6 PUBLIC AND FIRST NATIONS CONSULTATION

Consultation is a requirement of the Municipal Class Environmental Assessment Process. Through consultation, interested and potentially affected parties are informed about the study problem and opportunity, the study process, alternative solutions and study recommendations. Through consultation, there is an opportunity for interested and potentially affected parties to share knowledge of the local environment and provide feedback on study recommendations and potential impacts before decisions are finalized. For the Newtonbrook Creek Geomorphic Systems Master Plan study, the City consulted with compulsory and case specific Government Agencies and utility companies; First Nations identified by the provincial Ministry of Environment, Conservation and Parks; and the public, including local residents, community groups and interested parties. The City facilitated consultation by providing information about the study process, recommended solutions and opportunities for feedback. Consultation details and a public consultation report are provided in **Appendix X**.

6.1 Notification

Notification was circulated at the following stages of the Study process:

- A Notice of Study Commencement was issued in October 2022 to provide information about the study purpose and process.
- A Notice of Public Consultation was circulated the week of October 2, 2023, which provided information about the recommended solutions and opportunities for feedback.
- A Notice of Study Completion will be circulated when the final study report is complete.

Throughout consultation, a study web page (toronto.ca/Newtonbrook) was maintained with updated information including contact details for the project team, public consultation information and materials and information on how to provide feedback. Copies of the notices are provided in **Appendix X**.

6.2 First Nations

City consultation with First Nations is by delegated authority through the Ministry of Environment, Conservation and Parks (MECP). First Nations identified by the MECP with an interest in the Newtonbrook Creek GSMP study are:

- Alderville First Nation
- Beausoleil First Nation, with copy to the Williams Treaties First Nations coordinator
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation (Chippewas of Mnjikaning)
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Mississaugas of the Credit First Nation

The following information was provided to First Nations

- Notice of Commencement (October 2022)
- Notice of Public Consultation / recommended solutions (October 2023)
- Stage 1 Archaeology Report (December 2023)
- Overview of Key Study Findings (July 2025)

6.2.1 What We Heard

Alderville First Nation are interested in participating in Stage 2 Archaeological Assessments.
Hiawatha First Nation expressed support for the project recommendations.
Mississaugas of the Credit First Nation (MCFN) have received the archaeological assessment and would like to be updated on the study completion.

Curve Lake expressed a desire to be consulted as part of this study and forwarded a formal letter detailing their requested terms for consultation. A virtual meeting took place September 23, 2025 where City staff presented information about the project that is captured in the Overview of Key Study Findings .

- Curve Lake has an interest in sharing information on the principals of adapting traditional ecological knowledge (TEK) into infrastructure and project design.
- Curve Lake does not have the capacity to send out field liaison representatives for Stage 2 archaeological work but would be able to participate in document review and possibly a site visit.

In the case of further archaeological studies, Follow-up communication will continue during detailed design.
The communication log and details are provided in **Appendix X**.

6.3 Agencies and Utilities

Consultation with government agencies and utilities is carried out with compulsory agencies and those which are identified based on case specific conditions such as study area location and potential impacts. A list of 63 agencies and utilities was established for this study. The list is provided in **Appendix X**.
The following information was provided:

- Notice of Commencement (October 2022)
- Notice of Public Consultation providing information on the recommended solutions (October 2023)

6.3.1 What We Heard

Location details for infrastructure was received from: Enbridge, Canada Fuels Operations, Imperial Oil, HydroOne, Toronto Hydro, Telecon The project team has been asked to determine through a self-assessment whether projects could impact infrastructure or resources under the care of Transport Canada or the Ministry of Natural Resources and Forestry (MNRF). Ongoing communication and coordination through detail design is required with the Toronto Region and Conservation Authority's Toronto Nature Stewards. Follow-up communication with agencies and utilities will continue during detailed design and project implementation as required. The list of agencies and utilities along with copies of key correspondence are provided in **Appendix X**.

6.4 Private Property Impacts

Recommended solutions (projects) intersect with, or are adjacent to, five private properties and two properties owned by the Toronto Regional Conservation Authority. All property owners were notified about the study and potential impacts in September 2023. Residential properties received a combination of hand delivered notices and / or registered mail. Agencies and institutions were contacted via email.

Two property owners replied to the City with a request for more information. No comments on the recommended solutions were received. Communication with all property owners will continue during detailed design and project implementation as required. A list of potentially impacted properties is provided in **Appendix X**.

6.5 Public Consultation Feedback

Public consultation took place between October 2, 2023, and November 3, 2023, providing members of the public and community groups with an opportunity to learn about the study, ask questions and provide feedback. Feedback was received during a public event and site walk, via email and phone, and through an online survey:

The Notice of Public Consultation was circulated by Canada Post to 9,809 residential and business addresses in the study area and distributed by email to 23 interested parties including community groups and organizations, institutions and elected officials. A public drop-in event and site walk took place October 18, 2023, 9– 11:00 a.m. on the front lawn of the Forest Grove United Church at 43 Forest Grove Drive, a short walk from the study area and included a walk through the portion of the study area south of Forest Grove Drive. The event was attended by 32 people in addition to those who dropped in without registration. The online survey received seventeen responses. Communication via email and phone took place with 10 individuals and interested parties.

6.5.1 What We Heard

Overall, most participants were concerned with erosion along the creek, and there was general support for the recommended solutions. Emerging themes from public feedback included:

- An interest in technical details about design, future improvements, risks related to project work and implementation plans.
- Concern that trail closures during construction will be disruptive for the community and impact community wellness
- A preference for having the trail return to its current character of natural dirt and pea-gravel
- Concern for the impacts of construction on the natural environment including impacts on trees and the tree canopy, and impacts on the turtle habitat area downstream
- A desire by the Newtonbrook Nature Stewards to be involved it the restoration and replanting of the areas along the creek post-construction.

The Public Consultation Report is provided in **Appendix X**.

7 CONCLUSION & NEXT STEPS

7.1 Summary of Eleven Projects

In summary, this Newtonbrook Creek Geomorphic Systems Master Plan Report satisfies the original objectives of the study, by developing a comprehensive plan to strategically rehabilitate Newtonbrook Creek and Blue Ridge Creek with the aim of protecting Toronto Water infrastructure that is at risk of damage due to erosion. The study area was found to contain **nineteen (x19) vertical erosion risks** to watermain and sanitary infrastructure, **twenty-two (x22) horizontal erosion risks** to watermain and sanitary infrastructure, and **thirty-one (x31) erosion risks to storm sewer and outfall infrastructure**, totalling **seventy-two (x72) erosion related risks** to Toronto Water infrastructure within the study area. From there, alternatives were developed and evaluated for the **twenty-four (x24) highest priority risk sites**, which were grouped into **eleven (x11) capital works projects**, which will address:

- 8x Exposed Sanitary Sewer Crossings;
- 1x Exposed Sanitary Sewer Maintenance Hole;
- 1x Previously Exposed Sanitary Sewer Maintenance Hole (Protected through Ongoing Emergency Works);
- 7x Sanitary Sewer Crossings with Minimal Cover;
- 17x Lateral Risks to Sanitary Sewer Infrastructure;
- 1x Watermain Crossing with Minimal Cover;
- 1x Exposed Watermain Chamber;
- 4x Failed Storm Sewer Outfalls;
- 4x Storm Sewer Outfalls that are Functional but in a Degraded Condition;
- Multiple risks to Private Property;
- Multiple risks to the Local Multi-Use Trail System; and
- 3x Private Oil Pipeline Crossings (Trans-Northern, Imperial Oil and Sun-Canadian).

A summary of the eleven (x11) projects, along with their associated priority group and project cost estimate, is provided is the following table. Implementation of all eleven projects is anticipated to occur within the next **twenty (x20) years**, and cost a total of **$47,338,000**.

Project Name	Priority Grouping	Project Description	Project Cost Estimates
#1: NBC - Finch	High	Multiple Sanitary Assets Downstream of Bayview and Finch	$8,207,000
#2: NBC - King Maple	High	Exposed Sanitary Sewer Downstream of Forest Grove Near King Maple Place	$5,959,000
#3: BRC - Upper	High	Upper Blue Ridge Creek near Sifton Court	$4,834,000
#4: NBC - Tanner	High	Exposed Sanitary Crossing Downstream of Maxome Avenue Near Tanner Court	$2,434,000
#5: NBC - Maxome	Mid-High	Multiple Sanitary Risks Directly Upstream of Maxome Avenue	$5,757,000
#6: NBC - Manorcrest	Mid-High	Watermain Infrastructure Upstream of Bayview and Finch Near Manorcrest Drive	$3,271,000
#7: NBC - Forest Grove	Mid-Low	Failed Stormwater Outfall Downstream of Forest Grove Drive	$1,733,000
#8: BRC - Confluence	Mid-Low	Lower Blue Ridge Creek near Confluence with the Don River	$4,971,000
#9: NBC - Confluence	Lower	Previously Exposed Sanitary Maintenance Hole near Confluence with the Don River	$4,449,000
#10: NBC - Page	Lower	Multiple Sanitary Assets Upstream of Forest Grove Drive Near Page Avenue	$4,848,000
#11: NBC - Canary	Lower	Failed Stormwater Outfall at Burbank Drive Near Canary Crescent	$875,000

Following the submission of the Final Newtonbrook Creek Geomorphic Systems Master Plan Report, conceptual design packages including conceptual design briefs and engineering drawings at the 30% level will be prepared for each of the eleven (x11) NCGSMP projects. These eleven capital works projects will be prioritized against the proposed projects that are generated from the other four ongoing geomorphic systems master plan projects for watercourses across the City of Toronto, namely the Humber River, Mimico Creek, German Mills Creek and Yellow Creek. Upon completion of the City-wide project prioritization process, the detailed design, permitting, and construction process will be undertaken for each of the projects, starting with the highest priority project grouping.

7.2 Detailed Design and Investigations

At the detailed design stage there are many common elements required for successful implementation of conceptual designs for the fourteen (x14) recommended projects. Stream restoration is a multidisciplinary practice involving engineers, fluvial geomorphologists, and biologists. The detailed design is intended to satisfy all the environmental, hydrologic, hydraulic and structural requirements of the City of Toronto, TRCA, provincial and federal ministries, utilities, and property owners. Common tasks at the detailed design stage should include:

1. Review of concept designs and background information
2. Confirmation of design approach and project extents
3. Detailed topographic surveys and supporting investigations
4. Hydraulic and erosion assessments at project level
5. Draft detailed design for consultation and approvals
6. Coordination of agency approvals
7. Detailing of construction implementation, including phasing, access routes, staging areas, erosion and sediment controls, flow management systems
8. Preparation of contract drawings, price schedules, and special provisions for tendering
9. Commencement of construction (subject to City-wide priority and budget availability)

Typical detailed design packages for channel engineering and stream restoration projects are expected to include most, if not all, of the following design drawing elements:

- **General Plan - Existing Conditions and Removals:** Outlines project extents, property ownership and proposed site removals;
- **General Plan - Proposed Conditions:** Delineates the proposed restoration designs including the proposed length of channel rehabilitation works and any proposed erosion control structures;
- **Plan and Profile Drawings:** Defines alterations to the planimetric alignment and longitudinal profile of Newtonbrook and Blue Ridge Creek
- **Cross-Sections:** Outlines proposed changes to the cross-sectional configuration of the Newtonbrook and Blue Ridge Creek;
- **Site Access and Staging Plan:** Delineates the recommended site access, staging and stockpile areas;
- **Erosion and Sediment Control Plan**: Defines ESC requirements as per the Erosion and Sediment Guidelines for Urban Construction, GGHACA, as well as applicable TRCA standards and guidelines. Should also include proposed flow management solutions to establish a dry working condition. Flow management solutions may include such measures as bypass pumping, implementation of a bypass flume or installation of longitudinal coffer dams.
- **Landscape Restoration Plans:** Includes tree removal, preservation and planting plans. The development of restoration plans should consider impacts areas associated with different Ecological Land Classifications as well as TRCA guidelines; and
- **Construction Details:** Outlines the construction requirements for key design components

Design drawings are to be accompanied by a detailed design brief that documents the methodology and findings from all aspects of the study. The design brief may include annotated mapping, tables summarizing analytical results, photos, summary of landowner consultation, identified opportunities and constraints, and supporting

documentation for the detailed design. Some of the critical tasks for undertaking the detailed design are further defined in the following subsections.

7.2.1 Topographic Survey and Supporting Investigations

A detailed topographic survey is to be completed for each of the projects in order to obtain all topographic and property information required for the detailed design. Channel surveys are to be supervised by a stream restoration and channel engineering professional to ensure that the essential structural and geomorphological features are accurately surveyed. A topographical survey of the study area should be undertaken to obtain the following:

- Current data on the geometry of the bed, banks, and channel profile;
- Accurate representation of all significant vegetation including type and size;
- Confirmation of the location of municipal infrastructure;
- Accurate representation of all private utilities; and
- Detailed topographic data of all affected lands adjacent to the study area.

In some of the more complex cases, it may be appropriate to engage an Ontario Land Surveyor (OLS) to create the Plan of Survey to identify existing Standard Iron Bars (SIBs), the current legal property fabric, road allowance and easement limits. In these cases, all necessary legal plans and documents to identify the legal property fabric and property limits should be obtained. The surveyor or OLS may be required to tie legal fabric into surveyed property bars (a minimum of three (3) surveyed property bars that are well spaced apart). As per City of Toronto standards, the Plan of Survey must be georeferenced to NAD'27 MTM 3 Degree, and coordinates should be reported as Eastings and Northings (digital formats including ESRI shapefiles and AutoCAD drawing files).

7.2.2 Hydraulic Assessment

A hydraulic assessment of the proposed conditions will need to be undertaken for each project to facilitate permitting with TRCA. The results of each assessment will be included in the various project design briefs. Computation of peak velocities, shear stresses and stream powers for bank full and peak floods (i.e., 2–100-year events and Regional Storm) shall be included and incorporated into the evaluation of the proposed remedial measures. The assessment will be used to confirm that no negative flooding or erosion impacts will result from the proposed works, a condition of TRCA permits, and to size the material for the channel bed and bank restoration works. To facilitate permitting, an existing and proposed conditions model will need to be prepared to allow for a comparison of the proposed designs impacts on water surface elevations as well as channel velocities, shear stresses and stream power values.

When using the results from the hydraulic modelling assessment to adjust the cross-sectional design of the channel, efforts should be made to promote floodplain connectivity. Ideally, the bankfull depth of the channel should be exceeded for all storms events greater than the 2-year return period flow. In instances where this is infeasible due to site constraints, best efforts should be made such that the level of floodplain connectivity is either maintained or enhanced through implementation of the proposed design solution. As a TRCA permitting requirement, incremental and cumulative riparian storage volumes may need to be assessed at 0.3 metre increments for both existing and proposed model conditions. The results of this assessment should confirm that there is no loss in riparian storage volumes as a result of the implementation of the proposed works. The hydraulic modelling assessment should also give due consideration to the impacts of Climate Change by taking into account the projected intensification of design storms defined in the NCGSMP Climate Change Assessment.

Consideration should also be given on a project-by-project basis to explore opportunities for the installation of wetland pockets to help attenuate flows, create new habitat and reduce erosion. Pocket wetlands may be constructed adjacent to channel rehabilitation works or in line with storm sewer outfall channels.

7.2.3 Hydrogeological Assessment

As part of the detail design, a hydrogeological assessment should be completed for each project location, to determine any potential hydrogeological impacts to Newtonbrook and Blue Ridge Creek as a result of the proposed works. Furthermore, the hydrogeological assessment should confirm dewatering requirements to complete the proposed works at each project location.

7.2.4 Geomorphic Assessment

A detailed geomorphic assessment should be undertaken at the detailed stage to build on the findings of this report and ensure all proposed channel restoration works are designed accounting for dominant geomorphic trends and key fluvial geomorphology principles at the project-specific scale. Particular care should be taken at transition regions between proposed works and existing conditions to ensure these vulnerable areas remain geomorphically stable in the long-term.

7.2.5 Geotechnical Investigation

A geotechnical investigation should be undertaken to determine the engineering properties of the existing soils for bank protection works. The details of the geotechnical investigation are to be determined by a qualified geotechnical engineer in consultation with the stream restoration consultant.

Borehole logs containing appropriate and sufficient data should be prepared. Information from the boreholes is to be used for assessments of slope stability, soil properties for channel design, soil contamination, and any other geotechnical recommendations for engineered structures. Furthermore, soil chemical testing should be undertaken to provide recommendations for the disposal of excess material offsite in accordance with O.Reg. 406/19.

7.2.6 Utilities Confirmation

Further subsurface utility investigations will be required to confirm the impact of each proposed restoration design on the utilities and underground services within the proposed restoration areas. The utilities may include, but are not limited to, electrical, natural gas, cable television, telephone, water, sanitary sewer, and storm sewer.

Subsurface utility investigations should be completed in sufficient detail to identify all above ground and buried infrastructure within each project site. Prior to the start of construction, utility protection measures will need to be confirmed with each corresponding utility authority.

7.2.7 Tree Inventory

A tree inventory, arborist report, and tree preservation plan will need to be completed as part of the detailed design process for each project to support permitting efforts with MECP, Toronto Urban Forestry and TRCA. Impacts to existing trees and any implications under the City's by-law (including any associated protection or replanting requirements related to those impacts) should be detailed upon the completion of the tree inventory and leveraged to prepare site restoration plans that satisfy the requirements of all regulatory review agencies. Tree inventories should include the full expected area of construction related disturbance, including proposed access and staging areas. Every effort should be made to design access and staging areas that will minimize tree removals and environmental impacts.

7.2.8 Natural System Enhancement Opportunities

As part of the detail design, potential improvements/enhancements to the natural system should be explored within the vicinity of the eleven (x11) proposed infrastructure protection projects. These opportunities to enhance or improve the natural conditions could involve additional plantings of native shrubs and trees, or wetland enhancements/establishment.

7.2.9 Coordination with Basement Flood Protection Projects

As part of the detail design, coordination with the City of Toronto's ongoing Basement Flood Protection Projects within the Newtonbrook and Blue Ridge Creek Watersheds. Opportunities for project alignment should be explored to provide overall project scheduling and costing efficiencies, minimize disturbance to the natural areas, and ensure design congruency.

7.2.10General Mitigation Measures

7.2.10.1 Erosion and Sediment Control

Erosion and sedimentation control techniques are necessary precautions to minimize sediment entry into surrounding creeks and/or storm sewer pipes. Installation of construction fencing and erosion control / silt fence are required well in advance of construction activities. Construction fencing and access routes shall be clearly delineated and appropriate setbacks maintained from private property for the duration of construction works. Sediment and erosion control measures should remain in place until vegetation has become established.

Sediment and erosion control measures should also act as wildlife exclusion fencing to prevent small mammals and herpetofauna from entering disturbance areas.

Public lands should be restored with woody vegetation as a part of bank stabilization efforts.

Potential sources for sedimentation related to construction activities include sediments disturbed and deposited by construction vehicles and blowing sand and dust. The following mitigating measures are proposed:

- Place sediment traps to receive storm runoff during construction;
- Provide tire washing facilities for construction vehicles that exit the site;
- Install silt fencing along the perimeters of the work sites where appropriate to prevent migration of sediment-laden storm runoff;
- Cover exposed excavated material to prevent erosion by rain and wind; and
- Water or other dust suppressants to be employed during construction to control release of dust particles to the air.

An erosion and sediment control plan will be prepared and the selection of appropriate measures will be addressed during the detailed design stage. The erosion and sediment controls indicated are the minimum that are required. It is necessary to ensure that all erosion and sediment control measures are functional prior to and throughout the duration of construction.

7.2.10.2 Fuel Spills

Fuel spills may occur during the onsite refueling of construction equipment, and may potentially contaminate surface and groundwater as well as soils. Recommended mitigation measures include the following:

- Refueling in designated areas outside of the NHS;
- Spill containment for on-site storage tanks; and
- Develop and Implement as needed a spill clean-up contingency plan.

7.2.10.3 Environmental Disturbance

During the detailed design phase, every reasonable effort shall be undertaken to limit disturbance to the natural environment, and ensure that there is no increased risk associated with the natural hazards in the project area. This can be completed by undertaking the following:

- Reduction of the disturbance limits and tree removals to only the strictly required areas
- Strategical selection of access and staging/storage locations, using previously disturbed areas with low ecological value wherever possible
- Avoidance of impacts to areas with high ecological value such as wetlands wherever feasible
- Consultation with TRCA to delineate wetland extents where applicable

7.2.10.4 Stage 2 Archaeological Assessment

Stage 2 Archaeological Assessment work is required as part of the detailed design for each of the projects, which will include a test pit survey at five-meter intervals, prior to any proposed impacts. Should the proposed work extend beyond the current Study Area, further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands. Engagement with the First Nations is recommended via field liaison representation during the Stage 2 Archaeological Assessment.

TRCA Archaeology staff will complete the Stage 2 Archaeological Assessment where required on TRCA property. Scheduling TRCA staff for archaeological investigations (e.g., screening and/or field investigation) should be factored into project schedules accordingly.

7.2.10.5 Property Access Agreements

Within the study area, Newtonbrook and Blue Ridge Creek is located on both public and private property. For select projects, Property Access Agreements may be required for temporary construction access / staging. Where works are proposed on private property, the property owner will be advised of the ongoing erosion issues and associated risks on their property. The City may give future consideration to an easement acquisition in order to complete creek restoration works on select private properties.

For works proposed on TRCA property, any new infrastructure proposed within TRCA property may require permanent easements. If permanent easements are required, they will need TRCA Board Approval. TRCA easement requirements will be refined through consultation with TRCA throughout the design stage.

7.3 Permits and Approvals

In addition to the City's own requirements for review and approval of engineering works, a number of other potential regulatory requirements must be satisfied to secure the necessary approvals, specifically to minimize and mitigate the risks of environmental impacts. These approvals may involve up to three levels of government including conservation authorities, provincial ministries, and federal departments.

7.3.1 Toronto and Region Conservation Authority Permit

TRCA permits will be required at the detailed design stage under Section 28.1 of the Conservation Authorities Act. This typically involves two submissions (60% & 90% design), with the design drawings, a design brief, and hydraulic model files. Additional studies may be required as the design progresses. To enhance streamlining initiatives, TRCA staff highly recommend a pre-consultation review with TRCA prior to the 60% design stage. Scheduling of the project should allow for review of the submission by TRCA and revisions to the design and resubmission following receipt of comments from TRCA.

7.3.2 Provincial Species at Risk

Under the evolving MECP policy regarding SAR Habitat, a regulatory exemption clause has been published for "non-imminent threats to health and safety" under O.Reg. 242/08 (23.18) to the *Endangered Species Act*, which allows certain works to proceed without a permit regardless of their potential impacts, including:

- *Work to **maintain, repair, remove or replace an existing structure or any infrastructure** [specifically: a communications system; an electric power system, oil or gas pipeline, alternative energy system or renewable energy system; a road or railway system; water works, wastewater works, stormwater works and associated facilities; or drainage works designed to control surface water runoff, other than a drainage work to which section 23.9 applies], including the decommissioning of a mine, **or to upgrade an existing structure or any of the aforementioned infrastructure to meet a safety standard**, **if**:*
    - *i. **the maintenance, repair, removal, replacement, decommissioning or upgrade does not require:***
        - ***a temporary or permanent change to the location of the structure or infrastructure, or***
        - ***a temporary or permanent extension of the area the structure or infrastructure occupies**, except in the case of the replacement of an existing culvert with a new culvert that is larger than the one it replaces,*
    - *ii. in the case of work to maintain, repair, replace or upgrade a structure or infrastructure, the work does not alter the way in which the structure or infrastructure is used or operated.*

- *Work to protect against drought, flooding, forest fires, **unstable slopes and erosion as long as the protection does not include the building of new infrastructure**."*

As part of the proposed works, new erosion control works will be installed at all sites to protect existing infrastructure, with no new sewer or road infrastructure is planned at this time. As such, the proposed works

qualify for this exemption, as they are measures intended to prevent against unstable slope and erosion and do not involve the building of new infrastructure.

As part of the exemption, a Notice of Activity must be submitted through the provincial website (ONe-key) to register the project prior to commencing the proposed works. Although there are no associated additional approval application or review as part of this process, the proposed works are still obligated to minimize their effects on SAR (e.g., providing mitigation such as timing restriction on vegetation removal, following in-water works timing windows and standard DFO mitigation measures to prevent harm to fish, as well as providing habitat restoration/compensation as appropriate). A mitigation plan should be prepared, and records of the activity maintained, should the MECP request a review at a later date.

7.3.3 Department of Fisheries and Oceans (DFO) Request for Regulatory Review

Once the detailed design has been prepared for the channel works at each project, a request for regulatory review under the federal Fisheries Act should be submitted to DFO. Since channel restoration works are typically below the high-water mark, these projects often cannot be exempted from review based on the DFO's self-assessment process. As such, the detailed design package will need to include an offsetting plan to counterbalance serious harm to fish and fish habitat. Depending on the results of the regulatory review process, the proponents' plan may also need to include a letter of credit to ensure that the conditions of the Fisheries Act Authorization will ultimately be completed. The offsetting plan may include some combination of:

1. Habitat restoration and enhancement;
2. Habitat creation;
3. Chemical and biological manipulations; and/or
4. Other complementary measures.

7.3.4 Urban Forestry Ravine & Natural Feature Protection Permit

The Ravine & Natural Feature Protection By-law, Chapter 658 of the City of Toronto Municipal Code regulates certain activities within protected areas, including the injury and destruction of trees, filling, grading, and dumping in defined areas. A Permit for Tree Removal and Tree Injury in a Protected Property is required to conduct injury or destruction of trees on ravine protected lands within the City of Toronto. A permit application package will need to be submitted to Urban Forestry Ravine & Natural Feature Protection including an arborist report, landscape / replanting plan, and site plan.

7.4 Qualified Persons for Stream Restoration Design

Stream restoration is considered a multidisciplinary professional practice, including river engineers, fluvial geomorphologists, and biologists. While qualified persons (QP) are not directly defined by provincial regulation for stream restoration, there are requirements for the practice of engineering and geoscience regulated under the Professional Engineers of Ontario (PEO) and Professional Geoscientists of Ontario (PGO), respectively.

Erosion and flood mitigation projects with infrastructure and channel structures that are expected to be stable (i.e., not move), the QP is clearly expected to be a river engineer (P.Eng.). For projects where some degree of fluvial dynamics (e.g., erosion and sediment transport) is expected following construction, the QP is expected to be a fluvial geomorphologist (P.Geo.) or river engineer (P.Eng.) with knowledge and experience in geomorphology and environmental geoscience. With reference to guidelines by PEO for Sealing Multi-discipline Documents, it is expected that the professionals from each discipline can be identified in taking responsibility for their respective work.

7.5 Construction Services

All tender documentation will be completed applicable to the City of Toronto or TRCA standards, with Special Provisions and Schedule of Quantities with refined engineering cost estimates provided. The package will include Project Descriptions, Special Provisions, Specifications, Form of Tender and a Schedule of Prices. The final detailed design drawings will be issued as a set of contract drawings with the completed tender package. The contract drawings will be stamped by a professional engineer, signed, and labeled "Issued for Tender" complete with all necessary material and performance specifications. The consulting engineer will typically assist the City during the

tendering and procurement period as required, providing responses and clarification to bidders during the procurement process.

Inspection and administration services during construction under the guidance of a professional engineer (or geomorphologist) who has been integrated in the design and is well versed in similar construction projects is required. Tasks undertaken as part of the supervision role will include:

- Attend regular (bi-weekly) progress meetings, including pre-construction meeting, prepare and distribute meeting minutes within 5 days of the meeting;
- Respond to inquiries and request for information from external agencies, public stakeholders;
- Preparation of progress payment certificates and recording material quantities as they arrive to site;
- Overseeing the day-to-day construction and providing interpretation of the drawings;
- Ensuring that contractor's methodology complies with requirements of design;
- Monitor the traffic control measures to ensure they are consistent with traffic control plans;
- Inspect all layout and construction work to ensure compliance with the contract specifications and drawings;
- Provide advice to the contractor regarding the interpretation of the contract drawings and specifications and the preparation of supplemental details, instruction and clarifications as required;
- Notify the contractor of any deficiencies in the construction of the work, instructing the contractor to take appropriate corrective measures, confirm and report results of the corrective measures during construction. The deficiency list will be maintained and coordination of rectification throughout the 2-year maintenance period;
- Review, monitor and ensure compliance with contractor environmental conditions (i.e., Erosion and Sediment Control Plan).
- Preparation and issuance of substantial Performance certificate and recommendations; and
- Undertake a complete and thorough inspection of the contractor's work and prepare a report which lists all outstanding deficiencies at the end of the warranty period and coordinate and ensure that contractor corrects all warranty deficiencies expeditiously and to the satisfaction of the City.

7.6 As-Constructed Drawings and Analysis

This task will set baseline conditions following construction, which will enable future monitoring and comparative analysis. Specifically, an as-built survey of completed channel works (plan, profile, and cross sections) to verify implementation of design within reasonable tolerances should be undertaken. As-constructed drawings, together with a report summarizing pre- and post-construction conditions should be provided. The report should comment on significant deficiencies found with recommendations for correction or adaptive management as required. The HEC-RAS model should be updated to match as-built conditions (should the comparative analysis to the design highlight differential conditions), and the updated HEC-RAS model should be applied accordingly to confirm no negative impacts to flooding.

7.7 Monitoring Program

For the post construction monitoring program, Aquafor recommends a comprehensive approach, integrating engineering, ecology, and geomorphology, consistent with the City of Toronto standards and TRCA requirements. As such, a 3-year annual monitoring plan is recommended following completion of construction, which will include Warranty Period engineering review, as well as assessment of the efficacy of restoration plantings. Year 1 monitoring shall be completed after the first bankfull flow and no more than 12 months following the As-built survey. Year 2 and Year 3 monitoring shall be completed at 12-month interval following the Year 1 assessments. The program should include time for inspection of both the channel works and vegetation plantings for effectiveness and stability by the project engineer, the inspection of erosion and deposition by the project geomorphologist, and the planting success rate as well as observation monitoring of wildlife, birds, and fish by the project ecologist. The aquatic and terrestrial indicators will be compared to pre-construction baseline observations to be collected prior to construction at each of the project locations. Both the monitoring and warranty will be defined to suit the detailed design, and satisfy City, TRCA and other agency requirements.

8 SIGNATURES

This report was completed with input from the following consulting staff:

Robert Amos – Water Resources Engineer / Project Manager
Jacob Ursulak – Water Resources Engineer
Chad Cota – Water Resources Analyst
Mara Peever – Water Resources Analyst
Ibraaheem Laceman - Water Resources Analyst Student
David Kynaston – Fluvial Geomorphologist
Robert Walker – Climate Change Specialist
Julie Scott – Terrestrial Ecologist
Graham Eby – Aquatic Biologist
Jakub Ripley – GIS Specialist
Alex Verville – GIS Specialist
Palka Sharma – Senior CAD Technician
Mohammad Zakaria – CAD Technician
Mehrshad Dorri – CAD Technician

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9 REFERENCES

Ben Alaya, M.A., F.W. Zweirs and X. Zhang. (2019) Evaluation and Comparison of CanRCM4 and CRCM5 to Estimate Probable Maximum Precipitation over North America. J.Hydrometeorol. 20:2069-2089.

Ben Alaya, M.A., F.W. Zweirs and X. Zhang. (2020) Probable Maximum Precipitation in a Warming Climate over North America in CanRCM4 and CRCM5. Climate Change 158:611-629.

Bicknell, B.R., J.C. Imhoff, J.L. Kittle Jr., T.H. Jobes and A.S. Donigian (2001). Hydrological Simulation Program – FORTRAN. HSP-F Version 12 User's Manual. Aqua Terra Consultants in cooperation with the Hydrologic Analysis Software Program, USGS and the National Exposure Research Laboratory, U.S.EPA.

Biron, P.; Buffin-Bélanger, T.; Larocque, M.; Choné, G.; Cloutier, C. A.; Ouellet, M. A.; Demers, S.; Olsen, T.; Desjarlais, C.; Eyquem, J. (2014) Freedom Space for Rivers: A Sustainable Management Approach to Enhance River Resilience. Environmental Management 54: 1056 – 1073. DOI - 10.1007/s00267-014-0366-z

Buffin-Bélanger, T.; Biron, P.; Larocque, M.; Demers, S.; Olsen, T.; Choné, G.; Ouellet, M. A.; Cloutier, C. A.; Desjarlais, C.; Eyquem, J. (2015) Freedom Space for Rivers: An economically viable river management concept in a changing climate. Geomorphology 251: 137 – 148. DOI - 10.1016/j.geomorph.2015.05.013

Byun, K., C.M. Chui and A.F. Hamlet. 2019. Effects of 21st Century Climate Change on Seasonal Flow Regimes and Hydrologic Extremes Over the Midwest and Great Lakes Region of the US. Science of the Total Environment. Vol. 650., 1261-1277.

Chapman, L.J. and Putnam, D.F. 2007 The Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228.

Conceptual Restoration of two sites along Newton Creek (Geomorphic Solutions), July 2007

Credit Valley Conservation (2019) Fluvial Geomorphic Guidelines: Factsheet VI: Scour Analysis 1.0

Department of Fisheries and Oceans. (2019, August 29). *Projects Near Water*. Retrieved from Fisheries and Oceans Canada: http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

Hickin, E.; and Nanson, G. (1984) Lateral Migration Rates of River Bends. Journal of Hydraulic Engineering 110(11): 1557 – 1567 DOI: 10.1061/(asce)0733-9429(1984)110:11(1557)

Jensen, M.E. and H.R. Haise, 1963. Estimating Evapotranspiration from Solar Radiation. Proceedings of the American Society of Civil Engineers, Journal of Irrigation and Drainage, Vol. 89, No. IR4, pp 15-41.

Hooke, J.M. (1991). Non-Linearity in River Meander Development: Chaos Theory and Its Implications, Working Paper No.19. Department of Geography, University of Portsmouth, Hampshire, UK, 22p.

IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press, Cambridge, United Kingdom and New York, New York.

IPCC (2014): Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp

IPCC (2018) Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the Impacts of

Global Warming of 1.5°C above Pre-industrial Levels and Related Global Greenhouse Gas Emissions Pathways, In the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty.

IPCC (2023) AR6, Synthesis Report, Climate Change 2023, Summary for Policymakers, Chapter A, Current Status and Trends. IPCC, Geneva, Switzerland

Marshall Macklin Monaghan. (2003, July). Toronto Wet Weather Flow Management Mast Plan. Toronto, Ontario, Canada.

Mitsch, W.J. and B.C. Reeder. 1992. Nutrient and Hydrologic Budgets of a Great Lakes Coastal Freshwater Wetland During a Drought Year. Wetlands Ecology and Management1 (4):211-222.

Mortsch, L., S. Cohen, and G. Koshida. 2015. Climate and Water Availability Indicators in Canada: Challenges and a Way Forward. Part II – Historic Trends. Canadian Water Resources Journal 40: 146-159.

North-South Environmental Inc., Dougan & Associates, and Beacon Environmental. 2012. Environmentally Significant Areas (ESAs) in the City of Toronto (prepared for Toronto City Planning).

Ontario Digital Terrain Model, Lidar-Derived (ODTM). Ontario Ministry of Natural Resources and Forestry Provincial Mapping Unit, (2015). Available: Ontario GeoHub < https://geohub.lio.gov.on.ca/> (Accessed February 01, 2022).

Piegay, H.; Darby, S. E.; Mosselmaan, E.; Surian, N. (2005) A Review of Techniques Available for Delimiting the Erodible River Corridor: A Sustainable Approach to Managing Bank Erosion. River Research and Applications 21(7): 773–789.

Stanfield, L. (2017). *OSAP Version 10.*

Tam, B.Y., K. Szeto, B. Bonsal, G. Flato, A.J. Cannon and R. Rong. 2019. CMIP5 Drought Projections in Canada Based on the Standardized Precipitation Evapotranspiration Index. Canadian Water Resources Journal. Vol. 44, No. 1, 90-107.

The Ontario Geological Survey. 2003. Surficial Geology of Southern Ontario.

Totten Sims Hubicki Associates. (2003) Toronto Wet Weather Flow Management Master Plan, Area 2: Etobicoke and Mimico Watersheds. A study conducted for the City of Toronto.

TRCA. (2009). Don River Watershed Plan: Aquatic System Report on Current Conditions. Toronto, Ontario, Canada.

WMO (2009) Manual on Estimation of Probable Maximum Precipitation (PMP). WMO-No. 1045

Yang, Y., T.Y. Gan and X. Tan. 2020. Spatiotemporal Changes of Drought Characteristics and their Dynamic Drivers in Canada. Atmospheric Research. Vol. 232.,

Zhoa, C., F. Brissette, J. Chen and J. Martel. 2020. Frequency Change of Future Extreme Summer Meteorological and Hydrological Droughts Over North America. Journal of Hydrology. Vol. 584.