Appendix 8G

Social/Community Impacts

December 2010

METROLINX

An agency of the Government of Ontario

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SOCIAL/COMMUNITY IMPACTS
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OVERVIEW

Metrolinx commissioned the *GO Electrification Study* to examine how to best accomplish the goals of *The Big Move* (2008) over the next 25 years. The overriding purpose of the Study is to provide Metrolinx' Board of Directors with the information necessary to make an informed decision on whether to meet future service requirements by using conventional and future diesel powered trains or by utilizing trains powered by electricity or alternate means.

Social Community Impact Assessment (SCIA) is a systematic assessment used to identify and evaluate the potential effects and impacts on the day-to-day lives of people (individuals/households); institutions, community and recreation features; and communities. The impacts may be positive or negative. The assessment can provide information used to assist in decision-making with respect to comparison/selection of options or alternatives or the detailed assessment of a preferred option. SCIA complements and integrates the studies of other specialized disciplines with information on the social environment likely to be affected by a proposed development.

The construction and operation of alternative rail transportation technologies can result in social community impacts – some positive, others negative. Changes in noise and vibration levels, air quality and visual effects can affect the use and enjoyment of property, resulting in a change in satisfaction by residents, alteration in community character, or the operation of institutional, community and recreation features in the study area. Displacement of residents and institutional, community and recreation features may also occur if land is required for an option, with implications for residents, users and operators or community facilities and networks in the community. However, using the data on predicted effects, examined with case study experience and professional judgement, it is possible to provide an indication of what will most likely happen.

This White Paper provides:

- An overview of the considerations associated with the social community discipline;
- Assumptions for the social community impact assessment;
- A description of the relationship with other disciplines;
- Criteria, indicators and data sources for the social community impact assessment;
- The social community impact assessment; and
- Conclusions.

A listing of background documentation is also provided.

SCIA FINDINGS

To determine an overall rating for social community impacts, a numerical scoring system was employed. This system assumes that all disruptions are equal weight**.** The scale is as follows:

Strong positive impact:	+3
Moderate positive impact:	+2
Slight positive impact:	+1
Neutral/No impact:	0

Slight negative impact: -1

Moderate negative impact: -2

Strong negative impact: -3

This scale has been applied to achieve an overall social community rating in the table below.

Option	Noise	Vibration	Visual	Construction	Overall Rating	
1	0	0	-1	-1	-2	Moderate negative
2	0	0	-1	-1	-2	Moderate negative
3	0	0	-1	-1	-2	Moderate negative
11	0	0	-1	-1	-2	Moderate negative
15	+1	+1	-2	-1	-1	Slight negative
18	+1	+1	-2	-2	-2	Moderate negative

CONCLUSION

From the social community perspective, the slight positive impacts from electrification achieved through reduced noise and vibration effects will be offset somewhat by the visual and construction impacts associated with each option. All six options will have residents, and users of community, institutional and recreation features within the zones of influence experiencing some negative social community impacts due to visual and construction effects.

1. INTRODUCTION

1.1. GO Electrification Study

Metrolinx commissioned the *GO Electrification Study* to examine how to best accomplish the goals of *The Big Move* (2008) over the next 25 years. The overriding purpose of the Study is to provide Metrolinx' Board of Directors with the information necessary to make an informed decision on whether to meet future service requirements by using conventional and future diesel powered trains or by utilizing trains powered by electricity or alternate means. In summary, the key questions addressed in the Electrification study are:

- Is there a case for the electrification of GO Transit?
- …If so, how can this be done?
- …where and when should it be done?

In order to answer these questions it was important to understand the key attributes of electrification and other options. The trade-offs between different rolling stock technologies, including electric and diesel trains, associated infrastructure and operational considerations were assessed during the Electrification Study.

1.2. Six Short-Listed Options

Six short-listed options were identified in a Network Option Evaluation Report in September 2010. These are options for where on the GO Transit network – on one or more of the existing or planned GO rail lines – "short listed" alternative rolling stock technologies could be deployed in the future. The geographic extent of the six options is shown in Figures 1 to 6 (all involve use of electric locomotives):

Figure 1: Option 1 Georgetown

Option 1: Georgetown

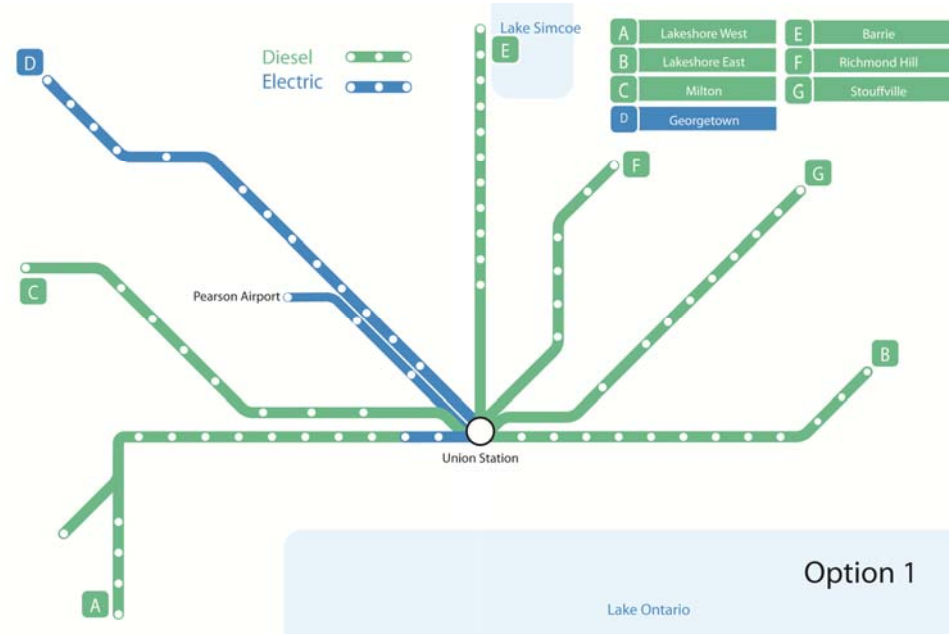


Figure 2: Option 2 Lakeshore West/East

Option 2: Lakeshore West/East

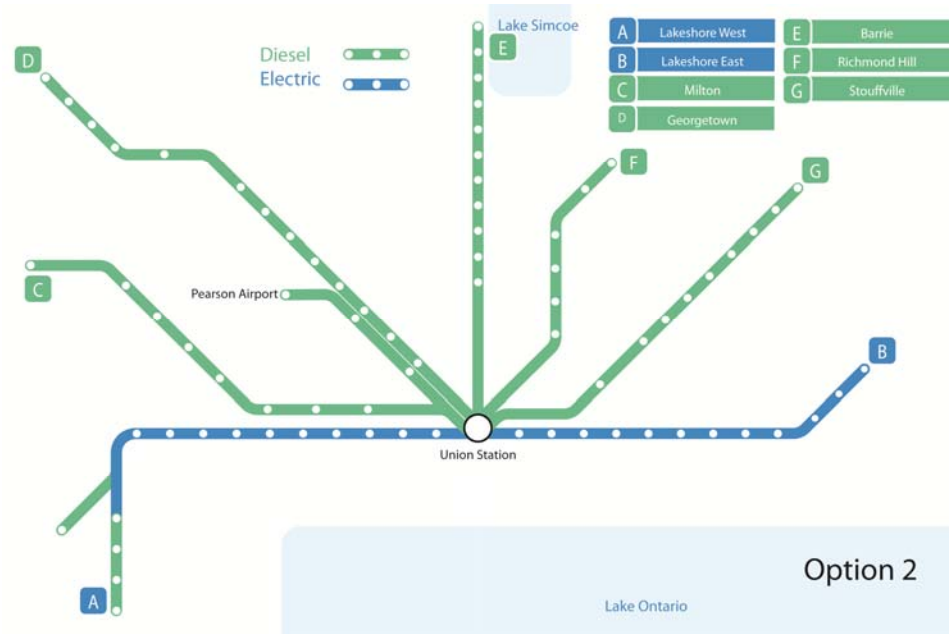


Figure 3: Option 3 Lakeshore West/East and Georgetown

Option 3: Lakeshore West/East and Georgetown

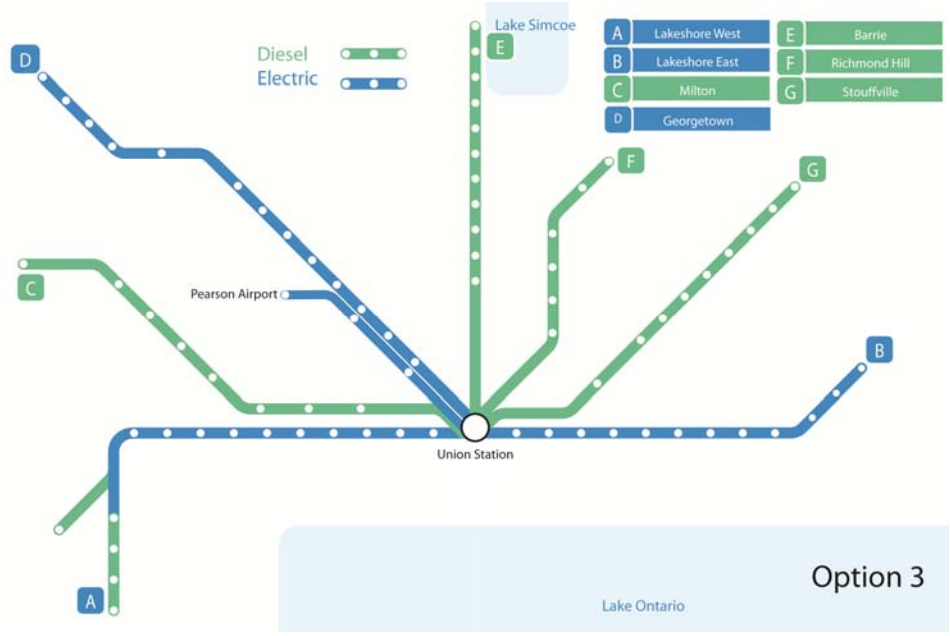


Figure 4: Option 11 Lakeshore West/East Georgetown and Milton

Option 11: Lakeshore West/East Georgetown and Milton

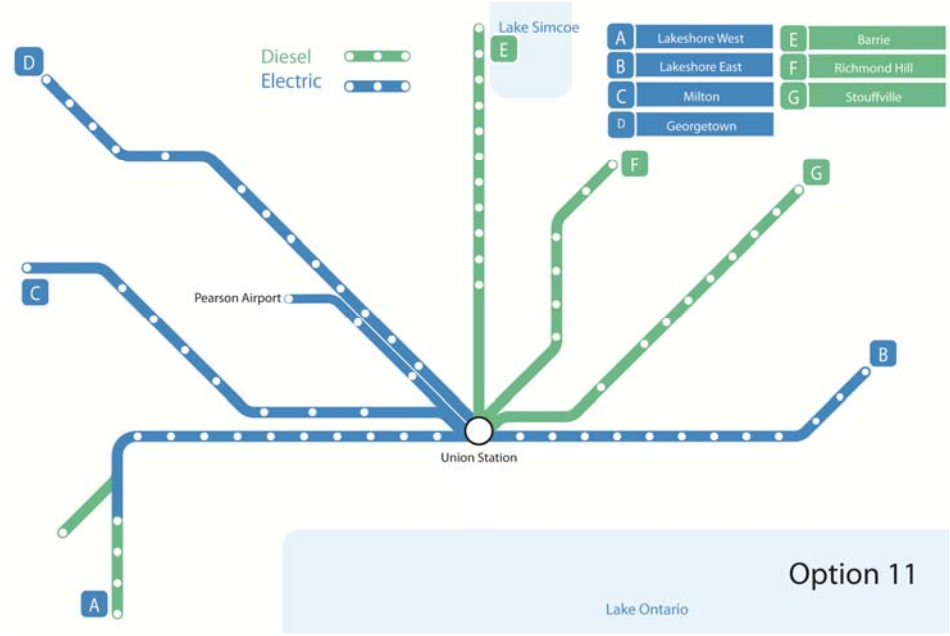


Figure 5: Option 15 Lakeshore West/East Georgetown Milton and Barrie

Option 15: Lakeshore West/East Georgetown, Milton and Barrie

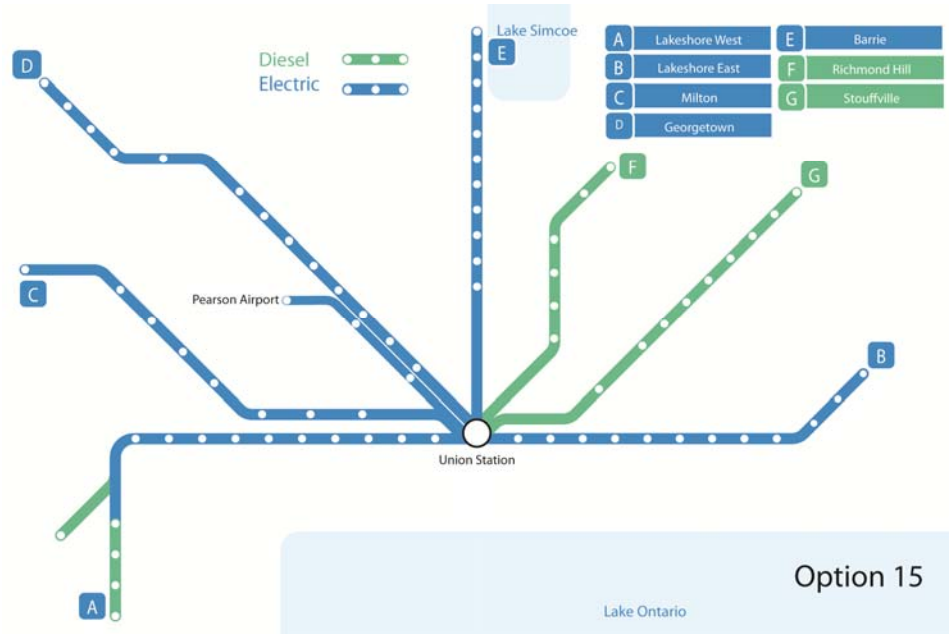
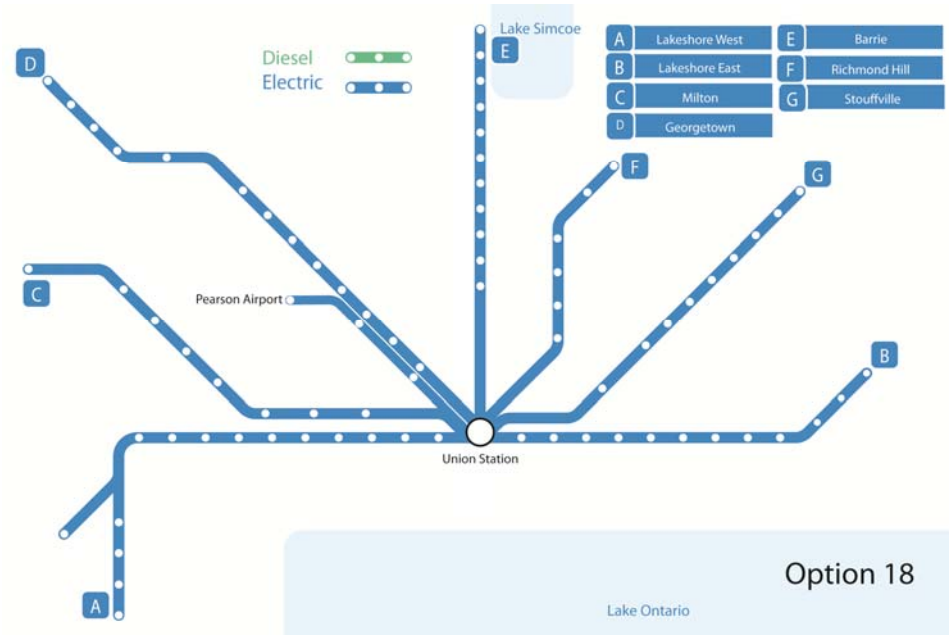


Figure 6: Option 18 - All

Option 18: All



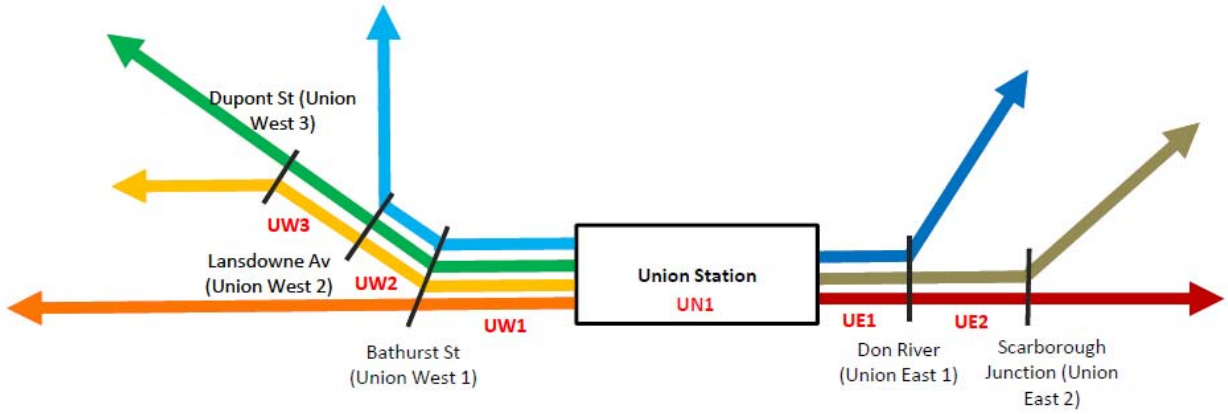
1.3. Reference Case

In the detailed assessment, the six short-listed options were compared to a Reference Case, that was developed for comparative purposes. It represents a reasonable scenario for future GO Transit service which incorporates existing attributes and approved/planned enhancements of GO Transit network, rolling stock, rail infrastructure and service levels consistent with the GO2020 service vision. The Reference Case, prepared specifically for the Electrification study, includes a high level service concept (not a plan), which is one possible outcome, subject to detailed feasibility, passenger demand and capital/operating funding. The Reference Case provides a consistent basis and assumptions for comparing future technology and network options as part of the electrification study."

To facilitate the detailed assessment of the six short-listed options, each corridor was divided in two distinct segments, as shown in Figure 7:

Figure 7 GO Transit Rail Network and Corridor Segments

Figure 8 Union Station Corridor Segments



2. OVERVIEW OF CONSIDERATIONS ASSOCIATED WITH THE SOCIAL COMMUNITY DISCIPLINE

Social Community Impact Assessment (SCIA) is a systematic assessment used to identify and evaluate the potential effects and impacts on the day-to-day lives of people (individuals/households); institutions, community and recreation features; and communities. The impacts may be positive or negative. The assessment will provide information used to assist in decision-making with respect to comparison/selection of options or alternatives or the detailed assessment of a preferred option. SCIA complements and integrates the studies of other specialized disciplines with information on the social environment likely to be affected by a proposed development.

The construction and operation of alternative rail transportation technologies can result in social community impacts – some positive, others negative. Changes in noise and vibration levels, air quality and visual effects can affect the use and enjoyment of property, resulting in a change in satisfaction by residents, alteration in community character, or the operation of institutional, community and recreation features in the study area. Displacement of residents and institutional, community and recreation features may also occur if land is required for an option, with implications for residents, users and operators or community facilities and networks in the community. However, using the data on predicted effects, examined with case study experience and professional judgement, it is possible to provide an indication of what will most likely happen.

Technical studies conducted by the Electrification Study Team such as Noise, Vibration, and Air Quality served as inputs to the assessment of the potential change in the use and enjoyment of property by residents, users of institutional, community and recreation features, and potential effects on community character: Change can be examined in terms of thresholds such as guidelines, standards or policies, and in terms of overall change from existing conditions, or the combined effects of disruption (e.g., noise and vibration). For example, noise effects related to an alternative may be within provincial guidelines, but still represent a significant change from ambient noise levels. The assessor must use judgment in evaluating these types of changes and their potential effects. Community character can be modified in a more general way by alterations to the ambient environmental conditions, and changes in aesthetics, accessibility etc.

3. INPUT DATA

The general approach for the Catchment Area Analysis included the identification of the types of institutional, community and recreation facilities to be considered.

The following information was gathered as input data for the SCIA and is given in Table 1:

Table 1: Input from Other Disciplines to SCIA

Discipline	Input to Social Community Impact Assessment
Air Quality	• Predicted changes in air quality parameters for residents/households and institutional, community and recreation features in the zone of influence
Noise	• Predicted changes in noise levels for residents/households and institutional, community and recreation features in the zone of influence
Vibration	• Predicted changes in vibration for residents/households and institutional, community and recreation features in the zone of influence
Visual/ Aesthetics	• Provision of visual images for catenary systems, sub-stations and autotransformer stations.
Stakeholder Engagement	• Information on community/stakeholder concerns regarding potential social community impacts.
Joint Venture – Technical/ Engineering Team	• Mapping of current GO rail network (track and stations) • Mapping of the relevant zone of influence for the detailed assessment of options • Overview of the six shortlisted technology options for detailed assessment • Data from Arup's the Population and Community Use Analysis (Appendix 8I) on projected population figures for the reference year 2021 and location, number and types of community, institutional and recreation facilities in the zone of influence.

4. CRITERIA, INDICATORS AND DATA SOURCES FOR THE SCIA

The detailed assessment utilized criteria/indicators for the analysis of the six short-listed options compared to the Reference Case. A brief discussion of the zone of influence is followed by a description of the criteria, indicators and data sources used for the SCIA.

4.1. Zone of Influence

The zone of Influence that was used for the SCIA was defined based on potential noise and vibration impacts. The zone of influence as the Zone defined by the distance from the centre of the rail corridor within which GO & ARL [airport rail link] operations are expected to result in a notable [noticeable] change in noise or vibration relative to existing ambient levels. Refer to Appendix 8E.

The Zones of Influence for noise and vibration were determined based on:

- A change of 5 dB above typical ambient levels for noise (assumed at 55/50 dBA for day/night respectively), or an overall level of 60 dBA (day) and 55 dBA (night); and
- For vibration, a perceptibility limit of 0.14 mm/s maximum RMS passby velocity.

The population and the number and types of community, institutional and recreation features were determined for the zone of influence for each segment along each rail corridor. The assessment of potential disruption to populations and community, institutional and recreation features within these zones was carried out for each of the six short-listed options.

4.2. Criteria, Indicators and Data Sources – Detailed Assessment

Proposed Criteria, Indicators and Data Sources

The criteria identified for use for the assessment of social community impacts for the six options are listed below:

1. Displacement of households/residents
2. Displacement of institutional, community and recreation features
3. Change in the use and enjoyment of property by residents
4. Change in the use and enjoyment of institutional, community and recreation features
5. Change in community character

Given that there will be no displacement of residents or institutional, community and recreation features related to the electrification options, the first two criteria were not applicable. Table 2 provides the description of the criteria, indicators and data sources for the remaining three criteria carried forward for use in the SCIA.

Table 2: Social Community Impact Assessment - Criteria, Indicators and Data Sources

Criteria	Rationale	Indicators	Data Sources
1. Change in the use and enjoyment of property by residents within the zone of influence	This criterion addresses the potential for changes – both positive and negative - in residents' use and enjoyment of their property in the zone of influence. *It should be noted that noise levels are anticipated to improve with Tier 4 diesel or electric options, relative to current conditions. Overhead catenary infrastructure associated with electric options may result in visual impacts for nearby residents.*	• Estimated number of residents experiencing a change in environmental conditions (e.g., noise, vibration, air quality, visual effects etc.). Will need to account for both 'improved' and 'negatively affected' conditions for residents.	• Catchment Area Analysis • Other study team members (e.g., engineering; noise; vibration, air quality) • Stakeholder engagement program results
2. Change in the use and enjoyment of institutional, community and recreation features within the zone of influence	This criterion addresses the potential the potential for changes – both positive and negative - in the use and enjoyment of institutional, community and recreation features located within the study area. Potentially sensitive 'Institutional, community and recreation features' (public or private) may include: • schools • hospitals • day care centres	• Number and type of institutional, community and recreation features**.** Will need to account for both 'improved' and 'negatively affected' features. • Measures include: - noise, vibration, visual and air quality impacts - direction of change (i.e., positive or	• Mapping along GO rail corridors affected by the options • Other study team members (e.g., engineering; noise; vibration, air quality) • Public and stakeholder engagement program results

Criteria	Rationale	Indicators	Data Sources
	• nursing homes • community centres • places of worship • parks and recreation areas	negative) - degree of change	
3. Change in community character	Communities may be urban, suburban, or rural in nature. Community character refers to the distinctive qualities of a community, which can be physical (land uses, environmental features, environmental conditions, landscape values), or socio-cultural (way of life, shared values and perspectives). The character of a community is a function of the mix of these qualities and the meaning /symbolism that residents attach to them. The intent is to minimize disruptive effects on communities, and optimize positive effects, caused by cumulative changes in the community environment (e.g., noise, air quality; visual impact).	• Direction (positive/negative) and degree of change in ambient environmental conditions (e.g., noise, vibration, air quality, visual) • Potential changes in land use trends. The electrification options may induce development which may be viewed as being either negative or positive. These projects may support or conflict with land use objectives of municipalities.	• SCIA findings related to change in use and enjoyment of property/ community features • Input from other study team members (e.g., engineering; noise; vibration, air quality) • Provincial planning and development information • Regional municipal plans or policies related to existing/future development along GO rail network • Stakeholder engagement program

5. SOCIAL COMMUNITY IMPACT ASSESSMENT

5.1. Considerations for the Assessment of social community Impacts

The overall objective of the detailed assessment of the short-listed options by the social community discipline is to describe and rate the social community impacts. A reasoned argument approach was taken to the evaluation, taking into account what is known with certainty, what can reasonably be expected, and the degree of confidence in what can be reasonably expected. Quantitative (where data is available) and qualitative descriptions of the potential impacts for each option were prepared in terms of the criteria and indicators described in Table 2.

5.2. Assumptions for the Assessment of social community Impacts

There are a number of assumptions and limitations associated with the assessment of the social community impacts of the six electrification options:

1. Population figures projected to the Year 2021 for each corridor segment based on the zones of influence for noise and vibration, were derived from those developed for 2031. For the year 2031, there was incomplete data for the following segments: LW4 (where 2031 information was available for only part of the segment) and GT3 & BA2 (for which only 2006 information was available) (see Figure 7).
2. Information on the number and type of institutional, community and recreation features was was obtained from the catchment area analysis. Projections to the year 2021 for the number, type and location of institutional, community and recreation features were not available. The data used reflects current information on institutional, community and recreation features.
3. No new fencing or barriers for the purpose of protecting the public from any potential hazard would be required for electrification. Any fencing or barriers would be associated with an overall increase in train volumes and related noise rather than electrification per se. Thus, the potential social community impact of fencing was not assessed.
4. . The need for grounding within 250m of the nearest rail, as required, for structures, buildings, station platforms, fencing, pipelines, above-ground fuel tanks and other utilities, may negatively interfere with and impact adjacent properties. However, given that the visual and construction impacts are considered minor, and the potential disruption of residents' properties of very limited duration, this disruption is considered a minor impact.
5. Although new electrical sub-stations would be required for electrification, their specific locations would be determined during future detailed design and assessment, if Metrolinx proceeds with electrification. There may be some land taking for sub-stations and autotransformer stations, but the locations of these have not been determined and so are not used in the SCIA.

6. There will be no new passenger stations as a result of electrification; any new stations will be constructed as a result of overall system enhancement rather than electrification.
7. Replacement of at-grade crossings with cul-de-sacs or underpasses/overpasses is not anticipated as a result of electrification. If required, such replacements would be due to service level increases and are considered as part of the Reference Case.
8. There will be no displacement of residences or institutional, community and recreation features due to electrification.
9. Eleven bridges will require reconstruction/rebuilding to a higher level, resulting in some construction impacts for a period of up to one year.
10. Electrification will require reconstruction of an underground tunnel on Hunter Street in Hamilton (for Option 18 only). This reconstruction involves entirely rebuilding the tunnel from Queen Street to Park Street. Social community impacts from the construction, estimated to extend for 3 years or more, are likely to be significant, affecting primarily high rise residential populations.
11. Residential/commercial/industrial intensification around stations is not anticipated due to electrification. The increase in GO service may result in increased development density but this is not due to specifically electrification; there may be a minor influence due to assumed reduced journey times using electric trains. Regional municipal plans anticipate higher infilling around transit stations, regardless of electrification.

5.3. Noise and Vibration Effects

The Noise and Vibration Impacts Appendix 8E assessed the potential for change in the levels of noise and vibration among the six short-listed options.

This noise and vibration assessment evaluates the relative benefits of various options for electrification of GO Transit's rail system. A short-list of six electrification options was considered, representing electrification of different parts of the network as well as electrification of the complete network. These options were compared to the Reference Case, a hypothetical future operating scenario based on the operation of Tier 4 diesel technology throughout the rail network.

The influence of noise and vibration was considered in comparing the six electrification options. For noise and vibration, the relative benefit depends strongly on the magnitude of the change between the Reference Case and the electrification option being considered. In addition, any potential benefit depends on the current noise and vibration levels in the affected areas. Since sound and vibration behave logarithmically, a relatively large change in level is necessary to result in significant perceptible benefits.

The benefit of electrification also depends on where a receptor is situated. Locomotive noise and vibration emissions are most concentrated within or immediately adjacent to the rail corridor and become less influential farther away. Therefore, it is of interest to know how many people live within a certain distance of the corridors, where the benefit is greatest.

Noise

The following considerations for the noise assessment are as per the following extract from Appendix 8E:

> Sounds of varying types are present throughout our environment and humans evaluate its influence in a subjective way. Unwanted sounds, or noise, tend to produce annoyance that leads to emotional responses and various social and societal issues. Naturally-occurring sounds are generally well-accepted by people, while noise associated with human activities can be a concern. Most human activities generate noise, and as development expands into the environment, the evaluation of potential noise effects on the surroundings is often a consideration.
>
> Due to the wide dynamic range of the ear, fairly large changes in sound pressure are necessary to be perceived. Table 3 summarizes the human perception of various changes in sound level.

Table 3: Accepted Human Perception of Changes in Sound Levels

Change in Sound Level (dB)	Human Perception of Change
<3	Imperceptible change
4 – 5	Just-perceptible change
6 – 9	Clearly noticeable change
> 10	Substantial change (perceived as twice or half as loud)

Vibration

Appendix 8E describes vibration as follows:

> Vibrations travel through solid mediums as waves in a similar way to how sound travels through fluid mediums. Vibration is an oscillating motion with no net movement (i.e., moves positively or negatively around a reference point) that can be described in terms of displacement, velocity or acceleration. Displacement is generally the easiest to understand. For a vibrating floor, it represents the distance the floor moves away from its static position. Velocity is the instantaneous speed of the floor's movement and acceleration is the rate of change of the speed. The response of humans, buildings, and equipment to vibration is most accurately described using velocity and acceleration; hence, these are most commonly used in evaluating vibration...
>
> Similar to noise, vibration can also create nuisance effects that lead to annoyance and concern by affected receptors. These can include perceptible movements of structures or effects such as window or picture rattling. Perceptible vibrations are typically

generated by large moving masses or very loud sound levels (i.e., sound-induced vibration) at close distances to a receptor. As a result, vibration impacts are normally associated with large or heavy modes of transport, such as trains, airplanes, or large trucks rather than lighter modes of transport such as automobiles. Vibration levels can also differ within a mode of transport; for example trains tend to produce higher vibration emissions than lighter rail vehicles such as Light Rail Transit or Diesel/Electric Motive Units...

Vibration velocities in the 0.05 to 0.1 mm/s (i.e., 65 to 72 VdB) range represent the lower extreme of human vibration perception and are generally barely perceptible, if at all. Velocities in the 0.14 to 0.2 mm/s (i.e., 75 to 78 VdB) range may generate just perceptible vibration in residences which often causes annoyance. More frequent events (i.e., passbys every 5 to 10 minutes) use the lower end of this range while infrequent events use the higher range of the perception threshold. Based on these ranges, a change of at least 3 VdB would be necessary to change the perception from barely perceptible to just perceptible (i.e., 72 VdB to 75 VdB). Differences of less than 3 VdB are unlikely to be noticeable.

Assessment of Noise and Vibration Effects

The following criteria and indicators were used in the noise and vibration assessment:

Table 4: Noise & Vibration Detailed Assessment Criteria, Indicators and Data Sources

Criteria	Rationale	Indicators
Potential to affect the local noise environment	Diesel and electric options have differing noise characteristics and result in differing requirements for mitigation.	• Extent of noise Zone of Influence (i.e., areas where noise levels may exceed applicable thresholds). • Feasibility of mitigation.
Potential to affect the local vibration environment	Diesel and electric options have different locomotive and train characteristics, resulting in differing ground-borne vibration effects and mitigation requirements.	• Extent of vibration Zone of Influence (i.e., areas where vibrations may exceed applicable thresholds). • Feasibility of mitigation.

The approach to the assessment as described in Appendix 8E is provided below:

The basic assessment methodology and parameters are set out in the preceding sections (Section 2, 3 and 4). The results of the screening-level noise and vibration modeling were used to establish Zones of Influence in which the applicable criteria could be triggered. Graphical Information Systems were used to visualize influence areas and determine affected populations and sensitive receptors for each electrification option. The data on affected populations was then used to compare the various options for the GO Electrification study versus a Reference Case that assumes Tier 4 diesel locomotives over the entire network. The study indicators were used to qualitatively rate technology options with respect to each individual criterion and corridor. An overall rating was then derived for noise/vibration for each electrification option, based on the rankings for the individual criteria.

The assessment results for each option and by corridor segment are described as follows in Appendix 8E:

The area and affected population in the Zones of Influence for each option was determined using GIS for each corridor and segment. The average affected area and population across all the corridors were assessed for the overall option. Since electrification produces less noise compared to diesel, the Zones of Influence decrease in size with the addition of more electrification in each option. As a result, every option sees a decrease in the overall Zone of Influence compared to the Reference Case. This result is expected as electric locomotives are quieter than diesel locomotives and EMUs quieter than DMUs.

Generally, electrification of a specific corridor lowers the sound levels by the overall difference between the sound emissions of the diesel and electric technologies (i.e., 3 dB between diesel and electric locomotives, and 3 dB between DMUs and EMUs on the ARL) excepting some reduction due to the influence of wheel noise (i.e., most corridors will not see the full 3 dB reduction, but something closer to 2 dB). The overall average sound level reduction generally becomes smaller again (i.e., on the order of 1-2 dB) due to the influence of those corridors that see no change from the louder diesel trains. Similar results can be seen for vibration. No changes greater than 3 dB are seen for any corridor, segment, or option. Importantly, changes of this magnitude are small and generally remain imperceptible to most people.

In order to assess the relative overall benefit of each option, a qualitative rating scale was established based on the quantitative results. The rating scale is presented in Table 5 for both noise and vibration. The rating scale is based on the human perception to changes in sound and vibration per the MOEE / GO Transit Draft Protocol.

Table 5: Scale for Qualitative Scoring

Effect	Noise	Vibration
Strong Positive	Reduction of >6 dB	Reduction of >6 VdB
Moderate Positive	Reduction of 4-5 dB	Reduction of 4-5 VdB
Slight Positive	Reduction of 2-3 dB	Reduction of 2-3 VdB
Neutral	Increase/Reduction of 0-1 dB	Change of 0-1 VdB
Slight Negative	Increase of 2-3 dB	Increase of 2-3 VdB
Moderate Negative	Increase of 4-5 dB	Increase of 4-5 VdB
Strong Negative	Increase of >6 dB	Increase of >6 VdB

Table 6 details the outcome of the application of the qualitative rating scale to the assessment results.

Table 6: (RWDI Table 11) Summary of the Magnitude of Effects of Electrification

Option	Noise	Vibration
1	Neutral effect from imperceptible (< 2 dB) overall reductions affecting 261,165 people in 2021 (i.e., 7% less than the Reference Case)	Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 261,165 people in 2021 (i.e., 7% of the Reference Case)
2	Neutral effect from imperceptible (< 2 dB) overall reductions affecting 250,362 people in 2021 (i.e., 11% less than the Reference Case)	Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 250,362 people in 2021 (i.e., 11% less than the Reference Case)
3	Neutral effect from imperceptible (< 2 dB) overall reductions affecting 236,423 people in 2021 (i.e., 16% less than the Reference Case)	Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 236,423 people in 2021 (i.e., 16% less than the Reference Case)
11	Neutral effect from imperceptible (< 2 dB) overall reductions affecting 227,401 people in 2021 (i.e., 19% less than the Reference Case)	Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 227,401 people in 2021 (i.e., 19% less than the Reference Case)
15	Slight benefit from just perceptible (i.e. 2-3 dB) overall reductions affecting 219,041 people in 2021 (i.e., 22% less than the Reference Case)	Slight benefit from minor reductions in perceptible vibration (i.e. 2-3 VdB) affecting 219,041 people in 2021 (i.e., 22% less than the Reference Case)
18	Slight benefit from just perceptible (i.e. 2-3 dB) overall reductions affecting 195,414 people in 2021 (i.e., 30% less than the Reference Case)	Slight benefit from minor reductions in perceptible vibration (i.e., 2-3 VdB) affecting 195,414 people in 2021 (i.e., 30% less than the Reference Case)

Table 7 summarizes the overall qualitative evaluation for each of the six short-listed electrification options. All options see a neutral benefit, excepting total or near-total electrification of the entire rail network (i.e., Options 15 and 18) which see a slight positive benefit due to the wide electrification of multiple corridors.

Table 7: Overall Qualitative Scoring Noise and Vibration for the Six Options

Option	Noise	Vibration
1	Neutral	Neutral
2	Neutral	Neutral
3	Neutral	Neutral
11	Neutral	Neutral
15	Slight Benefit	Slight Benefit
18	Slight Benefit	Slight Benefit

5.4. Air Quality Nuisance Effects (Dust and Odour)

Appendix 8D describes nuisance effects related to air quality as follows:

> Pollutants within diesel combustion exhaust can contribute to nuisances that are related to air quality. The potential effects are threefold: (1) impairment of visibility; (2) soiling of property (e.g., siding of houses), and (3) adverse odours associated with the exhaust fumes.
>
> In the context of soiling and visibility issues, airborne particulate matter of all types is often referred to as dust. Dust is a widely acknowledged potential nuisance resulting from both human and naturally occurring sources. The human sources include industrial and non-industrial operations such as vehicle traffic (especially on unpaved areas), domestic and commercial heating, wood stoves, campfires, pollen, burning of wastes, forest/grass fires, and various other sources. There are two potential sources of dust associated with locomotive operations: particulate matter in the diesel exhaust, and turbulent disturbance of dust settled on the ground near the right of way. The effects of increased service levels under the Reference Case on dust emissions should be assessed, and any benefits associated with the electrification options should be accounted for.
>
> The odours of exhaust gases vary widely; however, diesel engine exhaust fumes have a characteristic odour that could cause a nuisance effect. Therefore, it is of interest to know how the increased service levels as defined in the Reference Case might affect worst-case odour levels and also how the various electrification options might mitigate those effects.

Table 8 summarizes the criteria, indicators and data sources used in the air quality assessment. Criterion 4, Potential to affect soiling, visibility, and odour, is the only one relevant to the assessment of social community impacts.

Table 8: Air Quality and Health Detailed Assessment Criteria, Indicators and Data Sources

Criteria	Rationale	Indicators
4. Potential to affect soiling, visibility, and odour	Pollutants within diesel combustion exhaust can contribute to nuisance effects such as soiling, visibility and adverse odour. Particulate matter emissions (referred to as dust in the context of nuisance assessments) directly affect soiling and visibility. Diesel exhaust can be odourous in high enough concentrations despite significantly reduced sulphur contents in the ultra-low sulphur diesel used by the GO Transit and ARL fleets.	Population on either side of corridor that may experience a measurable increase in dust or odour effects from GO Transit/ARL operations. Magnitude of the GO Transit/ARL increment, relative to background dust levels and the detectable threshold for odours.

Dust Assessment

Appendix 8D presented the assessment for dust is described as follows:

> Dust is potentially made up of particulate matter of all size fractions; however, particles larger than 100µm in diameter are likely to settle within a short distance (6 to 9 meters from their source), and particles between 30 and 100µm in diameter are likely to settle within a moderate distance (around 100 meters from their source) [Ontario Ministry of the Environment, 2004]. Since the particulate matter exhausted from diesel internal combustion engines is less 44µm in diameter, the focus in this dust assessment is on that size fraction – referred to hereafter as PM.
>
> Comparing the maximum TSP contributions from GO Transit locomotives to upper end background TSP levels in the surrounding area, it was found that the GO Transit contribution falls to less than 10% of the background levels within a very short distance downwind of the right of way, even along the busiest sections of the network (less than 5 metres from the centreline of the corridor). This means that the incremental effect of exhaust particulate matter from GO/ARL operations will most likely be unnoticeable,

from the standpoint of visibility and soiling issues, compared to the normal range of background dust conditions.

Electrification under any of the short-listed options would reduce PM emissions relative to the Reference Case. However, since these emissions are not likely to result in significant visibility or soiling impacts under even the Reference Case, the benefits of further reducing PM emissions, from the standpoint of soiling and visibility, would be minimal.

Electrification, on the other hand, has the disadvantage of requiring construction of new infrastructure that would otherwise not be required. The construction activity will have the potential to produce significant dust emissions during, especially activities that involve traffic of heavy equipment on unpaved areas, excavation and handling of soil, and sand blasting. The potential for dust emissions can be mitigated to a certain extent through implementation of effective dust management plans during construction, based on industry best practices. Overall, the potential for extra dust emissions during construction phase represents a slight negative effect for electrification options.

Odour Assessment

Appendix 8D assessed the potential odour as follows:

As was done for the dust assessment, these threshold distances were calculated for every segment of the GO network. The calculated distances differ from segment to segment due to variations in train traffic volume, track orientation (affects wind direction), surrounding land-use type and surface roughness. A summary of the findings for the Reference Case is presented in Table 9.

Table 9: Summary of Threshold Distances for Odour

Corridor	Segment Description	Threshold Distance (m)
Lakeshore West + Milton + Georgetown + Barrie	Lakeshore West, Milton, Georgetown and Barrie Lines from Union to Lakeshore West Junction	<50
Milton + Georgetown + Barrie	Milton, Georgetown and Barrie Lines from Lakeshore West Junction to Barrie Junction	<30
Lakeshore East + Stouffville + Richmond Hill	Lakeshore East, Stouffville and Richmond Hill lines from Union to Richmond Hill Junction	<25
Lakeshore East + Stouffville	Lakeshore East and Stouffville lines from Richmond Hill Junction to Dundas St E	<20
Lakeshore East + Stouffville	Lakeshore East and Stouffville lines from Dundas St E Junction to Stouffville Junction	<20
Milton + Georgetown	Milton and Georgetown Lines from Barrie Junction to Milton Junction	<20
Georgetown	Georgetown Line from Milton Junction to Lawrence Ave W	<15
Georgetown	Georgetown Line from Lawrence Ave W To Woodbine Ave (HWY 27)	<15
Georgetown	Georgetown Line from Woodbine Ave (HWY 27) to Goreway Drive	<15
Lakeshore West	Lakeshore West Line from Lakeshore West Junction to Jameson Ave	<15
Lakeshore West	Lakeshore West Line from Jameson Ave to Park Lawn Rd	<15
Lakeshore West	Lakeshore West Line from Park Lawn Rd to 9th Line	<15
Lakeshore West	Lakeshore West Line from 9th Line to Oakville Station	<15
Remainder	Any segments not listed above	<10

Odour threshold distances were found to be less than 10 meters for the vast majority of the rail network. Many of the segments listed in Table 9 that have larger threshold distances are locations where multiple corridors are merged and there are multiple parallel tracks. In these locations, the right of way widens, so that much of the area within the specified distance lies within the right of way.

Note that the locomotives tested in the previous study were pre-Tier 4, meaning that they have higher emissions overall than the future Tier 4 GO locomotives, including, in all likelihood, odour. Also, the fuel used by GO locomotives during testing had a higher sulphur content than the ultra-low sulphur diesel (ULSD) presently used by GO Transit. Since sulphur is a significant component of odour in diesel exhaust, use of ULSD should significantly reduce odours and reduce threshold distances.

Taking these factors into consideration, the occurrence of detectable odours from the diesel locomotives in the Reference Case is expected to be limited to within short distances from the centre of the right of way and is not expected to be a significant nuisance effect for populations near the corridors. Therefore, the potential benefit of electrification options in this respect is small.

It should be noted that this analysis did not account for localized, short-term effects associated with idling locomotives at stations. The most significant instance of idling locomotives will be at Union Station. The range of detectable odours may extend farther in that area than reflected in the results above."

5.5. Visual Impact

Visual impacts represent changes in the elements of a landscape resulting from changes to land uses or facilities in an adjacent area. There are two specific dimensions to examining visual impacts of a project. First is the actual physical infrastructure and the extent to which it impinges on the existing viewshed of the individual receptor. Generally this means the visual impact will be greatest for those who are closer to the facility/structure, for those for whom the structure dominates the viewshed, and the extent to which it replaces some other significant and preferable element in the view shed.

The second dimension is that of the experience and perception of the individual affected by the visual change. Generally, development that replaces open or green space will be viewed negatively by most people. If the structures are large and dominate the view, one could anticipate a larger percentage of people perceiving a negative visual impact.

However, some individuals may reluctantly accept visual change and accommodate it, while others (a smaller number) may find that the view changes their environment to an extent that it may disrupt the use and enjoyment of property or the quality of experience at a community, institutional or recreation feature.

Nature of Visual Change

Visual changes related to electrification may be experienced as a result of overhead contact systems (OCS), substations and autotransformer stations built to accommodate electrification of the GO rail system. Residents and users of institutional, community and recreation features will experience a degree of visual impact related to the catenary infrastructure associated with electrification; the extent will vary based on site-specific circumstances (e.g., distance from the tracks, nature and extent of the views, topography, vegetation, nearby land uses, and the subjective experience of individuals).

The following images represent the potential visual representation of typical overhead catenary systems. A typical two-track catenary and feeder system is illustrated in Figure 10. At overlaps and at interlockings, the visual impact is greater than shown.

Figure 7: Typical Two-Track 2x25 KV OCS and Feeder System with Side Pole Construction

The OCS poles are installed at both sides of the track and are spaced approximately 55-60 m apart on tangent track, with the spacing decreasing progressively with decreasing radius of curves.

A typical multi-track catenary and feeder system is illustrated in the Figure 11. For multiple-track OCS and feeder system portal structures are used. The portal construction can be extended to accommodate practically any number of tracks. The portal spacing is comparable to the OCS pole spacing.

Figure 8: Typical Multi-Track 2x25 KV OCS and Feeder System with Side Portal Construction

Typical images of a substations and autotransformer station are provided below"

A typical 2x25 kV substation is shown in Figure 12, and typical 2x25 kV autotransformer station is shown in Figure 13. Both installations are from Amtrak's Northeast Corridor electrification system, New Haven, CT to Boston, MA.

Figure 9: Typical 2x25 KV System Sub-Station

Figure 10: Typical 2x25 KV System Autotransformer Station

Approach to the Assessment of Visual Effects

No viewshed studies were undertaken for the Electrification Study. To carry out the visual assessment and estimate the population potentially affected by visual changes in the environment, the predicted population affected by changes in noise and vibration as an indicator of visual impact. It is acknowledged that the viewshed for residents along the rail corridors may be larger or smaller depending on distance, land infrastructure and topography, and therefore the number of people experiencing visual effects may also be greater or lesser than the estimates.

For the assessment of visual impacts, the following number of substations and autotransformer stations for each option are provided in Table 10.

Table 10: Number of Substations and Autotransformer Stations by Option

Option	Number of Substations	Number of Autotransformer Stations
Option 1	2	3
Option 2	4	1
Option 3	6	4
Option 11	6	7
Option 15	7	10
Option 18	7	17

5.6. Public and Stakeholder Engagement

In Table 11 are comments provided by the public and stakeholders in the public engagement sessions held to date with relevance to the Social Community Impact Assessment (SCIA). The comments are from the following public events:

1) Stakeholder Workshop #1: March 31, 2010
2) Georgetown Update Meeting: May 27, 2010
3) Stakeholder Workshop #2: June 15, 2010
4) Stakeholder Workshop #3: September 22, 2010
5) Stakeholder Workshop #4: December 1,2010

Table 11: Public and Stakeholder Comments Relevant to Social Community Impact Assessment

Public Event	Date and Attendance	Public and Stakeholder Comments
Stakeholder Workshop #1	March 31, 2010; 25 attended	• Ensure that the future rail system is accessible for all users (e.g. family friendly and wheelchair accessible) • Ensure there is a safe interface between the public and proposed rail networks (e.g. safe railway crossings) • Examine both the hard and soft social and health costs associated with proposed technology options (e.g. sleep interference due to noise, overall quality of life, etc.)

Public Event	Date and Attendance	Public and Stakeholder Comments
		• Social and health implications should be incorporated into the financial assessment of various train technology options • The study should examine the impacts that technology alternatives have on existing and future opportunities for urban intensification, land development, and transit oriented development • Social community: divide the objective of adverse community/social impacts and noise & vibration[1] • For "user benefits" define users – recreational – Niagara Falls, Muskoka, week-ends to malls/fishing/hiking, tourist use, etc. • Social Community: Key: grade separations; barriers dividing neighbourhoods • Economics needs to be studied very closely with social/community • Appears to be Toronto-centric. What about the region? Think about the regional city. Assess impact on new communities, development at edges where most new development is happening. • Assess/measure increase in "liveability"; increase in quality of life; marketability of transit: "Regional City" • Avoid creating barriers through communities • Need to look at impacts from a local perspective. • Consider impact on sprawl and achievement of letter and spirit of growth plan
Georgetown Update Meeting	May 27, 2010; approx. 100 attended (84 signed in)	• Population density should be considered when assessing the impacts of technology alternatives on communities • GO operations are noisy and negatively impact households living along the train lines. • Socioeconomic levels should be included when mapping population density and environment/health impacts in order to understand the impacts of the GO operations on vulnerable populations.
Stakeholder Workshop #2	June 15, 2010; 11 attended	• The study should look beyond 2021 when calculating the social, environmental, and financial costs and benefits associated with electrifying the GO network

1 The reference was to the wording of the Social Community Objective:
"Minimize adverse community/social impacts including aesthetic impacts and impacts from noise and vibration."

Public Event	Date and Attendance	Public and Stakeholder Comments
		• Priority should be given to options that increase user benefits and result in positive social impacts (e.g. ability of technology options to encourage individual modal shifts, reduction of trip times) • How will this study connect to city plans and policies and other social objectives/benefits?
Stakeholder Workshop #3	September 22, 2010; 18 attended	• The study team should address the impacts that air quality, noise and vibration will have on clusters of vulnerable populations (i.e. hospitals, schools, retirement complexes) • Community impacts such as human health, noise and vibration – should be quantified so they can be fairly assessed against the capital costs of electrification • Hospitals and schools – not as much of them so how do they fit in factoring the air, noise and vibration impacts on the community? • Breakdown factors to ensure stakeholders can understand the impacts of options on their community
Stakeholder Workshop #4	December 1,2010 15 attended	• The Electrification Study has not adequately assessed neighbourhood quality of life and community impacts. • The study should determine the level of particulate matter in communities adjacent to the rail corridor.

5.7. the Assessment of Social Community Impacts

Social Community Impacts by Option

Table 12 provides a summary assessment of potential social community impacts for each of the six short-listed options, using the social community criteria.

Table 12: Assessment of Social Community Impacts – Six Electrification Options

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
Option 1 Electrification of Georgetown Corridor	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 261,165 people in 2021 (i.e., 7.1% less than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 261,165 people in 2021 (i.e., 7.1% less than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 615 institutional, community and recreation features in 2021 (i.e., 8.9% fewer than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 615 institutional, community and recreation features in 2021 (i.e., 8.9% fewer than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to	**Existing Conditions:** This corridor starts out at Union station in a heavily urbanised area comprising both residential and employment areas heading west. It passes through heavily built up residential and industrial areas, through a rural and agricultural area before terminating in a densely populated residential area in Kitchener. **Change:** Future growth is expected to be steered towards areas that are well served by transit[2]. As a result, there will be continued growth through intensification around station locations. Protected areas

[2] From the City of Toronto Official Plan. Such areas include Downtown, Central Waterfront, Centres, Avenues and Employment Districts. Growth will be guided by Secondary Plans.

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 52,775 people in 2021 (i.e., 18.8% more than the Reference Case) ***Construction Effects:*** Reconstruction impacts of 8 to 12 months can be expected on 3 bridges for Option 1. No tunnel reconstruction impacts are anticipated for this option.	electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 112 institutional, community and recreation features in 2021 (i.e., 16.6% of the features with electrification) Option 1 Substations: 2 Option 1 Autotransformer Stations: 3	as well as agricultural communities will be maintained.
Option 2 Electrification of Lakeshore West/East Corridors	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 250,362 people in 2021 (i.e., 10.9% less than the Reference Case)	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 595 institutional, community and recreation features in 2021 (i.e., 11.8%	**Existing Conditions:** This option is comprised of two corridors. One corridor starts at the heavily urbanized area around Union station and heads east towards Bowmanville. The

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	Vibration: Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 250,362 people in 2021 (i.e., 10.9% less than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 109,189 people in 2021 (i.e. 38.9% more than the Reference Case).	fewer than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 595 institutional, community and recreation features in 2021 (i.e., 11.8% fewer than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:***	segments pass through a series of mid to low density residential, industrial and employment areas interspersed with open and green space. The other corridor starts at a heavily urbanized area and proceeds west past employment and industrial areas as well as a number of high density condominium developments. The latter part crosses a section dominated by industrial and commercial activity before approaching a mix of suburban subdivisions, high rises and commercial space leading up to Hamilton Go Station. **Change:** There will be continued growth through intensification around station locations. Future growth will support the strengthening of transit use. Plans in place call for transit-supportive land use which will attract work trips by requiring higher densities and mixed uses be

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	Construction Effects: Reconstruction impacts of 8 to 12 months can be expected on 4 bridges for Option 2. No tunnel reconstruction impacts are anticipated for this option.	The change in the visual landscape will affect 238 institutional, community and recreation features in 2021 (i.e., 35.3% more than the Reference Case) Option 2 Substations: 4 Option 2 Autotransformer Stations: 1	located in conjunction with transit corridors and nodes. Prime agricultural areas as well as protected areas will be maintained.
Option 3 Electrification of Lakeshore West/East and Georgetown Corridors	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 236,423 people in 2021 (i.e., 15.9% less than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 236,423 people in 2021 (i.e., 15.9% less than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 549 institutional, community and recreation features in 2021 (i.e., 18.7% fewer than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 549 institutional, community and recreation features in 2021 (i.e., 18.7% fewer than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options.	**Existing Conditions:** This option combines the conditions present in Options 1 and 2 above. **Change:** Growth will continue with intensification occurring along transit corridors with higher densities located at transit nodes. Rural areas and prime agricultural areas will be protected.

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 149,047 people in 2021 (i.e. 53.0% more than the Reference Case). ***Construction Effects:*** Reconstruction impacts of 8 to 12 months can be expected on 4 bridges for Option 3. No tunnel reconstruction impacts are anticipated for this option.	Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 338 institutional, community and recreation features in 2021 (i.e.,50.1% more than the Reference Case) Option 3 Substations: 6 Option 3 Autotransformer Stations: 4	
Option 11 Electrification of Lakeshore West/East	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 227,401	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 535	**Existing Conditions:** In addition to the conditions found in Option 3 above, the initial

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
Georgetown and Milton Corridors	people in 2021 (i.e., 19.1% less than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 227,401 people in 2021 (i.e., 19.1% less than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will	institutional, community and recreation features in 2021 (i.e., 20.7% fewer than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 535 institutional, community and recreation features in 2021 (i.e., 20.7% fewer than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit	segment passes through an area comprised of medium density residential as well as commercial space, crossing a number of green spaces past a large industrial operation before terminating at Meadowvale Go Station. The other segment runs through a section dominated by commercial and residential areas, past a section of green space and into suburban residential subdivisions and commercial space close to Milton GO Station. **Change:** In addition to the changes above, Growth Plans envision increasing intensification of existing built-up areas with a focus which includes urban growth centers, intensification corridors, and major transit station areas. Green spaces are likely to be maintained with certain areas protected and excluded from future growth.

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	affect 161,141 people in 2021 (i.e. 57.3% more than the Reference Case). ***Construction Effects:*** Reconstruction impacts of 8 to 12 months can be expected on 1 bridge on the Lakeshore East Corridor. No tunnel reconstruction impacts are anticipated for Option 11.	for all options. ***Visual:*** The change in the visual landscape will affect 346 institutional, community and recreation features in 2021 (i.e., 51.3% more than the Reference Case) Option 11 Substations: 6 Option 11 Autotransformer Stations: 7	
Option 15 Electrification of Lakeshore West/East Georgetown, Milton and Barrie Corridors	***Noise:*** Slight benefit from just perceptible (i.e. 2-3 dB) overall reductions affecting 219,041 people in 2021 (i.e., 22.0% less than the Reference Case) ***Vibration:*** Slight benefit from minor reductions in perceptible vibration (i.e. 2-3 VdB) affecting 219,041 people in 2021 (i.e., 22.0% less than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction	***Noise:*** Neutral effect from imperceptible (< 2 dB) overall reductions affecting 515 institutional, community and recreation features in 2021 (i.e., 23.7% fewer than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB affecting 515 institutional, community and recreation features in 2021 (i.e., 23.7% fewer than the Reference Case) ***Dust:***	**Existing Conditions:** In addition to the conditions found in Option 11 above, this Option also includes a section which starts at a high density residential community in Toronto, passes through an area dominated by industrial and commercial activity, past a significant portion of green space before proceeding through suburban development and into an area bearing rural characteristics which includes the Scanlon Creek Conservation Area. It then enters an area characterized by suburban

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 177,019 people in 2021 (i.e. 63.0% more than the Reference Case). ***Construction Effects:*** Reconstruction impacts of 8 to 12 months can be expected on 4 bridges for Option 15. No tunnel reconstruction impacts are anticipated for this option.	Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will affect 407 institutional, community and recreation features in 2021 (i.e., 60.3% more than the Reference Case) Option 15 Substations: 7 Option 15 Autotransformer Stations: 10	development on the approach to its terminal point at Allendale. **Change:** Similar and in addition to the changes above, there will be intensification around stations and transportation corridors. In addition, higher densities may be introduced into new areas e.g. Allendale in conjunction with growth in transit development. Open spaces, agricultural areas, parks and conservation areas will be maintained.
Option 18 Electrification of all	***Noise:*** Slight benefit from just perceptible (i.e.	***Noise:*** Neutral effect from imperceptible (< 2	**Existing Conditions:** In addition to the conditions found

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
Corridors	2-3 dB) overall reductions affecting 195,414 people in 2021 (i.e., 30.5% less than the Reference Case) ***Vibration:*** Slight benefit from minor reductions in perceptible vibration (i.e., 2-3 VdB) affecting 195,414 people in 2021 (i.e., 30.5% less than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit for all options. ***Visual:*** The change in the visual landscape will	dB) overall reductions affecting 464 institutional, community and recreation features in 2021 (i.e., 31.3% fewer than the Reference Case) ***Vibration:*** Neutral effect from negligible reductions in perceptible vibration (< 1 VdB) affecting 464 institutional, community and recreation features in 2021 (i.e., 31.3% fewer than the Reference Case) ***Dust:*** Improvements in dust levels experienced due to electrification will be minimal for all options. Construction activities related to electrification infrastructure can produce potentially significant dust emissions which will require dust management mitigation. ***Odour:*** The reduction in odour due to electrification will have limited range and is expected to be a small benefit	in Option 15 above, this Option passes through a mix of both high and medium density residential communities with some green space, through a series of commercial spaces, past a community bearing rural characteristics. Part of this Option crosses an area dominated by industrial and commercial activity before passing through a community with both commercial and suburban subdivisions. This Option crosses a number of protected areas including Thompson Memorial Park, Stouffville Conservation Area and Hyde Park. **Change:** In addition to the changes above, increased density is expected around transit corridors as well as transportation nodes such as stations. Green spaces such as parks will be maintained. Continued growth is expected at

Options	Criterion 1 Change in the use and enjoyment of property by residents within the study area	Criterion 2 Change in the use and enjoyment of institutional, community and recreation features within the study area	Criterion 3 Change in community character
	affect 195,414 people in 2021 (i.e. 69.5% more than the Reference Case). ***Construction Effects:*** Reconstruction impacts of 8 to 12 months can be expected on 9 bridges. Major tunnel reconstruction impacts, lasting up to 3 years or more in a high-rise residential area are anticipated for the Hunter Street Tunnel for Option 18.	for all options. ***Visual:*** The change in the visual landscape will affect 464 institutional, community and recreation features in 2021 (i.e., 68.7% more than the Reference Case) Option 18 Substations: 8 Option 18 Autotransformer Stations: 17	the heavily industrial and commercial spaces located along certain sectors.

5.8. Community Character

Electrification of part or the entire GO Transit rail system may have implications for the character of communities in/near the area of influence. Communities may be urban, suburban, or rural in nature. Change in character can be caused by physical loss of community components (e.g., removal of homes/residents, institutions), or changes in the community environment (e.g., noise, air quality levels; demographic change etc.). The concern here is with the community's ability to deal with change in a way that maintains or enhances its social and cultural characteristics.

The communities affected by all six options have similar characteristics. All options go through high-density urban mixed use residential areas, industrial areas, commercial areas, suburban residential areas and rural and open spaces. The difference between the options relates to the scale and sequence of these ranges of land uses through which the rail lines pass.

Any changes in community character beyond those resulting from electrification will result primarily from the relative actions/decisions of local and regional councils. Most of the municipalities actively support intensification of development at or near train stations. Their decision to support intensification is heavily influenced by the provincial policies including the Provincial Growth Plan which calls for a similar approach to current and future planning. This intensification will change the localized community character at many of these locations – particularly in many of the suburban and rural areas. However, any such changes will be the result of much broader planning and development decisions, and not because of electrification.

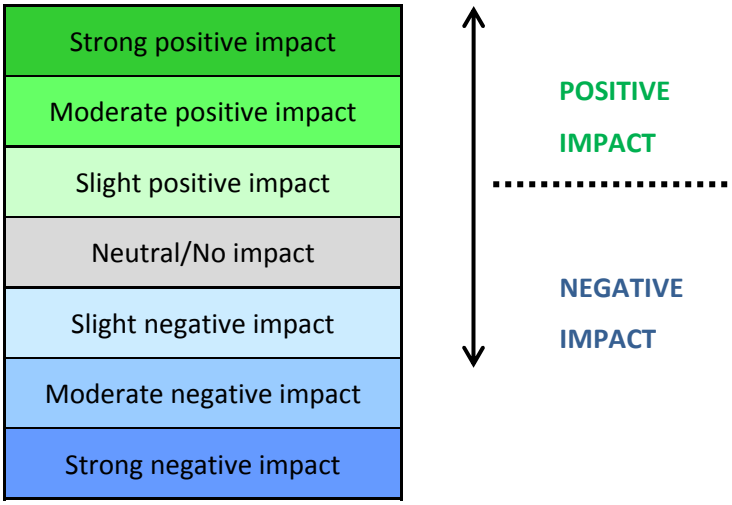
It is difficult to determine the degree of impact to community character due to electrification because all the options consist of pre-existing rail lines in 2021. These corridors will have evolving land uses and community characteristics over time. As a result, the community bordering the corridors is already exposed to rail traffic and the impacts related to this.

The main driver on community character from electrification will be visual effects resulting from the structural/electrical support systems that will be required. This will likely be most visible and pronounced in suburban and rural areas. Because visual impact is being dealt with as a separate disruption effect, it is not dealt with in community character. Because of the complexity and uncertainty of land use/planning decisions. It was not possible to use community character as a criterion that contributed to the rating of the options.

5.9. Social Community Qualitative Scale

Each of the options has been rated in terms of the SCIA criteria using a 7-point qualitative scale provide a summary of the degree of impact, as shown in Figure 15.

Figure 11: 7-Point Qualitative Scale



This scale was applied to the noise and vibration effects, and the anticipated effects of the visual change and construction impacts for each option are given in Table 13.

Table 13: Social Community Detailed Qualitative Scoring for the Six Options

Option	Noise & Vibration		Visual				Construction	
	Noise	Vibration	Population	Facilities	Substations Autotransformer Stations	Visual Qualitative Rating	Bridge/ Tunnel Recon-striation)	Construction Qualitative Rating
1	Neutral	Neutral	+18.8%	+16.6%	5	Slight Negative	3 bridges	Slight negative
2	Neutral	Neutral	+38.9%	+35.3%	5	Slight Negative	4 bridges	Slight negative
3	Neutral	Neutral	+53.0%	+50.1%	10	Slight Negative	4 bridges	Slight negative
11	Neutral	Neutral	+57.3%	+51.3%	13	Slight Negative	4 bridges	Slight negative
15	Slight Benefit	Slight Benefit	+63.0%	+60.3%	17	Moderate Negative	4 bridges	Slight negative
18	Slight Benefit	Slight Benefit	+69.5%	+68.7%	25	Moderate Negative	9 bridges and 1 major tunnel	Moderate negative

To determine an overall rating for social community impacts, a numerical scoring system was employed. This system assumes that all disruptions are equal weight**.** The scale is as follows:

Strong positive impact: +3

Moderate positive impact: +2

Slight positive impact: +1

Neutral/No impact: 0

Slight negative impact: -1

Moderate negative impact: -2

Strong negative impact: -3

This scale has been applied to determine an overall social community rating for each option, as shown in Table 14.

Table 14: Social Community Overall Rating of the Six Options

Option	Noise	Vibration	Visual	Construction	Overall Rating	
1	0	0	-1	-1	-2	Moderate negative
2	0	0	-1	-1	-2	Moderate negative
3	0	0	-1	-1	-2	Moderate negative
11	0	0	-1	-1	-2	Moderate negative
15	+1	+1	-2	-1	-1	Slight negative
18	+1	+1	-2	-2	-2	Moderate negative

5.10. Summary of Results by Option

Option 1: Georgetown

In Option 1 there is no noticeable change in the levels of noise and vibration due to electrification. The visual changes due to overhead catenary systems are expected to be experienced by 19% of the population and 17% of community, institutional and recreation features above Reference Case conditions. Development of 2 sub-stations and 3 autotransformer stations will contribute slightly to the visual impact. Construction impacts for reconstruction of three bridges contribute a slight negative impact. The overall social community impact rating for Option 1 is moderate negative (-2).

Option 2: Lakeshore West/East

In Option 2 there is no noticeable change in the levels of noise and vibration due to electrification. The visual changes due to overhead catenary systems are expected to be experienced by 39% of the population and 36% of community, institutional and recreation features above Reference Case conditions. Development of 4 sub-stations and 1 autotransformer stations will contribute slightly to the visual impact. Construction impacts for reconstruction of four bridges contribute a slight negative impact. The overall social community impact rating for Option 2 is moderate negative (-2).

Option 3: Lakeshore West/East and Georgetown

In Option 3 there is no noticeable change in the levels of noise and vibration due to electrification. The visual changes due to overhead catenary systems are expected to be experienced by 53% of the population and 50% of community, institutional and recreation features above Reference Case conditions. Development of 6 sub-stations and 4 autotransformer stations will contribute slightly to the visual impact. Construction impacts for reconstruction of one bridge contribute a slight negative impact. The overall social community impact rating for Option 3 is moderate negative (-2).

Option 11: Lakeshore West/East, Georgetown and Milton

In Option 11 there is no noticeable change in the levels of noise and vibration due to electrification. The visual changes due to overhead catenary systems are expected to be experienced by 57% of the population and 51% of community, institutional and recreation features above Reference Case conditions. Development of 6 sub-stations and 7 autotransformer stations will contribute slightly to the visual impact. Construction impacts for reconstruction of four bridges contribute a slight negative impact. The overall social community impact rating for Option 11 is moderate negative (-2).

Option 15: Lakeshore West/East, Georgetown, Milton and Barrie

In Option 15 there is a slight benefit in the change in levels of noise and vibration due to electrification. The visual changes due to overhead catenary systems are expected to be experienced by 63% of the population and 60% of community, institutional and recreation features above Reference Case conditions. Development of 7 sub-stations and 10 autotransformer stations will contribute to the visual impact. Construction impacts for reconstruction of four bridges contribute a slight negative impact. The overall social community impact rating for Option 15 is slight negative (-1).

Option 18: All

In Option 18 there is a slight benefit in the change in levels of noise and vibration due to electrification. The visual changes due to overhead catenary systems are expected to be experienced by 70% of the population and 69% of community, institutional and recreation features above Reference Case conditions. Development of 7 sub-stations and 17 autotransformer stations will contribute to the visual

impact. Construction impacts for reconstruction of nine bridges and a major tunnel contribute a moderate negative impact. The overall social community impact rating for Option 18 is moderate negative (-2).

Conclusion

From the social community perspective, the slight positive impacts from electrification achieved through reduced noise and vibration effects will be offset somewhat by the visual and construction impacts associated with each option. All six options will have residents, and users of community, institutional and recreation features within the zones of influence experiencing some negative social community impacts due to visual and construction effects.

APPENDIX 8G-1 – BACKGROUND MATERIAL

Clean Train Coalition. (May 2009). *The Better Move.* Retrieved online from:
http://www.cleantrain.ca/CleanTrainCoalition-TheBetterMove.pdf

Clean Train Coalition. (March, 2010). Progress Report. Retrieved online from:
http://www.cleantrain.ca/CTC%20Prog%20Report%20Colour%20Mar%202010.pdf

Hatch Mott MacDonald. (October 2008). *GO Transit – Lakeshore Corridor 2031 Addendum to April '08 Lakeshore Corridor Electrification Update.* Prepared for the GO Electrification Study. Retrieved online from: http://www.gotransit.com/estudy/en/current_study/docs/L3203/1-FinalReport.pdf

Hatch Mott MacDonald. (April 2008). *GO Transit – Lakeshore Corridor Electrification Update of 2001 Addendum to 1992 Study.* Prepared for the GO Electrification Study. Retrieved online from:
http://www.gotransit.com/estudy/en/current_study/docs/L3144/PR243550_PD4.pdf

Metrolinx. (November 2008). *The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area*. Greater Toronto Transportation Authority. Retrieved online from:
http://www.metrolinx.com/Docs/big_move/TheBigMove_020109.pdf

Ministry of Public Infrastructure Renewal. (2006). *Places to Grow: Growth Plan for the Greater Golden Horseshoe*. Queen's Printer for Ontario. Retrieved online from:
https://www.placestogrow.ca/images/pdfs/FPLAN-ENG-WEB-ALL.pdf

Ministry of Public Infrastructure Renewal. (2005). *ReNew Ontario 2005-2010 Strategic Highlights.* Queen's Printer for Ontario. Retrieved online from: http://www.pppcouncil.ca/pdf/renewont.pdf

Steer Davies Gleave, Economic Development Research Group and Metropolitan Knowledge International. (June 2009). *GO Transit Lakeshore Express Rail Benefits Case – Interim Report*. Retrieved online from:
http://www.metrolinx.com/Docs/general/GO_Lakeshore_BCA_Report.pdf

Selected Municipal Data Sources

Durham Region

Durham Region, Planning Department. (September 2009). *Durham Region Profile: Demographics and Socio-Economic Data.* Retrieved online from: http://www.durham.ca/departments/planning/stats-n-facts/durhamprofile/DurhamProfile.pdf

Durham Region, Planning Department. (December 2008). *Transportation [Map]*. Retrieved online from:
http://www.durham.ca/departments/planning/maps/Transportation_Map.pdf

Durham Region, Planning and Works Departments. (November 2005). *Transportation Master Plan*. Retrieved online from: http://www.durham.ca/departments/works/TMPNov2005.pdf

Durham Region. (n.d.). *Official Plan of the Regional Municipality of Durham: Schedule 'A' Regional Structure [Map].* Retrieved online from: http://www.durham.ca/departments/planning/op_documents/dr_official_plan_2008/schedule_a.pdf

Durham Region. (n.d.). *Official Plan of the Regional Municipality of Durham: Schedule 'C' – Map 'C3' Transit Priority Network [Map].* Retrieved online from: http://www.durham.ca/departments/planning/op_documents/dr_official_plan_2008/schedule_c.pdf

Durham Region. (n.d.). *Official Plan of the Regional Municipality of Durham: Schedule 'F' Specific Policy Area E, Future Growth Areas [Map].* Retrieved online from: http://www.durham.ca/departments/planning/op_documents/dr_official_plan_2008/schedule_f.pdf

Durham Region. (n.d.). *ViewDurham Internet Mapping Application [Map]*. Retrieved online from: http://www.durham.ca/default.asp?nr=div&axion=gismaps

Watson & Associates Economists Ltd., Urban Strategies Inc., and TSH Engineers, Architects and Planners. (November 2008). *Figure 3A: Final Recommended Growth Scenario: Balanced Growth.* A map completed for Durham Region, Whitby, ON by Watson & Associates Economists Ltd., Urban Strategies Inc., and TSH Engineers, Architects and Planners. Retrieved online from: http://www.durham.ca/growthplan/consultant_reports/FINAL_Figure3Aand3B_November14.pdf

Watson & Associates Economists Ltd., Urban Strategies Inc., and TSH Engineers, Architects and Planners. (November 2008). *Growing Durham: Recommended Growth Scenario and Policy Directions.* A report completed for Durham Region, Whitby, ON, by Watson & Associates Economists Ltd., Urban Strategies Inc., and TSH Engineers, Architects and Planners. Retrieved online from: http://www.durham.ca/growthplan/consultant_reports/FINALRecommendedGrowthScenarioandPolicyDirectionsReportNovember17.pdf

Halton Region

Crockett, Peter M. Commissioner of Planning and Public Works. (March 2008). *Report to Chair and Members of the Planning and Public Works Committee Re: PPW36-08 – Halton Region Transportation master Plan Update (2007)*. Retrieved online from:

http://www.halton.ca/cms/One.aspx?pageId=8619&portalId=8310&objectId.4329=18190&contextId.4329=18159&parentId.4329=18160

Dillon Consulting. (June 2004). *Halton Region Transportation Master Plan Final Report.* Retrieved online from: http://www.halton.ca/cms/One.aspx?pageId=8619&portalId=8310&objectId.4329=18188&contextId.4329=18159&parentId.4329=18160

Hemson Consulting Ltd. (May 2007). *Sustainable Halton – Effect of Demographic Change on Halton Region*. Halton Region. Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=18532

Regional Municipality of Halton. (n.d.). *Halton Region Environmentally Sensitive Area [Map].* Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=19393

Regional Municipality of Halton. (n.d.). *Halton Region Plan of Major Transportation [Map].* Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=17845

Regional Municipality of Halton. (April 2007). *Best Planning Estimates of Population, Occupied Dwelling Units and Employment, 2007-2021*. Regional Municipality of Halton. Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=19572

Regional Municipality of Halton. (August 2006). *Halton's Regional Official Plan*. Retrieved online from: http://www.halton.ca/cms/one.aspx?portalId=8310&pageId=26798#Part1

Regional Municipality of Halton. (August 2006). *Map 1 – The Regional Structure.* Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=17713

Regional Municipality of Halton. (May 2007). *Halton Region Strategic Plan, 2007-2010 Vision, Themes and Goals*. Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=19995

Regional Municipality of Halton. (March 2010). *The Road to Change Halton Region Transportation Master Plan 2031: Public Information Centre #1 [Presentation].* Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=37051

Urban Strategies Inc. (n.d). *Sustainable Halton – Working Paper #1: Locating New Urban Land*. Region of Halton. Retrieved online from: http://www.halton.ca/common/pages/UserFile.aspx?fileId=18488

Hamilton, City of

Hamilton, City of. (n.d.). *Hamilton Vision 2020 Goals Transportation.* Retrieved online from: http://www.hamilton.ca/NR/rdonlyres/433CD59D-DB5D-4042-8BFB-91C61A43A0AA/0/IndRept08Transportationtxt.pdf

Hamilton, City of. (n.d.). *iMapper [Interactive Map]*. Retrieved online from: http://www.map.hamilton.ca/maphamilton/Interactive/iMapper.aspx

Hamilton, City of, Planning and Economic Development. (n.d.). *Vision 2020 Goals.* Retrieved online from: http://www.hamilton.ca/ProjectsInitiatives/V2020/ResourceLibrary/City+of+Hamilton+Goals.htm

Toronto

Toronto, City of, Planning and Growth Management Committee. (April 2010). Draft Zoning By-law Maps. Retrieved online from: http://www.toronto.ca/legdocs/mmis/2010/pg/bgrd/backgroundfile-29457.htm

Toronto, City of. (n.d.). *Council's Strategic Plan.* Retrieved online from: http://www.toronto.ca/strategic_plan/strategic-plan.htm

Toronto, City of. (n.d.). *TOMaps [Interactive Map]*. Retrieved online from:
http://map.toronto.ca/imapit/iMapIt.jsp?app=TOMaps

Peel Region

Region of Peel. (n.d.). *Peel Service Delivery Areas (SDA) [Map]*. Retrieved online from:
http://www.peelregion.ca/scripts/sda/areas.pl

Region of Peel Planning Department. (n.d.). *PDC Regional Atlas*. Retrieved online from:
http://www.peelregion.ca/planning/pdc/maps/census/gis-atlas.htm

Region of Peel Planning Department. (September 2006). *2031 Regional Urban Boundary Schedule D*. Retrieved
online from: http://www.peelregion.ca/planning/rop-amendments/ropa15schd.pdf

Region of Peel Planning Department. (2008). *Region of Peel Major Transit Corridors [Map]*. Retrieved online from:
http://www.peelregion.ca/planning/rop/schg-2008.pdf

Region of Peel Planning Department. (2008). *Region of Peel Prime Agricultural Areas [Map]*. Retrieved online from:
http://www.peelregion.ca/planning/rop/schb-2008.pdf

Region of Peel Planning Department. (November 2008). *Official Plan: Office Consolidation*. Retrieved online from:
http://www.peelregion.ca/planning/rop/rop-nov2009.pdf

York Region

Selected examples of municipal data sources – for illustrative purposes only.

York Region. (n.d.). *York Region: Planning for Tomorrow [Map].* Retrieved online from:
http://maps.york.ca/yorkexplorer/pdf/2007_PlanningForTomorrow_Sml.pdf

York Region. (June 2008). *Map 10 Conceptual Transit Network [Map].* Retrieved online from:
http://www.york.ca/NR/rdonlyres/6uk7qkaf24cojidoorp3oyfjzp7n5pmixe35mgaquch7433pciyv2hlod2qfxksyng6rxm6abgejyuagkao3rsyl4g/Map+10+2008.pdf

York Region. (June 2008). *Official Plan Office Consolidation*. Retrieved online from:
http://www.york.ca/NR/rdonlyres/2pdxpozxz7ghmuirnd2pvrkylt4hlqcfgkibeiuv7glzlzak2xqpu2lx2ps4o2z22o5qxfvvv4cj3nhj6m3vbgq6mh/ROP+June+1_2008+w+maps.pdf

York Region. (2007). *York Region Sustainability Strategy: Towards a Sustainable Region*. Retrieved online from:
http://www.york.ca/NR/rdonlyres/ddvav3nrw2657f4dljc4m3kbxa4v35qzqdtw62f3zce5cvwur4wbcymuvnoobehvgdkpzgsjrzeohstbduin2jlsmd/Final+Sustainability+document.pdf

York Region. (2007). *Vision 2026: Towards a Sustainable Region Fifth Annual Report on Indicators of Progress 2006.* Retrieved online from:
http://www.york.ca/NR/rdonlyres/vmtnjbyaix3d7w3gc5lxpcwbnrhxfx6gnueb3w6w7yx3jdneu6xygyuctj3fkbjd6vafogeb5frbc35t3hdxp3ib7g/IOP_2006.pdf

York Region. (2006). *Vision 2026: Trends*. Retrieved online from:
http://www.york.ca/Departments/Planning%20and%20Development/Long%20Range%20Planning/Vision%202026/P8

York Region. (2006). *Vision 2026: Goals*. Retrieved online from:
http://www.york.ca/Departments/Planning%20and%20Development/Long%20Range%20Planning/Vision%202026/G1

York Region. (n.d.). *yrGEO [Maps]*. Retrieved online from: http://maps.york.ca/yorkexplorer/default.jsp

Experience Elsewhere

Auckland Regional Transport Authority. (August 2006). *A Step-change for Auckland Rail Development Plan 2006.*
The Auckland Regional Transport Authority: Auckland. Retrieved online from:
http://www.arta.co.nz/assets/arta%20publications/2006/ARTA%20Rail%20Development%20Plan%20September%202006.pdf

Auckland Regional Transport Authority. (February 2007). *Auckland Sustainable Transport Plan 2006-16*. The
Auckland Regional Transport Authority: Auckland. Retrieved online from:
http://www.arta.co.nz/assets/arta%20publications/2007/ARTA%20Sustainable%20Transport%20Plan%202006-16.pdf

Caltrain. (2009). *Caltrain Electrification: Powering the Future [Fact Sheet]*. Retrieved online from:
http://209.78.42.8/pdf/Electrification/CT_Fact_Sheet_10.09.pdf

U.S. Department of Transportation, Federal Transit Administration and the Peninsula Corridors Joint Power Board. July 2009. *Environmental Assessment/Final Environmental Impact Report- Volume I. Caltrain Electrification Program: San Francisco to San Jose (MP 0.0 to 52.0).* Retrieved online from:
http://www.caltrain.com/pdf/Electrification/EA-FEIR_07-2009/Caltrain_Electrification_EA-FEIR_Vol-I_July%202009.pdf

Department for Transport. (January 2010). *DRAFT Detailed Guidance on Social and Distributional Impacts on Transport Interventions TAG Unit 2.13*. Retrieved online from:
http://www.dft.gov.uk/webtag/documents/project-manager/pdf/unit2.13d.pdf

Department for Transport. (January 2010). DRAFT Detailed Guidance on Social and Distributional Impacts of Transport Interventions TAG Unit 3.17. Retrieved online from:
http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.17d.pdf

State of New York, Metropolitan Transportation Authority. (2009). *Greening Mass Transit & Metro Regions: The Final Report of the Blue Ribbon Commission on Sustainability and the MTA*. Retrieved online from: http://www.mta.info/sustainability/pdf/SustRptFinal.pdf