Potential for impact on agricultural land	**4**	Area of agricultural land designated for agriculture/ rural removed (ha)	6	2.94	0.17	1.01	2.21	0.13	0.76	0.85	0.05	0.29	5.47	0.31	1.87	6.05	0.35	2.07
Economic Environment Total								6.58			2.24			4.26			2.36			2.56
Cost	**10**	**Capital Cost (million $**	**10**	Estimated capital cost	10	$6.1	0.13	1.30	$10.9	0.23	2.31	$11.8	0.25	2.49	$9.8	0.21	2.07	$8.7	0.18	1.84
Transportation Service	**13**	**Change in Level of Transportation Service**	**6.5**	Critical screen line volume/capacity ratio - screen line 11	-	0.34			0.34			0.34			0.34			0.34		
				Critical screen line volume/capacity ratio - screen line 12	-	0.69			0.69			0.69			0.69			0.69		
				Mean network speed	-	56			56			56			56			56		
				Average network volume/capacity ratio	-	0.56			0.56			0.56			0.56			0.56		
		Change in Safety Levels	**6.5**	Number of residential property access points	3	35	0.2	0.48	39	0.2	0.54	64	0.3	0.88	40	0.2	0.55	39	0.2	0.54
				Number of commercial property access points	2	4	0.4	0.73	5	0.5	0.91	1	0.1	0.18	1	0.1	0.18	0	0.0	0.00
				Number of roadway access points	1.5	6	0.2	0.26	8	0.2	0.34	8	0.2	0.34	7	0.2	0.30	6	0.2	0.26
Transportation Service Total								1.47			1.79			1.41			1.03			0.80
Total	**100**		**100**		**93.5**			**15.41**			**13.55**			**21.73**			**16.41**			**26.40**

Note:
[1] Standardized data = data / max data value for all options
[2] No weight was assigned to indicators where no features are present, or where all options have the same level of effect
[3] For information only. Effect was measured through the area of residential/commercial property required.
[4] The Level of Transportation Service is not affected when comparing these two routes. Both options have equal scores for each indicator therefore, a weight has not been allocated to these indicators. Total score is now out of 93.5 instead of 100.

Waterdown/AIdershot TMP
Preliminary Hybrid Option - Eastern Connection Routes Comparative Evaluation
Table A4: Hybrid Option - Eastern Connection Routes Evaluation - Data Standardization Method 2[1]

						Option 1			Option 2			Option 3			Option 4			Option 5		
Criteria Group	**Criteria Group Weight**	**Criteria**	**Criteria Weight**	**Indicators**	**Indicator Weight[2]**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**	**Data**	**Standardized Data**	**Weighted Data**
Natural Environment	**27**	**Potential for impact on terrestrial features**	**17**	Area of provincially significant wetland removed (ha)	-	0			0			0			0			0		
				Area of core ANSIs removed *(not including provincially significant wetland)* (ha)	-	0			0			0			0			0		
				Area of edge ANSIs removed *(not including provincially significant wetland)* (ha)	7	0	0	0	0	0	0	0	0	0	0	0	0	0.64	1.00	7.00
				Area of core ESAs removed *(not including provincially significant wetland)* (ha)	-	0			0			0			0			0		
				Area of edge ESAs removed *(not including provincially significant wetland)* (ha)	4	0	0	0	0	0	0	0	0	0	0.263	0.76	3.02	0.35	1.00	4.00
				Length of corridor adjacent to ESAs & ANSIs *(on both sides of new road corridor)* (m)	3	0	0	0	0	0	0	0	0	0	0	0	0	446.27	1.00	3.00
				Area of other woodlots removed (non ESA/ANSI) (ha)	3	0.005	0.005	0.01	0.64	0.63	1.89	0.58	0.57	1.72	0.60	0.59	1.77	1.02	1.00	3.00
				Area of wetland removed (ha)	-	0			0			0			0			0		
				Area of other natural habitat removed (ha)	-	0			0			0			0			0		
				Number of new Niagara Escarpment crossings	-	0			0			0			0			0		
		Potential for impact on aquatic features	**10**	Number of watercourses crossed	10	2	0.29	2.86	3	0.43	4.3	7	1.00	10.0	3	0.43	4.3	2	0.29	2.9
Natural Environment Total								2.87	0.00		6.17			11.72			9.08			19.86
Social Environment	**32**	**Potential for impact on residents**	**19**	Number of residences displaced	7	0	0.00	0.00	2	0.33	2.3	6	1.00	7.0	0	0	0	1	0.17	1.2
				Number of residences within 25 m of the corridor *(widening of existing road)*	3	45	0.50	1.50	48	0.53	1.6	90	1.00	3.0	53	0.59	1.8	53	0.59	1.8
				Number of residences within 25 m of the corridor *(new road corridor)*	5	5	1.00	5.00	3	0.60	3.0	0	0	0	4	0.80	4.0	4	0.80	4.0
				Number of residences within 25-50 m of the corridor (widening of existing road)	1.5	39	0.53	0.80	46	0.63	0.9	70	0.96	1.4	73	1.00	1.5	73	1.00	1.5
				Number of residences within 25-50 m of the corridor (new road corridor)	1.5	4	0.57	0.86	1	0.14	0.2	0	0	0	6	0.86	1.3	7	1.00	1.5
				Number of residential properties required[3]	-	27			30			62			44			44		
				Area of residential properties required (ha)	1	0.193	0.06	0.06	1.13	0.37	0.4	3.06	1.00	1.0	1.07	0.35	0.3	1.07	0.35	0.3
		Potential for community character impacts	**5**	Length of route through existing residential communities (km)	5	0.700	0.53	2.67	0.700	0.53	2.67	1.31	1.00	5.00	0.0	0.0	0.0	0	0	0
		Potential for impact on community/ recreation features	**4**	Number of community/recreation features displaced (e.g. schools, churches, parks, etc.)	-	0			0			0			0			0		
				Number of community/recreation features within 25 m of the corridor	4	0	0	0	0	0	0	0	0	0	1	1.00	4.00	0	0	0
				Number of community/recreation features within 25-50 m of the corridor	-	0			0			0			0			0		
		Potential for impact on cultural features	**4**	Number of cultural features removed	2	1	1.00	2.00	0	0	0	0	0	0	0	0	0	1	1.00	2.00
				Number of cultural features within 25 m of the corridor	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1.00	2.00
Social Environment Total								12.89			11.14			17.44			12.90			14.28
Economic Environment	**18**	**Potential for impact on business enterprises**	**6**	Number of businesses displaced	-	0			0			0			0			0		
				Number of businesses within 25 m of the corridor	3	3	1.00	3.00	2	0.67	2.00	1	0.33	1.00	0	0.00	0.00	0	0.00	0.00
				Number of businesses within 25-50 m of the corridor	-	0			0			0			0			0		
				Number of commercial properties required[3]	-	1			1			2			1			1		
				Area of commercial properties required (ha)	3	0	0	0	0	0	0	2.00	1.00	3.00	0	0	0	0	0	0
		Potential for impact on downtown core business area	**5**	Length of route through downtown core business areas (m)	-	0			0			0			0			0		
		Potential for impact on future land use	**3**	Area of land designated for development removed (ha)	6	2.65	1.00	6.00	0.31	0.12	0.71	0.31	0.12	1	0.31	0.12	0.71	0.31	0.12	0.71
		Potential for impact on agricultural land	**4**	Area of agricultural land designated for agriculture/ rural removed (ha)	6	2.94	0.49	2.92	2.21	0.37	2.19	0.85	0.14	0.84	5.47	0.91	5.43	6.05	1.00	6.00
Economic Environment Total								11.92			4.91			5.55			6.15			6.71
Cost	**10**	**Capital Cost (million $**	**10**	Estimated capital cost	10	$6.1	0.52	5.22	$10.9	0.93	9.28	$11.8	1.00	10.00	$9.8	0.83	8.31	$8.7	0.74	7.38
Transportation Service	**13**	**Change in Level of Transportation Service**	**6.5**	Critical screen line volume/capacity ratio - screen line 11	-	0.34			0.34			0.34			0.34			0.34		
				Critical screen line volume/capacity ratio - screen line 12	-	0.69			0.69			0.69			0.69			0.69		
				Mean network speed	-	56			56			56			56			56		
				Average network volume/capacity ratio	-	0.56			0.56			0.56			0.56			0.56		
		Change in Safety Levels	**6.5**	Number of residential property access points	3	35	0.55	1.64	39	0.61	1.83	64	1.00	3.00	40	0.63	1.88	39	0.61	1.83
				Number of commercial property access points	2	4	0.80	1.60	5	1.00	2.00	1	0.20	0.40	1	0.20	0.40	0	0.00	0.00
				Number of roadway access points	1.5	6	0.75	1.13	8	1.00	1.50	8	1.0	1.50	7	0.88	1.31	6	0.75	1.13
Transportation Service Total								4.37			5.33			4.90			3.59			2.95
Total	**100**		**100**		**93.5**			**37.27**			**36.83**			**49.61**			**40.03**			**51.19**

Note:
[1] Standardized data = data / maximum data value for all options
[2] No weight was assigned to indicators where no features are present, or where all options have the same level of effect
[3] For information only. Effect was measured through the area of residential/commercial property required.
[4] The Level of Transportation Service is not affected when comparing these two routes. Both options have equal scores for each indicator therefore, a weight has not been allocated to these indicators. Total score is now out of 93.5 instead of 100.

EAST-WEST ROAD ENVIRONMENTAL STUDY REPORT
MINISTRY OF NATURAL RESOURCES' COMMENTS (JUNE 29, 2010):

AGENCY MEETING NOTES

Date: Tuesday, July 27, 2010
Time: 1:00 PM – 3:15 PM
Location: Room 634, Hamilton City Hall, 71 Main Street West

Attendance:
- Bill Allison - *Dillon Consulting*
- Syeda Banuri - *Senior Project Manager, City of Hamilton*
- Nora Jamieson - *Watershed Planner, Hamilton Conservation Authority*
- Usa Jennings - *Hamilton Conservation Authority*
- Paul MacLeod - *Project Manager, Dillon Consulting*
- Carly Marshall - *Co-op Student, Ministry of Environment*
- Don McKinnon - *Dillon Consulting*
- April Nix - *Planning Intern, Ministry of Natural Resources Guelph Office*
- Gavin Norman - *Manager – Engineering Design & Construction, City of Hamilton*
- Karolyne Pickett - *Ministry of Natural Resources*
- Ian Roul - *Biologist*, *Dillon Consulting*
- Barb Slattery - *Ministry of Environment*
- Ian Thornton - *Ministry of Natural Resources*
- Art Timmerman - *Biologist, Ministry of Natural Resources Guelph Office*
- Michael Witmer - *Assistant Environmental Planner, City of Hamilton*

Meeting Purpose:
To discuss and resolve all outstanding concerns raised by the Ministry of Natural Resources (MNR) Staff in a response letter to the New East-West Road Corridor Environmental Study Report (E-W ESR) dated June 29, 2010.

Notes of Meeting:

1. Syeda Banuri (SB) welcomed everyone to the meeting and gave a very special thanks to the Ministry of Environment (MOE) staff and Nora Jamieson from Hamilton Conservation Authority for attending.

2. SB briefly went through the history of the E-W ESR. The project is currently in Phases 3 and 4 of the Class Environmental Assessment (EA) process. The Project Team is currently finalizing the E-W ESR to be placed on the public record for a 45 day review period. During this review period, members of the public may request the Minister of the Environment to invoke a Part II order to "bump up" the Class EA to an

individual EA. Proceeding to Phases 3 and 4 of the Class EA were recommendations from Phase 2 of the Waterdown-Aldershot Transportation Master Plan (WATMP) that was undertaken collectively by the Cities of Hamilton and Burlington as well as the Regional Municipality of Halton. Phase 2 was completed in February 2008. Phases 3 and 4 commenced in 2008, and there are outstanding comments from the MNR and Conservation Halton (CH) that must be resolved before the E-W ESR can be filed on the public record. The MNR's June 29th letter outlined concerns over provincially significant wetlands (PSWs) and species at risk (SAR) in the study area.

3. SB updated the Project Team that the E-W ESR was endorsed by City of Hamilton Council in June 2010. The E-W ESR has yet to be endorsed by the Region of Halton.

4. Don McKinnon (DM) added to the general Class EA process with respect to the New E-W Road Class EA. A more detailed update was provided on Phases 3 and 4. The road is proposed to cross the Centre Road Woodlot, and there were 5 crossing options that were studied.

5. MNR staff expressed interest in Natural Heritage Survey timelines regarding how they were conducted, documented, etc. In particular, the MNR was interested in:
    - Amphibian calling surveys
    - Aquatic assessments

7. Project Staff informed the MNR that each of the 5 studied alignments were walked by qualified professionals and any observed species were documented. Also, each aquatic crossing was studied and assessed based on their suitability. The bulk of the field surveys were conducted in 2007. Hamilton Conservation Authority (HCA) and MNR Staff expressed concern that the environmental surveys were inadequate (i.e. done at inappropriate times of year) and the results/data may have changed since 2007.

8. Of the 5 crossing options for the Centre Road Woodlot, Project Team members stated that the southern alignment was selected as the most preferred option based on more social concerns, but also took into account the Borer's Creek crossing. This option is shown in the ESR in Figure 5.6 as Option #2 and is the light blue coloured route on the map.

9. Project Team members stated that since the road will be crossing a woodlot, significant tree removal within the road right of way will be required. As such a tree replanting program will take place at a ratio of 1:3. A possible location for the vegetative compensation is in the northeast

field above Option 5; commonly referred to in the E-W ESR as the "Sawtooth Option". No decisions were made at this meeting on this matter.

10. There was a miscommunication that the Centre Road Woodlot alignment (# N3) cannot be moved only because of the drain; the drain location cannot be altered.

    ACTION ITEM: Project Team needs to clarify whether the drain location is an issue preventing/allowing the relocation of this portion of the road alignment (Centre Road Woodlot).

11. Nora Jamieson (NJ) expressed a major concern with the Joe Sam's Park trail underpass and claimed that this is the first time she heard about the proposal to construct the pathway underneath the road. NJ's concerns with the underpass were with respect to an increase in impermeable surfaces in the PSW.

    ACTION ITEM: City Staff to flag mention of all crossing dimensions in ESR and list in table. Also note the impermeable cover material for the Joe Sam's Park crossing, and add to the general commitments table that the trail material still needs to be finalized.

12. NJ requested to see the commitments table before the ESR is filed, which must note the required protection for the two identified butternuts south of the proposed road alignment in the Centre Road Woodlot PSW.

13. Karolyne Pickett (KP) commented on the identification and documentation of endangered reptiles in certain habitats within the study area. She expressed concern that reptiles such as turtles, snakes and salamanders may not be being observed correctly in the habitats as they should be. Other species to note include the badger and bobcat north of the Waterdown North development lands.

14. KP discussed new guidelines for the protection of the Jefferson salamander under recent changes to the Endangered Species Act (ESA). Discussion included identifying vernal pools and Jefferson salamander breeding trends.

15. Species At Risk (SAR) lists can be provided by the MNR (KP) to assist Dillon with surveying additional habitat in accordance with ESA requirements. SAR lists will be provided by the MNR to Ian Roul (IR).

16. Dillon will conduct further screening of SARs and report back to KP and NJ.

ACTION ITEM: Prepare a short write up on how the 5 Centre Road Woodlot crossing alternatives were developed.

PROTECTING THE NATURAL ENVIRONMENT FROM LAKE TO ESCARPMENT

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January 7, 2010

Ms Melanie Jajko
Project Manager, Infrastructure Planning
City of Hamilton
71 Main Street
Hamilton, ON
L8P 4Y5

Dear Ms Jajko:

Re: East-West Transportation Corridor EA
City of Hamilton
Species at Risk Screening Report and Study Team Response Table
CH File: MPR 301

Staff of Conservation Halton have reviewed the *Species at Risk Screening Report, New East-West Road Corridor*, prepared by Dillon Consulting, dated September 2010, and offer the following comments. In addition, we have reviewed the response table, prepared by Dillon and input our responses directly into the table. We appreciate that many of the comments have been or will be addressed through revisions to the final ESR. We note however, that a few issues remain outstanding particularly related to the alignment of the road through Upcountry. We look forward to having continued discussions with the City in this regard prior to the finalization of the ESR. The updated response chart has been attached to this letter.

Species at Risk Screening Report

- Although the intent of this report seems to be to address only the East-West Corridor, we note that several species are identified within the Study Area of the North-South Corridor. Staff question whether MNR Aurora has been consulted and whether they have similar requirements to MNR Guelph as it pertains to documenting Species at Risk within the North-South Corridor. Given the highly sensitive nature of the surrounding natural environment and potential for species at risk (SAR) along the north-south corridor, staff recommend that this document be expanded to include this section of work as well if required by the MNR. This will ensure that the appropriate level of consideration is given to all SAR within this project. Staff recommend that discussions with the Aurora District Ministry of Natural Resources be initiated to determine what specific species should be looked at in addition to those already included in the report. We note that there are a number of SAR identified in the existing document that occur in both routes so in some cases there would only be a small amount of additional work required to expand the discussion.
- Staff note the Western Chorus Frog (listed federally as Threatened) was observed during the main study surveys however it is not listed in the report. While we acknowledge that this species was not included in the formal MNR list of species to discuss, it is a SAR and it was observed in the study area by the consultant therefore discussion is warranted in the document and mitigation measures developed accordingly. It should be noted that the response table provided to Conservation Halton indicates that this species will be added to the report.

- We recommend that the reference point for American Ginseng be removed from the map given that it is a species the MNR would normally consider confidential. This discussion should be included in the text as well.
- Staff request further detail on the proposed herpetofauna surveys, for example the proposed survey methodology, timing of the surveys, etc. Staff recommend that the Marsh Monitoring Program methodology be used to guide these surveys. If a different methodology is proposed we recommend that the study team consult with the appropriate Conservation Authority and MNR District Office to ensure concurrence with the method.
- Please provide further information on the discussions with the MNR regarding Butternut in the project area.
- Staff are concerned with the discussions regarding Barn Owl and Short-eared Owl in the report. For example, the report indicates that neither of these species were observed during the breeding bird surveys, however these species would not likely be expected during a breeding bird survey which is why specific owl surveys have been developed. As no owl surveys have been completed we do not agree that follow up surveys are not warranted to determine the presence of this species in the study area especially since there is suitable habitat for Short-eared Owl in the study area.
- With respect to the Milksnake discussion in the report, staff are concerned with the provided map as only two potential habitat locations are identified however the report states that "there are a number of areas that would meet the criteria for possible habitat". Staff recommend that this figure be updated to accurately reflect the potential Milksnake habitat in the study area.
- Staff note that the Northern Map Turtle follow-up section mentions Snapping Turtles. This should be corrected to reference Northern Map Turtle.
- There is a photo of a Red-bellied Woodpecker in the Red-headed Woodpecker section. This should be revised.
- Staff recommend that the consultant ensure that all maps be revised to generally depict the location of suitable habitat as per the discussions in the text. For example, the Stinkpot map doesn't reflect the discussion in the text.

We trust the above is of assistance. If you require additional information, please contact the undersigned at extension 266.

Yours truly,

Jennifer Lawrence, MCIP, RPP
Manager, Environmental Planning

encl.

cc: Ms Nora Jamieson, HamCA
Ms Cathy Plosz, Mr. Jason Thompson, Ms Jill Stephen, City of Hamilton
Ms Melinda Thompson-Black, Mr. John Pisapio, MNR

jl/devl planning/ea/Hamilton/watmp/east west corridor/sar screening report & response table.doc

Comment and Response Table – Conservation Halton Letter (April 29, 2010) Regarding the New East-West Road Corridor Class EA ESR - Draft August 2009

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
	Staff of Conservation Halton have reviewed the above noted draft document, prepared by Dillon Consulting Limited and offer the following comments. A portion of the study area is within Hamilton Conservation Authority's jurisdiction and, as such, our comments pertain only to the portion of the Study Area within the Grindstone Creek watershed. We note however that the Hamilton Conservation Authority has raised significant issues with respect to the conclusions, particularly as they relate to impacts to a Provincially Significant Wetland. Although outside of our watershed, staff support the Hamilton Conservation Authority's comments as they relate to the importance of protecting and maintaining Provincially Significant Wetlands. Given the historical loss of wetlands in Southern Ontario we recommend that every effort should be made to avoid the loss of any wetland features, especially wetlands that have been identified as having Provincial significance. Conservation Halton staff provided comments on a previous draft of the Natural Heritage components of the study. As a result, our comments below are divided between outstanding comments from our previous letter and comments on the draft ESR.	Comments noted. Discussions are ongoing with Hamilton Conservation Authority.	Comment noted.
<u>Outstanding Comments from July 6, 2008 CH letter regarding Natural Environment Report</u>			
1	It is unclear whether the following comments on the draft Natural Environment Report have been taken into account in the preparation of the ESR: Section 2.0 (Methods) - Staff questioned whether the following sources were consulted for terrestrial species information: • *Terrestrial Resource Comments on North Service Road/Waterdown Road Interchange Design Alternatives, City of Burlington, Ontario, prepared by Dougan and Associates and dated October 11, 2007* • *Tree Inventory Report, Waterdown Road — Hwy 403 Interchange, prepared by Wendy Shearer Landscape Architect Limited and dated August 22, 2007* • *South Waterdown Subwatershed Studs. Stage I Report (Volumes I and II), prepared by Ecoplans Limited and dated March 2006* • *South Waterdown Subwatershed Study Stage 2 Report*	Note that the reference should be to a CH letter of July 6, **2009** The 403/Waterdown Road Interchange is outside of the area of study for the East-West Road Corridor Class EA and south of the study area for the Waterdown Road Corridor Class EA. The reports related to the 403/Waterdown Road project were not used in the preparation of the Draft ESRs for either project. The South Waterdown study was reviewed as part of the Draft ESR. The study had very little overlap with the study area of the East-West Road as it was bounded to the north by Highway 5.	Thank you for the clarification. Given the extreme proximity of the 403/Waterdown Road Interchange to the southern limit of the Waterdown Road north-south corridor, the information within the EA should have been reviewed as it would have had relevant and valuable species information for the North-South component of the EA.

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
	Management Strategy, prepared by Ecoplans Limited and dated March 2008 • *South Waterdown Subwatershed Study Stage 3 Report Implementation and Monitoring Plan, Second Draft, prepared by Ecoplans Limited and dated May 2008* • *CUMIS Group Property, Burlington. Scoped Environmental Impact Study, prepared by Natural Resource Solutions Inc. and dated Alai, 2006.* Although the references cite the South Waterdown Subwatershed Study (Ecoplans Limited and MRC, 2006), and the Halton Natural Areas Inventory (Dwyer, 2006), it is not clear that the actual species lists from these references were incorporated into the current document, as there is no column for Ecoplans or NAI data in the species tables. The original species lists within the above documents should be examined for reference to any significant species not already known to the Dillon study team.	The Ecoplans study and the Halton Natural Areas Inventory were both reviewed for rare species in the region and the data was incorporated were appropriate.	
2	Section 3.0 (Results) - Ecological Land Classification - In response to a previous comment that FOD2-2 was listed but not mapped, the vegetation type has been removed from the list. However, the ELC data sheets for FOD2-2 (polygon 026) are included in Appendix B, and butternut is on the species list. Please clarify the location of this community and, specifically, the location of the butternut.	The ELC sheet from Polygon 026 is for an area that is outside of the study area. It has been removed from the appendix. For butternut locations, please refer to response # 4.	Item addressed.
3	Section 3.4 (Incidental Wildlife) - The putative bobcat vocalization is highly significant for Halton/Hamilton. Special surveys should be undertaken to determine whether this species is actually present.	We understand that the previous assessment that discussed the possibility of a bobcat has been re-issued indicating a mis-identification. As such, surveys for this species are not warranted.	Please provide further detail on how this species was misidentified and what it is now thought to be.
4	Appendix A - ELC Plant Species Lists for Sites 006, 007b and 026 - Butternut is noted within these communities (SWD3-2, SWD2-2 and FOD2-2), but not shown on Figure 4 or discussed in relevant sections of the main document.	Possible butternut trees were identified in Sites 006 and 007b which form part of the Centre Road Woodlot. Subsequent field investigations with Terry Schwan of the MNR and DNA analysis confirmed two pure butternuts. The location of these is shown on the Figure 4 . Community 026 refers to a community that is west of King Road and outside the study area. This ELC sheet has been removed from the ESR.	Item addressed.

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
5	Previous comments with respect to Crossings #6 — 14 have not been addressed.	The numbering referred to in the July 6, 2009 letter refers to an older figure. A brief description of each is provided below for clarity: Crossing 6 is the same on both Figures. This crossing is a CSP culvert draining roadside drainage and is proposed to be a CSP under the expanded road. Crossings 7 to 12 were replaced with three crossings 7 to 9 after further review of the site. All three crossings drain roadside water, while crossing 9 also receives water from a pond on the north side of the road. All three are CSP culverts and are proposed to be replaced with CSP culverts. Crossing 13 is now labeled as Crossing 11 and is described in more detail below in response to Comment 21. There is an existing CSP culvert and the future crossing is proposed to be a CSP culvert. Crossing 10 (April 2, 2009 Figure) did not show up on the original map. It is described in more detail in Comment 20 below. The existing crossing is a CSP culvert that is proposed to be replaced by a box culvert. Crossing 14 has been renamed Crossing 4 and is described in the ESR and in the response to Comment 17 below.	Item addressed subject to review of final ESR.
Comments on Draft ESR			
6	Staff continue to recommend that natural hazards, including karst, flood plains, stable top of bank and meander belt should be discussed in the ESR as they each could have implications on a preferred alignment design. Staff note that this was raised in our letter of July 6, 2009 and has not yet been addressed.	Text regarding these natural hazards will be added to the ESR. The implications of any of these features on the road design will be considered.	Item not addressed. Staff continue to recommend that natural hazard mapping be included in the final ESR.
7	Please consider a consistent approach to labelling the various figure/tables and exhibits and ensure they are all listed in the Table of Contents for ease of reference.	This will/has been done.	Item addressed subject to review of final ESR.

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
8	Page XVIII the first paragraph references a Section of the report that has not been assigned (Section XX).	Reference added.	Item addressed subject to review of final ESR.
9	Table 3-2 --- Criteria should be expanded to "Potential for impact on terrestrial features and functions". Potential impacts on species at risk should be included as an indicator, given that they are identified as one of the "main natural environmental issues of concern" on page 1-3. Potential impacts to wildlife movement should also be included as indicators,	The criteria and indicators in Table 3-1were developed during Phase 2 work and used to compare broad corridor alternatives. All text in the ESR in Chapter 3 has been taken directly from the previously published Phase 2 Report and has not been altered. The criteria "Potential for impact on terrestrial features" was carried forward into Phase 3 and 4 work to evaluate design alternatives. Where appropriate, additional or modified indicators were introduced to allow the consideration of issues specific to each alternative set being considered. For example, in the evaluation of alternatives through the Centre Road PSW, this criteria was expanded to include the following indicators: • Amount, nature and significance of natural habitat removed, • Number of significant trees along existing roadway removed, • Potential for effects to adjacent habitat • Fragmentation of natural areas, • Effects on terrestrial corridor connectivity/linkages, • Opportunity to enhance degraded natural areas Within these more localized indicators your suggested expanded criteria could be addressed, as the specific alternatives under more detailed evaluation demanded. Further, once the preferred alternative was selected and additional impacts and mitigation measures were investigated or discussed, even more detailed indicators could be introduced. That is why the "potential impacts on species at risk was identified on page 1-3 as a main natural environmental issue of concern.	Item addressed.

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
10	Section 3.4.1 (Hybrid Option — Dundas to Parkside Connection Options), page 3-11 — The use of the terminology "Options 1-5" for the hybrid options is somewhat confusing given that the main Options for the east-west road are labelled Options 1-4. Perhaps a different type of terminology could be used for the Dundas to Parkside Connection Options (i.e., Options A-E). Also, within this section, it is stated that Option 2 (connection along the eastern limit of Upcountry Estates) is the most preferred option for a number of reasons. One of the impacts is listed as the removal of 0.64 ha of "other woodlot". Staff could not locate a table within the study that clearly outlines the ranking evaluation of these connection options and would prefer to review this information in advance of agreeing to the selection process. The text does not address the proximity of Option 2 to the Grindstone Creek tributary and the impacts to the flooding hazards, erosion hazards, fish habitat and the watercourse that would occur with Option 2. This requires further discussion and analysis.	As indicated above, all text in Section 3 of the draft ESR is taken directly from previously released documentation. The appendix materials contain the original documents and Section 3 contains a summary only of this information. Modifying the labeling of the Phase 2 alternatives at this point is not considered practical or a necessity. The tables that summarize the evaluation assessment for the Hybrid Option is contained in Appendix A of the Phase 2 Report. These have also been attached to this Comment – Response table.	Item addressed given that information has been taken directly from previous ESR.
11	Page 4-9 - The provincial rank for butternut is identified in the first paragraph as S4, then as S3? in the subsequent paragraph. Please clarify. Please ensure that MNR is involved in any discussions related to endangered species. Staff have copied Melinda Thompson-Black, MNR-Aurora, for her information	According to the most recent NHIC search, butternut is listed as S3? The MNR has been contacted regarding the butternuts and have conducted analysis to determine the purity of the these trees. During the detailed design stage, the MNR will continue to be involved to ensure that the Endangered Species Act is appropriately dealt with.	Item addressed subject to MNR acceptance.
12	Figure 4.2 - Staff question why ELC and vegetation surveys were not completed for the natural area along Grindstone Creek, south and north of Parkside Drive? We note that the observation of the nationally Threatened chorus frog was in this vicinity.	ELC was not completed at the crossing at Grindstone Creek as the work proposed in this area involves replacement of the existing structure with a larger structure spanning the watercourse. An aquatic habitat assessment was conducted in the vicinity of this crossing location. City of Hamilton is working with MNR (Guelph District) about SAR in this area. MNR has provided a list of 36 species to carry out an assessment for potential habitat in this area. Threatened Chorus frog can also be added to the list. The work plan for assessment was also circulated to CH in August 2010 for information.	Please refer to discussion regarding the SAR Screening Report, on our letter dated January 7, 2011 and Western Chorus Frog.

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
13	Figure 4.2 - It was noted in the Natural Environment Report that property access was restricted in the lands east of the Upcountry Estates. As such, staff recommended that additional field surveys be undertaken at detailed design as necessary. The area northeast of Upcountry Estates labelled as "Forest" appears to be a swamp, based on an air photo review. This could result in additional mitigation requirements pertaining to maintenance of the hydrologic regime of the wetland. The ESR should provide for future commitments to undertake this work.	Additional field work will be undertaken in this area during the detailed design. A commitment to this will be added to the ESR text.	Item addressed subject to review of final ESR.
14	Figure 4.2 - Wetlands identified in the South Waterdown Subwatershed Study (particularly Wetland 5 in the vicinity of Dundas Street) should be included on this figure.	Wetland 5 will be included on the Figure in the final ESR.	Item addressed subject to review of final ESR.
15	Page 4-10 - On the basis of Figures 2 and 4 in the *COSEWIC Assessment and Update Status Report on the Western Chorus Frog* (Pseudacris triseriata) *in Canada*, staff are of the opinion that all chorus frog populations within Conservation Halton's jurisdiction belong to the Great Lakes/St. Lawrence —Canadian Shield population and as such should be considered members of a nationally Threatened species.	This note will be added to Section 4.3.4.	Item addressed subject to review of final ESR.
16	Section 4 3.6 (Aquatic Resources — Field Work Results), page 4-14 — this section references Figure 4.5 however, Figure 4.5 identifies watercourse crossings within the north-south road corridor. Staff note that Figure 6.1 appears to identify the watercourse crossings within the east-west corridor.	This has been addressed.	Item addressed subject to review of final ESR.
17	Section 4.3.6, page 4-15 — Crossing #4 - During a site visit to this crossing location on Oct. 14, 2009, it was noted that a defined channel was present here with an obvious channel that had been scoured clean of vegetation. It is staff's opinion that this feature falls under the definition of a watercourse pursuant to the Conservation Authorities Act and that it provides direct fish habitat during certain parts of the year when runoff levels are sufficient. In addition, this watercourse is located within a hedgerow and is surrounded on both sides by mature trees with a fairly dense understory of woody herbaceous vegetation. This vegetation is providing a variety of useful functions that benefit the watercourse. On site, CH staff estimated that the bankfull channel on this watercourse would be up to two metres in width. Dillon's fisheries biologist who was also present during this site visit agreed to that width during the visit. As such, it is requested that any transportation crossing structure placed here span a minimum of two metres over the width of the watercourse. It is also requested that the length of the culvert/bridge be kept to the minimum	The CA's recommendation regarding the design of the crossing at this location will be incorporated into the detailed design of this facility. This will be added in the commitments table.	Item addressed subject to review of final ESR.

I.D.#	Conservation Halton Comment	Dillon/City Response	CH Response January 2011
	possible to reduce disturbance to the watercourse and hedgerow. It is also requested that the crossing structure be designed as an open bottom structure to minimize disturbance to the interaction between the hyporheic zone and the bed of the watercourse. An open bottom structure would also allow for long term provision of natural substrate on the bed of the creek as this part of the creek contributes to the productivity of aquatic invertebrates which provide food for fish. This section of Grindstone Creek is a headwater creek and one of its main functions is to provide primary and secondary productivity to downstream reaches. The bottom of the creek in this headwater reach provides functionality with respect to the provision of allochthonous inputs to the downstream reaches of the watercourse. The construction of an open bottom structure at crossing # EW4 would be helpful in facilitating long term secondary productivity to occur at the location of the crossing structure. The use of an open bottom structure allows the functional connectivity between the hyporheic zone and the invert of the creek bottom to remain intact. Staff request that this be included as a commitment in the final ESR and that the description throughout the document be revised accordingly.		
18	Section 4.3.6 (Grindstone Creek — Northwest Branch Crossing #5) Page 4-16 — the tributary of Grindstone referred to in the report as the 'Northwest Branch' is considered to be the 'Main Branch' of Grindstone Creek.	This change will be made in the Final ESR.	Item addressed subject to review of final ESR.
19	Section 4.3.6 (Grindstone Creek — Northeast Branch Crossing #6) — Please indicate the date (including the day, month and year) when the survey was completed for this crossing location.	This survey was completed on July 11, 2008.	Item addressed.
20	Section 4.3.6 (Drainage Conveyance Crossing #10) - Please provide the following data regarding the drainage feature located at EW # 10: photographs of the upstream and downstream ends of the existing water conveyance structure, details regarding the presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish.	The upstream and downstream photos are provided as an appendix to this Comment-Response table. No groundwater seepages were observed in the area of the new crossing. No baseflow was observed. The channel width varies; upstream of the crossing it is a road side ditch greater than 2 metres in width. Downstream of the crossing the width is less than 1 metre. The system is ultimately connected to the	Item addressed subject to review of final ESR.

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		Upper Hager Creek through tributaries to the south. As an intermittent road side ditch, the channel would have a hydrological regime typical of urban run off. In the area of the crossing the drainage feature is an intermittent road side ditch that flows into an intermittent dry flat channel. The channel was dry during the time of survey and it is not expected that this area will provide habitat for fish or aquatic invertebrates. This will be added to the commitments table.	
21	Section 4.3.6 (Upper Hager Creek Crossing #11) - No indication is provided in the habitat description here regarding the following habitat parameters: presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish. Staff request that this information be provided. In addition, within this section, there is reference to Crossing 3 which staff assume should be Crossing #11. Please clarify.	The upstream and downstream photos are provided in an appendix to this Comment-Response table. The channel width varies; upstream of the crossing it is a road side ditch less than 2 metres in width. Downstream of the crossing the width is 1.5 to 2 metres. Upstream there is very limited flow, downstream the amount of flow increases indicating a baseflow source. The downstream hydrological regime would be less flashy than a typical urban runoff system due to the baseflow source. The upstream portion of the crossing is intermittent with limited flow while the downstream crossing has more sustained flows. The areas downstream would provide suitable habitat for fish and aquatic invertebrates.	Item addressed.
22	Section 4.3.9 (Hydraulic Assessment), page 4-19 — Reference is made to Figure 4.5 however, as noted above, this figure relates to the north-south corridor. Also, this section of the report makes reference to detailed hydraulic and hydrologic modeling outputs that are provided in Appendix C. Staff note that Appendix C was not included in the document. Please provide digital and hard	Appendix C has been submitted to HCA (report dated May 2010) and will be included in the final ESR package. The ESR text will be revised to reference 11 crossings.	To date, staff have not received Appendix C. The response indicates that the report was sent to the HCA (perhaps the Hamilton Conservation Authority?). We did receive a CD with some modeling however, it did not include the relevant hydraulic structures. This comment remains outstanding.

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	copies of this information at the earliest opportunity. Also, reference is made to 12 crossing structures however, only 11 are shown on Figure 4.4 and described within the text.		
23	Section 4.5.2 (Hydrogeology — Geological Setting), page 4-25 — reference is made in the first paragraph to Cross Section A-A in Figure 4-6 however, Cross Section A-A is found on Figure 3. Please revise. This section also states that Cross Section A-A was constructed using MOE well records. Staff question whether the individual borehole results were also used to further refine this figure? With respect to Figure 3 (Cross Section A-A) — Based on this figure it would appear that the water table is at the level of the invert of two watercourses within the study area, although the watercourses have not been labelled on the figure. Please identify the names of the watercourses as well as the month and year when the water table elevations were measured. Will the borehole information be included in the final ESR? This information would be helpful in assessing the analysis within the document.	References have been revised. Site visits and discussions with well owners were used to refine this figure. Agreed. This will be added t the text. Appendix materials will contain all borehole information generated as part of this study. Additional borehole work and geotechnical assessments will be completed during the design phase.	Item addressed subject to review of final ESR. Based on the response we assume that borehole results were not used to further refine the figure. Item addressed subject to review of final ESR. Item addressed subject to review of final ESR.
24	Section 4.5.2 (Hydrogeology — Potential Impacts of Road Construction), page 4-30 - Staff note that the road construction includes dewatering activities associated with the installation of various services and bridge and culvert footings. More detailed assessment of hydrogeologic conditions within the project limits, and the potential impacts of dewatering activities, must be completed in conjunction with the detailed design of the road.	We agree that more detailed hydrogeology is appropriate at the detailed design stage. This work includes dewatering planning.	Item addressed.
25	Section 4.5.2 (Hydrogeology — Potential Impacts on Groundwater Quality), page 4-31 — it is stated that the construction of the proposed corridor will not have any foreseeable impacts on groundwater quantity because the construction activities will not involve any groundwater extraction. It has been our experience that the construction of watercourse crossings sometimes requires dewatering in the event that the installation of the crossing foundations intercepts groundwater. This should be taken into consideration when evaluating potential impacts to private wells in the vicinity of watercourse crossings.	Dewatering planning will be completed as part of the detailed design. This includes potential impacts to private wells.	Item addressed.
26	Section 5 — please ensure that all figures, maps and Tables are labelled for ease of reference. There are at least two figures with	Agreed – this has been addressed.	Item addressed subject to review of final ESR.

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	alignment options/design drawings that are not labelled within this section.		
27	Page 5-2, Section N4 - As identified in the Grindstone Creek Watershed Study, the valley provides an ecological linkage and linkage restoration opportunity for natural areas north and south of Parkside Drive. As such, proposed works in this area should seek to improve wildlife passage and habitat connectivity.	The new crossing of the Grindstone Creek will be wider than the existing crossing and facilitate increased wildlife use. This will be further discussed with CH during the detailed design stage.	While staff agree that discussions should occur at the detailed design stage to determine how wildlife passage and connectivity can be improved, we recommend that this be a commitment in the EA and budgeted accordingly so that this recommendation can be implemented at detailed design.
28	Table 5-1 - "Potential for impact on terrestrial features" is listed as "High-medium" importance to Project Partners. Please note Conservation Halton stall consider this to be a criterion of high importance. Similarly, "Potential for Impact on aquatic features" is given an importance of Medium from the Project Partners. Given the existence of direct fish habitat, Conservation Halton would have likely assigned a High importance ranking to this criterion. Although it would appear that the Study Team solicited advice from the Neighbourhood Advisory Council, Conservation Halton staff cannot recall being requested to provide criteria importance to the Study Team. Please provide clarification as to how the relative importance was determined by the Project Partners. Additional analysis may be required upon further review of the criteria rankings.	As indicated in the text, both the East-West Corridor Neighbourhood Advisory Committee and the Project partners developed criteria importance. Other groups, such as Conservation Halton or business groups, were not involved in this.	As noted in our previous comments, it is unfortunate that the Study Team only engaged the citizens in developing the criteria importance as it is possible that the exclusion of the agencies in this process has led to the issues that are arising at this time in the study.
	The Indicators under "Natural Environment" are slightly different from the Indicators used when assessing the connection between Dundas Street and Parkside Drive. Please explain why different indicators were chosen for the overall corridor versus the Dundas — Parkside connection.	Please see the response to I.D. #9 for a further discussion on the evaluations indicators. The broad criteria were used for the evaluation of the design alternatives and, in most cases, more specific indicators were developed for each corridor section under evaluation, The specific indicators used in each evaluation were dependent on the environment potentially affected (i.e. there would be no point in including an indicator for a specific type of feature that was not present in the area. All potential impact differences were considered.	Item addressed.
	In the "Natural Environment" Criteria Group, there is only one criteria relating to impacts on aquatic features. In this table, all potential impacts need to be considered to evaluate the potential risks and impacts associated with the project on all affected aquatic features. Some examples of indicators that should be listed include: (1) Impacts on baseflow of all affected creeks; (2) Impacts on flow velocities and fish passage in all affected creeks;	Further consideration and description of impacts and mitigation of the selected undertaking is presented in Section 6 of the ESR. In addition to this, more detailed studies have been recommended for completion in the detailed design phase in some areas to address additional issues, such as those	Item addressed.

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	(3) Impacts on surface and groundwater quality in all affected creeks; (4) Potential for removal or creation of any existing or non existing barriers to fish passage; (5) Potential to cause excessive erosion or aggradation of sediments upstream and downstream of all proposed crossing alterations; (6) Will any channel realignments take place? What will the effects and risks of proposed channel realignments be?; (7) What in-stream aquatic habitat changes (e.g. loss of pools, flattening of riffles, widening of wetted width of existing channels, reductions in low flow water depths) are expected as a result of the proposed crossing replacements?; and, (8) How much natural riparian vegetation will be lost from around the affected flow features and what effect will this have on aquatic habitat in these features? Will efforts be made to reduce losses of riparian (waterside) vegetation during the construction phase of the project? Will all removed riparian vegetation be replaced with appropriate regionally native riparian species? Also, Table 5.1 does not include the requirement to mitigate the impacts to the flood plain through the North-South (N5) portion of the road adjacent to the Upcountry lands. Additionally, the meander belt of the existing watercourse must be determined such that the road can be set back an appropriate distance from the erosion hazard. These issues are critical as they will likely impact the road alignment and the property impacts for the Upcountry lands to the west.	raised by Conservation Halton in this comment. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff. Further discussions with the Up-Country developer are also required to finalize what studies are required on his behalf to assess and mitigate the potential impacts to this feature.	Item not addressed. Discussions are on-going. This issue needs to be resolved prior to the proposed road alignment being carried forward. It should be shown in the EA that the technical issues can be addressed and that the alignment is feasible and meets all required regulatory policies.
29	Table 5-4 (Hydro Line Alignments) — It would be helpful if this section of the road corridor had a detailed air photo and alignment options shown. Based on our previous comments with respect to Crossing #4, please revise the portion of the Table that identifies the potential for impact on aquatic features accordingly.	A figure will be provided showing the alternatives. The evaluation table will be modified to include reference to Crossing 4.	Item addressed subject to review of final ESR.
30	Table 1 (New Waterdown East-West Road — Option 4 vs. 5 Review), after page 5-30 — under "Potential for impact on Aquatic Features" please complete the number of metres of flood plain that will be crossed in this Option. Currently the text reads, "xxx m of flood plain".	This will be detailed in the Final ESR.	Item addressed subject to review of final ESR.
31	Section 5.6 (Sawtooth Option), page 5-35 — this section references Figure 5.8 however staff could not locate this figure in the report.	References to figures have been modified	Item addressed subject to review of final ESR.
32	Section 5.8 (N5 — Upcountry Development), page 5-38 -- this section states that a reserve for this road was determined by the developer and adopted as the most appropriate alignment. Staff	We do recognize that the floodplain and erosion hazards must be addressed prior to finalizing the road alignment, which will take	Item not addressed. The hazards need to be assessed and confirmed as the EA stage in order to determine the feasibility of the road alignment.

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	are concerned with this statement given that we have requested that the EA review the most appropriate alignment given the constraints associated with the tributary of Grindstone Creek that parallels the eastern lot line of Upcountry Estates and the associated flood plain that occurs on the Upcountry lands. It is our understanding that this phase of development on the Upcountry lands has not been draft plan approved and, as such, the location of the road should not be limited to that which has been reserved by the developer to date. The impacts of the proposed road alignment on the storage and conveyance functions of the flood plain must be addressed prior to the road alignment being determined as acceptable. Additional analysis of this issue, and determination of the meander belt/erosion hazard, must be completed prior to the road alignment being finalized. In addition, this section references Figure 5-9. Such a figure could not be found in the report however, there is an air photo with road pattern overlays on the page immediately following this section which staff assume is meant to be Figure 5-9. The figure identifies two proposed road locations/roundabouts however, there is no labelling on the figure so it is difficult to determine which one is the preferred alignment. Based on the text on page 5-38, it would appear that the study team is recommending the most easterly alignment of the road. This alignment would impact the woodlot/wetland at the northeastern property boundary of Upcountry Estates. Staff require further justification for the shift to the east as being the preferred alignment. Staff recommend that the "triangle" of land that would be left as a result of the westerly alignment could be used for tree planting to compensate for the loss of trees along the road alignment and to provide additional buffering to the existing woodlot/wetland.	place during detailed design. Opportunities to adjust the road alignment will be considered during detailed design and in consultation with Conservation Halton and the developer. This issue will need further discussions between the Conservation Halton and City staff. Concerns regarding the floodplain hazard were discussed with Halton CA during two meetings (July & August 2008). To address this concern, the Drainage and Hydrology report dated May 2010 included hydraulic analysis to demonstrate no negative impacts to flood levels associated with the roadway encroachment and to preliminarily size equalization culverts that connect the floodplain and maintain floodplain storage. The level of analysis completed confirms impacts to floodplain connection and conveyance can be addressed while recognizing that more studies are required at detailed design with considerations as noted in the report. HCA has established the meander belt/erosion hazard as part of the delineation of areas included in Ontario Regulation 162/06. Dillon reviewed the meander belt limits related to this section of the road and recommends detailed studies to refine this limit (i.e., fluvial geomorphology, geotechnical analysis) are to be completed during detailed design as the road alignment is being finalized. While the road alignment appears to be in the current meander belt limit, there is flexibility to move the alignment based on the detailed assessment of the meander belt width. In the event that the road alignment can not be located outside the meander belt width, opportunities to restore the original meander belt pattern (prior to creek realignment which occurred in the 1970's) can be met through the design of the culverts and stream rehabilitation works following current channel design methods.	

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		Reference to figures has be reviewed and adjusted where required.	Item addressed (related to figure references) subject to review of final ESR.
		Additional text will be added to the ESR. This area can be assessed for tree planting compensation potential. Text will be added to the ESR in this regard.	Item addressed subject to review of final ESR.
		Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.	Item not addressed. Discussion is on-going.
33	Section 6.3.1 - Exhibit 6-3 (East Parkside Drive Roundabout) — this exhibit appears to be identifying the preferred location of the roundabout at Parkside Drive however, this differs from the text in Section 5.8 which seems to indicate that a more easterly alignment is the preferred location. Staff prefer the alignment as shown in Exhibit 6-3 for the reasons outlined earlier in this letter. Please confirm which alignment is the ultimate preferred alignment for the roundabout at the north end of Upcountry.	The easterly alignment is recommended. See response to comment #32.	Item not addressed. If the easterly alignment is the preferred alternative than the information provided to date has not assessed the impacts on the wetland and woodland as a result of this alignment.
34	Section 6.3.1 - Page 6-13 (Upcountry Link) — this section of the report indicates that the proposed alignment is generally situated at the eastern limit of the subdivision with the exception of the mid-way point where the proposed centre line turns west in order to avoid impacts to a tributary of Grindstone Creek. It is important to note that the road alignment must not only address impacts to the creek, but must also mitigate impacts to the Regional Storm flood plain, erosion hazards and fish habitat associated with the creek. This is an important issue as both technical and policy requirements must be satisfied in order for Conservation Halton to be in a position to issue a permit under Ontario 162/06 for the proposed road. Additional comments are provided below under "Preferred Design Concept".	We believe that these issues can be appropriately addressed at detailed design when a permit submission will be made. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.	Item not addressed. Discussions are on-going.
35	Section 6.3.4 (Stormwater Management & Hydraulics), page 6-18 — staff recommend that reference be made to the South Waterdown Subwatershed Study as it relates to stormwater quality and quantity controls as well as hydraulics for that portion of the study area that is immediately adjacent to this area (i.e., along	Appendix C has been submitted (report dated May 2010) and will be included in the final ESR package	Item not addressed. See response to Item 22. Appendix C has not been submitted.

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	Dundas Street). In addition, as noted previously, reference is made to Appendix C however the appendix was not provided with the draft ESR.		
	Section 6.3.4, page 6-19 — it is stated that the new corridor crosses two watersheds (Borer's and Grindstone) however, the most easterly portion of the corridor also crosses the Hager Creek watershed within Conservation Halton's jurisdiction. Please add this to this section.	Reference t the Hager Creek watershed will be made in the ESR	Item addressed subject to review of final ESR.
	As previously noted, this section makes reference to 12 crossings whereas the figures and text only evaluate 11 crossings. Please clarify.	Figures and text are correct in indicating 11 crossings.	Item addressed subject to review of final ESR.
36	Section 6.3.4, Crossing EW4, page 6-25 - The second sentence of the second paragraph states "It is not a permanent watercourse but a natural depression area associated with wetland features". We recommend that this statement be revised as it is not entirely inaccurate. It is our opinion that this feature is a watercourse with a defined bed and banks. The bed of this channel was devoid of vegetation, indicating that a substantial enough volume of flow traverses this stretch of the watercourse to prevent vegetation from growing in the bed of the watercourse. When water is flowing in this channel, it is assumed that this channel provides direct fish habitat. Please modify this section and other portions of the document (i.e. Table X) to reflect this change.	The watercourse is not permanent. Field observations have indicated that this crossing is dry most of the year and is considered to be an intermittent watercourse.	To clarify, staff were not suggesting that the watercourse was permanent but rather that the feature meets the definition of a "watercourse" pursuant to the Conservation Authorities Act given that it has a defined bed and banks. We are requesting that the report be revised to indicate that this is a watercourse regulated by Conservation Halton and that, at certain times of the year, would likely represent direct fish habitat.
	In addition, within this section, a box culvert is proposed for Crossing EW4. As previously noted, staff request that the crossing be an open bottom culvert that is embedded. Please carry this forward in the Commitment section of the final ESR.	An open bottom culvert will be carried forward in the commitments section of the report.	Item addressed (regarding open bottom culvert) subject to review of final ESR.
37	Table 6-10, page 6-25 — staff note that the water surface elevations for both the 5 year and 10 year storm events are the same. Please confirm whether or not this is an error.	The 5 year WL is 241.27 m, however the analysis focused on the 25 year event (design event) and the Regional event.	Item addressed.
38	Crossing EW5, page 6-26 — staff are supportive of the proposed improvements to the hydraulic performance of the bridge structure in order to reduce the backwater impacts upstream of the structure and improve the safety of the road under flood conditions. The proposed bridge alignment, and the preferred direction of any widening, will be determined at the detail design stage. The design must take into account fluvial geomorphology, fisheries, terrestrial features, valley and floodplain grades on both the upstream and downstream sides of the bridge, etc	These will all be considered in the detailed design stage.	Item addressed.
39	Page 6-27 — staff note that this section did not include a hydraulic	See Item 32	Item not addressed. See response to Item 32.

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	analysis for the floodplain within the N5 portion of the proposed road. Please include this analysis as part of the final report.		
40	Page 6-28, Stormwater Management and Hydraulics: Hydraulic Evaluation of Road Crossing Structures — Crossing EW6 — staff are supportive of the proposed improvements to the hydraulic performance of Culvert Crossing EW6 in order to reduce the backwater impacts upstream of Dundas Street and improve the safety of the road under flood conditions. Any realignment of the culvert must be based on a fluvial geomorphic assessment of the creek in conjunction with any fisheries requirements. The following information is provided for detailed design: Please ensure that any rock protection material used to protect the new structure be round and appropriately sized for the channel. It is requested that oversized rock material not be added to the channel, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water may flow on either side of the oversized rock and could create new bank erosion or it may exacerbate existing erosion if the large rock is still located anywhere near the edge of the creek. Staff note that for the majority of the document the future crossing at EW6 is referred to as an open bottom culvert however, there are a couple of locations in the text and on figures within the document that it is shown or referred to as a closed bottom culvert. Please revise as necessary for consistency	Comments noted.	Item addressed. We request that the information be carried forward to detailed design.
41	Section 6.3.4, Crossing EW 11, page 6-30 — It appears from the photograph on page 4-17 that the existing CSP culvert is narrower than the wetted width of the watercourse at the time the photo was taken. Given the surrounding vegetation in the photograph staff have assumed that the photo was likely taken during the late spring or summer months. It could then be assumed that the flow in the creek at the time the photo was taken is less than would be expected during the annual spring freshet. As such, it is requested that the existing culvert be replaced with a larger crossing that will more effectively: • allow fish passage during higher flow events • convey sediment to downstream reaches of the creek • allow infiltration of groundwater (if present) • prevent the formation of a perched culvert which would prevent fish passage. Based on the above, it is requested that the existing culvert be	This will be added to the commitments section.	Item addressed subject to review of final ESR.

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	replaced with an open bottom creek crossing that will convey a minimum 2-year frequency flow event. Staff request that this be added to the Commitment section of the final ESR.		
42	Section 6.3.4, Floodplain Storage Analysis, page 6-31 - this section indicates that the proposed road construction will result in the loss of approximately 4200 m' in floodplain storage and recommends that this storage be maintained. The report further recommends that additional dynamic modeling be undertaken at the detailed design stage to finalize the sizing of the equalization culverts. This approach is not satisfactory to staff. The maintenance of storage discharge relationships for the flood plain must be maintained for the full range of storm events without increasing the flood plain limits on adjacent lands. This is a design constraint for the road and will be a requirement of Permit approval. Additional analysis is required prior to EA approval as satisfying this requirement may have impacts on road alignment and property requirements on the Upcountry lands. Perhaps flood storage requirements could be achieved on the east side of the proposed road by reconfiguring the floodplain grades and shifting the road further to the west. This would have the benefit of removing the floodplain designation from the Upcountry lands and saves the costs of installing large equalization culverts. It is also more in-line with the concept that was approved within the 1996 Paragon report. The EA should confirm whether this approach would be feasible. Staff are not prepared to leave this issue until detailed design for the above reasons. In addition to the above, the second paragraph of Section 6.3.4 suggests that the hydraulic analysis results have taken into consideration the proposed stream rehabilitation plan as outlined in the Upcountry Estates Environmental Implementation Report, dated May 1996. Please note that this report is no longer considered current and the proposed stream rehabilitation measures likely do not meet current standards for watercourse works. The ESR should be evaluating the most appropriate treatment for this tributary as part of the road alignment alternatives.	Based on the Paragon EIR (May 1996) the realigned channel is effective at conveying flows with a frequency of less than 100 years and that during large events such as the Regional the flows exceed the capacity of the realigned creek, resulting in the floodplain following the original creek alignment. For this reason, and because the road alignment does not encroach on the existing channel our analysis only considered the Regional event (i.e., storage for other events would not be effected by the road works). As noted in Item 32, the level of analysis completed confirms impacts from the road to floodplain connection and conveyance can be addressed. The proposed alignment poses no constraint in achieving floodplain storage for the Regional event. The capacity of the culverts is based on a conservative analysis. The required capacity for the Regional event can be readily met with the proposed two 1000 mm structures. There are opportunities to refine the analysis during detailed design, which may involve upsizing the culverts to provide sufficient capacity and flow equalization. Therefore, this is not considered a design constraint for the road which must be addressed prior to filing the EA. We acknowledge the recommendations to address flood storage, however as noted above, the use of culvert is still considered a viable option to mitigate impacts associated with the road alignment. Removing floodplain from the Up Country lands is beyond the scope of the EA for the E-W Corridor.	Item not addressed as staff are not in agreement with the response. Further discussion with the City and Dillon is required.

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		Furthermore, evaluating the most appropriate treatment for the tributary is beyond the scope of the EA and would require detailed studies that are best addressed during detail design and as part of the Up-Country development application. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.	
43	Section 6.3.4, Roadway Stormwater Management Alternatives, page 6-32 - please include the Hager Creek Watershed when outlining criteria for stormwater quality and quantity controls.	Comments noted and will be addressed.	Item addressed subject to review of final ESR.
44	Figure 6.2 (Road Drainage Areas and Outlet) - staff note that the legend colours and text do not align.	Comments noted and will be addressed.	Item addressed subject to review of final ESR.
45	Page 6-41 'Outlet EW5' - this section of the report indicates 'East of the outlet a new roadway is proposed while west of the outlet, the existing 4 lane road (Parkside Drive) is proposed to be widened to a 6 lane road'. Is this correct? Staff understood that Parkside Drive was going to be widened to a 4 lane road. Please confirm. This section also recommends the use of Oil Grit Separators for quality treatment. Staff are supportive of this and require that they be sized to provide Level 1/Enhanced treatment. Mitigating the thermal impacts of stormwater must also be discussed within this section of the document and carried forward to detailed design.	This has been corrected in the ESR. Parkside Drive will be a 4 lane road. Comment noted, text will be added to the ESR.	Items addressed subject to review of final ESR. Item addressed subject to review of final ESR.
46	Section 6.3.5, Outlet EW6, page 0-12 - two possible stormwater treatment systems are proposed: (1) an OGS; or, (2) directing the stormwater to the Upcountry Estates stormwater management facilities. Staff would prefer that the stormwater be directed to the Upcountry Estates facility as this is likely the most effective method of treatment. Can any of the stormwater be directed to the existing stormwater facility in the Gatesbury subdivision? We request that this be identified as the most preferred management method. Please consider revising this on page 6-47 also (Stormwater Management Summary).	Comments noted and will be considered during detailed design.	Item partially addressed. Please include as a commitment in the final ESR and identify that the most preferred management method would be to direct stormwater to existing/proposed stormwater management facilities.
47	Page 6-43 -- first paragraph — staff recommend that this section require the direction of a portion of stormwater flows from the road into the Upcountry stormsewer system such that treatment can be provided for by the existing stormwater management pond	Comments noted and will be considered during detailed design	See above.

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48	Section 6.3.5, Outlet EW7, page 6-44 — staff question why directing stormwater to proposed facilities in the future South Waterdown lands is not identified as a possible option for stormwater treatment? Please consider revising this on page 6-47 also (Stormwater Management Summary).	This was not recommended as a possible option based on the location of proposed ponds within the South Waterdown lands as shown on Figure 9 (Drainage and Hydrology Report) relative to the existing drainage outlet for the catchment tributary to EW7.	Item addressed however, should the pond locations in South Waterdown change as part of the subdivision detailed design, we trust that the City will consider whether it would be feasible to direct drainage to the facilities as part of the detailed design.
49	Section 6.3.5, Structures. page 6-49 — it would be helpful if the crossing structures in this section were labelled as per the numbers used in Figure 6.1 for cross reference purposes. It is noted that flow velocities will be greater than 3.8 m/s during the design and regional storm events. Staff recommend that, at detailed design, a shear stress/tractive force analysis be undertaken. Further, we recommend that bioengineering be considered for bank treatments.	Comments noted.	Item addressed subject to review of final ESR.
50	Section 6.3.5 (Grindstone Creek Tributary Branch Crossing), page 6-49 and Plate 8 — the text in Section 6.3.5 states that this crossing will be replaced with an open bottom concrete culvert however, the diagram on Plate 8 shows a closed bottom box culvert. Please revise Plate 8 accordingly.	Plate 8 will be revised.	Item addressed subject to review of final ESR.
51	Section 6.3.6 - For a number of utilities (e.g. Union Gas, Bell Canada, Imperial Oil and Sun-Canadian Pipelines) test pits are proposed at detailed design to confirm potential conflicts, relocation strategies and grading requirements. What is the magnitude of additional impacts on natural areas that could reasonably be anticipated? Will any disturbance to the creek be required as a result of the relocation of the underground gas main or other utilities? Should some or all of this work be undertaken prior to detailed design to ensure that the selection of the preferred alternative takes all grading/disturbance requirements into account? Also within this section, given that groundwater elevations have been observed to be approximately 1 metre below ground surface, it is advisable that a hydrogeological study be undertaken to examine the effects that the construction of utilities such as the new storm sewers will have on the base flows of the creek. This study should also look at impacts to the creeks within the study area from dewatering that will be necessary to construct/install utilities such as the storm sewers. Please include such a study in the Commitment section of the final ESR.	All test pits will take place within the road alignment right-of-way and no additional disturbance to natural areas will occur as a result of their excavation. Comments noted. The need for dewatering and a dewatering plan will be completed as part of the detailed design.	Comment partially addressed. Staff had requested information with respect to whether any utilities will need to be relocated and, if so, whether these relocations would have an impact on natural features and watercourses. This evaluation would normally be a part of the evaluation matrix in terms of anticipated impacts. Item addressed (regarding dewatering) subject to review of final ESR.
52	Page 6-58 `Watermains' — This section of the report should be clarified to indicate that Upcountry installed a watermain along	Locates for all utilities will be completed as the basis for the detailed design.	Item addressed.

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	Parkside Drive underneath the Main Branch of Grindstone Creek. Locates will be required as part of detailed design.		
53	Page 6-61 - Staff support the consideration of solar powered lighting, both as a means of minimizing impacts to natural areas through reduction of associated electrical infrastructure, and reducing the overall carbon footprint of the project. We note that all lighting, but especially that adjacent to natural areas, should be designed so as to minimize spill onto adjacent areas or above the horizon,	Lighting will be designed to minimize the spill into the adjacent natural areas during the detailed design.	Item addressed. Staff recommend that this be included as a commitment in the final ESR.
54	Section 6.3.7 landscaping/Streetscaping this section should be expanded to include the use of Low impact Development (LID) stormwater management measures (i.e. tree pits, bioretention areas, etc.) within the streetscaping for the road.	Low impact development measures can be incorporated into the landscaped areas of the road right-of-way during the detailed design stage.	Item addressed. Staff recommend that this be included as a commitment in the final ESR.
55	Section 6 3.8. Geotechnical, page 6-91 - please provide a map of all borehole locations to provide greater clarity with respect to the proximity of each borehole to natural features such as watercourses, woodlands and wetlands. Specifically, additional detail with respect to the location of Borehole #13 and its proximity to nearby watercourses is required. Also, more discussion with respect to the type of foundation to be used at this crossing location is required. At this point, the H-pile driven into bedrock may be a preferred installation method because it is thought that the enhanced stability of this approach will reduce the amount of in-channel or near channel hardening required to prevent scouring or undermining of the abutments. However, staff question what the construction impacts will be with respect to hydrogeology and groundwater and request additional discussion in the report	Refer to Appendix F, Geotechnical. This contains a summary of the borehole work. Comments noted. We believe that this should be part of detailed design stage investigations. Further discussion will be held between CH and City of Hamilton staff during detailed design stage is recommended.	Item addressed. Item addressed.
56	Table 6.41 and Section 6.4.1 - Under "Description of Effect" for "Amount, nature and significance of natural habitat removed", several areas of natural habitat loss are not addressed. These include: • Grindstone Creek crossing at Parkside Drive • North side of Dundas Street, at approximately Station 10+450 • Southwest intersection of Dundas Street and Evans Road • Grindstone Creek crossing at Dundas Street, between new East-West Road and Evans Road • East of roundabout at Parkside Drive and New East-West Road Please prescribe restoration/mitigation measures for these areas.	Mitigation for all natural areas that have trees removed includes a minimum compensatory tree replacement plan based on the area of the natural community removed is to be implemented at a rate of 3:1. Tree compensation plans will be developed during the detailed design stage. A statement regarding this will be added to the commitments table.	Item addressed subject to review of final ESR.

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57	Table 6.41 and pages 6-115 to 6-116 - Staff support the proposed mitigation measures for Lake Medad Valley Swamp PSW and Nelson Escarpment Woods ESA under the "Potential for effects to adjacent habitat" section. The development and implementation of the EMP should be added to the first phase of the project, as outlined on page 6-99, to ensure that buffer vegetation is well established prior to the commencement of any site alteration associated with the project.	We agree that the development and implementation of the Environmental Management Plan should be completed early in the implementation process. This will be added to this commitments table.	Item addressed subject to review of final ESR.
58	Table 6.41 - Under "Effect on terrestrial corridor connectivity/linkages", the Grindstone Creek crossing at Parkside Drive should be addressed.	The crossing of Grindstone Creek at Parkside Drive includes a wider structure than is currently found there. This will provide improved passage compared to the existing condition.	Please see our response to Item 27. We also note that this is the location where the Western Chorus Frog was observed and this should be taken into consideration when developing mitigation measures.
59	Table 6.41 — this table should include a section regarding the potential impact of the road construction as it relates to sediment and erosion issues	Sediment and erosion will be mitigated through the design of an effective sediment and erosion control plan at the detailed design stage.	Item addressed subject to review of final ESR.
60	Table 6.41 - The number of indicators listed in this table related to aquatic impacts is insufficient. The description of the effect, mitigation and net effects sections are correspondingly insufficient. All of these sections need to be effectively presented including all potential effects on all of the watercourses. These effects should cover impacts to: fish communities, fish passage, aquatic invertebrate communities, water quality (including water temperature and chlorides), water quantity, sediment transport, provision of baseflow, flow permanency, bank erosion, channel scouring and/or aggradation, configuration of channel widths and depths, riparian habitat (including all riparian functions), and in stream habitat features including but not limited to pools, riffles, runs, overhanging banks, woody debris, substrate type and size etc. In addition to the above the table indicates that the mitigation for the crossing of the northeast branch of Grindstone Creek (Crossing 6) will be the responsibility of the developer of the plan of subdivision. Staff note that Crossing 6 is outside of the Upcountry Estates draft plan. Is it anticipated that all of the work for Crossing 6 will be undertaken by the owners of the South Waterdown lands on the south side of Dundas Street? If not, the mitigation plan should be included in the ESR.	The assessment of the quality and quantity of fish habitat took into account the variables mentioned where they were applicable. As the majority of the crossings are culverts connecting roadside drainage and do not have baseflow, aquatic invertebrate habitat or fish communities, these variables do not apply to the majority of the crossings. Where applicable, additional text will be added to the ESR. Agreed, the ESR text will be amended. Mitigation for all crossings that are within the City owned property will be completed by the City. Mitigation includes the installation of open bottom structures where the crossings include permanent fish habitat, re-planting in riparian habitat if vegetation is removed and using effective stormwater techniques to mitigate the degradation of water quality.	Item addressed subject to review of final ESR. Item addressed subject to review of final ESR.

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	Finally. this portion of the table only addresses Crossing 6. Additional information should be included for all watercourse crossings.	Agreed. Text will be added to address all watercourses.	Item addressed subject to review of final ESR.
61	Page 6-108 - It should be clarified in the opening paragraph that the proposed works also have the potential to impact natural heritage functions, species at risk and significant wildlife habitat. Are there any potential impacts on locally rare species?	This will be addressed in the final ESR.	Item addressed subject to the review of the final EA document.
62	Section 6.4.1 (Natural Environment), page 6-110 — this section states that tree selection should be determined using Conservation Halton's Landscape Guidelines. While staff have no objection to the use of these guidelines we note that this portion of the document is addressing compensatory plantings within the Hamilton CA watershed. Staff defer to the Hamilton CA for appropriate planting guidelines within that area.	Acknowledged.	Item addressed.
63	Page 6-112 — several paragraphs on this page reference a Section of the report that has not been assigned (Section X).	This has been addressed.	Item addressed subject to review of final ESR.
64	Page 6-115 — this page includes several incomplete references (Section X and Figure X).	This has been addressed.	Item addressed subject to review of final ESR.
65	Pages 6-118 and 6-119 these pages include an incomplete reference (Table X	This has been addressed.	Item addressed subject to review of final ESR.
66	Section 6.4.1, Aquatic Habitat Impacts and Mitigation, page 6-119 — Please provide definitions of Type 2 and Type 3 habitat as it is being referred to in this document. Reference is made in this section to Table X. Although staff could not find a table labelled as such, we assume it is the table found immediately after page 6-119. Please confirm.	The habitat designation used is based on the following scale: • Type 1 habitat: Critical Habitat – Includes coldwater streams with little to no degradation • Type 2 habitat: Important Habitat – Includes somewhat degraded warmwater streams and intermittent streams • Type 3 habitat: Marginal habitat – Includes ephemeral drains and degraded intermittent streams • Roadside drains: Drainage conveyance that does not meet the requirements of the above. This has been addressed.	Item addressed subject to review of final ESR.
67	Section 6.4.1, Aquatic Habitat Impacts and Mitigation — Stormwater Management, page 6-119 —reference is made to the provision of Level 2 (Normal) water quality treatment. The remainder of the document commits to providing Level 1	Level 1 treatment will be provided.	Item addressed subject to review of final ESR and removal of reference to on-line ponds.

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	(Enhanced) water quality treatment. We assume this is a typographical error and that it is the intention that this section refer to Level 1 (Enhanced). As Enhanced is the most appropriate level of treatment please revise accordingly. In addition, Conservation Halton policy does not support the creation of on-line ponds so the reference to on-line ponds should be removed.		
68	Page 6-120, Preferred Design Concepts — Please make revisions to the fisheries section related to Crossing EW4 as outlined previously in this letter. Notwithstanding the above, the "Potential Impacts" column appears to be insufficient. No reference has been made to impacts associated with groundwater, dewatering, increased levels of chlorides, cumulative impacts of transportation crossings on streams (with attention paid to the longitudinal connectivity of fish habitat), impacts to fish habitat associated with the typical impacts to channel form associated with transportation crossings (widening of channels, reductions in water depths in channels, changes to substrates, etc.). Staff request that this information be added to the Table.	The assessment of the impacts on fish habitat took into account the variables mentioned where they were applicable. As the majority of the crossings are culverts connecting roadside drainage and do not have baseflow, aquatic invertebrate habitat or fish communities, these variables do not apply to the majority of the crossings. The majority of the crossings are not new and the water entering the lower reaches is already primarily roadside drainage. Water quality will be treated to the Level 1 standard through the stormwater management plan.	Item addressed subject to review of final ESR.
69	Page 6-122, General Aquatic Design-Related Mitigation Measures - In the second sentence in the second paragraph on this page, "proper construction sighting" is referred to as a mitigation strategy. Was "proper construction staging" intended? Also, the last bullet of this section incorrectly references a stormwater management water quality treatment standard of Level 2. This must be revised to indicate Level 1. Enhanced. At detailed design, it is requested that all substrate or rock additions below the normal high water mark (2 year bankfull channel flow) mimic the type of substrate present in the channel. For, example, if the channel exhibits a lot of shale oriented substrate it is requested that any rock added to the channel to reinforce abutments be of a similar (flat) shape. If the substrates are not shale oriented, then it is requested that any substrates added to the channel be round rather than angular in shape. It is also requested that oversized rock material not be added to these channels, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water flow may flow on either side of the oversized rock and could create new bank erosion or it could exacerbate existing erosion if it is still located anywhere near the edge of the creek. Staff request that this be included in the mitigation measures.	Acknowledged. The wording has been clarified/modified. Agreed. Reference to these comments will be added in the commitments table.	Item addressed subject to review of final ESR. Item addressed subject to review of final ESR.

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	Staff are supportive of the list of mitigation measures with the exception of the use of Level 2 versus Level 1 TSS removal and the use of closed bottom versus open bottom crossings. The reasons for this have already been included in this letter	Agreed – ESR text will be modified	Item addressed subject to review of final ESR.
70	Page 6-123 'Future Aquatic Works Required' — this section should be expanded to include the requirement for a fluvial geomorphic assessment. Additionally, an MOE Permit to Take Water may be required if dewatering volumes for the project exceed 50 000 Litres/day.	Both a fluvial geomorphologic assessment and a dewatering assessment will take place during the detailed design.	Item addressed assuming that these will be added as commitments in the final ESR.
71	Table 6-42 - Staff question whether costs associated with compensatory tree planting and restoration have been included in the project budget?	Restoration costs have been included in the project budget.	Item addressed.
72	Pedestrian Underpass at Joe Sam's Park- The ESR should explore options that could allow the pedestrian underpass to also function as a wildlife crossing structure.	Agreed. The need/value for a wildlife passage structure in this general area will be assessed during the detailed design stage.	Staff do not agree that the "need/value" for a wildlife structure should be evaluated at detailed design as there may be several options that need to be assessed as part of the EA. While we do acknowledge that the specific design can be left to detailed design, we continue to recommend that a potential wildlife crossing structure should be considered as part of the EA.
73	Due to the presence of significant natural areas throughout the study area, the use of invasive species for landscaping should be strictly prohibited. In general, native species should be used where possible, and in areas directly abutting significant natural areas, species should reflect those actually present in the natural communities, preferably from a local seed source.	Comments noted. We agree with these principles for landscaping. They will form the basis of edge management planning and landscaping near natural features along the new roadway.	Item addressed.
74	All engineering alternatives that would reduce the footprint of disturbance through natural areas should be employed.	We agree. The current footprint has been minimized in all natural areas to the extent possible. This will be assessed further in the detailed design.	Item addressed.
75	Preliminary Preferred Design, Grindstone Creek Crossing 1, General Arrangement — staff request that the station or crossing location numbering be consistent with the crossing location numbering on Figure 4.4 for ease of reference	Cross references will be added to the text.	Item addressed subject to review of final ESR.
76	Preferred Design Concept Drawings — Upcountry Plate 2 — The limit of the right-of-way, associated grading and pavement are all extremely close to the edge of the tributary of Grindstone Creek. Please advise as to whether the road is within the meander belt of this watercourse. Conservation Halton policy requires that all new development, including infrastructure, be setback a minimum of 15 metres from the meander belt. Please advise as to how this affects	Additional studies are recommended in this area in consultation with Conservation Halton and the developer as part of the EIS for the development. Meander belt analysis was not undertaken as part of this study.	Item not addressed. Discussion is on-going.

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	the location of the road alignment. Upcountry Plates 1 and 2 will need to be revised once the meander belt assessment and the hydraulic analysis has been completed for the Regional Storm floodplain associated with the Grindstone Tributary and the storage and conveyance impacts of the road have been addressed. This cannot be left until detailed design as satisfying this requirement may have impacts on road alignment and property requirements on the Upcountry Lands.	City and CH staff will discuss this further.	
77	Dundas Plate 5 and 6 — staff could not locate the existing Hager Creek culvert on these drawings. Please clarify.	Additional detail has been added on the plate.	Item addressed subject to review of final ESR.
78	It would be helpful if the Preferred Design Concept Drawings could include creek names and crossing location nomenclature consistent with Figure 6.1.	Additional detail has been added on the plate.	Item addressed subject to review of final ESR.
79	Page 7-18 `Parkside Drive Routing (Options 4, Options 5-Opta, and Option 5-Sawtooth' — the second paragraph of this section references a Section of the report that has not been assigned (Section XX).	This has been addressed.	Item addressed subject to review of final ESR.
80	Staff note that the Appendices were not included in the document. Please provide for staff review.	These have been provided.	Staff note that not all appendices have been received. Specifically Appendix C has not been submitted. The CD that was provided to staff in July 2010 included only a portion of the modeling (some culvert master files, HEC-RAS file for EW4, etc.).
81	It would be extremely helpful if a response chart was provided with the final ESR to enable a more efficient review of the final document.	Agreed, this will be provided.	Item addressed subject to the submission of the final ESR.

Comment and Response Table – Conservation Halton Letter (January 2011) Regarding the New East-West Road Corridor Class EA ESR - Draft August 2009

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	Staff of Conservation Halton have reviewed the above noted draft document, prepared by Dillon Consulting Limited and offer the following comments. A portion of the study area is within Hamilton Conservation Authority's jurisdiction and, as such, our comments pertain only to the portion of the Study Area within the Grindstone Creek watershed. We note however that the Hamilton Conservation Authority has raised significant issues with respect to the conclusions, particularly as they relate to impacts to a Provincially Significant Wetland. Although outside of our watershed, staff support the Hamilton Conservation Authority's comments as they relate to the importance of protecting and maintaining Provincially Significant Wetlands. Given the historical loss of wetlands in Southern Ontario we recommend that every effort should be made to avoid the loss of any wetland features, especially wetlands that have been identified as having Provincial significance. Conservation Halton staff provided comments on a previous draft of the Natural Heritage components of the study. As a result, our comments below are divided between outstanding comments from our previous letter and comments on the draft ESR.	Comments noted. Discussions are ongoing with Hamilton Conservation Authority.	Comment noted.	
1	It is unclear whether the following comments on the draft Natural Environment Report have been taken into account in the preparation of the ESR: Section 2.0 (Methods) - Staff questioned whether the following sources were consulted for terrestrial species information: • *Terrestrial Resource Comments on North Service Road/Waterdown Road Interchange Design Alternatives, City of Burlington, Ontario, prepared by Dougan and Associates and dated October 11, 2007* • *Tree Inventory Report, Waterdown Road — Hwy 403 Interchange, prepared by Wendy Shearer Landscape Architect Limited and dated August 22, 2007* • *South Waterdown Subwatershed Studs. Stage I Report (Volumes I and II), prepared by Ecoplans Limited and dated March 2006* • *South Waterdown Subwatershed Study Stage 2 Report Management Strategy, prepared by Ecoplans Limited and dated March 2008* • *South Waterdown Subwatershed Study Stage 3 Report Implementation and Monitoring Plan, Second Draft, prepared by Ecoplans Limited and dated May 2008* • *CUMIS Group Property, Burlington. Scoped Environmental Impact Study, prepared by Natural Resource Solutions Inc. and dated Alai, 2006.* Although the references cite the South Waterdown Subwatershed Study (Ecoplans Limited and MRC, 2006), and the Halton Natural Areas Inventory (Dwyer, 2006), it is not clear that the actual species lists from these references were incorporated into the current document, as there is no column for Ecoplans or NAI data in the species tables. The original species lists within the above documents should be examined for reference to any significant species not already known to the Dillon study team.	Note that the reference should be to a CH letter of July 6, **2009** The 403/Waterdown Road Interchange is outside of the area of study for the East-West Road Corridor Class EA and south of the study area for the Waterdown Road Corridor Class EA. The reports related to the 403/Waterdown Road project were not used in the preparation of the Draft ESRs for either project. The South Waterdown study was reviewed as part of the Draft ESR. The study had very little overlap with the study area of the East-West Road as it was bounded to the north by Highway 5. The Ecoplans study and the Halton Natural Areas Inventory were both reviewed for rare species in the region and the data was incorporated were	Thank you for the clarification. Given the extreme proximity of the 403/Waterdown Road Interchange to the southern limit of the Waterdown Road north-south corridor, the information within the EA should have been reviewed as it would have had relevant and valuable species information for the North-South component of the EA.	N/A The Waterdown Road Corridor is addressed in a completely separate ESR. The information contained within the 403/Waterdown Road Interchange EA is not relevant to the East-West Corridor.

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		appropriate.		
2	Section 3.0 (Results) - Ecological Land Classification - In response to a previous comment that FOD2-2 was listed but not mapped, the vegetation type has been removed from the list. However, the ELC data sheets for FOD2-2 (polygon 026) are included in Appendix B, and butternut is on the species list. Please clarify the location of this community and, specifically, the location of the butternut.	The ELC sheet from Polygon 026 is for an area that is outside of the study area. It has been removed from the appendix. For butternut locations, please refer to response # 4.	Item addressed.	N/A
3	Section 3.4 (Incidental Wildlife) - The putative bobcat vocalization is highly significant for Halton/Hamilton. Special surveys should be undertaken to determine whether this species is actually present.	We understand that the previous assessment that discussed the possibility of a bobcat has been re-issued indicating a mis-identification. As such, surveys for this species are not warranted.	Please provide further detail on how this species was misidentified and what it is now thought to be.	Please contact the assessment authors (Savanta) to discuss the how this was ultimately resolved and documented.
4	Appendix A - ELC Plant Species Lists for Sites 006, 007b and 026 - Butternut is noted within these communities (SWD3-2, SWD2-2 and FOD2-2), but not shown on Figure 4 or discussed in relevant sections of the main document.	Possible butternut trees were identified in Sites 006 and 007b which form part of the Centre Road Woodlot. Subsequent field investigations with Terry Schwan of the MNR and DNA analysis confirmed two pure butternuts. The location of these is shown on the Figure 4 . Community 026 refers to a community that is west of King Road and outside the study area. This ELC sheet has been removed from the ESR.	Item addressed.	N/A
5	Previous comments with respect to Crossings #6 — 14 have not been addressed.	The numbering referred to in the July 6, 2009 letter refers to an older figure. A brief description of each is provided below for clarity: Crossing 6 is the same on both Figures. This crossing is a CSP culvert draining roadside drainage and is proposed to be a CSP under the expanded road. Crossings 7 to 12 were replaced with three crossings 7 to 9 after further review of the site. All three crossings drain roadside water, while crossing 9 also receives water from a pond on the north side of the road. All three are CSP culverts and are proposed to be replaced with CSP culverts. Crossing 13 is now labeled as Crossing 11 and is described in more detail below	Item addressed subject to review of final ESR.	N/A

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		in response to Comment 21. There is an existing CSP culvert and the future crossing is proposed to be a CSP culvert. Crossing 10 (April 2, 2009 Figure) did not show up on the original map. It is described in more detail in Comment 20 below. The existing crossing is a CSP culvert that is proposed to be replaced by a box culvert. Crossing 14 has been renamed Crossing 4 and is described in the ESR and in the response to Comment 17 below.		
6	Staff continue to recommend that natural hazards, including karst, flood plains, stable top of bank and meander belt should be discussed in the ESR as they each could have implications on a preferred alignment design. Staff note that this was raised in our letter of July 6, 2009 and has not yet been addressed.	Text regarding these natural hazards will be added to the ESR. The implications of any of these features on the road design will be considered.	Item not addressed. Staff continue to recommend that natural hazard mapping be included in the final ESR.	Text will be added to the final ESR that includes a commitment to the completion of natural hazard assessments during detailed design at all appropriate locations throughout the East-West corridor including all key watercourse crossings and through the Upcountry alignment. Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands.
7	Please consider a consistent approach to labelling the various figure/tables and exhibits and ensure they are all listed in the Table of Contents for ease of reference.	This will/has been done.	Item addressed subject to review of final ESR.	N/A
8	Page XVIII the first paragraph references a Section of the report that has not been assigned (Section XX).	Reference added.	Item addressed subject to review of final ESR.	N/A
9	Table 3-2 --- Criteria should be expanded to "Potential for impact on terrestrial features and functions". Potential impacts on species at risk should be included as an indicator, given that they are identified as one of the "main natural environmental issues of concern" on page 1-3. Potential impacts to wildlife movement should also be included as indicators,	The criteria and indicators in Table 3-1were developed during Phase 2 work and used to compare broad corridor alternatives. All text in the ESR in Chapter 3 has been taken directly from the previously published Phase 2 Report and has not been altered. The criteria “Potential for impact on terrestrial features” was carried forward into Phase 3 and 4 work to evaluate design alternatives. Where appropriate, additional or modified indicators were introduced to allow the consideration of issues specific to each alternative set being considered. For example, in the	Item addressed.	N/A

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		evaluation of alternatives through the Centre Road PSW, this criteria was expanded to include the following indicators: • Amount, nature and significance of natural habitat removed, • Number of significant trees along existing roadway removed, • Potential for effects to adjacent habitat • Fragmentation of natural areas, • Effects on terrestrial corridor connectivity/linkages, • Opportunity to enhance degraded natural areas Within these more localized indicators your suggested expanded criteria could be addressed, as the specific alternatives under more detailed evaluation demanded. Further, once the preferred alternative was selected and additional impacts and mitigation measures were investigated or discussed, even more detailed indicators could be introduced. That is why the "potential impacts on species at risk was identified on page 1-3 as a main natural environmental issue of concern.		
10	Section 3.4.1 (Hybrid Option — Dundas to Parkside Connection Options), page 3-11 — The use of the terminology "Options 1-5" for the hybrid options is somewhat confusing given that the main Options for the east-west road are labelled Options 1-4. Perhaps a different type of terminology could be used for the Dundas to Parkside Connection Options (i.e., Options A-E). Also, within this section, it is stated that Option 2 (connection along the eastern limit of Upcountry Estates) is the most preferred option for a number of reasons. One of the impacts is listed as the removal of 0.64 ha of "other woodlot". Staff could not locate a table within the study that clearly outlines the ranking evaluation of these connection options and would prefer to review this information in advance of agreeing to the selection process. The text does not address the proximity of Option 2 to the Grindstone Creek tributary and the impacts to the flooding hazards, erosion hazards, fish habitat and the watercourse that would occur with Option 2. This requires further discussion and analysis.	As indicated above, all text in Section 3 of the draft ESR is taken directly from previously released documentation. The appendix materials contain the original documents and Section 3 contains a summary only of this information. Modifying the labeling of the Phase 2 alternatives at this point is not considered practical or a necessity. The tables that summarize the evaluation assessment for the Hybrid Option is contained in Appendix A of the Phase 2 Report. These have also been attached to this Comment – Response table.	Item addressed given that information has been taken directly from previous ESR.	N/A

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11	Page 4-9 - The provincial rank for butternut is identified in the first paragraph as S4, then as S3? in the subsequent paragraph. Please clarify. Please ensure that MNR is involved in any discussions related to endangered species. Staff have copied Melinda Thompson-Black, MNR-Aurora, for her information	According to the most recent NHIC search, butternut is listed as S3? The MNR has been contacted regarding the butternuts and have conducted analysis to determine the purity of these trees. During the detailed design stage, the MNR will continue to be involved to ensure that the Endangered Species Act is appropriately dealt with.	Item addressed subject to MNR acceptance.	N/A
12	Figure 4.2 - Staff question why ELC and vegetation surveys were not completed for the natural area along Grindstone Creek, south and north of Parkside Drive? We note that the observation of the nationally Threatened chorus frog was in this vicinity.	ELC was not completed at the crossing at Grindstone Creek as the work proposed in this area involves replacement of the existing structure with a larger structure spanning the watercourse. An aquatic habitat assessment was conducted in the vicinity of this crossing location. City of Hamilton is working with MNR (Guelph District) about SAR in this area. MNR has provided a list of 36 species to carry out an assessment for potential habitat in this area. Threatened Chorus frog can also be added to the list. The work plan for assessment was also circulated to CH in August 2010 for information.	Please refer to discussion regarding the SAR Screening Report, on our letter dated January 7, 2011 and Western Chorus Frog.	Western chorus frog was observed within the WATMP study area on April 8, 2008 during amphibian surveys. The only observed record was in the Grindstone Creek – Northwest Branch area. This area of the alignment includes an upgrade of the existing road crossing and will not impact the surrounding habitat for western chorus frogs. During detail design ELC mapping and habitat assessment work for the Western Corus Frog will be undertaken for the Grindstone Creek crossing of Parkside Drive.
13	Figure 4.2 - It was noted in the Natural Environment Report that property access was restricted in the lands east of the Upcountry Estates. As such, staff recommended that additional field surveys be undertaken at detailed design as necessary. The area northeast of Upcountry Estates labelled as "Forest" appears to be a swamp, based on an air photo review. This could result in additional mitigation requirements pertaining to maintenance of the hydrologic regime of the wetland. The ESR should provide for future commitments to undertake this work.	Additional field work will be undertaken in this area during the detailed design. A commitment to this will be added to the ESR text.	Item addressed subject to review of final ESR.	N/A
14	Figure 4.2 - Wetlands identified in the South Waterdown Subwatershed Study (particularly Wetland 5 in the vicinity of Dundas Street) should be included on this figure.	Wetland 5 will be included on the Figure in the final ESR.	Item addressed subject to review of final ESR.	N/A
15	Page 4-10 - On the basis of Figures 2 and 4 in the *COSEWIC Assessment and Update Status Report on the Western Chorus Frog* (Pseudacris triseriata) *in Canada*, staff are of the opinion that all chorus frog populations within Conservation Halton's jurisdiction belong to the Great Lakes/St. Lawrence —Canadian Shield population and as such should be considered members of a nationally Threatened species.	This note will be added to Section 4.3.4.	Item addressed subject to review of final ESR.	N/A
16	Section 4 3.6 (Aquatic Resources — Field Work Results), page 4-14 — this section references Figure 4.5 however, Figure 4.5 identifies watercourse crossings within the north-south road corridor. Staff note that Figure 6.1 appears to identify the watercourse crossings within the east-west corridor.	This has been addressed.	Item addressed subject to review of final ESR.	N/A

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17	Section 4.3.6, page 4-15 — Crossing #4 - During a site visit to this crossing location on Oct. 14, 2009, it was noted that a defined channel was present here with an obvious channel that had been scoured clean of vegetation. It is staff's opinion that this feature falls under the definition of a watercourse pursuant to the Conservation Authorities Act and that it provides direct fish habitat during certain parts of the year when runoff levels are sufficient. In addition, this watercourse is located within a hedgerow and is surrounded on both sides by mature trees with a fairly dense understory of woody herbaceous vegetation. This vegetation is providing a variety of useful functions that benefit the watercourse. On site, CH staff estimated that the bankfull channel on this watercourse would be up to two metres in width. Dillon's fisheries biologist who was also present during this site visit agreed to that width during the visit. As such, it is requested that any transportation crossing structure placed here span a minimum of two metres over the width of the watercourse. It is also requested that the length of the culvert/bridge be kept to the minimum possible to reduce disturbance to the watercourse and hedgerow. It is also requested that the crossing structure be designed as an open bottom structure to minimize disturbance to the interaction between the hyporheic zone and the bed of the watercourse. An open bottom structure would also allow for long term provision of natural substrate on the bed of the creek as this part of the creek contributes to the productivity of aquatic invertebrates which provide food for fish. This section of Grindstone Creek is a headwater creek and one of its main functions is to provide primary and secondary productivity to downstream reaches. The bottom of the creek in this headwater reach provides functionality with respect to the provision of allochthonous inputs to the downstream reaches of the watercourse. The construction of an open bottom structure at crossing # EW4 would be helpful in facilitating long term secondary productivity to occur at the location of the crossing structure. The use of an open bottom structure allows the functional connectivity between the hyporheic zone and the invert of the creek bottom to remain intact. Staff request that this be included as a commitment in the final ESR and that the description throughout the document be revised accordingly.	The CA's recommendation regarding the design of the crossing at this location will be incorporated into the detailed design of this facility. This will be added in the commitments table.	Item addressed subject to review of final ESR.	N/A
18	Section 4.3.6 (Grindstone Creek — Northwest Branch Crossing #5) Page 4-16 — the tributary of Grindstone referred to in the report as the 'Northwest Branch' is considered to be the 'Main Branch' of Grindstone Creek.	This change will be made in the Final ESR.	Item addressed subject to review of final ESR.	N/A
19	Section 4.3.6 (Grindstone Creek — Northeast Branch Crossing #6) — Please indicate the date (including the day, month and year) when the survey was completed for this crossing location.	This survey was completed on July 11, 2008.	Item addressed.	N/A
20	Section 4.3.6 (Drainage Conveyance Crossing #10) - Please provide the following data regarding the drainage feature located at EW # 10: photographs of the upstream and downstream ends of the existing water conveyance structure, details regarding the presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish.	The upstream and downstream photos are provided as an appendix to this Comment-Response table. No groundwater seepages were observed in the area of the new crossing. No baseflow was observed. The channel width varies; upstream of the	Item addressed subject to review of final ESR.	N/A

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		crossing it is a road side ditch greater than 2 metres in width. Downstream of the crossing the width is less than 1 metre. The system is ultimately connected to the Upper Hager Creek through tributaries to the south. As an intermittent road side ditch, the channel would have a hydrological regime typical of urban run off. In the area of the crossing the drainage feature is an intermittent road side ditch that flows into an intermittent dry flat channel. The channel was dry during the time of survey and it is not expected that this area will provide habitat for fish or aquatic invertebrates. This will be added to the commitments table.		
21	Section 4.3.6 (Upper Hager Creek Crossing #11) - No indication is provided in the habitat description here regarding the following habitat parameters: presence of groundwater seepage, thermal regime of the watercourse, bankfull channel width of the watercourse, connectivity to downstream fish habitat, stability (flashiness) of hydrological regime in this tributary, presence of aquatic invertebrates, and presence of fish. Staff request that this information be provided. In addition, within this section, there is reference to Crossing 3 which staff assume should be Crossing #11. Please clarify.	The upstream and downstream photos are provided in an appendix to this Comment-Response table. The channel width varies; upstream of the crossing it is a road side ditch less than 2 metres in width. Downstream of the crossing the width is 1.5 to 2 metres. Upstream there is very limited flow, downstream the amount of flow increases indicating a baseflow source. The downstream hydrological regime would be less flashy than a typical urban runoff system due to the baseflow source. The upstream portion of the crossing is intermittent with limited flow while the downstream crossing has more sustained flows. The areas downstream would provide suitable habitat for fish and aquatic invertebrates.	Item addressed.	N/A
22	Section 4.3.9 (Hydraulic Assessment), page 4-19 — Reference is made to Figure 4.5 however, as noted above, this figure relates to the north-south corridor. Also, this section of	Appendix C has been submitted to HCA (report dated May 2010) and will be	To date, staff have not received Appendix C. The response indicates that the report	A revised Appendix C will be provided.

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	the report makes reference to detailed hydraulic and hydrologic modeling outputs that are provided in Appendix C. Staff note that Appendix C was not included in the document. Please provide digital and hard copies of this information at the earliest opportunity. Also, reference is made to 12 crossing structures however, only 11 are shown on Figure 4.4 and described within the text.	included in the final ESR package. The ESR text will be revised to reference 11 crossings.	was sent to the HCA (perhaps the Hamilton Conservation Authority?). We did receive a CD with some modeling however, it did not include the relevant hydraulic structures. This comment remains outstanding.	
23	Section 4.5.2 (Hydrogeology — Geological Setting), page 4-25 — reference is made in the first paragraph to Cross Section A-A in Figure 4-6 however, Cross Section A-A is found on Figure 3. Please revise. This section also states that Cross Section A-A was constructed using MOE well records. Staff question whether the individual borehole results were also used to further refine this figure? With respect to Figure 3 (Cross Section A-A) — Based on this figure it would appear that the water table is at the level of the invert of two watercourses within the study area, although the watercourses have not been labeled on the figure. Please identify the names of the watercourses as well as the month and year when the water table elevations were measured. Will the borehole information be included in the final ESR? This information would be helpful in assessing the analysis within the document.	References have been revised. Site visits and discussions with well owners were used to refine this figure. Agreed. This will be added t the text. Appendix materials will contain all borehole information generated as part of this study. Additional borehole work and geotechnical assessments will be completed during the design phase.	Item addressed subject to review of final ESR. Based on the response, we assume that borehole results were not used to further refine the figure. Item addressed subject to review of final ESR. Item addressed subject to review of final ESR.	N/A Borehole logs were not used to refine this figure.
24	Section 4.5.2 (Hydrogeology — Potential Impacts of Road Construction), page 4-30 - Staff note that the road construction includes dewatering activities associated with the installation of various services and bridge and culvert footings. More detailed assessment of hydrogeologic conditions within the project limits, and the potential impacts of dewatering activities, must be completed in conjunction with the detailed design of the road.	We agree that more detailed hydrogeology is appropriate at the detailed design stage. This work includes dewatering planning.	Item addressed.	N/A
25	Section 4.5.2 (Hydrogeology — Potential Impacts on Groundwater Quality), page 4-31 — it is stated that the construction of the proposed corridor will not have any foreseeable impacts on groundwater quantity because the construction activities will not involve any groundwater extraction. It has been our experience that the construction of watercourse crossings sometimes requires dewatering in the event that the installation of the crossing foundations intercepts groundwater. This should be taken into consideration when evaluating potential impacts to private wells in the vicinity of watercourse crossings.	Dewatering planning will be completed as part of the detailed design. This includes potential impacts to private wells.	Item addressed.	N/A
26	Section 5 — please ensure that all figures, maps and Tables are labeled for ease of reference. There are at least two figures with alignment options/design drawings that are not labeled within this section.	Agreed – this has been addressed.	Item addressed subject to review of final ESR.	N/A
27	Page 5-2, Section N4 - As identified in the Grindstone Creek Watershed Study, the valley provides an ecological linkage and linkage restoration opportunity for natural areas north and south of Parkside Drive. As such, proposed works in this area should seek to improve wildlife passage and habitat connectivity.	The new crossing of the Grindstone Creek will be wider than the existing crossing and facilitate increased wildlife use. This will be further discussed with CH during the detailed design stage.	While staff agree that discussions should occur at the detailed design stage to determine how wildlife passage and connectivity can be improved, we recommend that this be a commitment in the EA and budgeted accordingly so that this recommendation can be implemented at detailed design.	A commitment has been added to the commitments section to ‘seek to improve wildlife passage and connectivity as part of the design of the expanded Grindstone Crossing’.

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28	Table 5-1 - "Potential for impact on terrestrial features" is listed as "High-medium" importance to Project Partners. Please note Conservation Halton stall consider this to be a criterion of high importance. Similarly, "Potential for Impact on aquatic features" is given an importance of Medium from the Project Partners. Given the existence of direct fish habitat, Conservation Halton would have likely assigned a High importance ranking to this criterion. Although it would appear that the Study Team solicited advice from the Neighbourhood Advisory Council, Conservation Halton staff cannot recall being requested to provide criteria importance to the Study Team. Please provide clarification as to how the relative importance was determined by the Project Partners. Additional analysis may be required upon further review of the criteria rankings. The Indicators under "Natural Environment" are slightly different from the Indicators used when assessing the connection between Dundas Street and Parkside Drive. Please explain why different indicators were chosen for the overall corridor versus the Dundas — Parkside connection. In the "Natural Environment" Criteria Group, there is only one criteria relating to impacts on aquatic features. In this table, all potential impacts need to be considered to evaluate the potential risks and impacts associated with the project on all affected aquatic features. Some examples of indicators that should be listed include: (1) Impacts on baseflow of all affected creeks; (2) Impacts on flow velocities and fish passage in all affected creeks; (3) Impacts on surface and groundwater quality in all affected creeks; (4) Potential for removal or creation of any existing or non existing barriers to fish passage; (5) Potential to cause excessive erosion or aggradation of sediments upstream and downstream of all proposed crossing alterations; (6) Will any channel realignments take place? What will the effects and risks of proposed channel realignments be?; (7) What in-stream aquatic habitat changes (e.g. loss of pools, flattening of riffles, widening of wetted width of existing channels, reductions in low flow water depths) are expected as a result of the proposed crossing replacements?; and, (8) How much natural riparian vegetation will be lost from around the affected flow features and what effect will this have on aquatic habitat in these features? Will efforts be made to reduce losses of riparian (waterside) vegetation during the construction phase of the project? Will all removed riparian vegetation be replaced with appropriate regionally native riparian species? Also, Table 5.1 does not include the requirement to mitigate the impacts to the flood plain through the North-South (N5) portion of the road adjacent to the Upcountry lands. Additionally, the meander belt of the existing watercourse must be determined such that the road can be set back an appropriate distance from the erosion hazard. These issues are critical as they will likely impact the road alignment and the property impacts for the Upcountry lands to the west.	As indicated in the text, both the East-West Corridor Neighbourhood Advisory Committee and the Project partners developed criteria importance. Other groups, such as Conservation Halton or business groups, were not involved in this. Please see the response to I.D. #9 for a further discussion on the evaluations indicators. The broad criteria were used for the evaluation of the design alternatives and, in most cases, more specific indicators were developed for each corridor section under evaluation, The specific indicators used in each evaluation were dependent on the environment potentially affected (i.e. there would be no point in including an indicator for a specific type of feature that was not present in the area. All potential impact differences were considered. Further consideration and description of impacts and mitigation of the selected undertaking is presented in Section 6 of the ESR. In addition to this, more detailed studies have been recommended for completion in the detailed design phase in some areas to address additional issues, such as those raised by Conservation Halton in this comment. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff. Further discussions with the Up-Country developer are also required to finalize what studies are required on his behalf to assess and mitigate the potential impacts to this feature.	As noted in our previous comments, it is unfortunate that the Study Team only engaged the citizens in developing the criteria importance as it is possible that the exclusion of the agencies in this process has led to the issues that are arising at this time in the study. Item addressed. Item addressed. Item not addressed. Discussions are on-going. This issue needs to be resolved prior to the proposed road alignment being carried forward. It should be shown in the EA that the technical issues can be	Comment noted. Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands. Revised HEC-RAS model have been provided to Conservation Halton for the recommended alignment.

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			addressed and that the alignment is feasible and meets all required regulatory policies.	Details regarding the alignment through the Upcountry Development require additional discussion with the Conservation Authority. These meetings will be scheduled in 2011, prior to finalizing the ESR
29	Table 5-4 (Hydro Line Alignments) — It would be helpful if this section of the road corridor had a detailed air photo and alignment options shown. Based on our previous comments with respect to Crossing #4, please revise the portion of the Table that identifies the potential for impact on aquatic features accordingly.	A figure will be provided showing the alternatives. The evaluation table will be modified to include reference to Crossing 4.	Item discussed subject to review of final ESR.	N/A
30	Table 1 (New Waterdown East-West Road — Option 4 vs. 5 Review), after page 5-30 — under "Potential for impact on Aquatic Features" please complete the number of metres of flood plain that will be crossed in this Option. Currently the text reads, "xxx m of flood plain".	This will be detailed in the Final ESR.	Item addressed subject to review of final ESR.	N/A
31	Section 5.6 (Sawtooth Option), page 5-35 — this section references Figure 5.8 however staff could not locate this figure in the report.	References to figures have been modified	Item addressed subject to review of final ESR.	N/A
32	Section 5.8 (N5 — Upcountry Development), page 5-38 -- this section states that a reserve for this road was determined by the developer and adopted as the most appropriate alignment. Staff are concerned with this statement given that we have requested that the EA review the most appropriate alignment given the constraints associated with the tributary of Grindstone Creek that parallels the eastern lot line of Upcountry Estates and the associated flood plain that occurs on the Upcountry lands. It is our understanding that this phase of development on the Upcountry lands has not been draft plan approved and, as such, the location of the road should not be limited to that which has been reserved by the developer to date. The impacts of the proposed road alignment on the storage and conveyance functions of the flood plain must be addressed prior to the road alignment being determined as acceptable. Additional analysis of this issue, and determination of the meander belt/erosion hazard, must be completed prior to the road alignment being finalized. In addition, this section references Figure 5-9. Such a figure could not be found in the report however, there is an air photo with road pattern overlays on the page immediately following this section which staff assume is meant to be Figure 5-9. The figure identifies two	We do recognize that the floodplain and erosion hazards must be addressed prior to finalizing the road alignment, which will take place during detailed design. Opportunities to adjust the road alignment will be considered during detailed design and in consultation with Conservation Halton and the developer. This issue will need further discussions between the Conservation Halton and City staff. Concerns regarding the floodplain hazard were discussed with Halton CA during two meetings (July & August 2008). To address this concern, the Drainage and Hydrology report dated May 2010 included hydraulic analysis to demonstrate no negative impacts to flood levels associated with the roadway encroachment and to preliminarily size equalization culverts that connect the floodplain and maintain floodplain storage. The level of analysis completed confirms impacts to floodplain connection and conveyance can be addressed while recognizing that more studies are required at detailed design	Item not addressed. The hazards need to be assessed and confirmed as the EA stage in order to determine the feasibility of the road alignment.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands.

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	proposed road locations/roundabouts however, there is no labelling on the figure so it is difficult to determine which one is the preferred alignment. Based on the text on page 5-38, it would appear that the study team is recommending the most easterly alignment of the road. This alignment would impact the woodlot/wetland at the northeastern property boundary of Upcountry Estates. Staff require further justification for the shift to the east as being the preferred alignment. Staff recommend that the "triangle" of land that would be left as a result of the westerly alignment could be used for tree planting to compensate for the loss of trees along the road alignment and to provide additional buffering to the existing woodlot/wetland.	with considerations as noted in the report. HCA has established the meander belt/erosion hazard as part of the delineation of areas included in Ontario Regulation 162/06. Dillon reviewed the meander belt limits related to this section of the road and recommends detailed studies to refine this limit (i.e., fluvial geomorphology, geotechnical analysis) are to be completed during detailed design as the road alignment is being finalized. While the road alignment appears to be in the current meander belt limit, there is flexibility to move the alignment based on the detailed assessment of the meander belt width. In the event that the road alignment can not be located outside the meander belt width, opportunities to restore the original meander belt pattern (prior to creek realignment which occurred in the 1970's) can be met through the design of the culverts and stream rehabilitation works following current channel design methods. Reference to figures has be reviewed and adjusted where required. Additional text will be added to the ESR. This area can be assessed for tree planting compensation potential. Text will be added to the ESR in this regard. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.	Item addressed (related to figure references) subject to review of final ESR. Item addressed subject to review of final ESR.	

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33	Section 6.3.1 - Exhibit 6-3 (East Parkside Drive Roundabout) — this exhibit appears to be identifying the preferred location of the roundabout at Parkside Drive however, this differs from the text in Section 5.8 which seems to indicate that a more easterly alignment is the preferred location. Staff prefer the alignment as shown in Exhibit 6-3 for the reasons outlined earlier in this letter. Please confirm which alignment is the ultimate preferred alignment for the roundabout at the north end of Upcountry.	The easterly alignment is recommended. See response to comment #32.	Item not addressed. If the easterly alignment is the preferred alternative then the information provided to date has not assessed the impacts on the wetland and woodland as a result of this alignment.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands. In addition, the roundabout location has also been shifted westerly to avoid contact with the woodlot/wetland.
34	Section 6.3.1 - Page 6-13 (Upcountry Link) — this section of the report indicates that the proposed alignment is generally situated at the eastern limit of the subdivision with the exception of the midway point where the proposed centre line turns west in order to avoid impacts to a tributary of Grindstone Creek. It is important to note that the road alignment must not only address impacts to the creek, but must also mitigate impacts to the Regional Storm flood plain, erosion hazards and fish habitat associated with the creek. This is an important issue as both technical and policy requirements must be satisfied in order for Conservation Halton to be in a position to issue a permit under Ontario 162/06 for the proposed road. Additional comments are provided below under "Preferred Design Concept".	We believe that these issues can be appropriately addressed at detailed design when a permit submission will be made. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.	Item not addressed. Discussions are on-going.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands.
35	Section 6.3.4 (Stormwater Management & Hydraulics), page 6-18 — staff recommend that reference be made to the South Waterdown Subwatershed Study as it relates to stormwater quality and quantity controls as well as hydraulics for that portion of the study area that is immediately adjacent to this area (i.e., along Dundas Street). In addition, as noted previously, reference is made to Appendix C however the appendix was not provided with the draft ESR. Section 6.3.4, page 6-19 — it is stated that the new corridor crosses two watersheds (Borer's and Grindstone) however, the most easterly portion of the corridor also crosses the Hager Creek watershed within Conservation Halton's jurisdiction. Please add this to this section. As previously noted, this section makes reference to 12 crossings whereas the figures and text only evaluate 11 crossings. Please clarify.	Appendix C has been submitted (report dated May 2010) and will be included in the final ESR package Reference t the Hager Creek watershed will be made in the ESR Figures and text are correct in indicating 11 crossings.	Item not addressed. See response to Item 22. Appendix C has not been submitted. Item addressed subject to review of final ESR. Item addressed subject to review of final ESR.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands. A revised Appendix C will be provided.
36	Section 6.3.4, Crossing EW4, page 6-25 - The second sentence of the second paragraph states "It is not a permanent watercourse but a natural depression area associated with wetland features". We recommend that this statement be revised as it is not entirely inaccurate. It is our opinion that this feature is a watercourse with a defined bed and banks. The bed of this channel was devoid of vegetation, indicating that a substantial enough volume of flow traverses this stretch of the watercourse to prevent vegetation from growing in the bed of the watercourse. When water is flowing in this channel, it is assumed that this channel provides direct fish habitat. Please modify this section and other portions of the document (i.e. Table X) to reflect this change. In addition, within this section, a box culvert is proposed for Crossing EW4. As previously noted, staff request that the crossing be an open bottom culvert that is embedded. Please carry this forward in the Commitment section of the final ESR.	The watercourse is not permanent. Field observations have indicated that this crossing is dry most of the year and is considered to be an intermittent watercourse. An open bottom culvert will be carried forward in the commitments section of the report.	To clarify, staff were not suggesting that the watercourse was permanent but rather that the feature meets the definition of a “watercourse” pursuant to the Conservation Authorities Act given that it has a defined bed and banks. We are requesting that the report be revised to indicate that this is a watercourse regulated by Conservation Halton and that, at certain times of the year, would likely represent direct fish habitat. Item addressed (regarding open bottom	We acknowledge that this is a ‘watercourse’ and is regulated by Conservation Halton and may at certain times of the year represent direct fish habitat. The ESR will be revised accordingly.

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			culvert) subject to review of final ESR.	
37	Table 6-10, page 6-25 — staff note that the water surface elevations for both the 5 year and 10 year storm events are the same. Please confirm whether or not this is an error.	The 5 year WL is 241.27 m, however the analysis focused on the 25 year event (design event) and the Regional event.	Item addressed.	N/A
38	Crossing EW5, page 6-26 — staff are supportive of the proposed improvements to the hydraulic performance of the bridge structure in order to reduce the backwater impacts upstream of the structure and improve the safety of the road under flood conditions. The proposed bridge alignment, and the preferred direction of any widening, will be determined at the detail design stage. The design must take into account fluvial geomorphology, fisheries, terrestrial features, valley and floodplain grades on both the upstream and downstream sides of the bridge, etc	These will all be considered in the detailed design.	Item addressed.	N/A
39	Page 6-27 — staff note that this section did not include a hydraulic analysis for the floodplain within the N5 portion of the proposed road. Please include this analysis as part of the final report.	See Item 32	Item not addressed. See response to Item 32.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands.
40	Page 6-28, Stormwater Management and Hydraulics: Hydraulic Evaluation of Road Crossing Structures — Crossing EW6 — staff are supportive of the proposed improvements to the hydraulic performance of Culvert Crossing EW6 in order to reduce the backwater impacts upstream of Dundas Street and improve the safety of the road under flood conditions. Any realignment of the culvert must be based on a fluvial geomorphic assessment of the creek in conjunction with any fisheries requirements. The following information is provided for detailed design: Please ensure that any rock protection material used to protect the new structure be round and appropriately sized for the channel. It is requested that oversized rock material not be added to the channel, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water may flow on either side of the oversized rock and could create new bank erosion or it may exacerbate existing erosion if the large rock is still located anywhere near the edge of the creek. Staff note that for the majority of the document the future crossing at EW6 is referred to as an open bottom culvert however, there are a couple of locations in the text and on figures within the document that it is shown or referred to as a closed bottom culvert. Please revise as necessary for consistency	Comments noted.	Item addressed. We request that the information be carried forward to detailed design.	Comment noted.
41	Section 6.3.4, Crossing EW 11, page 6-30 — It appears from the photograph on page 4-17 that the existing CSP culvert is narrower than the wetted width of the watercourse at the time the photo was taken. Given the surrounding vegetation in the photograph staff have assumed that the photo was likely taken during the late spring or summer months. It could then be assumed that the flow in the creek at the time the photo was taken is less than would be expected during the annual spring freshet. As such, it is requested that the existing culvert be replaced with a larger crossing that will more effectively: • allow fish passage during higher flow events • convey sediment to downstream reaches of the creek • allow infiltration of groundwater (if present)	This will be added to the commitments section.	Item addressed subject to review of final ESR.	N/A

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	• prevent the formation of a perched culvert which would prevent fish passage. Based on the above, it is requested that the existing culvert be replaced with an open bottom creek crossing that will convey a minimum 2-year frequency flow event. Staff request that this be added to the Commitment section of the final ESR.			
42	Section 6.3.4, Floodplain Storage Analysis, page 6-31 - this section indicates that the proposed road construction will result in the loss of approximately 4200 m' in floodplain storage and recommends that this storage be maintained. The report further recommends that additional dynamic modeling be undertaken at the detailed design stage to finalize the sizing of the equalization culverts. This approach is not satisfactory to staff. The maintenance of storage discharge relationships for the flood plain must be maintained for the full range of storm events without increasing the flood plain limits on adjacent lands. This is a design constraint for the road and will be a requirement of Permit approval. Additional analysis is required prior to EA approval as satisfying this requirement may have impacts on road alignment and property requirements on the Upcountry lands. Perhaps flood storage requirements could be achieved on the east side of the proposed road by reconfiguring the floodplain grades and shifting the road further to the west. This would have the benefit of removing the floodplain designation from the Upcountry lands and saves the costs of installing large equalization culverts. It is also more in-line with the concept that was approved within the 1996 Paragon report. The EA should confirm whether this approach would be feasible. Staff are not prepared to leave this issue until detailed design for the above reasons. In addition to the above, the second paragraph of Section 6.3.4 suggests that the hydraulic analysis results have taken into consideration the proposed stream rehabilitation plan as outlined in the Upcountry Estates Environmental Implementation Report, dated May 1996. Please note that this report is no longer considered current and the proposed stream rehabilitation measures likely do not meet current standards for watercourse works. The ESR should be evaluating the most appropriate treatment for this tributary as part of the road alignment alternatives.	Based on the Paragon EIR (May 1996) the realigned channel is effective at conveying flows with a frequency of less than 100 years and that during large events such as the Regional the flows exceed the capacity of the realigned creek, resulting in the floodplain following the original creek alignment. For this reason, and because the road alignment does not encroach on the existing channel our analysis only considered the Regional event (i.e., storage for other events would not be effected by the road works). As noted in Item 32, the level of analysis completed confirms impacts from the road to floodplain connection and conveyance can be addressed. The proposed alignment poses no constraint in achieving floodplain storage for the Regional event. The capacity of the culverts is based on a conservative analysis. The required capacity for the Regional event can be readily met with the proposed two 1000 mm structures. There are opportunities to refine the analysis during detailed design, which may involve upsizing the culverts to provide sufficient capacity and flow equalization. Therefore, this is not considered a design constraint for the road which must be addressed prior to filing the EA. We acknowledge the recommendations to address flood storage, however as noted above, the use of culvert is still considered a viable option to mitigate impacts associated with the road alignment. Removing floodplain from	Item not addressed as staff are not in agreement with the response. Further discussion with the City and Dillon is required.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands.

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		the Up Country lands is beyond the scope of the EA for the E-W Corridor. Furthermore, evaluating the most appropriate treatment for the tributary is beyond the scope of the EA and would require detailed studies that are best addressed during detail design and as part of the Up-Country development application. Further discussion regarding the Upcountry alignment will be held between Conservation Halton and City of Hamilton staff.		
43	Section 6.3.4, Roadway Stormwater Management Alternatives, page 6-32 - please include the Hager Creek Watershed when outlining criteria for stormwater quality and quantity controls.	Comments noted and will be addressed.	Item addressed subject to review of final ESR.	N/A
44	Figure 6.2 (Road Drainage Areas and Outlet) - staff note that the legend colours and text do not align.	Comments noted and will be addressed.	Item addressed subject to review of final ESR.	N/A
45	Page 6-41 'Outlet EW5' - this section of the report indicates 'East of the outlet a new roadway is proposed while west of the outlet, the existing 4 lane road (Parkside Drive) is proposed to be widened to a 6 lane road'. Is this correct? Staff understood that Parkside Drive was going to be widened to a 4 lane road. Please confirm. This section also recommends the use of Oil Grit Separators for quality treatment. Staff are supportive of this and require that they be sized to provide Level 1/Enhanced treatment. Mitigating the thermal impacts of stormwater must also be discussed within this section of the document and carried forward to detailed design.	This has been corrected in the ESR. Parkside Drive will be a 4 lane road. Comment noted, text will be added to the ESR.	Items addressed subject to review of final ESR. Item addressed subject to review of final ESR.	N/A
46	Section 6.3.5, Outlet EW6, page 0-12 - two possible stormwater treatment systems are proposed: (1) an OGS; or, (2) directing the stormwater to the Upcountry Estates stormwater management facilities. Staff would prefer that the stormwater be directed to the Upcountry Estates facility as this is likely the most effective method of treatment. Can any of the stormwater be directed to the existing stormwater facility in the Gatesbury subdivision? We request that this be identified as the most preferred management method. Please consider revising this on page 6-47 also (Stormwater Management Summary).	Comments noted and will be considered during detailed design.	Item partially addressed. Please include as a commitment in the final ESR and identify that the most preferred management method would be to direct stormwater to existing/proposed stormwater management facilities.	Item added as a commitment.
47	Page 6-43 -- first paragraph — staff recommend that this section require the direction of a portion of stormwater flows from the road into the Upcountry stormsewer system such that treatment can be provided for by the existing stormwater management pond	Comments noted and will be considered during detailed design	See above.	Item added as a commitment.
48	Section 6.3.5, Outlet EW7, page 6-44 — staff question why directing stormwater to proposed facilities in the future South Waterdown lands is not identified as a possible option for stormwater treatment? Please consider revising this on page 6-47 also (Stormwater Management Summary).	This was not recommended as a possible option based on the location of proposed ponds within the South Waterdown lands as shown on Figure 9 (Drainage and Hydrology Report) relative to the existing drainage outlet for the catchment tributary to EW7.	Item addressed, however, should the pond locations in South Waterdown change as part of the subdivision detailed design, we trust that the City will consider whether it would be feasible to direct drainage to the facilities as part of the detailed design.	N/A

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49	Section 6.3.5, Structures. page 6-49 — it would be helpful if the crossing structures in this section were labelled as per the numbers used in Figure 6.1 for cross reference purposes. It is noted that flow velocities will be greater than 3.8 m/s during the design and regional storm events. Staff recommend that, at detailed design, a shear stress/tractive force analysis be undertaken. Further, we recommend that bioengineering be considered for bank treatments.	Comments noted.	Item addressed subject to review of final ESR.	N/A
50	Section 6.3.5 (Grindstone Creek Tributary Branch Crossing), page 6-49 and Plate 8 — the text in Section 6.3.5 states that this crossing will be replaced with an open bottom concrete culvert however, the diagram on Plate 8 shows a closed bottom box culvert. Please revise Plate 8 accordingly.	Plate 8 will be revised.	Item addressed subject to review of final ESR.	N/A
51	Section 6.3.6 - For a number of utilities (e.g. Union Gas, Bell Canada, Imperial Oil and Sun-Canadian Pipelines) test pits are proposed at detailed design to confirm potential conflicts, relocation strategies and grading requirements. What is the magnitude of additional impacts on natural areas that could reasonably be anticipated? Will any disturbance to the creek be required as a result of the relocation of the underground gas main or other utilities? Should some or all of this work be undertaken prior to detailed design to ensure that the selection of the preferred alternative takes all grading/disturbance requirements into account? Also within this section, given that groundwater elevations have been observed to be approximately 1 metre below ground surface, it is advisable that a hydrogeological study be undertaken to examine the effects that the construction of utilities such as the new storm sewers will have on the base flows of the creek. This study should also look at impacts to the creeks within the study area from dewatering that will be necessary to construct/install utilities such as the storm sewers. Please include such a study in the Commitment section of the final ESR.	All test pits will take place within the road alignment right-of-way and no additional disturbance to natural areas will occur as a result of their excavation. Comments noted. The need for dewatering and a dewatering plan will be completed as part of the detailed design.	Comment partially addressed. Staff had requested information with respect to whether any utilities will need to be relocated and, if so, whether these relocations would have an impact on natural features and watercourses. This evaluation would normally be a part of the evaluation matrix in terms of anticipated impacts. Item addressed (regarding dewatering) subject to review of final ESR.	The specifics with respect to utility relocations will be resolved during the detail design stage. The ESR will contain a commitment to undertaking additional hydrogeological work in support of the potential for groundwater impacts/dewatering related to underground utility relocations. To date the identified utility relocations within the Waterdown Road Corridor have been relatively routine e.g. (hydro pole relocations) and as such minor impacts only are anticipated.
52	Page 6-58 `Watermains' — This section of the report should be clarified to indicate that Upcountry installed a watermain along Parkside Drive underneath the Main Branch of Grindstone Creek. Locates will be required as part of detailed design.	Locates for all utilities will be completed as the basis for the detailed design.	Item addressed.	N/A
53	Page 6-61 - Staff support the consideration of solar powered lighting, both as a means of minimizing impacts to natural areas through reduction of associated electrical infrastructure, and reducing the overall carbon footprint of the project. We note that all lighting, but especially that adjacent to natural areas, should be designed so as to minimize spill onto adjacent areas or above the horizon,	Lighting will be designed to minimize the spill into the adjacent natural areas during the detailed design.	Item addressed. Staff recommend that this be included as a commitment in the final ESR.	This has been added as a commitment.
54	Section 6.3.7 Landscaping/Streetscaping this section should be expanded to include the use of Low impact Development (LID) stormwater management measures (i.e. tree pits, bioretention areas, etc.) within the streetscaping for the road.	Low impact development measures can be incorporated into the landscaped areas of the road right-of-way during the detailed design stage.	Item addressed. Staff recommend that this be included as a commitment in the final ESR.	This has been added as a commitment.
55	Section 6 3.8. Geotechnical, page 6-91 - please provide a map of all borehole locations to provide greater clarity with respect to the proximity of each borehole to natural features such as watercourses, woodlands and wetlands. Specifically, additional detail with respect to the location of Borehole #13 and its proximity to nearby watercourses is required. Also, more discussion with respect to the type of foundation to be used at this crossing location is required. At this point, the H-pile driven into bedrock may be a preferred	Refer to Appendix F, Geotechnical. This contains a summary of the borehole work. Comments noted. We believe that this should be part of detailed design stage	Item addressed. Item addressed.	N/A

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	installation method because it is thought that the enhanced stability of this approach will reduce the amount of in-channel or near channel hardening required to prevent scouring or undermining of the abutments. However, staff question what the construction impacts will be with respect to hydrogeology and groundwater and request additional discussion in the report	investigations. Further discussion will be held between CH and City of Hamilton staff during detailed design stage is recommended.		
56	Table 6.41 and Section 6.4.1 - Under "Description of Effect" for "Amount, nature and significance of natural habitat removed", several areas of natural habitat loss are not addressed. These include: • Grindstone Creek crossing at Parkside Drive • North side of Dundas Street, at approximately Station 10+450 • Southwest intersection of Dundas Street and Evans Road • Grindstone Creek crossing at Dundas Street, between new East-West Road and Evans Road • East of roundabout at Parkside Drive and New East-West Road Please prescribe restoration/mitigation measures for these areas.	Mitigation for all natural areas that have trees removed includes a minimum compensatory tree replacement plan based on the area of the natural community removed is to be implemented at a rate of 3:1. Tree compensation plans will be developed during the detailed design stage. A statement regarding this will be added to the commitments table.	Item addressed subject to review of final ESR.	N/A
57	Table 6.41 and pages 6-115 to 6-116 - Staff support the proposed mitigation measures for Lake Medad Valley Swamp PSW and Nelson Escarpment Woods ESA under the "Potential for effects to adjacent habitat" section. The development and implementation of the EMP should be added to the first phase of the project, as outlined on page 6-99, to ensure that buffer vegetation is well established prior to the commencement of any site alteration associated with the project.	We agree that the development and implementation of the Environmental Management Plan should be completed early in the implementation process. This will be added to this commitments table.	Item addressed subject to review of final ESR.	N/A
58	Table 6.41 - Under "Effect on terrestrial corridor connectivity/linkages", the Grindstone Creek crossing at Parkside Drive should be addressed.	The crossing of Grindstone Creek at Parkside Drive includes a wider structure than is currently found there. This will provide improved passage compared to the existing condition.	Please see our response to Item 27. We also note that this is the location where the Western Chorus Frog was observed and this should be taken into consideration when developing mitigation measures.	The presence of western chorus frogs will be taken into consideration in the design of this crossing.
59	Table 6.41 — this table should include a section regarding the potential impact of the road construction as it relates to sediment and erosion issues	Sediment and erosion will be mitigated through the design of an effective sediment and erosion control plan at the detailed design stage.	Item addressed subject to review of final ESR.	N/A
60	Table 6.41 - The number of indicators listed in this table related to aquatic impacts is insufficient. The description of the effect, mitigation and net effects sections are correspondingly insufficient. All of these sections need to be effectively presented including all potential effects on all of the watercourses. These effects should cover impacts to: fish communities, fish passage, aquatic invertebrate communities, water quality (including water temperature and chlorides), water quantity, sediment transport, provision of baseflow, flow permanency, bank erosion, channel scouring and/or aggradation, configuration of channel widths and depths, riparian habitat (including all riparian functions), and in stream habitat features including but not limited to pools, riffles, runs, overhanging banks, woody debris, substrate type and size etc. In addition to the above. the table indicates that the mitigation for the crossing of the northeast branch of Grindstone Creek (Crossing 6) will be the responsibility of the developer	The assessment of the quality and quantity of fish habitat took into account the variables mentioned where they were applicable. As the majority of the crossings are culverts connecting roadside drainage and do not have baseflow, aquatic invertebrate habitat or fish communities, these variables do not apply to the majority of the crossings. Where applicable, additional text will be added to the ESR. Agreed, the ESR text will be amended.	Item addressed subject to review of final ESR.	N/A

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	of the plan of subdivision. Staff note that Crossing 6 is outside of the Upcountry Estates draft plan. Is it anticipated that all of the work for Crossing 6 will be undertaken by the owners of the South Waterdown lands on the south side of Dundas Street? If not, the mitigation plan should be included in the ESR. Finally. this portion of the table only addresses Crossing 6. Additional information should be included for all watercourse crossings.	Mitigation for all crossings that are within the City owned property will be completed by the City. Mitigation includes the installation of open bottom structures where the crossings include permanent fish habitat, re-planting in riparian habitat if vegetation is removed and using effective stormwater techniques to mitigate the degradation of water quality. Agreed. Text will be added to address all watercourses.	Item addressed subject to review of final ESR.	
61	Page 6-108 - It should be clarified in the opening paragraph that the proposed works also have the potential to impact natural heritage functions, species at risk and significant wildlife habitat. Are there any potential impacts on locally rare species?	This will be addressed in the final ESR.	Item addressed subject to the review of the final EA document.	N/A
62	Section 6.4.1 (Natural Environment), page 6-110 — this section states that tree selection should be determined using Conservation Halton's Landscape Guidelines. While staff have no objection to the use of these guidelines we note that this portion of the document is addressing compensatory plantings within the Hamilton CA watershed. Staff defer to the Hamilton CA for appropriate planting guidelines within that area.	Acknowledged.	Item addressed.	N/A
63	Page 6-112 — several paragraphs on this page reference a Section of the report that has not been assigned (Section X).	This has been addressed.	Item addressed subject to review of final ESR.	N/A
64	Page 6-115 — this page includes several incomplete references (Section X and Figure X).	This has been addressed.	Item addressed subject to review of final ESR.	N/A
65	Pages 6-118 and 6-119 these pages include an incomplete reference (Table X	This has been addressed.	Item addressed subject to review of final ESR.	N/A
66	Section 6.4.1, Aquatic Habitat Impacts and Mitigation, page 6-119 — Please provide definitions of Type 2 and Type 3 habitat as it is being referred to in this document. Reference is made in this section to Table X. Although staff could not find a table labelled as such, we assume it is the table found immediately after page 6-119. Please confirm.	The habitat designation used is based on the following scale: • Type 1 habitat: Critical Habitat – Includes coldwater streams with little to no degradation • Type 2 habitat: Important Habitat – Includes somewhat degraded warmwater streams and intermittent streams • Type 3 habitat: Marginal habitat – Includes ephemeral drains and degraded intermittent streams • Roadside drains: Drainage conveyance that does not meet the requirements of the above.	Item addressed subject to review of final ESR.	N/A

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		This has been addressed.		
67	Section 6.4.1, Aquatic Habitat Impacts and Mitigation — Stormwater Management, page 6-119 —reference is made to the provision of Level 2 (Normal) water quality treatment. The remainder of the document commits to providing Level 1 (Enhanced) water quality treatment. We assume this is a typographical error and that it is the intention that this section refer to Level 1 (Enhanced). As Enhanced is the most appropriate level of treatment please revise accordingly. In addition, Conservation Halton policy does not support the creation of on-line ponds so the reference to on-line ponds should be removed.	Level 1 treatment will be provided.	Item addressed subject to review of final ESR and removal of reference to on-line ponds.	N/A
68	Page 6-120, Preferred Design Concepts — Please make revisions to the fisheries section related to Crossing EW4 as outlined previously in this letter. Notwithstanding the above, the "Potential Impacts" column appears to be insufficient. No reference has been made to impacts associated with groundwater, dewatering, increased levels of chlorides, cumulative impacts of transportation crossings on streams (with attention paid to the longitudinal connectivity of fish habitat), impacts to fish habitat associated with the typical impacts to channel form associated with transportation crossings (widening of channels, reductions in water depths in channels, changes to substrates, etc.). Staff request that this information be added to the Table.	The assessment of the impacts on fish habitat took into account the variables mentioned where they were applicable. As the majority of the crossings are culverts connecting roadside drainage and do not have baseflow, aquatic invertebrate habitat or fish communities, these variables do not apply to the majority of the crossings. The majority of the crossings are not new and the water entering the lower reaches is already primarily roadside drainage. Water quality will be treated to the Level 1 standard through the stormwater management plan.	Item addressed subject to review of final ESR.	N/A
69	Page 6-122, General Aquatic Design-Related Mitigation Measures - In the second sentence in the second paragraph on this page, "proper construction sighting" is referred to as a mitigation strategy. Was “proper construction staging" intended? Also, the last bullet of this section incorrectly references a stormwater management water quality treatment standard of Level 2. This must be revised to indicate Level 1. Enhanced. At detailed design, it is requested that all substrate or rock additions below the normal high water mark (2 year bankfull channel flow) mimic the type of substrate present in the channel. For, example, if the channel exhibits a lot of shale oriented substrate. it is requested that any rock added to the channel to reinforce abutments be of a similar (flat) shape. If the substrates are not shale oriented, then it is requested that any substrates added to the channel be round rather than angular in shape. It is also requested that oversized rock material not be added to these channels, because if the oversized rock does fall or get pushed into the channel due to the force of the water (or some other mechanism) the water flow may flow on either side of the oversized rock and could create new bank erosion or it could exacerbate existing erosion if it is still located anywhere near the edge of the creek. Staff request that this be included in the mitigation measures. Staff are supportive of the list of mitigation measures with the exception of the use of Level 2 versus Level 1 TSS removal and the use of closed bottom versus open bottom crossings. The reasons for this have already been included in this letter	Acknowledged. The wording has been clarified/modified. Agreed. Reference to these comments will be added in the commitments table. Agreed – ESR text will be modified	Item addressed subject to review of final ESR. Item addressed subject to review of final ESR. Item addressed subject to review of final	N/A

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			ESR.	
70	Page 6-123 'Future Aquatic Works Required' — this section should be expanded to include the requirement for a fluvial geomorphic assessment. Additionally, an MOE Permit to Take Water may be required if dewatering volumes for the project exceed 50 000 Litres/day.	Both a fluvial geomorphologic assessment and a dewatering assessment will take place during the detailed design.	Item addressed assuming that these will be added as commitments in the final ESR.	This information has been added as a commitment in the ESR.
71	Table 6-42 - Staff question whether costs associated with compensatory tree planting and restoration have been included in the project budget?	Restoration costs have been included in the project budget.	Item addressed.	N/A
72	Pedestrian Underpass at Joe Sam's Park- The ESR should explore options that could allow the pedestrian underpass to also function as a wildlife crossing structure.	Agreed. The need/value for a wildlife passage structure in this general area will be assessed during the detailed design stage.	Staff do not agree that the "need/ value" for a wildlife structure should be evaluated at detailed design as there may be several options that need to be assessed as part of the EA. While we do acknowledge that the specific design can be left to detailed design, we continue to recommend that a potential wildlife crossing structure should be considered as part of the EA.	As there will be a pedestrian underpass at Joe Sams Park, there is no questioning that there will be the ability to have connectivity. The question that remains is what form that connectivity will take and what specific design measures will allow it provide for wildlife passage as well as human passage. In addition, a location just west of the new Joe Sams Park crossing has been identified with the potential for the introduction of a wildlife culvert (i.e. there is sufficient clearance under the new road). The ESR will recommend that a crossing be provided at this location with the details to be resolved during the design phase.
73	Due to the presence of significant natural areas throughout the study area, the use of invasive species for landscaping should be strictly prohibited. In general, native species should be used where possible, and in areas directly abutting significant natural areas, species should reflect those actually present in the natural communities, preferably from a local seed source.	Comments noted. We agree with these principles for landscaping. They will form the basis of edge management planning and landscaping near natural features along the new roadway.	Item addressed.	N/A
74	All engineering alternatives that would reduce the footprint of disturbance through natural areas should be employed.	We agree. The current footprint has been minimized in all natural areas to the extent possible. This will be assessed further in the detailed design.	Item addressed.	N/A
75	Preliminary Preferred Design, Grindstone Creek Crossing 1, General Arrangement — staff request that the station or crossing location numbering be consistent with the crossing location numbering on Figure 4.4 for ease of reference	Cross references will be added to the text.	Item addressed subject to review of final ESR.	N/A
76	Preferred Design Concept Drawings — Upcountry Plate 2 — The limit of the right-of-way, associated grading and pavement are all extremely close to the edge of the tributary of Grindstone Creek. Please advise as to whether the road is within the meander belt of this watercourse. Conservation Halton policy requires that all new development, including infrastructure, be setback a minimum of 15 metres from the meander belt. Please advise as to how this affects the location of the road alignment. Upcountry Plates 1 and 2 will need to be revised once the meander belt assessment and the hydraulic analysis has been completed for the Regional Storm floodplain associated with the Grindstone Tributary and the storage and conveyance impacts of the road have been addressed. This cannot be left until detailed design as satisfying this requirement may have	Additional studies are recommended in this area in consultation with Conservation Halton and the developer as part of the EIS for the development. Meander belt analysis was not undertaken as part of this study. City and CH staff will discuss this further.	Item not addressed. Discussion is on-going.	Note that a subsequent alignment adjustment is being recommended through the Upcountry development that moves the new road west and out of the floodplain and hazard lands.

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	impacts on road alignment and property requirements on the Upcountry Lands.			
77	Dundas Plate 5 and 6 — staff could not locate the existing Hager Creek culvert on these drawings. Please clarify.	Additional detail has been added on the plate.	Item addressed subject to review of final ESR.	N/A
78	It would be helpful if the Preferred Design Concept Drawings could include creek names and crossing location nomenclature consistent with Figure 6.1.	Additional detail has been added on the plate.	Item addressed subject to review of final ESR.	N/A
79	Page 7-18 `Parkside Drive Routing (Options 4, Options 5-Opta, and Option 5-Sawtooth' — the second paragraph of this section references a Section of the report that has not been assigned (Section XX).	This has been addressed.	Item addressed subject to review of final ESR.	N/A
80	Staff note that the Appendices were not included in the document. Please provide for staff review.	These have been provided.	Staff note that not all appendices have been received. Specifically Appendix C has not been submitted. The CD that was provided to staff in July 2010 included only a portion of the modeling (some culvert master files, HEC-RAS file for EW4, etc.).	A revised Appendix C will be provided.
81	It would be extremely helpful if a response chart was provided with the final ESR to enable a more efficient review of the final document.	Agreed, this will be provided.	Item addressed subject to the submission of the final ESR.	N/A

First Nations Correspondences

From: Bryan LaForme [bryanlaforme@newcreditfirstnation.ca]
Sent: October 17, 2008 12:23 PM
To: Stone, Danny
Subject: RE: Updated: Information Meeting With Mississaugas of the New Credit First Nations.

Danny
Sorry I couldn't make it on the 16th, something came up that I had to attend to.
Please let me know what dates you have in mind for the next meeting? Right now the first two weeks in November are open. Please try not to have the meeting on Mondays our council meeting are all on Mondays.

Thank You

Chief Bryan LaForme

-----Original Message-----
From: Stone, Danny [mailto:Danny.Stone@hamilton.ca]
Sent: Thursday, October 16, 2008 10:31 AM
To: Banuri, Syeda; Paul MacLeod; Chief Bryan LaForme; TOE, Assistant Environmental Planner
Cc: Shepley, Amanda; Lee-Morrison, Christine
Subject: Updated: Information Meeting With Mississaugas of the New Credit First Nations.

When: Thursday, October 16, 2008 11:00 AM-1:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where: 77 James Street North, Hamilton Ont. Unit # 320. 350 B

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Chief Laforme is unable to attend Oct 16th scheduled meeting. We will be rescheduling.

Informational Meeting with Mississaugas of the New Credit First Nations.
77 James Street North, Hamilton Ont. Unit # 320
Boardroom 350 B

If there are any questions or equipment required please feel free to contact me.

Regards,

Danny Stone
Project Manager
Waterfront Recreation
Environmental Planning
Capital Planning and Implementation
Public Works
City of Hamilton
PH. 905-546-2424 ext. 5102.
FAX. 905-546-4435
Danny.Stone@hamilton.ca

From: Stone, Danny
Sent: November 11, 2008 5:37 PM
To: 'Chief Bryan LaForme'
Cc: Banuri, Syeda; Lee-Morrison, Christine
Subject: Information Meeting

Hello Chief Laforme,

We would still like to arrange an informational meeting with you or a representative at your convenience. What days and times are you available in the near future?

Sincerely,

Danny Stone
Project Manager
Waterfront Recreation
Environmental Planning
Capital Planning and Implementation
Public Works Department
City of Hamilton
320-77 James St. N.
Hamilton, Ontario, L8R 2K3
Telephone. 905-546-2424 Extension. 5102.
Facsimile. 905-546-4435
Email:Danny.Stone@hamilton.ca

From: Stone, Danny
Sent: January 6, 2009 9:55 AM
To: 'bryanlaforme@newcreditfirstnation.com'
Subject: Re: Waterdown Aldershot Transportation Information Meeting

Hi Chief Bryan,
We would like to schedule a meeting, what are a few dates at the end of the month that you are availble?

Regards,

Danny Stone
Project Manager
Waterfront Recreation
Environmental Planning
Capital Planning and Implementation
Public Works Department
City of Hamilton
320-77 James St. N.
Hamilton, Ontario, L8R 2K3
Telephone. 905-546-2424 Extension. 5102.
Facsimile. 905-546-4435
Email:Danny.Stone@hamilton.ca

-----Original Message-----
From: Bryan LaForme [mailto:
Sent: Tuesday, December 02, 2008 11:26 AM
To: Stone, Danny
Subject: RE: Updated: Information Meeting With Mississaugas of the New Credit First Nations.

Dear Mr. Stone;

Sorry for not getting back to you sooner but I have off sick. There are only a couple of dates available before Christmas break. I have December 12, 16,and the17, open. Let me know if this is suitable.

Thanks

Chief Bryan

-----Original Message-----
From: Stone, Danny [mailto:Danny.Stone@hamilton.ca]
Sent: Thursday, October 16, 2008 10:31 AM
To: Banuri, Syeda; Paul MacLeod; Chief Bryan LaForme; TOE, Assistant Environmental Planner
Cc: Shepley, Amanda; Lee-Morrison, Christine
Subject: Updated: Information Meeting With Mississaugas of the New Credit First Nations.

When: Thursday, October 16, 2008 11:00 AM-1:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where: 77 James Street North, Hamilton Ont. Unit # 320. 350 B

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Chief Laforme is unable to attend Oct 16th scheduled meeting. We will be rescheduling.

Informational Meeting with Mississaugas of the New Credit First Nations.
77 James Street North, Hamilton Ont. Unit # 320
Boardroom 350 B

If there are any questions or equipment required please feel free to contact me.

Regards,

Danny Stone
Project Manager
Waterfront Recreation
Environmental Planning
Capital Planning and Implementation
Public Works
City of Hamilton
PH. 905-546-2424 ext. 5102.
FAX. 905-546-4435
Danny.Stone@hamilton.ca

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From: Stone, Danny
Sent: January 13, 2009 12:50 PM
To: 'bryanlaforme@newcreditfirstnation.com'
Subject: Re: Waterdown Aldershot Transportation Master Plan Information Meeting

Waterdown Aldershot Transportation Master Plan Informational Meeting. Friday, January 23, 2009 10:30 AM-12:30 PM.

77 James Street North, Hamilton Ont. Unit # 320
Boardroom TBD

If there are any questions or equipment required please feel free to contact me.

Regards,

Danny Stone
Project Manager
Waterfront Recreation
Environmental Planning
Capital Planning and Implementation
Public Works
City of Hamilton
PH. 905-546-2424 ext. 5102.
FAX. 905-546-4435
Danny.Stone@hamilton.ca

-----Original Message-----
From: Bryan LaForme [mailto:bryanlaforme@newcreditfirstnation.ca]
Sent: Wednesday, January 07, 2009 10:29 AM
To: Stone, Danny
Subject: RE: Waterdown Aldershot Transportation Information Meeting

Hi Dan
A couple of dates are good for me Jan 22,and Jan 23. If this fits with your schedule please confirm.

Have a nice day

Chief Bryan LaForme

-----Original Message-----
From: Stone, Danny [mailto:Danny.Stone@hamilton.ca]
Sent: Tuesday, January 06, 2009 9:55 AM

Presentation Slides

Municipal Class Environmental Assessments

Waterdown Road Corridor (North Service Road to Dundas Street)
New East – West Road Corridor (Highway 6 to Brant Street)

Meeting with The Mississaugas of the New Credit First Nations

Introductions

Meeting Agenda

- Meeting Purpose
- Presentation
  - Background of the Projects
  - Current Status
  - Review of Current Proposed Design Concept – Waterdown Road Corridor
  - Review of Current Proposed Design Concept – East-West Road Corridor
  - King Road Technical Feasibility Study
  - Review of Outstanding Work & Issues
  - Schedule
- Discussion
- Adjourn

Meeting Purpose

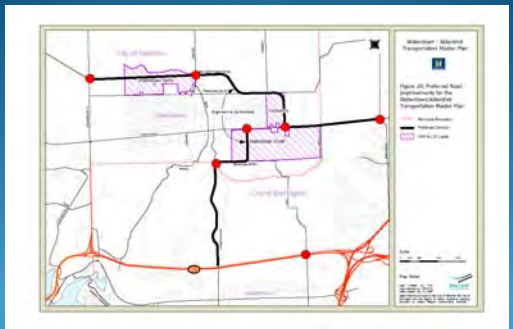
To present the project and discuss any items of concern/interest of The Mississaugas of the New Credit First Nations

Project Background

Waterdown / Aldershot Transportation Master Plan (TMP) Report Recommendations

- TMP initiated to assess transportation requirements of proposed developments
- Completed in February 2008
- Recommendations from TMP Report (Phase 2):
  - Implement transit service and TDM measures to reduce trips (10%);
  - Improve walking and cycling facilities and policies to promote these modes;
  - Implement intersection improvements to maximize the use of existing facilities; and
  - Road capacity improvements including: Waterdown Rd. & a new East-West roadway.
- Burlington's request to consider improvements to King Road to address road safety issues (King Road Technical Feasibility Study)
- Burlington's request to consider phasing of a 3-Lane option for Waterdown Road

Recommended Road Improvements



Aerial Photo

Class EA Phase 3 & 4 Process Current Status

- Data Collection in study area
  - Status: largely complete including natural science inventory
- Identify alternatives
  - Status: alternatives identified/developed
- Evaluation of alternatives
  - Status: Largely complete– preliminary recommendations identified
- Development of preliminary design
  - Status: Nearing completion
- Consultation (Neighbourhood Advisory Committees, Public and Agency)
  - Status: Ongoing
- Report Preparation (separate reports for each project)
  - Status: Ongoing

Waterdown Road Corridor

- Four lanes on Waterdown Road and Mountain Brow Road
- New "mid-block" roadway through future subdivision
- Reduced posted speed (50 k/hr)
- New alignment section at south end (to be confirmed)
- Retaining wall at south end (east side) adjacent to Sassafras Woods
- Roundabouts on mid-block connector road
- New crossing of Grindstone Creek tributary on mid-block connector road
- Restricted movements at Dundas Road intersection
- Improved drainage
- Enhanced landscaping/streetscaping plan

Waterdown Road Corridor Main Public Feedback/Concerns

- Proximity of new road to residences/property impacts
- Bruce Trail crossings
- Road safety/traffic speeds/slight lines
- Backing out onto road from driveways
- Storm water concerns

New East-West Road Corridor

- Basic 2-lane road (4 lanes on Parkside Drive section)
- Widening of Dundas Street to 6-lanes
- New intersection at Highway 6
- Use of roundabouts where ever possible
- Crossings of Borer's Creek and Grindstone Creek
- Environmental concerns at Centre Road Provincially Significant Woodlot
- Reduced posted speed (50 k/hr)
- Enhanced landscaping/streetscaping plan

East – West Corridor Main Public Feedback/Concerns

- Preferred northern option at Highway 6
- Traffic noise
- Northlawn resident's issues with proximity of new road/suggestions for a more northern routing
- Traffic safety/reduce travel speeds/traffic calming
- Social/property impacts along Parkside Drive
- Alexander Place impacts
- Preference for northern options
- Railway crossing
- Linking the East-West corridor with the new north-south corridor

King Road Technical Feasibility Study

- Alternatives currently being developed and assessed:
  - Do Nothing
  - Two-lane reconstruction (20 km/h posted speed)
  - Convert to a one-way road (north bound) through escarpment
  - Convert to alternating one-way road through escarpment (south bound in a.m., north bound in p.m.) using traffic control signals
  - Close road
- Additional natural environmental data collection work
- Detailed plans of new construction alternative developed
- Evaluation of alternatives to be completed in near future
- Reviews of evaluation with external agencies
- Preliminary conclusions to be available at next round of public meetings

Outstanding Work & Issues

- Alignment through North Waterdown and Center Road PSW
- Alignment through south end of Waterdown corridor
- Structure treatments at creek crossings
- Stormwater management assessment & recommendations
- Creek realignment concepts
- Utilities
- Streetscaping proposals
- Property requirements
- Costing
- Implementation and phasing
- Advancing permitting

Schedule

- Neighbourhood Advisory Committee Meetings at end of October
- Final round of Public Information Centres in early November
- Report(s) filing in Spring 2009 (30 day public review period)
- Design, property purchase and construction not currently scheduled –dependent on approvals and rate of development

Discussion

Please note that as part of the required stakeholder and agency consultation, proponents are advised to contact the following agencies – to determine potentially affected Aboriginal communities in the project area:

1. **The Ontario Secretariat for Aboriginal Affairs**
   (Contact: Ms. Pam Wheaton, Director, Policy and Relationships Branch, Ontario Secretariat of Aboriginal Affairs, 720 Bay St., 4th Floor, Toronto ON M5G 2K1; fax: 416-326-4017; pam.wheaton@ontario.ca)

2. **Indian and Northern Affairs of Canada – Specific Claims Branch**
   (Contact: Mr. Don Boswell, Senior Claims Analyst, Specific Claims Branch, Department of Indian and Northern Affairs, 10 Wellington St., Room 1310, Gatineau QC K1A 0H4; fax: 819-956-2258; boswelld@inac.gc.ca);

3. **Indian and Northern Affairs of Canada - Litigation Management and Resolution Branch**
   (Contact: Mr. Franklin Roy, Director, Litigation Management and Resolution Branch, Department of Indian and Northern Affairs, 10 Wellington Street, Gatineau QC K1A 0H4; fax: 819-997-1679; royf@inac.gc.ca);

4. **Indian and Northern Affairs of Canada - Comprehensive Claims Branch**
   (Contact: Ms. Louise Trepanier, Director, Claims East of Manitoba, Comprehensive Claims Branch, Department of Indian and Northern Affairs, 10 Wellington St., Room 1310, Gatineau QC K1A 0H4; 819-953-3109; trepanierl@inac.gc.ca)

5. **Ministry of the Attorney General – Aboriginal Legal Issues Office**
   (Contact: Mr. Grant Wedge, Council, Crown Law Office-Civil, Ministry of the Attorney General, 720 Bay Street, 8th Floor, Toronto ON M5G 2K1; fax: 416-326-4181; grant.wedge@ontario.ca)

Once identified, you are advised to provide notification directly to the Aboriginal communities who may be affected by the project and provide them with an opportunity to participate in any planned public consultation sessions and comment on the project.

Letters to First Nations

Public Works Department
Capital Planning and Implementation
77 James Street North, Suite 320
Hamilton, ON L8R 2K3
905-546-2424 ext.5650 (Telephone) ~ 905-546-4435(Facsimile)

February 13, 2008

Dear (*NAME*):

Subject: ***Waterdown/Aldershot Transportation Master Plan – Public Information Centres***

The Waterdown/Aldershot Transportation Master Plan (WATMP) is being undertaken by the City of Hamilton, the City of Burlington and the Halton Region. The purpose of the Master Plan is to identify a future transportation network required to accommodate urban development in the community of Waterdown.

The *Waterdown/Aldershot Transportation Master Plan – Phase 2 Report* recommends methods to increase transportation capacity to accommodate future urban development in the community of Waterdown in the City of Hamilton and the community of Aldershot in the City of Burlington.

The *Waterdown/Aldershot Transportation Master Plan – Phase 2 Report* recommends a number of methods for increasing transportation capacity: public transit, bike routes, transportation demand management, and roadway improvements. The roadway improvements include a north-south route (widening Waterdown Road) and a combination of new roadways and road improvements to service future east-west capacity (please see Figure 1 below).

The Project Partners are now preparing to commence Phase 3 & 4 for two Class EA projects that have been identified by the Waterdown/Aldershot Transportation Master Plan. The North-South Road (Waterdown Rd) Class EA and the East-West Road Class EA will both be undergoing detailed community consultation. In preparation for these two studies, two Public Information Centres will be held to:

- Present the final *Phase 2 Report (Waterdown-Aldershot Transportation Master Plan)*; and,
- Discuss the proposed technical work program and public consultation and outreach plan (contained in a *Path Forward Report* which can be found on the project website, www.hamilton.ca/WaterdownTMP).

You are invited to attend these meetings at the following dates and locations:

Wednesday March 5, 2008	***Thursday March 6, 2008***
5:00PM - 8:00PM	5:00PM - 8:00PM
Crossroads Centre	St. Thomas the Apostle Parish Hall
1295 North Service Rd, Burlington, ON	715 Centre Road, Waterdown, ON

Please visit our website to pre-register for these sessions and to get more information: www.hamilton.ca/WaterdownTMP.

Given the history and location of your community to the City of Hamilton and the City of Burlington, your input is important in the planning process. If you have an interest in this project we would appreciate your participation at these meetings or if you would prefer we could mail you

further documentation or information that is available with regards to the project and hold a separate meeting at your earliest convenience to discuss the project in further detail.

On behalf of the City of Hamilton, we look forward to your involvement in the planning process for the Waterdown/Aldershot Transportation Master Plan Project.

If you have any questions please contact the Neutral Community Facilitator's Office at (905) 818-8464 or by email at info@waterdown-aldershot.ca.

We will be contacting you within the next few weeks to discuss your interest in participating in the Waterdown/Aldershot Transportation Master Plan Project.

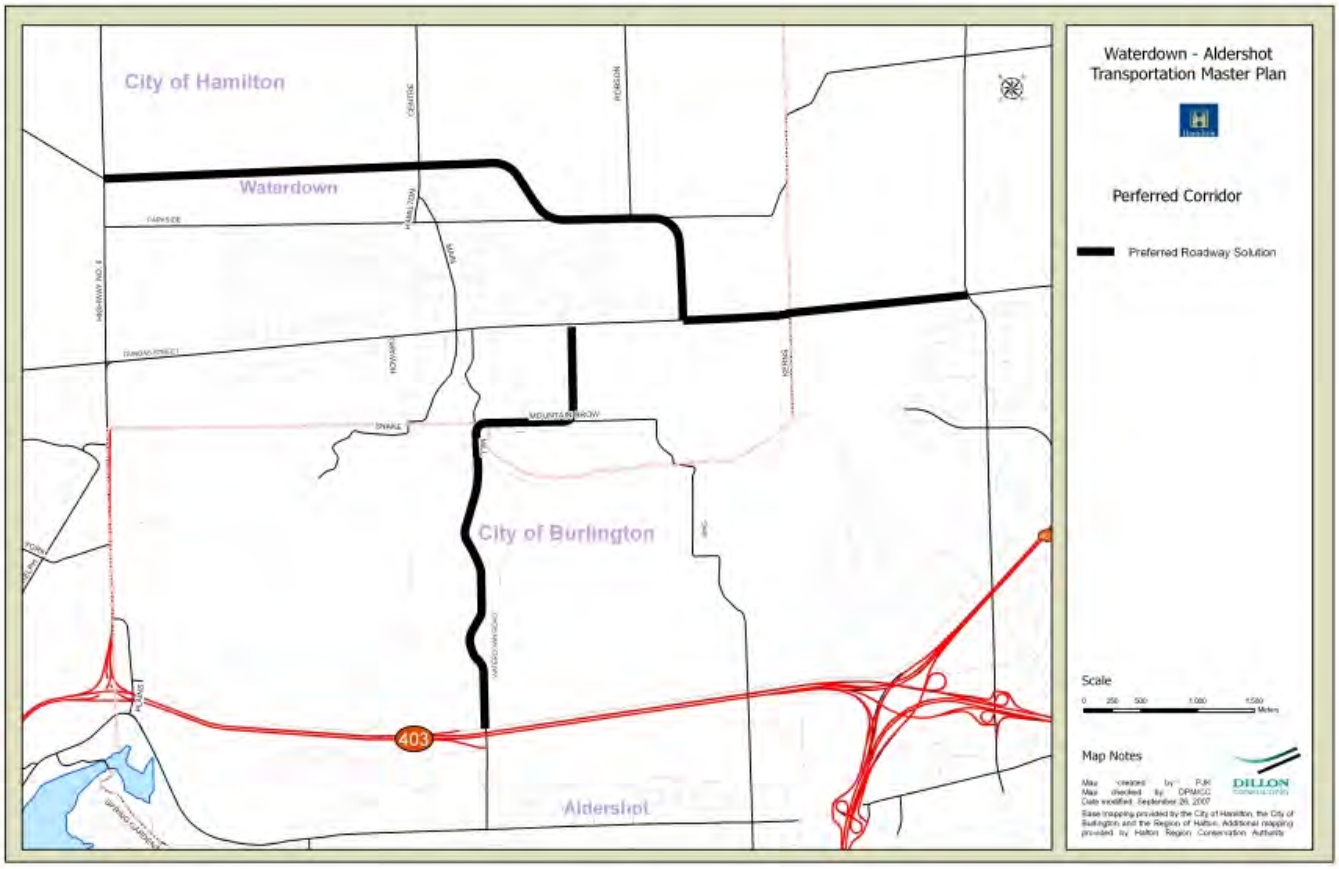
Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Very truly yours,

Diana Morreale, MCIP, RPP
Senior Project Manager
Environmental Planning
Public Works
City of Hamilton

Cc: Don McKinnon, Dillon Consulting
Sally Leppard, Consultant, Lura Consulting

Figure 1: Map of Preferred Routes



City of Hamilton
Public Works Department
Capital Planning and Implementation
77 James Street North, Suite 320
Hamilton, ON L8R 2K3
905-546-2424 ext.4101Telephone) ~ 905-546-4435(Facsimile)

June 12, 2008

Dear (*NAME*)

Subject: ***Public Information Centres #1 – Phase 3 & 4 Municipal Class Environmental Assessment – New East-West Corridor and Waterdown Road Corridor***

In accordance with the Municipal Engineers Association's Municipal Class Environmental Assessment Process, the City of Hamilton, City of Burlington and the Region of Halton ("Project Partners") recently completed the Waterdown-Aldershot Transportation Master Plan (WATMP). This plan identified a future transportation network that will service proposed residential/urban development in the community of Waterdown.

The Waterdown-Aldershot Transportation Master Plan – Phase 2 Report (copy included) recommended a variety of methods to increase transportation capacity including public transit, bicycle routes, transportation demand management and road improvements. The study is now considering the preferred corridors (see Figure 1 attached):

- New East-West Corridor
- North-South Corridor (expansion of Waterdown Road)

Consideration in Phase 2 was given to elements including:

- natural environment;
- property impacts;
- transportation and traffic operations;
- social effects (air, noise, etc.); and
- cost

The roadway improvements include a north-south corridor (Waterdown Road) and a new east-west corridor as shown in bold on the map (Figure 1). The two preferred corridors are considered as schedule "C" projects under the Municipal Engineer's Municipal Class Environmental Assessment Process and must proceed under the full planning and documentation procedures specified in the Municipal Engineer's Association Municipal Class Environmental Assessment document (October 2000 as amended in 2007). According to the document, Schedule "C" projects require that alternative design concepts be developed and evaluated in detail considering natural, social and economic environments with public and agency input (Phase 3) and an Environmental Study Report be prepared and filed for review by the public and commenting agencies (Phase 4).

Currently, The Project Partners are engaged in Phase 3 of the Municipal Class Environmental Assessment process. Agency and Public Consultation is a key part of the process and further Notices for future public consultation events will be published as the process moves forward. Shortly, a series of Public Information Centres will be held, and we would like to take this opportunity to make you aware of the following dates/times/locations:

Tuesday, June 24th, 2008	***Thursday June 26th, 2008***
6:00PM - 8:30PM	6:00PM - 8:30PM
St. Thomas the Apostle Parish Hall	Crossroads Centre
715 Centre Road, Waterdown, ON	1295 North Service Rd, Burlington, ON

If you require any further technical information in advance of these meetings, please visit our website at: www.hamilton.ca/WaterdownTMP.

If you have an interest in this project, we would appreciate your participation at these meetings or if you would prefer we could mail you further documentation or information that is available with regards to the project and hold a separate meeting at your earliest convenience to discuss the project in further detail.

Information will be collected in accordance with the **Freedom of Information and Protection of Privacy Act.** With the exception of personal information, all comments will become part of the public record**.**

On behalf of the Project Partners, we look forward to your involvement in the planning process for the Waterdown/Aldershot Transportation Master Plan Project.

Very truly yours,

Syeda Basira Banuri, M. Eng
Senior Project Manager
Capital Planning & Implementation
Public Works, City of Hamilton
Tel: 905-545-2424 ext 4101
Fax: 905-546-4435
Email: sbanuri@hamilton.ca

Cc: Paul MacLeod, Dillon Consulting
Sally Leppard, Consultant, Lura Consulting

Figure 1: Map of Preferred Routes