



## **407 East Transportation Corridor Environmental Screening Report**

**December, 2009**

# Table of Contents

	page
<b>1. Introduction .....</b>	<b>1-1</b>
1.1 Background .....	1-1
1.2 The Undertaking and Projects subject to Federal EA.....	1-2
1.3 The Proponent.....	1-3
1.4 The Environmental Screening Report Organization .....	1-4
<b>2. Environmental Assessment Requirements .....</b>	<b>2-1</b>
2.1 Canadian Environmental Assessment Act .....	2-1
2.2 Ontario Environmental Assessment Act .....	2-2
<b>3. Overview of the Federal EA Process.....</b>	<b>3-1</b>
3.1 The Federal EA Process and the Responsible Authorities.....	3-1
3.1.1 Role of the Responsible Authorities.....	3-4
3.1.1.1 <i>Role of Other Potential Responsible Authorities</i> .....	3-4
3.1.2 Role of Expert Federal Authorities.....	3-5
3.1.2.1 <i>Environment Canada</i> .....	3-6
3.1.2.2 <i>Health Canada</i> .....	3-8
3.1.2.3 <i>Natural Resources Canada</i> .....	3-8
<b>4. Permits and Approvals .....</b>	<b>4-1</b>
4.1 Federal Permits, Approvals and Authorizations .....	4-1
4.1.1 Fisheries Act .....	4-1
4.1.2 Navigable Waters Protection Act.....	4-2
4.1.3 Consideration of Federal Policies .....	4-2
4.2 Provincial Permits, Approvals and Agreements .....	4-4
4.2.1 Ministry of Environment .....	4-4
4.2.2 Ministry of Natural Resources.....	4-5
4.2.3 Ministry of Culture .....	4-6
4.2.4 GO Transit .....	4-6
4.2.5 Ontario Realty Corporation .....	4-6
4.2.6 Hydro One Networks .....	4-7
4.2.7 Consideration of Provincial Plans and Policies .....	4-7
4.3 References .....	4-8

<b>5.</b>	<b>Consultation .....</b>	<b>5-1</b>
5.1	Consultation Requirements under CEAA .....	5-1
5.2	Overview of Consultation Process.....	5-1
5.2.1	Consultation Objectives .....	5-2
5.2.2	Consultation Elements .....	5-4
5.3	Government Agency Consultation.....	5-4
5.4	Public Consultation.....	5-8
5.4.1	Public Information Centres .....	5-8
5.4.2	Community Advisory Group.....	5-11
5.4.3	Comments Received Related to the Federal Process.....	5-11
5.5	First Nations and Aboriginal Organization Consultations .....	5-13
<b>6.</b>	<b>Overview of the Undertaking.....</b>	<b>6-1</b>
6.1	Background .....	6-1
6.1.1	Purpose of the Undertaking .....	6-1
6.1.2	Rationale for the Undertaking .....	6-1
6.1.2.1	<i>Policy Framework.....</i>	<i>6-1</i>
6.1.3	“Alternatives To” the Undertaking .....	6-4
6.1.4	“Alternative Methods” of carrying out the Undertaking .....	6-5
6.1.4.1	<i>Generation of the Alternative Routes .....</i>	<i>6-6</i>
6.1.4.2	<i>Screening of the Alternative Routes.....</i>	<i>6-6</i>
6.1.4.3	<i>Assessment and Evaluation of the Alternative Routes .....</i>	<i>6-6</i>
6.2	Overview Description of the Undertaking .....	6-7
6.2.1	The Highway and Transitway .....	6-7
6.2.1.1	<i>Mainline Sections.....</i>	<i>6-7</i>
6.2.1.2	<i>Links to Highway 401.....</i>	<i>6-9</i>
6.2.2	Support Facilities .....	6-10
6.2.3	Structures.....	6-12
6.2.4	Drainage and Stormwater Management.....	6-13
6.2.4.1	<i>Drainage.....</i>	<i>6-13</i>
6.2.4.2	<i>Stormwater Management.....</i>	<i>6-15</i>
6.2.5	Illumination.....	6-17
6.2.6	Pavement.....	6-17
6.2.7	Other Design Features .....	6-18
6.2.8	Utilities .....	6-18
6.2.9	Construction Phase Works and Activities.....	6-18
6.2.9.1	<i>Physical Works and Activities .....</i>	<i>6-18</i>
6.2.9.2	<i>Staging.....</i>	<i>6-19</i>
6.2.10	Operations and Maintenance Phase Works and Activities.....	6-20

<b>7.</b>	<b>Federal Environmental Assessment Framework .....</b>	<b>7-1</b>
7.1	Projects Subject to Federal EA.....	7-1
7.2	Environmental Components .....	7-4
7.3	Temporal Boundaries .....	7-5
7.4	Geographic Study Areas .....	7-5
7.4.1	Site Study Area (SSA) or Project Footprint (PFP).....	7-5
7.4.2	Local Study Area (LSA) .....	7-6
7.4.3	Regional Study Area (RSA).....	7-6
7.5	References .....	7-7
<b>8.</b>	<b>Description of the Environment Potentially Affected .....</b>	<b>8-1</b>
8.1	Introduction.....	8-1
8.2	Air Quality and Climate (Transportation Corridor) .....	8-2
8.2.1	Air Quality .....	8-2
8.2.2	Climate.....	8-6
8.3	Noise and Vibration (Transportation Corridor).....	8-8
8.4	Surface and Subsurface Geology and Soils (Transportation Corridor) .....	8-11
8.4.1	Surface Geology and Soils .....	8-11
8.4.2	Subsurface Geology .....	8-11
8.5	Groundwater (Transportation Corridor) .....	8-14
8.5.1	Hydrostratigraphic Units .....	8-14
8.5.2	Groundwater Flow.....	8-16
8.5.3	Groundwater Recharge .....	8-16
8.5.4	Groundwater Discharge.....	8-16
8.5.5	Groundwater Wells and Groundwater Quality .....	8-17
8.6	Surface Water (Projects subject to Federal EA).....	8-18
8.6.1	Regional Overview.....	8-18
8.6.2	Local Study Area.....	8-22
8.7	Vegetation and Vegetation Communities (Projects subject to Federal EA) .....	8-24
8.7.1	Regional Overview.....	8-24
8.7.2	Local Study Area.....	8-32
8.8	Wetlands (Projects subject to Federal EA).....	8-32
8.8.1	Regional Overview.....	8-32
8.8.2	Local Study Area.....	8-40
8.9	Fish and Fish Habitat (Projects subject to Federal EA).....	8-43
8.9.1	Regional Overview.....	8-43
8.9.2	Local Study Area.....	8-46
8.10	Wildlife and Wildlife Habitat, including Migratory Birds (Projects subject to Federal EA) .....	8-50
8.10.1	Regional Overview.....	8-50
8.10.2	Local Study Area.....	8-65

8.11	Species at Risk (Projects subject to Federal EA)	8-69
8.11.1	Regional Overview	8-69
8.11.1.1	Golden Winged Warbler ( <i>Vermivora chrysoptera</i> Linnaeus, Paruline à ailes dorées)	8-69
8.11.1.2	Blanding's Turtle ( <i>Emydoidea blandingii</i> )	8-70
8.11.1.3	Butternut ( <i>Juglans cinerea</i> )	8-71
8.11.1.4	Redside Dace ( <i>Clinostomus elongatus</i> )	8-71
8.11.1.5	Re-Introduced Atlantic Salmon ( <i>Salmo salar</i> )	8-72
8.11.2	Local Study Area	8-72
8.12	Socio-economic Environment (Transportation Corridor)	8-73
8.12.1	Land Use Planning Context	8-73
8.12.2	Existing Land Uses and Socio-economic Features Potentially Affected	8-77
8.13	Cultural Environment (Transportation Corridor)	8-78
8.13.1	Archaeological Resources	8-78
8.13.2	Built Heritage and Cultural Landscapes	8-79
8.14	Current Use of Land and Resources By Aboriginal People (Transportation Corridor)	8-80
8.15	Contaminated Sites & Waste Management (Transportation Corridor)	8-81
8.16	Identification of Valued Ecosystem Components	8-82
8.17	References	8-86
<b>9.</b>	<b>Likely Environmental Effects</b>	<b>9-1</b>
9.1	Air Quality and Climate (Transportation Corridor)	9-1
9.1.1	Summary of Methods and Applicable Guidelines	9-1
9.1.1.1	Summary of Methods	9-2
9.1.1.2	Applicable Guidelines	9-3
9.1.2	Construction Phase	9-4
9.1.3	Operations and Maintenance Phase	9-4
9.1.4	Mitigation/Compensation Measures	9-7
9.1.5	Residual Effects	9-8
9.2	Noise and Vibration (Transportation Corridor)	9-9
9.2.1	Summary of Methods and Applicable Guidelines	9-9
9.2.1.1	Summary of Methods	9-12
9.2.1.2	Applicable Guidelines	9-15
9.2.2	Construction Phase	9-17
9.2.3	Operations and Maintenance Phase	9-17
9.2.4	Mitigation / Compensation Measures	9-21
9.2.5	Residual Effects	9-25
9.3	Surface and Subsurface Geology and Soils (Transportation Corridor)	9-25
9.3.1	Summary of Methods and Applicable Guidelines	9-25
9.3.2	Construction Phase	9-26
9.3.3	Operations and Maintenance Phase	9-30
9.3.4	Mitigation / Compensation Measures	9-30

9.3.5	Residual Effects .....	9-31
9.4	Groundwater (Transportation Corridor) .....	9-32
9.4.1	Summary of Methods and Applicable Guidelines .....	9-32
9.4.1.1	<i>Applicable Guidelines</i> .....	9-35
9.4.2	Construction Phase .....	9-36
9.4.3	Operations and Maintenance Phase .....	9-39
9.4.4	Mitigation/Compensation Measures .....	9-40
9.4.5	Residual Effects .....	9-46
9.5	Surface Water (Projects subject to Federal EA) .....	9-46
9.5.1	Summary of Methods and Applicable Guidelines .....	9-46
9.5.2	Construction Phase .....	9-47
9.5.3	Operations and Maintenance Phase .....	9-49
9.5.4	Mitigation / Compensation Measures .....	9-57
9.5.5	Residual Effects .....	9-59
9.6	Vegetation and Vegetation Communities (Projects subject to Federal EA) .....	9-60
9.6.1	Summary of Methods and Applicable Guidelines .....	9-60
9.6.2	Construction Phase .....	9-63
9.6.3	Operations and Maintenance Phase .....	9-69
9.6.4	Mitigation / Compensation Measures .....	9-70
9.6.5	Residual Effects .....	9-74
9.7	Wetlands (Projects subject to Federal EA) .....	9-75
9.7.1	Summary of Methods and Applicable Guidelines .....	9-75
9.7.2	Construction Phase .....	9-76
9.7.3	Operations and Maintenance Phase .....	9-79
9.7.4	Mitigation / Compensation Measures .....	9-80
9.7.5	Residual Effects .....	9-81
9.8	Fish and Fish Habitat (Projects Subject to Federal EA) .....	9-82
9.8.1	Summary of Methods and Applicable Guidelines .....	9-82
9.8.1.1	<i>New Crossings – Low Sensitivity Fish and Fish Habitat</i> .....	9-84
9.8.1.2	<i>New Crossings – Moderate Sensitivity Fish and Fish Habitat</i> .....	9-85
9.8.1.3	<i>New Crossings – High Sensitivity Fish and Fish Habitat</i> .....	9-85
9.8.1.4	<i>Project Specific Selection and Sizing of Crossing Type</i> .....	9-85
9.8.1.5	<i>Consideration in Designing Bridges and Culverts</i> .....	9-86
9.8.2	Construction Phase .....	9-89
9.8.3	Operations and Maintenance Phase .....	9-94
9.8.4	Mitigation / Compensation Measures .....	9-96
9.8.5	Residual Effects .....	9-101
9.9	Wildlife and Wildlife Habitat, including Migratory Birds (Projects Subject to Federal EA) .....	9-102
9.9.1	Summary of Methods and Applicable Guidelines .....	9-102
9.9.2	Construction Phase .....	9-104
9.9.3	Operations and Maintenance Phase .....	9-108
9.9.4	Mitigation / Compensation Measures .....	9-109
9.9.5	Residual Effects .....	9-112

9.10	Species at Risk (Projects subject to Federal EA)	9-112
9.10.1	Summary of Methods and Applicable Guidelines	9-113
9.10.2	Construction Phase	9-114
9.10.3	Operations and Maintenance Phase	9-114
9.10.4	Mitigation / Compensation Measures	9-115
9.10.5	Residual Effects	9-117
9.11	Socio-economic Environment (Transportation Corridor)	9-117
9.11.1	Summary of Methods and Applicable Guidelines	9-117
9.11.2	Construction Phase	9-118
9.11.3	Operations and Maintenance Phase	9-119
9.11.4	Mitigation / Compensation Measures	9-120
9.11.5	Residual Effects	9-120
9.12	Cultural Environment (Transportation Corridor)	9-121
9.12.1	Summary of Methods and Applicable Guidelines	9-121
	9.12.1.1 <i>Archaeology</i>	9-121
	9.12.1.2 <i>Built Heritage</i>	9-124
9.12.2	Construction Phase	9-125
9.12.3	Operations and Maintenance Phase	9-126
9.12.4	Mitigation / Compensation Measures	9-126
9.12.5	Residual Effects	9-128
9.13	Current Use of Land and Resources by Aboriginal People (Transportation Corridor)	9-128
9.13.1	Summary of Methods and Applicable Guidelines	9-128
9.13.2	Construction Phase	9-129
9.13.3	Operations and Maintenance Phase	9-129
9.13.4	Mitigation / Compensation Measures	9-130
9.13.5	Residual Effects	9-130
9.14	Contaminated Sites & Waste Management	9-130
9.14.1	Summary of Methods and Applicable Guidelines	9-130
9.14.2	Construction Phase	9-132
9.14.3	Operations and Maintenance Phase	9-137
9.14.4	Mitigation / Compensation Measures	9-137
9.14.5	Residual Effects	9-139
9.15	Consideration of Effects on the Capacity of Renewable Resources	9-139
9.15.1	Residual Effects	9-140
9.16	Effects of the Environment on the Undertaking (Transportation Corridor)	9-140
9.16.1	Mitigation Measures	9-142
9.16.2	Residual Effects	9-142
9.17	Effects of Accidents and Malfunctions (Transportation Corridor)	9-143
9.17.1	Residual Effects	9-145
9.18	Summary of Residual Effects	9-145
9.19	References	9-147

<b>10. Likely Cumulative Effects</b>	<b>10-1</b>
10.1 Approach	10-1
10.2 Scope of the Cumulative Effects Assessment	10-2
10.3 Residual Effects of the Projects Subject to Federal EA and the 407 East Transportation Corridor	10-4
10.4 Identification and Description of Other Projects and Activities	10-4
10.4.1 Certain and Planned Projects and Activities	10-12
10.4.2 Reasonably Foreseeable Projects and Activities	10-15
10.5 Likely Interactions Between 407 East Transportation Corridor and Other Projects and Activities	10-22
10.5.1 Screening of Likely Interactions	10-23
10.5.1.1 Past and Existing Projects and Activities	10-23
10.5.1.2 Certain and Planned Projects and Activities	10-26
10.5.1.3 Reasonably Foreseeable Projects and Activities	10-28
10.6 Cumulative Effects Assessment – The 407 East Transportation Corridor and Other Projects and Activities	10-31
10.6.1 Air Quality and Climate	10-32
10.6.1.1 Implications for Human Health	10-36
10.6.1.2 Mitigation / Compensation Measures	10-38
10.6.1.3 Residual Effects	10-40
10.6.2 Noise and Vibration	10-41
10.6.2.1 Mitigation / Compensation Measures	10-44
10.6.2.2 Residual Effects	10-45
10.6.3 Surface and Subsurface Geology and Soils	10-45
10.6.3.1 Mitigation / Compensation Measures	10-47
10.6.3.2 Residual Effects	10-47
10.6.4 Groundwater	10-47
10.6.4.1 Mitigation / Compensation Measures	10-49
10.6.4.2 Residual Effects	10-50
10.6.5 Surface Water	10-50
10.6.5.1 Implications for Human Health	10-54
10.6.5.2 Mitigation / Compensation Measures	10-59
10.6.5.3 Residual Effects	10-62
10.6.6 Vegetation and Vegetation Communities	10-62
10.6.6.1 Mitigation / Compensation Measures	10-65
10.6.6.2 Residual Effects	10-67
10.6.7 Wetlands	10-67
10.6.7.1 Mitigation / Compensation Measures	10-68
10.6.7.2 Residual Effects	10-71
10.6.8 Wildlife and Wildlife Habitat, including Migratory Birds	10-71
10.6.8.1 Mitigation / Compensation Measures	10-72
10.6.8.2 Residual Effects	10-73
10.6.9 Species at Risk	10-73
10.6.9.1 Mitigation / Compensation Measures	10-74
10.6.9.2 Residual Effects	10-75

---

10.6.10 Socio-economic Environment .....	10-75
10.6.10.1 Mitigation / Compensation Measures .....	10-79
10.6.10.2 Residual Effects .....	10-81
10.7 Summary of Residual Cumulative Effects .....	10-81
10.8 References .....	10-83
<b>11. Significance of Residual Adverse Cumulative Effects .....</b>	<b>11-1</b>
11.1 Context for Determination of Significance .....	11-1
<b>12. Monitoring and Follow-Up .....</b>	<b>12-1</b>
12.1 Mitigation and Compensation Plan .....	12-1
12.2 Monitoring Strategy and Schedule .....	12-1
12.2.1 Environmental Effects Monitoring .....	12-2
12.2.2 EA Compliance Monitoring .....	12-3
<b>13. Environmental Assessment Determination .....</b>	<b>13-1</b>
13.1 Conclusions of the Ontario Ministry of Transportation .....	13-1
13.2 Determination of the Responsible Authorities .....	13-2

## List of Figures

Figure 2-1	Provincial EA Process .....	2-3
Figure 3-1	Federal-Provincial Coordination Process.....	3-3
Figure 5-1	Overview of 407 Consultation Process .....	5-3
Figure 5-2	Consultation Elements .....	5-4
Figure 6-1	Analysis Area .....	6-3
Figure 6-2	Technically Preferred Route.....	6-8
Figure 6-3	Typical 10-Lane Section for 407 Mainline.....	6-11
Figure 6-4	Watercourse Crossing Location Plan.....	6-14
Figure 7-1	Projects Subject to Federal EA .....	7-3
Figure 8-1	Geological Cross-Sections.....	8-13
Figure 8-2	Evaluated Wetlands within the 407 East Transportation Corridor Regional Study Area .....	8-37
Figure 9-1	Combined Effects Analysis Example for PM2.5.....	9-6
Figure 9-2	Typical Frequency Spectra of Traffic Noise – Vehicle Pass-bys at 90 km/h .....	9-10
Figure 9-3	Decay of Noise with Distance .....	9-12
Figure 9-4	The Noise Modelling Process .....	9-14
Figure 9-5	Construction Noise Analysis - Audley Road to Ashburn Road (Section 2).....	9-18
Figure 9-6	Mitigation Measures (Noise Barriers) to be Installed .....	9-22
Figure 9-7	Barrier 1 – Brooklin Area.....	9-23
Figure 9-8	Barrier 2– Hampton Area .....	9-24
Figure 9-9	Barrier 3 – West Link / Highway 401 Area .....	9-24
Figure 9-10	Areas Susceptible to Erosion .....	9-28
Figure 9-11	Archaeological Assessment Process in Ontario .....	9-122
Figure 9-12	Waste Management Property – ID # 1-8 (Former Brock North Landfill).....	9-133
Figure 9-13	Waste Management Property – ID # 7-16 (Darlington NGD Landfill (Closed)) .....	9-134
Figure 9-14	Waste Management Property – ID # 7-21 (Waste Transfer Station).....	9-135
Figure 10-1	Conceptual Approach to the Cumulative Effects Assessment.....	10-3
Figure 10-2	Other Projects and Activities Considered in the Cumulative Effects Assessment.....	10-8
Figure 10-3	Existing Urban and Rural/Agricultural Land Use.....	10-9
Figure 10-4	Existing Provincial and Regional Transportation Network and Planned Improvements.....	10-13
Figure 10-5	Comparison of Rankings of Mitigated Future Build Versus Future No-Build Leq (24 h) Sound Levels – Entire Project.....	10-43
Figure 10-6	General Location Surficial Sand Aquifers and Lanes at Full Build Out.....	10-55

## List of Tables

Table 5-1	RAG Meeting Dates / Agenda Items .....	5-5
Table 7-1	Projects Subject to Federal EA .....	7-1
Table 8-1	Level of Detail Considerations .....	8-1
Table 8-2	Summary of Relevant Air Quality Thresholds (µg/m <sup>3</sup> ).....	8-4
Table 8-3	Summary of Ambient Measurements from MOE Station No. 45025, Ritson Road and Olive Avenue, Oshawa, MOE Station No. 48006, Eagle Street/McCaffrey Road, Newmarket [3-5].....	8-5
Table 8-4	Summary of Ambient Air Measurements (µg/m <sup>3</sup> ).....	8-6
Table 8-5	Regional Study Area Climate Normals.....	8-7
Table 8-6	Regional Study Area Atmospheric Hazards.....	8-8
Table 8-7	Ranges of Sound Levels .....	8-9
Table 8-8	Existing Municipal Noise By-laws.....	8-10
Table 8-9	Drainage Areas of Major Watersheds .....	8-18
Table 8-10	Existing Surface Water Conditions for Projects subject to Federal EA.....	8-22
Table 8-11	Regionally Rare Flora in the Study Area of the East Duffins Creek Watershed.....	8-25
Table 8-12	Locally Rare Plant Species Identified within the Regional Study Area of the East Duffins Creek Watershed .....	8-25
Table 8-13	Locally Rare Flora in the Study Area of the Carruthers Creek Watershed .....	8-26
Table 8-14	Regionally Rare Plant Species in the Study Area of the Lynde Creek Watershed (Mainline).....	8-27
Table 8-15	Regionally Rare Plant Species in the Study Area of the Lynde Creek Watershed (West Durham Link) .....	8-28
Table 8-16	Regionally Rare Flora in the Study Area of the Oshawa and Pringle Creek Watersheds .....	8-29
Table 8-17	Regionally Rare Flora in the Study Area of the Farwell Creek, Black Creek, Bowmanville Creek and Soper Creek Watersheds.....	8-30
Table 8-18	Regionally Rare Flora in the Study Area of the Wilmot Creek Watershed .....	8-31
Table 8-19	Regionally Rare Flora in the Study Area of the Black Creek, Tooley Creek and Darlington Creek Watersheds .....	8-32
Table 8-20	Existing Vegetation and Vegetation Communities Associated with the Projects subject to Federal EA .....	8-33
Table 8-21	Evaluated Wetlands within the 407 East Transportation Corridor RSA.....	8-38
Table 8-22	Existing Wetlands Associated with Projects subject to Federal EA.....	8-40
Table 8-23	Existing Fish and Fish Habitat Conditions Associated with Projects subject to Federal EA.....	8-47
Table 8-24	Forest Area-sensitive Species in the Study Area of the East Duffins Creek Watershed.....	8-51
Table 8-25	Rare Bird Species in the Study Area of the East Duffins Creek Watershed.....	8-51

Table 8-26	Forest Area-sensitive Bird Species in the Study Area of the Carruthers Creek Watershed .....	8-53
Table 8-27	Rare Bird Species in the Study Area of the Carruthers Creek Watershed .....	8-53
Table 8-28	Forest Area-sensitive Species in the Study Area of the Lynde Creek Watershed (Mainline).....	8-54
Table 8-29	Forest Area-sensitive Species in the Study Area of the Lynde Creek Watershed (West Durham Link).....	8-56
Table 8-30	Rare Bird Species in the Study Area of the Lynde Creek Watershed (West Durham Link).....	8-56
Table 8-31	Forest Area-sensitive Species in the Study Area of the Oshawa Creek Watershed .....	8-58
Table 8-32	Forest Area-sensitive Species in the Study Area of the Harmony Creek Watershed.....	8-59
Table 8-33	Forest Area Sensitive Species in the Study Area of the Farewell Creek, Black Creek, Bowmanville Creek and Soper Creek Watersheds.....	8-61
Table 8-34	Rare Bird Species in the Study Area of the Farewell Creek, Black Creek, Bowmanville Creek and Soper Creek Watersheds .....	8-61
Table 8-35	Forest Area-sensitive Species in the Study Area of the Wilmot Creek Watershed .....	8-62
Table 8-36	Rare Bird Species in the Study Area of the Wilmot Creek Watershed .....	8-63
Table 8-37	Forest Area-sensitive Species in the Study Area of the Black Creek, Tooley Creek and Darlington Creek Watersheds .....	8-64
Table 8-38	Rare Bird Species of the Study Area of the Black Creek, Tooley Creek and Darlington Creek Watersheds.....	8-64
Table 8-39	Existing Wildlife and Wildlife Habitat Conditions Associated with Projects subject to Federal EA .....	8-66
Table 8-40	Species at Risk Associated with Projects subject to Federal EA.....	8-73
Table 8-41	Valued Ecosystem Components .....	8-83
Table 9-1	Contaminants of Interest from a Vehicular Emission Perspective .....	9-2
Table 9-2	Summary of Relevant Air Quality Thresholds (µg/m3).....	9-4
Table 9-3	Maximum Predicted Concentrations – Entire 407 East Transportation Corridor.....	9-5
Table 9-4	Extent of Impact – Number of Affected Air Quality Sensitive Receptors .....	9-5
Table 9-5	Subjective Human Perception of Changes in Sound Level , .....	9-11
Table 9-6	Summary of Mitigation Efforts Under Ontario Noise Guidelines.....	9-16
Table 9-7	Summary of the Construction Noise Analysis along the 407 East Transportation Corridor .....	9-17
Table 9-8	Ranking of Mitigated Future Build Sound Levels – Transportation Corridor.....	9-19
Table 9-9	Ranking of Changes in Mitigated Future Build Sound Levels – Entire Project.....	9-19
Table 9-10	Change in Future Build Versus No-Build Sound Levels Only for NSAs With Future Build Levels > 60 dBA.....	9-20
Table 9-11	Change in Future Build Versus No-Build Sound Levels Only for NSAs With Future Build Levels > 65 dBA.....	9-20
Table 9-12	NPC-115 Maximum Noise Emission Levels for Typical Construction Equipment.....	9-21

Table 9-13	NPC-119 Maximum Blast Vibration Levels .....	9-22
Table 9-14	Factors Influencing Soil Erodibility .....	9-26
Table 9-15	Hydraulic Conductivity Summary by Hydrostratigraphic Unit.....	9-33
Table 9-16	Summary of Likely Effects on Groundwater.....	9-38
Table 9-17	Number of Domestic Wells requiring Decommissioning .....	9-40
Table 9-18	Summary of Mitigation Measures - Construction Phase.....	9-42
Table 9-19	Summary Mitigation Measures – Operations and Maintenance Phase.....	9-43
Table 9-20	Stormwater Management Ponds associated with Projects Subject to Federal EA .....	9-50
Table 9-21	Overview of Key Effects to Vegetation and Vegetation Communities Projects Subject to Federal EA .....	9-64
Table 9-22	Effects on Wetlands at the Projects subject to Federal EA.....	9-77
Table 9-23	Summary of Key Effects to Fish and Fish Habitat .....	9-94
Table 9-24	Construction Timing Windows Based on the Fishery Present.....	9-97
Table 9-25	Overview of Key Effects to Wildlife and Wildlife Habitat for the Projects Subject To Federal EA .....	9-105
Table 9-26	Construction Timing Windows for Redside Dace fishery.....	9-116
Table 9-27	Agricultural Lands Displaced.....	9-119
Table 9-28	Summary of Stage 2 Archaeological Field work Completed To Date (as of May 2009).....	9-125
Table 9-29	Summary of Archaeological Findings Submitted to MCL (as of December 2008) .....	9-125
Table 9-30	Key Design/Mitigation Measures.....	9-142
Table 9-31	Summary of Residual Effects .....	9-146
Table 10-1	Residual Adverse Effects of the Projects Subject to Federal EA and the 407 East Transportation Corridor that are Subject to Cumulative Effects Assessment.....	10-4
Table 10-2	Projects and Activities Selected for the Cumulative Effects Assessment.....	10-7
Table 10-3	Past and Projected Population and Employment Levels .....	10-10
Table 10-4	Availability of Agricultural Lands in Durham Region .....	10-10
Table 10-5	Likely Interactions between 407 East Transportation Corridor and Other Projects and Activities .....	10-25
Table 10-6	Summary of Regional Criteria Contaminants Assessment for 407 East Transportation Corridor (kTonne/year).....	10-34
Table 10-7	407 East Transportation Corridor GHG Emissions (Metric Tonnes/Year).....	10-35
Table 10-8	Ranges of Sound Levels .....	10-41
Table 10-9	Future No-Build and Mitigated Future Build Noise Level Statistics .....	10-42
Table 10-10	Comparison of Rankings of Mitigated Future Build vs. Future No-Build Sound Levels – Entire Project.....	10-42
Table 10-11	Change in Future Build Versus No-Build Sound Levels Only for NSAs With Future Build Levels > 60 dBA.....	10-43
Table 10-12	Change in Future Build Versus No-Build Sound Levels Only for NSAs With Future Build Levels > 65 dBA.....	10-44

---

Table 10-13	MOE Publication LU-131 Requirements .....	10-44
Table 10-14	Cumulative Effects on Surface Water .....	10-52
Table 10-15	Cumulative Effects on Forest Areas.....	10-63
Table 10-16	Cumulative Effects on Interior Forest Habitat .....	10-64
Table 10-17	Cumulative Effects on Wetlands .....	10-70
Table 10-18	Projects in the Vicinity of the 407 East Durham Link and Highway 401 .....	10-76
Table 10-19	Cumulative Effects on Agriculture .....	10-80
Table 10-20	Summary of Residual Adverse Cumulative Effects .....	10-81
Table 11-1	Significance Assessment Framework .....	11-2
Table 11-2	Significance of Residual Adverse Cumulative Effects .....	11-4
Table 12-1	Summary of Monitoring Requirements Associated with the Undertaking and Projects Subject to the Federal EA .....	12-2
Table 12-2	EA Commitments and Compliance Monitoring .....	12-4

## Appendices

- A. Federal Environmental Assessment Guidelines Under the Canadian Environmental Assessment Act for the 407 East Transportation Corridor Project
- B. Protocol for Engaging First Nation Communities in Archaeology
- C. Responsible Authorities (RAs) Correspondence
- D. Projects Subject to Federal EA Local Study Area (LSA) Maps
- E. Fish and Fish Habitat Impact Summary Table
- F. Wildlife Species List