

Table of Contents

1	INTRODUCTION.....	1-1
1.1	Purpose of the Environmental Impact Statement 2021 Update.....	1-1
1.1.1	Summary of Updates to Introduction.....	1-1
1.2	Project Overview.....	1-2
1.2.1	Name of Designated Project.....	1-2
1.2.2	Project Location.....	1-2
1.2.2.1	<i>Beaver Dam Mine Site</i>	1-2
1.2.2.2	<i>Haul Road</i>	1-2
1.2.2.3	<i>Touquoy Mine</i>	1-2
1.2.3	Overview.....	1-3
1.2.4	Beaver Dam Mine.....	1-3
1.2.5	Haul Road.....	1-7
1.2.6	Touquoy Gold Mine.....	1-7
1.3	Purpose of the Project.....	1-8
1.4	Proponent Information.....	1-8
1.4.1	Proponent Profile.....	1-8
1.4.2	Corporate Governance and Management Structure.....	1-9
1.4.3	Proponent Personnel Details.....	1-11
1.4.4	Environmental Assessment Consulting Team.....	1-12
1.5	Regulatory Framework and Role of Government.....	1-13
1.5.1	Federal Regulatory Framework.....	1-16
1.5.1.1	<i>Canadian Environmental Assessment Act, 2012</i>	1-16
1.5.1.2	<i>Fisheries Act, 1985</i>	1-18
1.5.1.3	<i>Migratory Birds Convention Act, 1994</i>	1-18
1.5.1.4	<i>Navigation Protection Act, 1985</i>	1-19
1.5.1.5	<i>Federal Guidance Applicable to the Project</i>	1-19
1.5.2	Provincial Regulatory Framework.....	1-20
1.5.2.1	<i>Nova Scotia Environment Act, 1995</i>	1-20
1.5.2.2	<i>Nova Scotia Endangered Species Act, 1999</i>	1-21
1.5.2.3	<i>Provincial Guidance Applicable to the Project</i>	1-21

1.5.3	Municipal Regulatory Framework	1-21
1.5.4	Indigenous Peoples	1-21
1.6	Guiding Principles	1-22
1.6.1	Planning Tool	1-22
1.6.2	Public Participation	1-22
1.6.3	Mi'kmaq of Nova Scotia Engagement.....	1-23
1.6.4	Precautionary Approach Application	1-24
1.7	Benefits of the Project.....	1-24
1.7.1	Environmental Benefits.....	1-24
1.7.2	Socio-economic Benefits	1-25
1.8	Environmental Impact Statement Organization	1-26
2	PROJECT DESCRIPTION	2-1
2.1	Introduction.....	2-1
2.1.1	Summary of the Project Description Before the Updates	2-1
2.1.2	Summary of Updates to Project Description.....	2-1
2.1.3	Overview of Updates	2-2
2.2	Ownership and Tenements	2-2
2.2.1	Ownership	2-2
2.2.2	Mineral Tenures.....	2-3
2.2.2.1	<i>Beaver Dam Property.....</i>	2-3
2.2.2.2	<i>Touquoy Property.....</i>	2-5
2.2.3	Surface Rights.....	2-5
2.2.3.1	<i>Beaver Dam Property.....</i>	2-5
2.2.3.2	<i>Haul Road</i>	2-5
2.2.3.3	<i>Touquoy Property.....</i>	2-5
2.3	Project Location.....	2-6
2.3.1	Beaver Dam Mine.....	2-6
2.3.2	Haul Road	2-6
2.3.3	Touquoy Mine.....	2-6
2.4	Ecological Setting.....	2-11
2.4.1	Physiography and Drainage	2-11

2.4.2	Climate	2-11
2.4.3	Current Land Use	2-12
2.4.4	Traditional Land Use	2-12
2.4.5	Significant Areas.....	2-13
2.5	Project History	2-13
2.5.1	Beaver Dam Mine.....	2-13
2.5.2	Touquoy Mine.....	2-14
2.6	Geology and Resources.....	2-14
2.6.1	Regional Geology.....	2-14
2.6.2	Beaver Dam Deposit (Resource).....	2-15
2.7	Project Components.....	2-17
2.7.1	Summary of 2021 Updates.....	2-18
2.7.2	Beaver Dam Mine Site	2-20
2.7.2.1	<i>Open Pit</i>	2-20
2.7.2.2	<i>Waste Material Stockpiles</i>	2-21
2.7.2.3	<i>Waste Rock Storage Area.....</i>	2-22
2.7.2.4	<i>Historic Tailings and Waste Rock.....</i>	2-26
2.7.2.5	<i>Mine Site Roads</i>	2-26
2.7.2.6	<i>Infrastructure and Facilities</i>	2-28
2.7.2.7	<i>Fuel Storage and Distribution.....</i>	2-31
2.7.2.8	<i>Power Generation and Distribution</i>	2-31
2.7.2.9	<i>Water Management.....</i>	2-31
2.7.3	Haul Roads.....	2-38
2.7.3.1	<i>Beaver Dam Mines Road (Section 1).....</i>	2-40
2.7.3.2	<i>New Construction East of Highway 224 Section 3B.....</i>	2-40
2.7.3.3	<i>Haul Road to Mooseland Road Section 4A/B.....</i>	2-40
2.7.3.4	<i>Haul Road Mooseland Road to Touquoy Section 5A/B.....</i>	2-40
2.7.3.5	<i>Bypass Roads</i>	2-41
2.7.3.6	<i>Haul Road Bridges</i>	2-42
2.7.4	Touquoy Mine Site	2-43
2.7.4.1	<i>Currently Approved Operations at the Touquoy Mine Site.....</i>	2-44

2.7.4.2	<i>Touquoy Gold Mine Environmental Assessment</i>	2-44
2.7.4.3	<i>Existing Industrial Approval at the Touquoy Mine Site</i>	2-45
2.7.4.4	<i>Touquoy Mine Site and Benefits to the Beaver Dam Mine Project</i>	2-46
2.8	Project Schedule	2-48
2.9	Project Activities	2-48
2.9.1	Construction (Year 1)	2-48
2.9.1.1	<i>Beaver Dam Mine Site</i>	2-48
2.9.1.2	<i>Haul Road</i>	2-54
2.9.1.3	<i>Touquoy Mine Site</i>	2-56
2.9.1.4	<i>Construction Environmental Mitigations and Monitoring</i>	2-61
2.9.2	Operations and Maintenance (Years 2 to 6)	2-62
2.9.2.1	<i>Beaver Dam Mine Site</i>	2-62
2.9.2.2	<i>Haul Road</i>	2-67
2.9.2.3	<i>Touquoy Mine Site</i>	2-68
2.9.2.4	<i>Existing Environmental Mitigation Requirements Associated with Operations</i>	2-70
2.9.3	Active Closure and Reclamation (Years 5 to 7).....	2-70
2.9.3.1	<i>Reclamation Objectives and Goals</i>	2-70
2.9.4	Post-closure Monitoring and Adaptive Management (Year 7 to 10+ Years)	2-77
2.9.4.1	<i>Beaver Dam Mine</i>	2-77
2.9.4.2	<i>Touquoy Mine</i>	2-78
2.9.4.3	<i>Reclamation Schedule</i>	2-78
2.9.5	Greenhouse Gas Emissions.....	2-78
2.10	Alternative Means of Carrying out the Project	2-79
2.10.1	Identification of Alternative Means.....	2-79
2.10.2	Mine Type.....	2-80
2.10.3	Ore Extraction Methods.....	2-81
2.10.4	Ore Processing Methods	2-81
2.10.5	Ore Processing Locations	2-82
2.10.6	Ore Transportation	2-83
2.10.7	Energy Source.....	2-84
2.10.8	Project Component Locations	2-84

2.10.9	Water Supply and Management	2-85
2.10.10	Mine Waste Management Facilities.....	2-86
2.10.10.1	Waste Rock Storage	2-86
2.10.10.2	Tailings Storage.....	2-87
2.10.11	The Preferred Approach	2-88
2.11	Conclusions	2-92
3	PUBLIC ENGAGEMENT	3-1
3.1	Introduction.....	3-1
3.1.1	Summary of Public Engagement Before the Updates	3-1
3.1.2	Summary of Updates to Public Engagement.....	3-1
3.2	Objectives	3-3
3.3	Spatial Boundary	3-3
3.4	Engagement Strategy.....	3-6
3.4.1	Adaptive Management.....	3-8
3.4.2	Community Liaison Committee.....	3-9
3.4.3	Open Houses and Town Hall Meetings	3-10
3.4.4	Presentations and Meetings with Local Community Groups	3-10
3.4.5	Community Bulletins (Newsletter)	3-10
3.4.6	Signage	3-11
3.4.7	Website, Email, Phonenumber and other Digital Media.....	3-11
3.4.8	Media and Press Releases.....	3-12
3.4.9	Meetings with Local Residents and Landowners.....	3-12
3.4.10	Complaints Response Procedure.....	3-12
3.5	Regulatory Consultation	3-12
3.6	Public Engagement Activities.....	3-13
3.6.1	Community Open Houses	3-13
3.6.2	Community Liaison Committee.....	3-15
3.6.3	Stakeholder Meetings.....	3-16
3.6.3.1	Nova Scotia Salmon Association	3-16
3.6.3.2	Mooseland and Area Community Association.....	3-17
3.6.3.3	Sheet Harbour and Area Chamber of Commerce	3-17

3.6.3.4	<i>All Terrain Vehicle Groups</i>	3-18
3.6.4	Summary of Supplementary Engagement – 2020 and early 2021	3-18
3.7	Key Concerns Raised and Proponent Responses	3-20
3.7.1	Public Engagement 2015 to 2019	3-20
3.7.2	2020 Supplementary Engagement Strategy	3-20
3.8	Ongoing Public Engagement	3-30
4	INDIGENOUS PEOPLES ENGAGEMENT	4-1
4.1	Introduction	4-1
4.1.1	Summary of Indigenous Peoples Engagement Before the Updates.....	4-1
4.1.2	Summary of Updates to Indigenous Peoples Engagement	4-1
4.2	Objectives	4-2
4.3	Indigenous People in Nova Scotia	4-3
4.4	Key Engagement Activities	4-5
4.5	Mi’kmaq of Nova Scotia Engagement Activities	4-6
4.5.1	Community Open Houses	4-8
4.5.2	Community Liaison Committee.....	4-9
4.6	Key Concerns Raised by the Mi’kmaq of Nova Scotia and Proponent Responses	4-9
4.7	Ongoing Mi’kmaq of Nova Scotia Engagement	4-13
5	ENVIRONMENTAL EFFECTS ASSESSMENT METHODOLOGY	5-1
5.1	Introduction	5-1
5.1.1	Summary of Environmental Effects Assessment Methodology Before the Updates	5-1
5.1.2	Summary of Updates to Environment Effects Assessment Methodology	5-1
5.2	Scope of the Environmental Assessment	5-2
5.2.1	Designated Project	5-2
5.2.2	Factors to be Considered	5-4
5.2.3	Scope of Factors to be Considered	5-4
5.3	Overview of Approach	5-5
5.4	Valued Components Selection	5-6
5.5	Project Boundaries	5-9
5.5.1	Temporal Boundaries	5-9
5.5.2	Spatial Boundaries	5-9

5.5.2.1	<i>Project Area (PA)</i>	5-9
5.5.2.2	<i>Local Assessment Area (LAA)</i>	5-9
5.5.2.3	<i>Regional Assessment Area (RAA)</i>	5-9
5.5.3	Administrative Boundaries.....	5-12
5.5.4	Technical Boundaries.....	5-12
5.6	Standards or Thresholds for Characterizing and Determining Significance of Effects	5-13
5.7	Baseline Conditions	5-13
5.8	Anticipated Project-Environment Interaction	5-13
5.9	Effects Prediction	5-18
5.10	Mitigation Measures	5-18
5.11	Residual Effects and the Determination of Significance	5-18
5.12	Follow-up and Effects Monitoring	5-22
5.13	Effects of the Environment on the Project	5-22
6	ENVIRONMENTAL EFFECTS ASSESSMENT	6-1
6.1	Noise	6-1
6.1.1	Introduction.....	6-1
6.1.1.1	<i>Summary of Noise Before the Updates</i>	6-1
6.1.1.2	<i>Summary of Updates to Noise</i>	6-1
6.1.2	Rationale for Valued Component Selection.....	6-3
6.1.3	Baseline Program Methodology	6-3
6.1.4	Baseline Conditions.....	6-6
6.1.4.1	<i>Overview</i>	6-6
6.1.4.2	<i>Ambient Noise</i>	6-6
6.1.5	Consideration of Engagement Results	6-9
6.1.6	Effects Assessment Methodology and Modelling	6-9
6.1.6.1	<i>Boundaries</i>	6-9
6.1.6.2	<i>Thresholds for Determination of Significance</i>	6-12
6.1.6.3	<i>Noise Modelling Methodology</i>	6-12
6.1.7	Project Activities, Noise Interactions, and Predicted Effects	6-19
6.1.7.1	<i>Overview</i>	6-19
6.1.7.2	<i>Model Results: Prediction of Noise Effects, Construction</i>	6-22

6.1.7.3	<i>Model Results: Predicted of Noise Effects, Operations</i>	6-24
6.1.7.4	<i>Noise Effects Summary</i>	6-27
6.1.8	Mitigation.....	6-28
6.1.9	Residual Effects and Significance.....	6-29
6.2	Air	6-32
6.2.1	Introduction.....	6-32
6.2.1.1	<i>Summary of Air Before the Updates</i>	6-32
6.2.1.2	<i>Summary of Updates to Air</i>	6-32
6.2.2	Rationale for Valued Component Selection.....	6-34
6.2.3	Baseline Program Methodology.....	6-34
6.2.4	Baseline Conditions.....	6-34
6.2.4.1	<i>Climate and Meteorological Information</i>	6-34
6.2.4.2	<i>Ambient Air Quality Standards</i>	6-35
6.2.4.3	<i>Baseline Air Quality Monitoring Program</i>	6-35
6.2.4.4	<i>Regional Ambient Air Quality</i>	6-36
6.2.5	Consideration of Engagement Results.....	6-41
6.2.6	Effects Assessment Methodology.....	6-41
6.2.6.1	<i>Boundaries</i>	6-41
6.2.6.2	<i>Thresholds for Determination of Significance</i>	6-44
6.2.6.3	<i>Air Effects Modelling, Summary</i>	6-45
6.2.7	Project Activities/Interactions with Air Quality.....	6-47
6.2.7.1	<i>Prediction of Air Effects, Beaver Dam Mine Site</i>	6-47
6.2.7.2	<i>Prediction of Air Effects, Haul Road</i>	6-85
6.2.7.3	<i>Prediction of Air Effects, Touquoy Mine Site</i>	6-87
6.2.8	Mitigation.....	6-89
6.2.9	Residual Effects and Significance.....	6-90
6.2.10	Proposed Follow-up and Monitoring Program.....	6-92
6.3	Light	6-93
6.3.1	Introduction.....	6-93
6.3.1.1	<i>Summary of Light Before the Updates</i>	6-93
6.3.1.2	<i>Summary of Updates to Light</i>	6-93

6.3.2	Rationale for Valued Component Selection.....	6-95
6.3.3	Baseline Program Methodology	6-95
6.3.4	Baseline Conditions.....	6-95
6.3.5	Consideration of Engagement Results	6-96
6.3.6	Effects Assessment Methodology Update.....	6-96
6.3.6.1	<i>Boundaries</i>	6-96
6.3.6.2	<i>Light Assessment Modelling Methodology</i>	6-98
6.3.6.3	<i>Thresholds for Determination of Significance</i>	6-101
6.3.7	Project Activities, Light Interactions, and Effects	6-102
6.3.7.1	<i>Beaver Dam Mine Site and Haul Road</i>	6-103
6.3.7.2	<i>Touquoy Mine Site</i>	6-107
6.3.8	Mitigation	6-107
6.3.9	Residual Effects and Significance	6-108
6.3.10	Proposed Compliance and Effects Monitoring Program.....	6-110
6.4	Greenhouse Gases	6-111
6.4.1	Introduction.....	6-111
6.4.1.1	<i>Summary of Greenhouse Gases Before the Updates</i>	6-111
6.4.1.2	<i>Summary of Updates to Greenhouse Gases</i>	6-111
6.4.2	Rationale for Valued Component Selection.....	6-112
6.4.3	Baseline Program Methodology	6-112
6.4.4	Baseline Conditions.....	6-112
6.4.4.1	<i>Provincial and Federal Greenhouse Gas Limits</i>	6-112
6.4.5	Consideration of Engagement Results	6-113
6.4.6	Effects Assessment Methodology	6-114
6.4.6.1	<i>Boundaries</i>	6-114
6.4.6.2	<i>Thresholds for Determination of Significance</i>	6-116
6.4.7	Project Activities/Interactions with Greenhouse Gas	6-117
6.4.7.1	<i>Beaver Dam Mine Site and Haul Road</i>	6-119
6.4.7.2	<i>Touquoy Mine Site</i>	6-119
6.4.7.3	<i>Overall Project</i>	6-120
6.4.8	Mitigation	6-120

6.4.9	Residual Effect and Significance	6-120
6.4.10	Proposed Compliance and Effects Monitoring Program	6-122
6.5	Geology, Soils, and Sediment Quality	6-123
6.5.1	Introduction.....	6-123
6.5.1.1	<i>Summary of Geology, Soils, and Sediment Quality Before the Updates.....</i>	<i>6-123</i>
6.5.1.2	<i>Summary of Updates to Geology, Soils, and Sediment Quality</i>	<i>6-123</i>
6.5.2	Rationale for Valued Component Selection.....	6-125
6.5.3	Baseline Program Methodology for Soil and Sediments	6-125
6.5.4	Baseline Conditions.....	6-128
6.5.4.1	<i>Regional Overview</i>	<i>6-128</i>
6.5.4.2	<i>Local Baseline Study Results.....</i>	<i>6-135</i>
6.5.5	Consideration of Consultation and Engagement Results	6-141
6.5.6	Effects Assessment Methodology	6-142
6.5.6.1	<i>Boundaries</i>	<i>6-142</i>
6.5.6.2	<i>Thresholds for Determination of Significance.....</i>	<i>6-144</i>
6.5.6.3	<i>Metal Leaching and Acid Rock Drainage Assessment.....</i>	<i>6-144</i>
6.5.7	Project Activities Interactions and Effects.....	6-148
6.5.7.1	<i>Overview of Potential Project Interactions.....</i>	<i>6-148</i>
6.5.7.2	<i>Potential Project Interactions, Beaver Dam Mine Site.....</i>	<i>6-148</i>
6.5.7.3	<i>Potential Project Interactions, Haul Road.....</i>	<i>6-149</i>
6.5.7.4	<i>Potential Project Interactions, Touquoy Mine Site.....</i>	<i>6-150</i>
6.5.8	Mitigation.....	6-150
6.5.9	Residual Effects and Significance	6-152
6.5.10	Proposed Compliance and Effects Monitoring Program.....	6-154
6.6	Groundwater Quality and Quantity	6-155
6.6.1	Introduction.....	6-155
6.6.1.1	<i>Summary of Groundwater Quality and Quantity Before the Updates.....</i>	<i>6-155</i>
6.6.1.2	<i>Summary of Updates to Groundwater Quality and Quantity</i>	<i>6-155</i>
6.6.2	Rationale for Valued Component Selection.....	6-158
6.6.3	Baseline Program Methodology	6-158
6.6.3.1	<i>Beaver Dam Mine Site Baseline Program Methodology Update.....</i>	<i>6-159</i>

6.6.3.2	<i>Touquoy Mine Site Baseline Program Methodology</i>	6-162
6.6.4	Baseline Conditions	6-163
6.6.4.1	<i>Regional Baseline Conditions</i>	6-163
6.6.4.2	<i>Project Area Baseline Conditions</i>	6-171
6.6.5	Consideration of Engagement Results	6-180
6.6.6	Effects Assessment Methodology Update	6-181
6.6.6.1	<i>Boundaries</i>	6-181
6.6.6.2	<i>Beaver Dam Mine Site Groundwater Modelling Methodology</i>	6-184
6.6.6.3	<i>Touquoy Mine Site Groundwater Modelling Methodology</i>	6-184
6.6.6.4	<i>Thresholds for Determination of Significance</i>	6-185
6.6.7	Project Activities/Interactions with Groundwater Quality and Quantity	6-186
6.6.7.1	<i>Beaver Dam Mine Site</i>	6-188
6.6.7.2	<i>Haul Road</i>	6-199
6.6.7.3	<i>Touquoy Mine Site</i>	6-200
6.6.7.4	<i>Groundwater Project Effects Summary</i>	6-207
6.6.8	Mitigation	6-209
6.6.9	Significance of Residual Effects	6-210
6.6.10	Proposed Compliance and Effects Monitoring Program	6-212
6.7	Surface Water Quantity and Quality	6-213
6.7.1	Introduction	6-213
6.7.1.1	<i>Summary of Surface Water Quality and Quantity Before the Updates</i>	6-213
6.7.1.2	<i>Summary of Updates to Surface Water Quantity and Quality</i>	6-213
6.7.2	Rationale for Valued Component Selection	6-215
6.7.3	Baseline Program Methodology	6-217
6.7.4	Water Quantity Baseline Conditions	6-224
6.7.4.1	<i>Overview</i>	6-224
6.7.4.2	<i>Monitoring Results</i>	6-228
6.7.5	Water Quality Baseline Conditions	6-237
6.7.5.1	<i>Overview</i>	6-237
6.7.5.2	<i>Baseline Results</i>	6-240
6.7.6	Consideration of Engagement Results	6-252

6.7.7	Effects Assessment Methodology	6-252
6.7.7.1	<i>Boundaries</i>	6-253
6.7.7.2	<i>Thresholds for Determination of Significance</i>	6-259
6.7.7.3	<i>Surface Water Modelling: Methodology</i>	6-261
6.7.8	Project Activities/Interactions with Surface Water Quantity and Quality	6-269
6.7.8.1	<i>Overview of Potential Surface Water Interactions</i>	6-269
6.7.8.2	<i>Surface Water Effects: Beaver Dam Mine</i>	6-271
6.7.8.3	<i>Surface Water Quality Effects: Haul Road</i>	6-297
6.7.8.4	<i>Surface Water Effects: Touquoy Mine Site</i>	6-303
6.7.9	Mitigation	6-308
6.7.9.1	<i>Water Treatment and Project Discharges</i>	6-308
6.7.9.2	<i>Sedimentation and Erosion</i>	6-309
6.7.10	Residual Effects and Significance	6-311
6.7.10.1	<i>Beaver Dam Mine</i>	6-311
6.7.10.2	<i>Haul Road</i>	6-312
6.7.10.3	<i>Touquoy Mine Site</i>	6-313
6.7.11	Proposed Compliance and Effects Monitoring Program.....	6-315
6.7.12	Summary of Residual Effects to Surface Water Quantity and Quality	6-315
6.8	Wetlands	6-317
6.8.1	Introduction.....	6-317
6.8.1.1	<i>Summary of Wetlands Before the Updates</i>	6-317
6.8.1.2	<i>Summary of Updates to Wetlands</i>	6-317
6.8.2	Rationale for Valued Component Selection.....	6-319
6.8.3	Baseline Program Methodology	6-320
6.8.3.1	<i>Desktop Evaluation</i>	6-320
6.8.3.2	<i>Field Delineation</i>	6-320
6.8.3.3	<i>Wetlands of Special Significance</i>	6-322
6.8.3.4	<i>Wetland Functional Assessment</i>	6-324
6.8.3.5	<i>Touquoy Mine Site</i>	6-324
6.8.4	Baseline Conditions.....	6-325
6.8.4.1	<i>Functional Assessment Results</i>	6-348

6.8.4.2	<i>Touquoy Mine Site</i>	6-376
6.8.5	Considerations of Engagement Results	6-378
6.8.6	Effects Assessment Methodology	6-378
6.8.6.1	<i>Boundaries</i>	6-378
6.8.6.2	<i>Wetland Cumulative Effects Modeling</i>	6-380
6.8.6.3	<i>Thresholds for Determination of Significance</i>	6-388
6.8.7	Project Activities/Interactions with Wetlands	6-389
6.8.7.1	<i>Beaver Dam Mine Site and Haul Road Wetland Impacts</i>	6-390
6.8.7.2	<i>Wetland Cumulative Effects Modelling Results</i>	6-421
6.8.8	Avoidance and Mitigation	6-424
6.8.8.1	<i>Wetland Avoidance</i>	6-424
6.8.8.2	<i>Wetland Mitigation</i>	6-426
6.8.9	Residual Effects and Significance	6-427
6.8.10	Proposed Compliance and Effects Monitoring Program.....	6-430
6.9	Fish and Fish Habitat	6-431
6.9.1	Introduction.....	6-431
6.9.1.1	<i>Summary of Fish and Fish Habitat Before Updates</i>	6-431
6.9.1.2	<i>Summary of Updates to Fish and Fish Habitat</i>	6-431
6.9.2	Rationale for Valued Component Selection.....	6-433
6.9.3	Baseline Methodology	6-434
6.9.3.1	<i>Surface Water</i>	6-436
6.9.3.2	<i>Benthic Macroinvertebrate Sampling</i>	6-436
6.9.3.3	<i>Fish Habitat Assessment</i>	6-438
6.9.3.4	<i>Fish Collection</i>	6-441
6.9.3.5	<i>Environmental DNA</i>	6-442
6.9.4	Baseline Results.....	6-445
6.9.4.1	<i>Overview</i>	6-445
6.9.4.2	<i>Site Specific Study Results</i>	6-449
6.9.5	Consideration of Engagement Results	6-480
6.9.6	Effects Assessment Methodology	6-480
6.9.6.1	<i>Boundaries</i>	6-480

6.9.6.2	<i>Thresholds for Determination of Significance</i>	6-483
6.9.7	Project Activities/Interactions with Fish and Fish Habitat	6-485
6.9.7.1	<i>Overview of Potential Fish and Fish Habitat Interactions</i>	6-485
6.9.7.2	<i>Beaver Dam Mine Site, Fish and Fish Habitat Effects</i>	6-488
6.9.7.3	<i>Haul Road, Fish and Fish Habitat Effects</i>	6-508
6.9.7.4	<i>Indirect Effects to Adjacent Streams</i>	6-517
6.9.7.5	<i>Summary of Effects to Fish and Fish Habitat</i>	6-522
6.9.7.6	<i>Fish and Fish Habitat Effects: Touquoy Mine Site</i>	6-541
6.9.8	Avoidance and Mitigation	6-543
6.9.8.1	<i>Avoidance</i>	6-543
6.9.8.2	<i>Mitigation</i>	6-545
6.9.8.3	<i>Offsetting</i>	6-551
6.9.9	Significance of Residual Effects	6-552
6.9.10	Proposed Compliance and Effects Monitoring Program Update	6-559
6.10	Habitat and Flora	6-560
6.10.1	Introduction	6-560
6.10.1.1	<i>Summary of Habitat and Flora Before the Update</i>	6-560
6.10.1.2	<i>Summary of Updates to Habitat and Flora</i>	6-560
6.10.2	Rationale for Valued Component Selection	6-562
6.10.3	Baseline Program Methodology	6-562
6.10.3.1	<i>Priority List Methodology and Desktop Evaluation</i>	6-563
6.10.3.2	<i>Habitat Survey</i>	6-564
6.10.3.3	<i>Vascular Plant Survey</i>	6-569
6.10.3.4	<i>Lichen Survey</i>	6-570
6.10.3.5	<i>Habitat Desktop Analysis</i>	6-570
6.10.3.6	<i>Old Forest and Interior Forest Desktop Analysis</i>	6-571
6.10.4	Baseline Conditions	6-572
6.10.4.1	<i>Desktop Evaluation</i>	6-572
6.10.4.2	<i>Habitat Survey Results</i>	6-574
6.10.4.3	<i>Vascular Plants</i>	6-584
6.10.4.4	<i>Lichens</i>	6-585

6.10.4.5	<i>Habitat Desktop Analysis</i>	6-587
6.10.4.6	<i>Old Forest and Interior Forest</i>	6-593
6.10.5	Consideration of Engagement Results	6-593
6.10.6	Effects Assessment Methodology	6-595
6.10.6.1	<i>Boundaries</i>	6-595
6.10.6.2	<i>Thresholds for Determination of Significance</i>	6-597
6.10.7	Project Activities/Interactions with Habitat and Flora	6-597
6.10.7.1	<i>Direct and Indirect Impacts of the Project on Habitat and Flora</i>	6-599
6.10.7.2	<i>Touquoy Mine Site</i>	6-604
6.10.8	Mitigation	6-604
6.10.9	Residual Effects and Significance	6-606
6.10.10	Proposed Compliance and Effects Monitoring Program	6-608
6.11	Terrestrial Fauna	6-609
6.11.1	Introduction	6-609
6.11.1.1	<i>Summary of Terrestrial Fauna Before the Updates</i>	6-609
6.11.1.2	<i>Summary of Updates to Terrestrial Fauna</i>	6-609
6.11.2	Rationale for Valued Component Selection	6-611
6.11.3	Baseline Program Methodology	6-611
6.11.4	Baseline Conditions	6-617
6.11.4.1	<i>Mammals</i>	6-617
6.11.4.2	<i>Herpetofauna</i>	6-620
6.11.4.3	<i>Summary of Fauna and Habitat within the Project Area</i>	6-621
6.11.5	Consideration of Engagement Results	6-622
6.11.6	Effects Assessment Methodology	6-622
6.11.6.1	<i>Boundaries</i>	6-622
6.11.6.2	<i>Thresholds for Determination of Significance</i>	6-624
6.11.7	Project Activities/Interactions with Terrestrial Fauna	6-625
6.11.7.1	<i>Habitat Use and Direct Loss</i>	6-625
6.11.7.2	<i>Habitat Fragmentation</i>	6-629
6.11.7.3	<i>Direct Mortality</i>	6-631
6.11.7.4	<i>Sensory Disturbance</i>	6-631

6.11.7.5	<i>Touquoy Mine Site</i>	6-633
6.11.8	Mitigation	6-634
6.11.9	Residual Effects and Significance Update.....	6-635
6.11.10	Proposed Compliance and Effects Monitoring Program.....	6-637
6.12	Avifauna	6-638
6.12.1	Introduction.....	6-638
6.12.1.1	<i>Summary of Avifauna Before the Updates</i>	6-638
6.12.1.2	<i>Summary of Updates to Avifauna</i>	6-638
6.12.2	Rationale for Valued Component Selection.....	6-640
6.12.3	Desktop Review.....	6-640
6.12.3.1	<i>Maritime Breeding Bird Atlas</i>	6-640
6.12.3.2	<i>Important Avifauna Areas</i>	6-641
6.12.4	Baseline Program Methodology	6-642
6.12.4.1	<i>Fall Migration</i>	6-643
6.12.4.2	<i>Winter Birds</i>	6-649
6.12.4.3	<i>Spring Diurnal Raptor Migration</i>	6-649
6.12.4.4	<i>Spring Nocturnal Owl</i>	6-649
6.12.4.5	<i>Spring Migration</i>	6-650
6.12.4.6	<i>Breeding Birds</i>	6-650
6.12.5	Baseline Conditions.....	6-652
6.12.5.1	<i>Winter Birds</i>	6-659
6.12.5.2	<i>Spring Diurnal Raptor Migration</i>	6-659
6.12.5.3	<i>Nocturnal Owl</i>	6-659
6.12.5.4	<i>Fall Migration</i>	6-659
6.12.5.5	<i>Spring Migration</i>	6-660
6.12.5.6	<i>Breeding Birds</i>	6-661
6.12.5.7	<i>Common Nighthawk</i>	6-664
6.12.5.8	<i>Discussion</i>	6-664
6.12.6	Consideration Engagement Results	6-666
6.12.7	Effects Assessment Methodology	6-666
6.12.7.1	<i>Boundaries</i>	6-666

6.12.7.2	<i>Thresholds for Determination of Significance</i>	6-668
6.12.8	Project Activities/Interactions with Avifauna	6-669
6.12.8.1	<i>Habitat Use and Direct Loss</i>	6-671
6.12.8.2	<i>Habitat Fragmentation</i>	6-672
6.12.8.3	<i>Direct Mortality</i>	6-673
6.12.8.4	<i>Sensory Disturbance</i>	6-675
6.12.8.5	<i>Touquoy Mine Site</i>	6-677
6.12.9	Mitigation	6-677
6.12.10	Residual Effects and Significance	6-679
6.12.11	Proposed Compliance and Effects Monitoring Program Update	6-681
6.13	Species of Conservation Interest and Species at Risk	6-682
6.13.1	Introduction.....	6-682
6.13.1.1	<i>Summary of Species of Conservation Interest and Species at Risk Before the Updates</i>	6-682
6.13.1.2	<i>Summary of Update to Species of Conservation Interest and Species at Risk</i>	6-682
6.13.2	Rationale for Valued Component Selection.....	6-684
6.13.3	Baseline Program Methodology	6-685
6.13.3.1	<i>Desktop Priority Species List Methodology</i>	6-685
6.13.3.2	<i>Field Program Methodologies</i>	6-687
6.13.4	Baseline Conditions.....	6-704
6.13.4.1	<i>Priority Fish Species</i>	6-704
6.13.4.2	<i>Priority Vascular Flora Species</i>	6-711
6.13.4.3	<i>Priority Lichen Species</i>	6-718
6.13.4.4	<i>Priority Terrestrial Mammal Species</i>	6-723
6.13.4.5	<i>Priority Terrestrial Mammal Summary</i>	6-727
6.13.4.6	<i>Priority Herpetofauna Species</i>	6-728
6.13.4.7	<i>Priority Invertebrate Species</i>	6-729
6.13.4.8	<i>Priority Avifauna Species</i>	6-731
6.13.5	Consideration of Engagement Results	6-739
6.13.6	Effects Assessment Methodology	6-740
6.13.6.1	<i>Boundaries</i>	6-740
6.13.6.2	<i>Thresholds for Determination of Significance</i>	6-742

6.13.7	Project Activities/Interactions with Species of Conservation Interest and Species at Risk	6-745
6.13.8	Mitigation	6-752
6.13.8.1	<i>Priority Fish Species</i>	6-752
6.13.8.2	<i>Priority Vascular Flora and Lichen Species</i>	6-754
6.13.8.3	<i>Priority Terrestrial Fauna Species</i>	6-757
6.13.8.4	<i>Priority Avifauna Species</i>	6-759
6.13.9	Residual Effects and Significance	6-764
6.13.9.1	<i>Priority Fish Species</i>	6-765
6.13.9.2	<i>Priority Vascular Plant and Lichen Species</i>	6-765
6.13.9.3	<i>Priority Terrestrial Fauna Species</i>	6-765
6.13.9.4	<i>Priority Avifauna Species</i>	6-768
6.13.10	Proposed Compliance and Effects Monitoring Programs	6-770
6.14	Mi'kmaq of Nova Scotia	6-772
6.14.1	Introduction.....	6-772
6.14.1.1	<i>Summary of Mi'kmaq of Nova Scotia Before the Updates</i>	6-772
6.14.1.2	<i>Summary of Updates to Mi'kmaq of Nova Scotia</i>	6-772
6.14.2	Rationale for Valued Component Selection.....	6-773
6.14.3	Baseline Program Methodology	6-775
6.14.3.1	<i>Beaver Dam Mine Site and Haul Road Baseline Program Methodology</i>	6-775
6.14.3.2	<i>Touquoy Baseline Program Methodology</i>	6-778
6.14.4	Baseline Conditions.....	6-778
6.14.4.1	<i>Regional Baseline Conditions and General Information Relating to Mi'kmaq Communities</i>	6-778
6.14.4.2	<i>Beaver Dam Mine Site and Haul Road Baseline Conditions</i>	6-789
6.14.4.3	<i>Touquoy Mine Site Baseline Conditions</i>	6-797
6.14.5	Consideration of Engagement Results	6-797
6.14.6	Effects Assessment Methodology	6-798
6.14.6.1	<i>Boundaries</i>	6-798
6.14.6.2	<i>Thresholds for Determination of Significance</i>	6-799
6.14.7	Project Activities/Interactions with Mi'kmaq of Nova Scotia.....	6-800
6.14.7.1	<i>Project Interactions with Mi'kmaq Traditional Use/Rights</i>	6-811
6.14.7.2	<i>Project Interactions and Mi'kmaq Health and Socio-economic Conditions</i>	6-817

6.14.8	Mitigation	6-824
6.14.9	Residual Effects and Significance	6-837
6.14.9.1	<i>Millbrook First Nation Beaver Dam Community Consultation Report Summary</i>	6-837
6.14.10	Proposed Compliance and Effects Monitoring Program	6-846
6.15	Physical and Cultural Heritage	6-847
6.15.1	Introduction	6-847
6.15.1.1	<i>Summary of Physical and Cultural Heritage Before the Updates</i>	6-847
6.15.1.2	<i>Summary of Updates to Physical and Cultural Heritage</i>	6-847
6.15.2	Rationale for Valued Component Selection	6-849
6.15.3	Baseline Program Methodology	6-849
6.15.4	Baseline Conditions	6-850
6.15.4.1	<i>Beaver Dam Mine Site</i>	6-850
6.15.4.2	<i>Haul Road</i>	6-852
6.15.4.3	<i>Touquoy Mine Site</i>	6-853
6.15.5	Consideration of Engagement Results	6-853
6.15.6	Effects Assessment Methodology	6-853
6.15.6.1	<i>Boundaries</i>	6-853
6.15.6.2	<i>Thresholds for Determination of Significance</i>	6-854
6.15.7	Project Activities/Interactions with Physical and Cultural Heritage	6-854
6.15.7.1	<i>Touquoy Mine Site</i>	6-856
6.15.8	Mitigation	6-856
6.15.9	Residual Effects and Significance	6-857
6.15.10	Proposed Compliance and Effects Monitoring Program	6-859
6.16	Socio-economic Conditions	6-860
6.16.1	Introduction	6-860
6.16.1.1	<i>Summary of Socio-economic Conditions Before the Updates</i>	6-860
6.16.1.2	<i>Summary of Updates to Socio-economic Conditions</i>	6-860
6.16.2	Rational for Valued Component Selection	6-860
6.16.3	Baseline Program Methodology	6-866
6.16.4	Baseline Conditions	6-867
6.16.4.1	<i>The Nova Scotia Economy – Pre COVID</i>	6-867

6.16.4.2	<i>Baseline Conditions – Post COVID</i>	6-868
6.16.4.3	<i>Local Context and Population</i>	6-870
6.16.4.4	<i>Community Infrastructure</i>	6-873
6.16.4.5	<i>Recreational Facilities</i>	6-876
6.16.4.6	<i>Local Economy</i>	6-878
6.16.4.7	<i>Roads and Traffic</i>	6-879
6.16.4.8	<i>Parks and Open Space</i>	6-879
6.16.4.9	<i>Tourism</i>	6-882
6.16.4.10	<i>Health and Well-being</i>	6-884
6.16.4.11	<i>Emergency Services</i>	6-885
6.16.4.12	<i>Land and Resource Use</i>	6-885
6.16.4.13	<i>Natural Resource Use</i>	6-887
6.16.5	Themes and Topic Areas	6-888
6.16.5.1	<i>Workforce Development</i>	6-888
6.16.5.2	<i>Demographics</i>	6-895
6.16.5.3	<i>Healthy Communities</i>	6-896
6.16.5.4	<i>Land Use, Recreational and Indigenous</i>	6-898
6.16.5.5	<i>Parks and Open Space, Tourism</i>	6-905
6.16.5.6	<i>Roads and Traffic</i>	6-907
6.16.5.7	<i>Impact on Government Revenues</i>	6-910
6.16.6	Viewshed Analysis	6-912
6.16.7	Reclamation and Closure	6-913
6.16.8	Consideration of Engagement Results	6-914
6.16.9	Effects Assessment Methodology	6-915
6.16.9.1	<i>Boundaries</i>	6-915
6.16.10	Project Activities/Interaction with Socio-economic Conditions	6-916
6.16.10.1	<i>Touquoy Mine Site</i>	6-918
6.16.11	Mitigation	6-918
6.16.12	Residual Effects and Significance	6-919
6.16.13	Proposed Compliance and Effects Monitoring Program	6-923
6.17	Assessment of Valued Components within Federal Jurisdiction	6-924

6.17.1	Introduction.....	6-924
6.17.1.1	Summary of Assessment of Valued Components within Federal Jurisdiction Before the Updates....	6-924
6.17.1.2	Summary of Updates to Assessment of Valued Components within Federal Jurisdiction	6-924
6.17.2	Environmental Effects within Federal Jurisdiction	6-926
6.17.2.1	Fish and Fish Habitat	6-926
6.17.2.2	Migratory Birds	6-927
6.17.2.3	Species at Risk.....	6-927
6.17.3	Environmental Effects on Federal or Transboundary Lands	6-929
6.17.4	Environmental Effects on Indigenous Peoples	6-929
6.17.5	Power or Duty by Federal Authority.....	6-930
6.17.6	Environmental Effects Incidental of Decisions Made by a Federal Authority.....	6-931
6.18	Accidents and Malfunctions	6-933
6.18.1	Summary of Accidents and Malfunctions Before the Updates.....	6-933
6.18.2	Summary of Updates to Accidents and Malfunctions	6-933
6.18.3	Introduction.....	6-934
6.18.4	Accidents and Malfunctions Risk Assessment Methodology.....	6-935
6.18.5	Hazard Identification.....	6-938
6.18.6	Structural Failures	6-938
6.18.6.1	Open Pit Mine Slope Failure	6-938
6.18.6.2	Stockpile Slope Failure.....	6-941
6.18.6.3	Settling Pond Failure	6-945
6.18.6.4	Infrastructure Failure	6-949
6.18.7	Accidents.....	6-952
6.18.7.1	Fuel and/or Other Spills.....	6-952
6.18.7.2	Unplanned Explosives Event.....	6-961
6.18.7.3	Mobile Equipment Accident.....	6-963
6.18.7.4	Touquoy Mine.....	6-968
6.18.8	Other Malfunctions	6-973
6.18.8.1	Forest and/or Site Fires.....	6-973
6.18.9	Risk Assessment Summary.....	6-977
7	EFFECTS OF THE ENVIRONMENT ON THE BEAVER DAM MINE PROJECT.....	7-1

7.1	Introduction.....	7-1
7.1.1	Summary of Effects of the Environment on the Beaver Dam Mine Project Before the Updates.....	7-1
7.1.2	Summary of Updates to Effects of the Environment on the Beaver Dam Mine Project.....	7-1
7.2	Environmental Considerations.....	7-2
7.2.1	Climate	7-3
7.2.1.1	<i>Temperature</i>	7-3
7.2.1.2	<i>Precipitation</i>	7-3
7.2.1.3	<i>Wind</i>	7-4
7.2.2	Extreme Weather.....	7-5
7.2.2.1	<i>Flood and Drought Conditions</i>	7-5
7.2.2.2	<i>Extreme Temperatures, Storms, and Wind</i>	7-5
7.2.2.3	<i>Lighting Strikes</i>	7-5
7.2.3	Climate Change.....	7-6
7.2.3.1	<i>Regional Future Projections</i>	7-6
7.2.3.2	<i>Effects of Climate Change on the Project</i>	7-7
7.2.3.3	<i>Forest Fires</i>	7-7
7.2.3.4	<i>Climate Change Mitigation and Adaptation</i>	7-7
7.2.4	Slope Stability.....	7-8
7.2.5	Seismic Events.....	7-9
7.3	Mitigation.....	7-10
7.4	Summary	7-11
8	CUMULATIVE ENVIRONMENTAL EFFECTS ASSESSMENT	8-1
8.1	Introduction.....	8-1
8.1.1	Summary of the Cumulative Effects before Updates.....	8-1
8.1.2	Summary of Updates to the Cumulative Effects	8-1
8.1.3	Summary of Approach to Cumulative Effects Assessment	8-2
8.2	Types of Cumulative Effects.....	8-2
8.3	Cumulative Assessment Methodology	8-3
8.3.1	Scoping Approach	8-3
8.3.2	Assessment Approach.....	8-6
8.3.2.1	<i>Baseline Conditions</i>	8-6

8.3.2.2	<i>Identification and Assessment of the Cumulative Effects</i>	8-7
8.3.2.3	<i>Mitigation</i>	8-7
8.3.2.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-7
8.3.2.5	<i>Follow-up and Monitoring</i>	8-7
8.3.3	Consideration of Engagement Results and Indigenous Traditional Knowledge	8-8
8.4	Scoping of the Valued Components	8-8
8.4.1	Identification of the Valued Components.....	8-8
8.4.2	Determining the Spatial and Temporal Boundaries	8-9
8.4.2.1	<i>Spatial Boundaries</i>	8-9
8.4.2.2	<i>Temporal Boundaries</i>	8-9
8.4.3	Identification, Selection and Description Past, Present and Future Physical Activities	8-14
8.4.3.1	<i>Current and Past Projects</i>	8-15
8.4.3.2	<i>Future Physical Activities (Certain, Reasonably Foreseeable or Hypothetical)</i>	8-22
8.4.4	Confirmation of Valued Components to be Carried Forward Cumulative Effects Assessment.....	8-26
8.5	Cumulative Effects Assessment of the Valued Components	8-33
8.5.1	Noise Cumulative Effects Assessment.....	8-33
8.5.1.1	<i>Baseline Conditions</i>	8-33
8.5.1.2	<i>Analysis of Effects</i>	8-34
8.5.1.3	<i>Mitigation</i>	8-38
8.5.1.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-39
8.5.1.5	<i>Follow-up and Monitoring Programs</i>	8-41
8.5.2	Air Cumulative Effects Assessment.....	8-41
8.5.2.1	<i>Baseline Conditions</i>	8-41
8.5.2.2	<i>Analysis of Effects</i>	8-43
8.5.2.3	<i>Mitigation</i>	8-50
8.5.2.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-50
8.5.2.5	<i>Follow-up and Monitoring Programs</i>	8-52
8.5.3	Light Cumulative Effects Assessment	8-52
8.5.3.1	<i>Baseline Conditions</i>	8-52
8.5.3.2	<i>Mitigation</i>	8-56
8.5.3.3	<i>Residual Cumulative Effects and Significance Assessment</i>	8-56

8.5.3.4	<i>Follow-up and Monitoring Programs</i>	8-58
8.5.4	Surface Water Quality and Quantity Cumulative Effects Assessment.....	8-58
8.5.4.2	<i>Analysis of Effects</i>	8-62
8.5.4.3	<i>Mitigation</i>	8-71
8.5.4.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-71
8.5.4.5	<i>Follow-up and Monitoring Programs</i>	8-73
8.5.5	Fish and Fish Habitat Cumulative Effects Assessment.....	8-73
8.5.5.1	<i>Baseline conditions</i>	8-73
8.5.5.2	<i>Analysis of Effects</i>	8-75
8.5.5.3	<i>Mitigation</i>	8-79
8.5.5.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-79
8.5.5.5	<i>Follow-up and Monitoring Programs</i>	8-79
8.5.6	Species of Conservation Interest and Species at Risk Cumulative Effects Assessment.....	8-81
8.5.6.1	<i>Baseline conditions</i>	8-81
8.5.6.2	<i>Analysis of Effects</i>	8-85
8.5.6.3	<i>Mitigation</i>	8-99
8.5.6.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-99
8.5.6.5	<i>Follow-up and Monitoring Programs</i>	8-100
8.5.7	Mi'kmaq of Nova Scotia Cumulative Effects Assessment.....	8-102
8.5.7.1	<i>Baseline conditions</i>	8-102
8.5.7.2	<i>Analysis of Effects</i>	8-106
8.5.7.3	<i>Mitigation</i>	8-117
8.5.7.4	<i>Residual Cumulative Effects and Significance Assessment</i>	8-118
8.5.7.5	<i>Follow-up and Monitoring Programs</i>	8-120
8.6	Cumulative Effects Summary	8-120
9	SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT MITIGATIONS AND ENVIRONMENTAL RESIDUAL EFFECTS	9-1
9.1	Summary of the Environmental Impact Statement	9-1
10	FOLLOW-UP AND MONITORING PROGRAMS PROPOSED	10-1
10.1	Environmental Follow-Up Program	10-1
10.2	Environmental Monitoring Plans	10-1