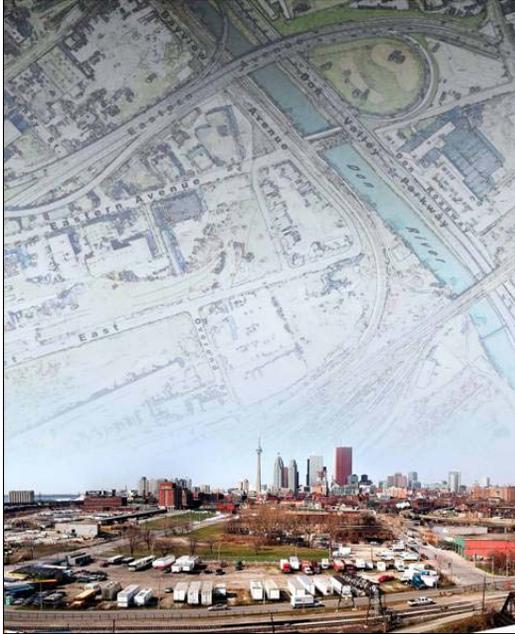


EXECUTIVE SUMMARY



View of Spill Zone 3 from the Don River



The Regulatory Floodplain

This Class Environmental Assessment (Class EA) was undertaken to examine alternative flood protection systems, and their environmental effects, for the elimination of the flood risk on 210 hectares of land west of the Lower Don River that are now located within the Regulatory Floodplain. This study was conducted in accordance with the *Conservation Authority Class EA for Remedial Flood and Erosion Control Projects* (Conservation Ontario, 2002) and the *Canadian Environmental Assessment Act*.

Flooding along the Lower Don River has a written history dating back to the mid-1870s, beginning with ice jams and late fall flooding. As recently as May 2000, flooding occurred within this area due to a series of severe thunderstorms. While most of the storm events over the past few decades have resulted mainly in nuisance type flooding, the area is subject to extensive flooding under a tropical storm similar to Hurricane Hazel, which occurred on October 15 and 16, 1954. Since the early 1980s, the Lower Don River floodplain has been identified by the TRCA as the highest priority flood prone area within its jurisdiction.

The Province of Ontario currently uses the rainfall from Hurricane Hazel centered over the Don watershed to define the limits of flooding during saturated soil antecedent conditions. With this amount of rainfall, the river is anticipated to rise to levels that exceed the channel of the river and begin to spill to the extent that the valley allows.

Currently, there are approximately 440 hectares of land within the Regulatory Floodplain along the Lower Don River, near its outlet to Lake Ontario. There are three identified flood zones within the Regulatory Floodplain.



Toronto's Waterfront

The general Study Area for this Class EA includes the 210 hectares of land that comprise Spill Zone 3 of the Regulatory Floodplain along the Lower Don River. This includes the areas between the Don River and the CN Tower to the west, and extending from Lake Ontario to as far north as Queen Street. Areas immediately north of the CN Rail line and west of the Don River would experience the most severe flooding, with flood depths in some locations exceeding 3 metres under Regulatory Flood conditions. During Regulatory Flood levels, the CN Rail crossing does not provide sufficient capacity to pass all of the floodwaters flowing downstream. As a result, the embankment acts as a dam at these flood levels which increases the degree of flooding upstream in Spill Zone 3.

The floodplain extends south of the railway embankment as floodwaters would flow south to Lake Ontario through underpasses at Cherry, Parliament, Sherbourne, Jarvis, Yonge, Bay and York Streets.

To protect the lands susceptible to flooding in Spill Zone 3, the flood waters must be contained upstream of the CN Rail crossing. Accordingly, the flood waters that currently would flow westerly, across the West Don Lands, will need to be restricted and conveyed under the CN Rail bridge over the Don River. A fundamental consideration is to achieve the stated objective without creating additional flooding upstream, downstream or on lands to the east.

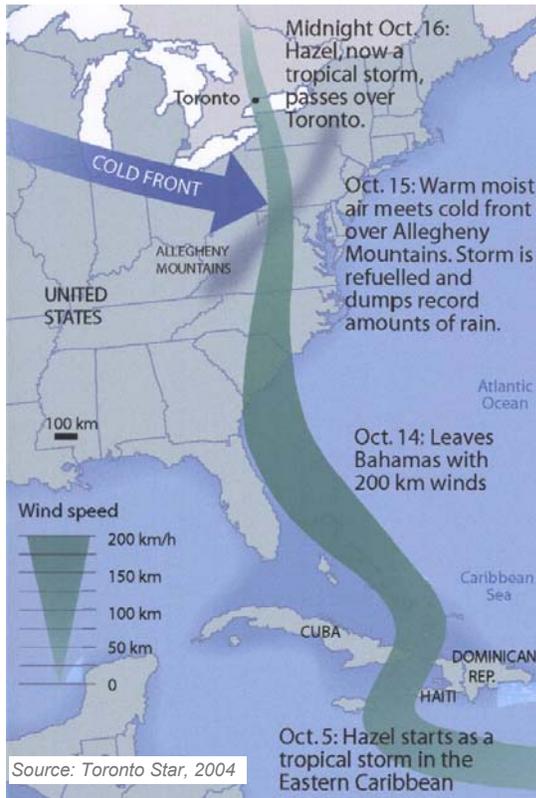


Lower Don River North of Queen Street

DESCRIPTION OF THE UNDERTAKING

The preferred undertaking to accomplish the above was selected through a comparison of several flood control alternatives. The proposed undertaking involves:

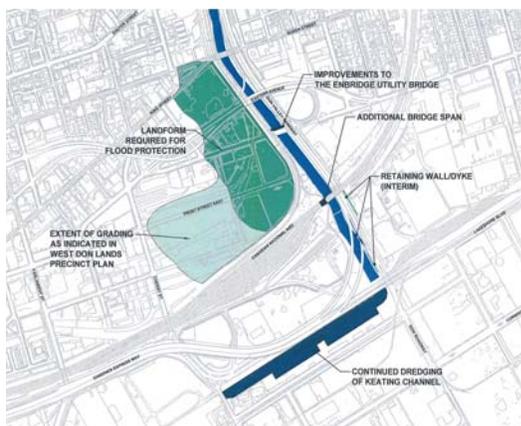
- A flood protection landform on the west side of the Don River;



Path of Hurricane Hazel

- Interim flood protection works on the east bank of the Don River (retaining wall/dykes);
- An additional span (21.3 m) attached to the west abutment of the existing CN Rail bridge over the Don River;
- Continued dredging of the Keating Channel as per the Keating Channel Environmental Assessment (Acres, 1983); and,
- Modifications to the Enbridge Utility Bridge that crosses the Don River.

Although modifications to the Enbridge Utility Bridge are not critical to overall flood protection, it would be beneficial to deal with local impacts. The construction of the Flood Protection Landform will also require the relocation of infrastructure including Bayview Ave and other utilities. The relocation of this infrastructure has been addressed in a separate EA (under the Municipal Class EA) as part of the West Don Lands Precinct Plan. To facilitate the construction of the flood protection landform, the TWRC has initiated the West Don Land (WDL) Soil and Groundwater Management Strategy (SGMS) to address the management of subsurface environmental conditions.



Elements of Flood Protection Project

The estimated costs associated with the remedial flood protection project are \$5.6 M for the flood protection landform, \$14.6 M for the bridge extension, \$0.5 M for the East Bank works, and \$0.3 M for the modifications to Enbridge Utility Bridge for a total of \$21 M.

CONCURRENT AND RELATED STUDIES

The Lower Don West Remedial Flood Protection Project forms part of the overall vision for the Lower Don River. The elimination of the floodplain and the naturalization of the mouth of the Don River is one of



**West Don Lands & East Bayfront
Precinct Plans**

the four priority projects being undertaken and/or funded by the Toronto Waterfront Revitalization Corporation (TWRC) aimed at the revitalization of the City's waterfront.

The *Don Mouth Naturalization and Port Lands Flood Protection Project*, which is being initiated by TRCA as an Individual Environmental Assessment undertaking will address the floodplain areas in Spill Zones I and 2 and the naturalization of the mouth of river.

While the *Lower Don River West - Remedial Flood Protection Project* will function independently of any other naturalization and flood protection works, it must be compatible with the *Don Mouth Naturalization and Port Lands Flood Protection Project* and not impose any constraints.

As part of the initial planning activities by TWRC, precinct plans are being prepared for the West Don Lands and the East Bayfront.



The Portlands

The West Don Lands occupy a 32 hectare area between the Don River and Parliament Street to the west, and from the CN Rail line to Queen Street to the north. The West Don Lands precinct plan indicates a mixed residential and commercial land use, with provision for affordable housing and recreational opportunities.

The East Bayfront precinct plan is a 36 hectare waterfront area that extends south of the CN Rail line between Jarvis and Cherry Street. It is expected to become a community with 6-8,000 units of housing, including affordable housing and related commercial spaces.

Both precinct plan lands are situated within the Regulatory Floodplain of the Lower Don River, and are reliant on the construction of the *Lower Don River West - Remedial Flood Protection Project* for their viability and implementation.



Source: West Don Lands Precinct Plan,

West Don Lands Precinct Plan Concept

The West Don Lands precinct plan, in particular, is highly integrated with the *Lower Don River West - Remedial Flood Protection Project*. A centrepiece of this plan is the proposed 7.2 hectare Don River Park; the flood protection landform would establish a large component of the land base which will form the Don River Park. This green space will extend westward well into the community and form part of a boulevard along Front Street leading towards the downtown Toronto.

The infrastructure servicing strategy including water, storm sewers, wastewater sewers, and roadways for the West Don Lands precinct plan has been developed through the *Class Environmental Assessment Master Plan*. The servicing concepts developed as part of the *Master Plan* have been incorporated into the design of the remedial flood protection works. Of particular importance is the relocation and realignment of Bayview Ave, and the redirection of all storm runoff from the precinct plan area westerly toward Cherry Street, where it will be intercepted and conveyed to Lake Ontario. The integrity of the flood protection landform must be maintained by ensuring that no buried servicing (sewers) is allowed within the fill to protect against failure via saturation or boils.



Members of the Public at the Open House

Another local project is Commissioners Park, a 16.6 ha waterfront greenspace that is being developed by TWRC. The facility will be located in the Portlands, and extend from the south side of the Keating Channel to Commissioners Street. The park is intended to be a waterfront landmark, as well as providing active recreational facilities and helping to meet the future needs of the communities in the West Don Lands, the East Bayfront and the Port Lands.

PUBLIC AND AGENCY CONSULTATION

A number of consultation activities were held throughout the duration of the Class EA study including:



Geo-Environmental Assessment



Aquatic & Fish Habitat Assessment

- Project initiation and open house advertisements in the local media;
- Three newsletters (*LDRW News*) were sent to those on the mailing list and made available at various events;
- Three Public Open Houses/Workshops;
- Four Community Liaison Committee Meetings;
- Five Technical Advisory Committee Meetings;
- Meeting with the band council of the Mississaugas of the New Credit to provide an opportunity to accommodate their concerns and ideas, as well as to provide background information on the project and the preferred alternative;
- West Don Lands Precinct Plan public events; and,
- A project website was maintained on TRCA's main website.

Comments and input received from the public at these events were considered by the project Team in the selection, assessment and design of the preferred flood remediation project.

BASELINE INVENTORIES

Baseline conditions in the study area were inventoried for a number of environmental components including:

- Aquatic Habitat and Fish;
- Terrestrial Natural Heritage;
- Built Heritage and Archaeological Resources;
- Socio-economic and Land Use;
- Hydrology/Hydraulics of the Lower Don River;
- Rail Corridor Impact Assessment;
- Geo-Environmental Assessment; and,
- West Nile Virus Assessment.

These inventories facilitated the identification of constraint areas and formed the basis for the assessment of the potential for effects of the project.

LONG LIST OF ALTERNATIVES

- Do Nothing;
- Floodplain Policy Revision;
- Flood Protection Landform (with and without culvert and east bank retaining wall/dykes);
- Wedge (with and without culvert and east bank retaining wall/dykes);
- CN Rail Bridge and Channel Widening;
- Secondary Channel with Flood Protection Landform;
- Floodwall/Dyke;
- Upstream Storage;
- Flood Proofing of Individual Structures;
- River Dredging; and,
- Watershed Conservation Measures.

EVALUATION OF ALTERNATIVES

A long list of flood control/remediation alternatives to address the flood risk problem was identified and then screened against three criteria including:

- Does the alternative achieve flood protection to the Regulatory Flood level for the Lower Don River West Lands?
- Does the alternative comply with current provincial floodplain policies, including the technical requirements associated with a permanent solution?
- Is the alternative technically feasible/proven?

The alternatives that did not meet all three criteria, and therefore were screened from further consideration included: Do Nothing, Floodplain Policy revision, Floodwalls/Dykes, Upstream Storage, Flood Proofing of Structures, and Watershed Conservation Measures. Notwithstanding that Watershed Conservation Measures alone cannot address the flooding associated with the Regulatory Storm, such measures form a significant component of other TRCA/City initiatives aimed at improving the overall health of the local streams, rivers and the waterfront. As such, they were assumed to be in place in conjunction with the other alternatives.

The remaining five alternatives were then assessed and evaluated on the basis of 35 evaluation criteria organized under six study assessment groups: Physical, Biological, Cultural, Socio-economic, Engineering/Technical, and Cost.

Basic requirements for permanent flood control solution as stipulated by the various levels of government.

- ... minimum required width of flood protection landform berm is 120 m;
 - ... toe of flood protection landform must be set a minimum of 40 m from the west bank of the Don River;
 - ... buried utilities (i.e.; storm and sanitary sewers) longitudinally within the flood protection landform is prohibited;
 - ... flood protection landform to account for potential effects of future climate change;
 - ... fill slopes on the wet side of flood protection landform - 5-10 %; on the dry side - 1.5-2.5 % typical, with a maximum of 5 % in localized areas;
 - ... structures foundations should not encroach onto the 120 metre footprint; and,
 - ... recreational uses and limited ancillary structures (no foundations) may be permitted in keeping with the allowable uses as per the *TRCA Valley and Stream Corridor Management Guidelines*.
 - ... planting restrictions as per the preliminary Flood Protection Landform vegetation zones.
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Through the assessment and evaluation process, the Flood Protection Landform (with the culvert and east bank retaining wall/dykes) was considered preferred over all other alternatives. Key advantages of this alternative, as compared to the others, include:

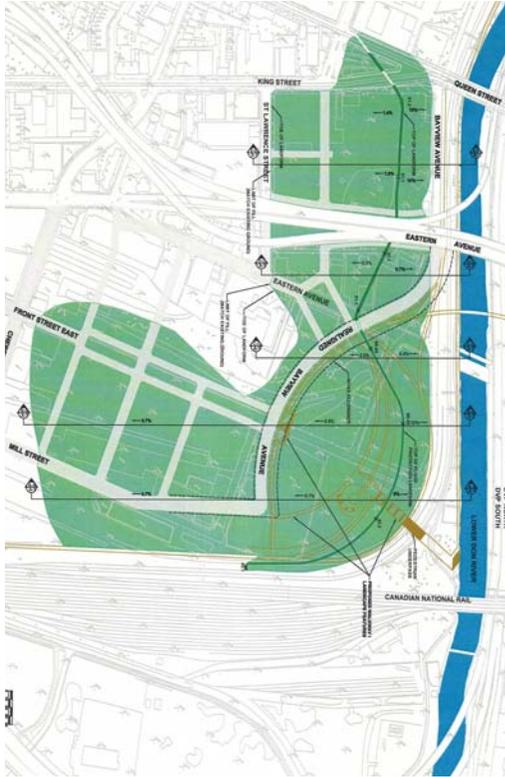
- Minimal noise and air quality effects during the operation period;
- Allows for advance opportunities for clean-up of contaminated lands in the Lower Don River West lands;
- Will enhance sediment transport in the Lower Don River;
- Will facilitate the creation of new habitat and linkages;
- Will result in limited effects to aquatic habitat;
- Will create an opportunity to enhance the landscape/views;
- Will allow opportunities to enhance greenspace/recreation areas;
- Creates no constraints on future efforts to naturalize the Lower Don River;
- High flexibility to address future changes in river flows;
- Low complexity and high ease of implementation;
- Minimal risk of failure;
- Limited need to relocate utilities; and
- Low cost.

REFINEMENT OF THE PREFERRED ALTERNATIVE

The multi-cell culvert, which provides additional capacity through the CN Rail embankment, allows the Hydro One Networks ducts in the vicinity of the embankment to remain in place without any realignment of the electrical cables/ducts. Previous studies indicated that this realignment would be prohibitively costly; however, discussions with Hydro One Networks revealed a significant cost reduction for the relocation works. Geo-environmental and geotechnical investigations at the proposed location of the culvert were also conducted

to establish the subsurface conditions and to assess their effects on the design and construction of the proposed culvert works with regards to soil disposal, foundation requirements, temporary track protection requirements, and methods to control dewatering.

Given the considerable reduction in the cost estimate of relocating the Hydro One Networks underground plant, and the relatively unfavourable geotechnical conditions that were revealed by the geotechnical investigation, the bridge extension option (identified in initial stages of developing alternatives for the project whereby the waterway opening is augmented through the provision of an additional bridge span at the existing CN Rail bridge) was revisited as a viable method of providing additional hydraulic capacity. Based on a comparative evaluation between the bridge extension and culvert options, the bridge extension option emerged as the preferred method for providing additional hydraulic capacity through the CN Rail embankment and was adopted as a component of the overall remedial flood protection project.



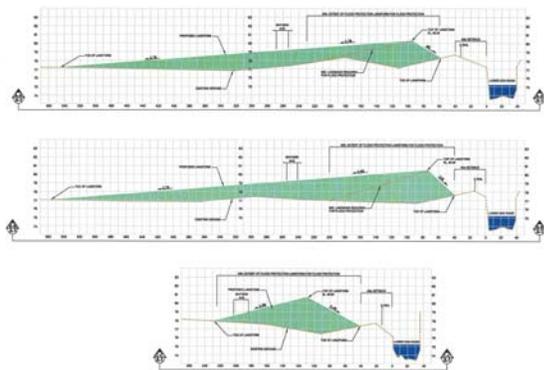
Flood Protection Landform - Plan View

CONFIGURATION OF THE PREFERRED ALTERNATIVE

The preferred flood remediation project includes: a flood protection landform; an extension to the existing CN Rail bridge to facilitate flows, and retaining wall/dykes on the east bank of the Don River so as to not further impact Spill Zones 1 and 2.

The following describes the details of the key elements of the preferred flood control alternative:

- The average height of the flood protection landform at its crest ranges from 2.8 to 3.8 m and the crest elevation ranges from 81.5 m at its northern edge at King Street to 80.0 m at the CNR embankment;



Flood Protection Landform - Section View



Enbridge Utility Bridge

privately-owned land and connects with the Don Valley Parkway north-bound off-ramp of the Gardner Expressway.

Further south, a retaining wall extends from the Don Valley Parkway southbound onramp to the Gardner Expressway and extends along the east bank of the Don River. From this point, the retaining wall is transformed into a 1 to 1.5 m high dyke and connects to the roadbed of Lake Shore Boulevard. The retaining wall/dykes will be located on City-owned land;

- Continued dredging of the Keating Channel as per the Keating Channel Environmental Assessment (Acres, 1983); and,
- Modifications to the Enbridge Utility Bridge that crosses the Don River.

ENVIRONMENTAL EFFECTS OF THE FLOOD REMEDIATION PROJECT

As part of this Class EA, an effects assessment of the proposed project was undertaken. A summary of these effects (negative and positive), are as follows:

- Some noise and dust disturbance effects can be expected in the area during the construction period. The absence of residents in the immediate vicinity of the project area reduces the significance of these effects, nonetheless, standard controls for dust and noise at construction site will be incorporated where appropriate during the implementation of the flood control components;
- There is some potential for increased sediment loads to enter the Don River during construction. Sediment controls will be put in place to minimize these effects;



Existing Pathway under CN Rail Embankment

- The West Don Lands Soil and Groundwater Management Strategy (SGMS) will allow for management of subsurface environmental conditions in the area;
- There are no sensitive natural heritage features in the project study area;
- Approximately 0.5 ha of poor quality vegetation will be removed. Plantings/landscaping of the landform will increase the amount of vegetation as well as wildlife habitat opportunities;
- There will be no loss of fish habitat: additional habitat will likely result due to the natural river bottom at the bridge extension;
- Some minor disturbance to the aquatic habitat is possible during the construction of the bridge extension. Measures will be put in place to minimize sedimentation, and the bridge extension will be designed to ensure that no impediment to fish passage is created;
- Approximately 20 businesses that lease property from the Ontario Realty Corporation (on a monthly renewal basis) will be displaced;
- The project will effectively eliminate the flood risk in Spill Zone 3. The bridge extension will likely result in the reduction of sediment transport through the area, however, continued dredging of the Keating Channel will aid in improving sediment conveyance in the area;
- The recreation pathway along the west side of the Lower Don River will be improved. The existing underpass through the CN Rail embankment which is prone to flooding) will be replaced;
- Construction of the bridge extension will have impacts on railway infrastructure and operations during the construction period. Coordination



Flood Protection Landform Conceptualization

with CN Rail, GO Transit, CP Rail, VIA Rail and Toronto Terminals Railway is ongoing to minimize these impacts; and,

- Construction of the bridge extension will require the relocation of Hydro One Networks underground cables. Coordination with Hydro One is also ongoing to minimize any impacts during construction.

The results of this Class EA study have concluded that the construction and operation of this project will result in few negative environmental effects. The project will result in a number of positive effects including the elimination of the flood risk west of the river. Landscaping efforts associated with the project will increase greenspace, recreation and natural habitat opportunities in the area as well.

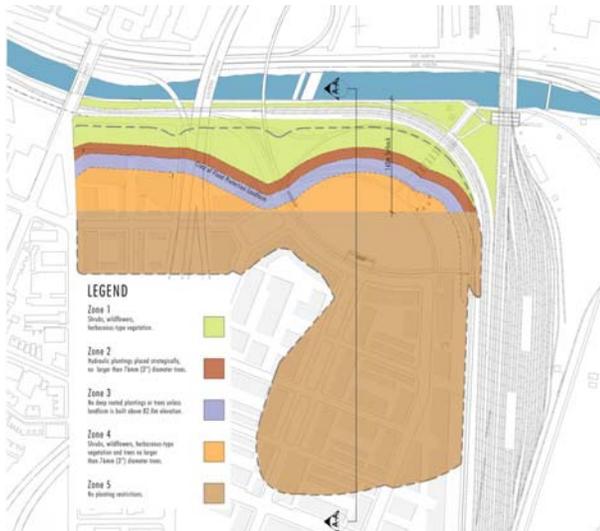
MITIGATION PLAN

The following summarizes the mitigation measures recommended to offset the few negative environmental effects that will result from the construction and operation of the flood protection landform and associated works:



Flood Protection Landform Conceptualization Section View

- Dust suppression on roadways during construction, and a vegetated covering for the flood protection landform will eliminate dust effect after construction;
- Temporary noise barriers will be installed and night time construction limited to the extent possible during construction;
- East bank works (retaining wall/dykes) will mitigate increased flooding on the east side of the river;
- Swales will be incorporated into the design to enhance water quality;



Landscaping Plan



Planting Zone 1: Grasses, wildflowers and other herbaceous vegetation; limited number of woody shrubs.

- Best Management Practices will minimize sediment runoff, and plantings on the flood protection landform will minimize erosion and sediment potential after construction, as well as provide/improve wildlife habitat and increase shading (microclimate benefit);
- Construction of the bridge extension will not take place during fish spawning seasons;
- The creation of new recreation trails and underpass improvements will enhance pedestrian pathways;
- Where archaeologically significant features are discovered, the features will be excavated and preserved;
- All businesses that will require relocation will be notified, by TWRC and/or ORC, well in advance of construction and access to businesses to be maintained during construction, with detours to be provided if required;
- Mitigation measures required for the relocation of roads and utilities will be defined during the detailed design phase; and,
- Record of site conditions under Ontario Regulation 153-04 will be completed once contaminated soil/groundwater remedial approaches are implemented/completed to allow for land use changes and building permit issues.

LANDSCAPING CONSIDERATIONS AND CONCEPTS

Based on flood protection and long-term stability considerations, preliminary concepts for the landscape treatment of the flood protection landform were defined on the basis of five zones relative to the distance from the river's edge. The type of

vegetation that can occur within each of the zones is prescribed by the flood control measures as is summarized as follows:

- Zone 1 (River's edge to within 15 m of crest of landform on wet side): Grasses, herbaceous vegetation. Limited numbers of woody shrubs;
- Zone 2 (Edge of Zone 1 to crest of landform on wet side): Hydraulic plantings with woody shrubs and trees no larger than 75 mm diameter;
- Zone 3 (Crest of landform to 20 m east on dry side): Shrubs, wildflowers and herbaceous vegetation, no deep rooted plantings or trees unless landform is over 82.0 m;
- Zone 4 (20 m east of the crest of the landform to 160 m development setback): Shrubs, wildflowers and herbaceous vegetation and trees no larger than 75 mm diameter; and,
- Zone 5 (Beyond 160 m development setback from edge of the river): No restrictions.

The development of the preliminary planting zones is in draft form and the final planting strategy will be developed in consultation through the park design and precinct landscaping plan.

CONCLUSIONS

The *Lower Don River West Remedial Flood Protection Project* has been carried out under the Class EA process. The main objective of this undertaking is to permanently remove 210 ha of land in downtown Toronto from the Regulatory Floodplain. It is recommended to eliminate the flooding risk via the construction of a flood protection landform on the west side of the river, flood protection works on the east side of the river, a bridge extension at the CN Rail embankment, continued dredging of the Keating

Channel (as per the requirements under the previous Keating Channel Environmental Assessment), and modifications to the Enbridge Utility Bridge.

The preferred solution was selected among several alternatives via a comparative evaluation. Ample public consultation activities were conducted throughout the Class EA study, whereby public comments and concerns were received and considered by the Study Team in the selection, assessment and functional design of the preferred solution.



Demonstration Plan

An analysis of the potential environmental effects indicate that the construction and operation of the remedial flood protection project would result in a few negative environmental effects that are readily mitigable, and several positive effects, the foremost being the elimination of the flood risk to 210 ha of downtown Toronto.

This Environmental Assessment also covers the requirements of the Ontario Realty Corporation Class EA process for land transfers, with the exception of providing an individual strategy for relocating existing businesses and for soil/groundwater remediation. These strategies will be developed by the Ontario Realty Corporation and the Toronto Waterfront Revitalization Corporation within the coming months, and will be submitted to the Ministry of the Environment for review prior to implementation of the preferred alternative.