Don Mouth Naturalization And Port Lands Flood Protection Project

Appendix M

Criteria, Measures and Indicators for Effects Assessment

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Toronto and Region Conservation for The Living City

Appendix M. Table 7.2 – Construction Criteria Table (by Objective)

Criteria	Indicator(s)	Measurement	Environmental Components
Objective 1: Naturalization			
Changes to Aquatic Habitat	• Disruption, destruction, and alteration of aquatic habitat	• Estimate the amount and types/quality of existing aquatic habitat that will be disrupted, destroyed, or altered due to construction	• Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)
Effects to Aquatic and Terrestrial Species	• Nuisance effects on aquatic and terrestrial species from construction (noise, dust, vibration, sediment release, etc.)	• Qualitative assessment of changes to species behaviour resulting from nuisance effects	• Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat) • Terrestrial Environment (vegetation communities, wildlife habitat, wildlife biota, wildlife linkages/connectivity)
Changes to Terrestrial Habitat	• Removal or disturbance of terrestrial habitat	• Estimate the amount and types/quality of existing terrestrial habitat that will be removed or disturbed due to construction.	• Terrestrial Environment (vegetation communities, wildlife habitat, wildlife biota, wildlife linkages/connectivity)
Objective 2: Flood Protection			
Management of Stormwater During Rainfall Storm Event	• Effects of erosion during rainfall and flood events within the construction area	• Qualitative assessment of effects of rainfall storm event	• Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)
Potential to Impact Flooding Conditions On-site During Construction	• Extent of flooded areas within the construction area	• Qualitative assessment of effects of phasing on flooding conditions	• Hydrology and Surface Water (flooding) • Socio-economic (existing land use)
Potential to Impact Flooding Conditions Elsewhere	• Extent of flooding that will continue to occur in developed areas or beyond the Project Study Area in Spill Zones 1 and 2	• Area outside of construction area flooded during storm events	• Hydrology and Surface Water (flooding) • Socio-economic (traffic, road infrastructure, emergency services)
Objective 3: Operational Management and Constructability			
Management of stormwater related to precipitation events	• Extent of areas inundated by stormwater runoff and surface water ponding in the construction area related to precipitation events	• Qualitative assessment of the potential effects related to Stormwater Quality and Quantity that were assessed include runoff and surface water ponding	• Hydrology and Surface Water (stormwater quality and quantity)
Effects from construction on lake and river water quality	• Effects of in-water and near shore works on water quality	• Qualitative assessment of the effects of in-water and near shore works on water quality	• Hydrology and Surface Water (lake/ river water quality)
	• Ability to manage sediment and debris during construction	• Qualitative assessment of the sediment and debris management activities during construction	• Hydrology and Surface Water (lake/ river water quality)
Changes to Sediment and Debris Management	• Effects to habitat as a result of changes to management activities	• Qualitative description of implications of phasing on sediment and debris management activities	• Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)
Implications of Phasing on Port Operations	• Location of promontories and exclusion zone in relation to current navigation patterns	• Estimate effects of promontories and exclusion zone in relation to current navigation patterns	• Socio-economic (economic base)
	• Loss of potential mooring revenue	• Estimate length of dock wall modified or buried by reach	• Socio-economic (economic base)

Criteria	Indicator(s)	Measurement	Environmental Components
Total cost of construction	• Total cost associated with constructing the project	• Estimated cost of constructing the project	• Socio-economic (economic base)
Effects to Visual Landscape Due to Sediment and Debris Management/Construction Equipment *(cranes, debris booms, hydraulic dredge, etc.)*	• Changes to visual landscape due to equipment	• Visibility of construction activities and equipment • Visibility of sediment and debris management equipment	• Socio-economic (visual effect)
Objective 4: Integration with Infrastructure			
Changes to Existing and Planned Roads Solely Due to DMNP	• Nuisance effects as a result of modifications to Lake Shore Boulevard at the Don Roadway, Cherry Street bridge, Commissioners Street, Basin Street, and potential changes to Gardiner substructure	• Compare predicted access during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted noise levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted air quality levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users.	• Atmospheric Environment (air quality) • Atmospheric Environment (noise) • Socio-economic (existing land use) • Socio-economic (traffic, road infrastructure, emergency services)
Changes to Existing Rail Lines or Yards or Access Roads Leading to Rail Yards	• Nuisance effects as a result of modifications to rail lines, yards or access roads (Villiers spur, Keating Yard and rail connection to mainline/Don Yard, and Don Yard access road)	• Compare predicted access during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted noise levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted air quality levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users.	• Atmospheric Environment (air quality) • Atmospheric Environment (noise) • Socio-economic (existing land use)

Changes to Existing, Planned and Proposed Underground Utilities Due to Location of Floodplain and Low Flow Channel	• Nuisance effects as a result of modifications to:
	  • Enbridge gas pipeline
	  • water and wastewater utilities
	  • other underground utilities
		• Compare predicted servicing during construction to existing conditions, and estimate their effects on existing businesses and recreational users.
		• Compare predicted noise levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users.
		• Compare predicted air quality levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users.
			• Atmospheric Environment (air quality)
			• Atmospheric Environment (noise)
			• Socio-economic (existing land use

Criteria	Indicator(s)	Measurement	Environmental Components
Changes to Existing Above Ground Utilities	• Nuisance effects as a result of modifications to the hydro bridge and other utilities (assuming bridge is buried underneath the river)	• Compare predicted access during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted noise levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted air quality levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users.	• Atmospheric Environment (air quality) • Atmospheric Environment (noise) • Socio-economic (existing land use)
Changes to Dock Walls	• Nuisance effects as a result of modifications to dock walls	• Compare predicted access during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted noise levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users. • Compare predicted air quality levels during construction to existing conditions, and estimate their effects on existing businesses and recreational users. Dust • Compare current cost of dock wall maintenance to predicted cost.	• Atmospheric Environment (air quality) • Atmospheric Environment (noise)
Costs of Infrastructure Modification/Relocation Associated with DMNP	• Total cost of infrastructure modification / relocation	• Estimate cost of modification/relocation of infrastructure during construction.	• Socio-economic (economic base)
Objective 5: Recreational and Cultural Opportunities			
Effect from Construction on Traditional Uses of Lands by Aboriginal Peoples	• Extent of traditional uses of lands within floodplain and low flow channel	• Compare predicted effects on traditional use to existing conditions.	• Aboriginal Interests (traditional land and resources use, culture and heritage)
Effects on Recreational Users from Construction Nuisances	• Nuisance effects (noise) from construction activities in the vicinity of recreational uses	• Compare current noise levels to those predicted during construction.	• Atmospheric Environment (noise) • Socio-economic (land-based recreation, marine recreation)
	• Nuisance effects (dust, combustion emissions) from construction activity in the vicinity of recreational uses	• Compare current dust levels to those predicted during construction.	• Atmospheric Environment (air quality) • Socio-economic (land-based recreation, marine recreation)
Effect from Construction on Archaeological Resources	• Significance of archaeological resources within floodplain and low flow channel	• Estimate predicted effects on archaeological resources given what is known about the area.	• Physical and Cultural Heritage Resources (archaeological resources)
Changes to Use of River Mouth and Inner Harbour for Boating	• Effects of construction on recreational boating	• Compare predicted navigational constraints for recreational boating during construction to existing conditions.	• Socio-economic (land-based recreation, marine recreation)

Criteria	Indicator(s)	Measurement	Environmental Components
Changes to Existing Pedestrian/Cycling Trails	• Effects of construction on existing pedestrian / cycling trail access	• Compare predicted trail access during construction to existing conditions.	• Socio-economic (land-based recreation, marine recreation)
Displacement of built heritage resources as a result of the Project	• Effects to cultural heritage value (changes to structures) of built heritage resources and cultural heritage landscapes within low flow channel or floodplain	• Compare predicted value of cultural heritage resources (and qualitative value of landscape resources) during construction to existing conditions.	• Physical and Cultural Heritage Resources (built heritage, cultural landscape resources)
Objective 6: Co-ordination with Other Planning Initiatives			
Removal of, or Changes to, Existing Land Use	• Number and type of displaced and disrupted land uses	• Compare predicted changes in land use to existing conditions.	• Socio-economic (existing land use)
Employment Created from Construction Activities	• Changes in employment levels (direct and indirect)	• Compare predicted employment levels to existing conditions.	• Socio-economic (economic base)
Objective 7: Consistency with WT Sustainability Framework			
Effects of Transporting Soils Off-site	• Nuisance effects (dust, combustion emissions) associated with transportation of soils off-site	• Qualitative assessment of nuisance effects based on the maximum truck volume loads per day used to transport soils off-site	• Atmospheric Environment (air quality) • Atmospheric Environment (noise) • Socio-economic (existing land use) • Socio-economic (traffic, road infrastructure, emergency services)
Environmental Implications of Soil Management Activities During Construction	• Nuisance effects (dust, combustion emissions) associated with excavation, on-site movement, and stockpiling of contaminated materials	• Qualitative assessment of nuisance effects associated with excavation, on-site movement, and stockpiling of contaminated materials	• Atmospheric Environment (air quality)
	• Effects on soils from excavation	• Qualitative assessment of effects on soils from excavation	• Soils (geology and soils)
Environmental Implications of Groundwater Management Activities During Construction	• Contaminated groundwater requiring treatment/ management	• Qualitative assessment of the environmental implications of groundwater management activities during construction	• Groundwater (groundwater quality)
Total Cost of Soil Management	• Total cost associated with managing soil associated with the project	• Total cost related to the management of soil based on the volume of soil excavated from the site and the average cost per tonne for treatment and disposal.	• Soils (geology and soils)

Appendix M. Table 7.3 – Establishment / Post-Establishment Criteria Table (by Objective)

Criteria	Indicator(s)	Measurement	Environmental Components
1. Naturalization Objective			
Area and Function of Wetland Habitat Types Created	• Area and type of wetland created	• Measure increase in total area of wetland and description of habitat type created	• Wetland Environment (wetland biota, wetland habitat)
	• Largest single patch size of wetland	• Measure largest patch (insert definition)	• Wetland Environment (wetland biota, wetland habitat)
Potential to Create Ecosystem Function for Wildlife Species and Communities	• Ratio of perimeter to area of the largest contiguous wetland habitat patch	• Measure ratio	• Wetland Environment (wetland biota, wetland habitat)
	• Performance of wetland habitat	• Qualitative assessment of activities that will ensure performance of wetland habitat	• Wetland Environment (wetland biota, wetland habitat)
	• Area of terrestrial habitat created	• Measure total area	• Terrestrial Environment (vegetation communities, wildlife habitat, wildlife biota, wildlife linkages/connectivity)
	• Species that will use habitat for breeding purposes	• Qualitative assessment of the species that are anticipated to use habitat for breeding purposes	• Terrestrial Environment (vegetation communities, wildlife habitat, wildlife biota, wildlife linkages/connectivity)
Effects on Native Fish Habitat or Aquatic Communities	• Total area of aquatic habitat	• Measure total area	• Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)
	• Area of each type of aquatic habitat created	• Measure total area of each type	• Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)
Effects of Hydraulics and Hydrology / Sedimentation on Sustainability of Vegetation Communities and Associated Fauna	• Management of full range of flows without adverse impact on vegetation communities (high erosional stress, sediment deposits)	• Frequency of inundation of offline wetlands. • Median water level in low flow channel. • Evaluation of hydraulic model output with respect to vegetation survivability • Potential for sediment deposition to affect vegetation survivability • Potential for sedimentation to affect channel form and associated vegetation • Qualitative assessment of ability of communities to adapt to climate change	• Wetland Environment (wetland biota, wetland habitat) • Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)
Effects on Wildlife Species or Communities *(i.e., minimizing disturbance and connecting habitat)*	• Enhancement for migratory bird habitat (internal linkages as well as links external to the project to both existing and planned habitat)	• Compare predicted linkages to existing conditions.	• Terrestrial Environment (vegetation communities, wildlife habitat, wildlife biota, wildlife linkages/connectivity)
	• Disturbance to communities as a result of fragmentation and nuisance behaviour from human activity	• Qualitative assessment of the potential effects of adjacent human activity on wetland survivability.	• Wetland Environment (wetland biota, wetland habitat)
Effects of Water Quality on Wetland and Aquatic Habitat	• Response of vegetation communities to changes in water quality, including from sediment management activities	• Compare future to current water quality within the Keating Channel • Qualitative assessment of water quality within the low flow channel, and the lake-fed wetlands	• Wetland Environment (wetland biota, wetland habitat) • Aquatic Environment (sediment quality and quantity, aquatic biota, aquatic habitat)

Criteria	Indicator(s)	Measurement	Environmental Components
2. Flood Protection Objective			
Potential to Impact Flooding Conditions Elsewhere	• Extent of flooding that will continue to occur in developed areas or beyond the Project Study Area in Spill Zones 1 and 2	• Results of regulatory flood hydraulic modelling regarding water elevations at CN bridge.	• Hydrology and Surface Water (flooding) • Socio-economic (existing land use) • Socio-economic (traffic, road infrastructure, emergency services)
Land Area Removed from Flood Risk	• Property area removed from flood risk	• Total area removed except for the extent of the floodplain.	• Socio-economic (existing land use, planned land use)
	• Change in assessment values as a result of removal of flood risk	• Compare predicted future assessment values to baseline	• Socio-economic (existing land use, planned land use)
Resilience of stabilization works for valley, low flow channel, and levees	• Ability of stabilization works to maintain structural integrity of valley, low flow channel, and levees	• Qualitative assessment of the potential effects of flood events on structural integrity of stabilization	• Hydrology and Surface Water (flooding)
3. Operational Management and Constructability Objective			
Potential Changes to Storm-water Quality and Quantity	• Change in amount of impervious cover	• Compare predicted changes in amount of impervious cover to baseline	• Hydrology and Surface Water (stormwater quality and quantity)
Effects of operational management on water quality	• Changes in water quality related to sediment management activities	• Qualitative assessment of the effects on water quality associated with future sediment management activities	• Hydrology and Surface Water (stormwater quality and quantity)
Effects to Port Operations	• Changes to Toronto Port Authority works yard operations	• Compare predicted operations during post-establishment to existing conditions.	• Socio-economic (existing land use)
	• Changes to Port operations	• Compare predicted loss of dockwall post-establishment to existing conditions. • Velocities in Ship Channel during spill events	• Socio-economic (existing land use)
	• Qualitative assessment of effects on shipping activities	• Qualitative, comparing predicted effects post-establishment on existing conditions.	• Socio-economic (existing land use)
Annual Operations and Maintenance Costs	• Annual cost of sediment and debris management activities	• Compare predicted costs to existing (if any).	• Socio-economic (economic base)
	• Annual cost of maintaining flood protection works, including weirs	• Compare predicted costs (if any) to existing costs (if any).	• Socio-economic (economic base)
Effects to Visual Landscape Due to Sediment and Debris Management/Construction Equipment *(cranes, debris booms, hydraulic dredge, etc.)*	• Changes to visual landscape due to equipment	• Compare predicted views of the equipment to existing conditions	• Socio-economic (visual effect)
4. Integration with Infrastructure Objective			
Roadway Maintenance	• Long-term maintenance implications for Lake Shore Boulevard, Cherry Street, Don Roadway, Commissioners Street, Basin Street, and Gardiner Expressway substructures	• Qualitative assessment of implications of flood events on maintaining naturalized system	• Socio-economic (traffic, road infrastructure, emergency services)

Criteria	Indicator(s)	Measurement	Environmental Components
Provision for water-based emergency services	• Ability of water-based emergency services to navigate new river	• Qualitative assessment of the ability of water-based emergency services to navigate new river	• Socio-economic (traffic, road infrastructure, emergency services)
	• Effects of maintaining servicing on valley system and low flow channel	• Qualitative assessment of effects of maintaining servicing on the naturalized area once it is established	• Wetland Environment (wetland biota, wetland habitat)
5. Recreational and Cultural Opportunities Objective			
Sustainability of Informal Park Spaces such as Trails and Upland Forest	• Qualitative assessment of maintenance requirements of "park" space	• Describe predicted maintenance requirements.	• Socio-economic (land-based recreation, marine recreation)
Changes to Use of River Mouth and Inner Harbour for Recreational Boating	• Compatibility of recreational boating activities with naturalization	• Compare predicted post-establishment areas for recreational boating to existing conditions.	• Socio-economic (land-based recreation, marine recreation)
Effects on Recreational Users of Increased Park Space and Trails	• Qualitative assessment of increased park space and trails on user enjoyment	• Describe predicted effects on user enjoyment of parks and trails	• Socio-economic (land-based recreation, marine recreation)
Effects on Recreational Users from Operations Nuisances	• Noise from dredging/sediment maintenance equipment	• Compare current noise levels to those predicted during operations.	• Socio-economic (land-based recreation, marine recreation)
	• Nuisance effects (dust, combustion emissions, noise) from sediment and debris management equipment in the vicinity of recreation uses	• Compare current dust levels to those predicted during operations.	• Atmospheric Environment (air quality) • Atmospheric Environment (noise) • Socio-economic (land-based recreation, marine recreation)
6. Co-ordination with Other Planning Initiatives Objective			
Consistency with the Intent of the Central Waterfront Secondary Plan	• Consistency of project with objectives of Central Waterfront Secondary Plan (cross referenced to other indicators as appropriate)	• Qualitative assessment as to whether the plans fall within the Plan	• Socio-economic (existing land use)
Consistency with Planning Policies and Planning Studies Currently Underway	• Consistency of project with Lower Don Lands Master Plan, Keating North Precinct Plan, Gardiner Expressway Individual EA, and Official Plan Amendment for the Project Study Area, and other planning studies and projects in the vicinity of the Project Study Area	• Qualitative assessment of project's consistency with these plans	• Socio-economic (planned land use)
	• Consistency with the Provincial Policy Statement	• Qualitative assessment of project's consistency with the PPS	• Socio-economic (planned land use)
Nuisance Effects on the Planned Surrounding Communities	• Nuisance effects (dust, combustion emissions) from sediment and debris management equipment in the vicinity of residential uses • Nuisance effects (noise) from operational management areas	• Estimate post-establishment noise levels, and their effects on planned communities.	• Atmospheric Environment (air quality) • Atmospheric Environment (noise) • Socio-economic (planned land use)
7. Consistency with WT Sustainability Framework Objective			
Soil Quality as a Result of the Project	• Soils that meet MOE standards	• Qualitative assessment of the soil quality within the new floodplain as a result of the project.	• Soils (geology and soils)
Ability to Reuse Clean Sediment for Beneficial Purposes	• Quantity of sediment that can be reused for beneficial purposes	• Qualitative assessment of opportunities to re-use clean sediment for beneficial purposes	• Soils (geology and soils)