October 16, 2024
Project No. 2406378

Branthaven Fourth Line Inc
720 Oval Court
Burlington, ON L7L 6A9

Re: Secondary Source Review and Characterization Memorandum
9755-9875 Derry Road (DeMarchi)
Milton, Ontario

Introduction

GEI Consultants Canada Ltd. (GEI) is the retained ecological consultant for Branthaven Fourth Line Inc's (Branthaven's) proposed development, of the 9755-9875 Derry Road "DeMarchi" lands located north of Derry Road, west of Cedar Hedge Road, east of Laking Terrace, and south of Costigan Pond in Milton, Ontario (herein referred to as the Subject Lands). The Subject Lands consist of actively managed agricultural lands (soy), and contain a portion of the Centre Tributary of Sixteen Mile Creek (herein referred to as "Centre Tributary"). The Subject Lands are proposed to be developed for residential use.

Through pre-consultation discussions with the Town of Milton and Halton Region, it was requested that high-level documentation be provided outlining how the proposed development complies with the Sixteen Mile Creek Sub-Watershed Planning Study (Areas 2 & 7;SWS, 2000) and Centre Tributary Scoped Subwatershed Impact Study (SIS, 2000), in order to support Branthaven's Draft Plan Approval submission. The following memorandum provides secondary source review, a characterization of current ecological conditions, and a review of the proposed development's conformance with the aforementioned SWS and SIS reports.

Background

The Subject Lands are the last remaining undeveloped parcel within the Phase 1 (i.e., Bristol Survey) planning district, with development (including channel realignment) already completed on all surrounding properties. The Bristol Survey planning district was preceded by, and falls within the Study Area for, the Sixteen Mile Creek Areas 2 & 7 SWS. In addition, the Centre Tributary Scoped SIS was previously prepared for the entire Centre Tributary of Sixteen Mile Creek, a portion of which runs through the middle of the Subject Lands.

To ensure consistency with previous applications upstream and downstream of the Subject Lands, as well as conformance with the Sixteen Mile Creek Areas 2 & 7 SWS and Centre Tributary SIS, GEI has reviewed the SWS and SIS reports and provided a high-level summary of the ecological requirements described within these reports in the sections below.

Sixteen Mile Creek Sub-Watershed Planning Study (Areas 2 & 7)

The Sixteen Mile Creek Areas 2 & 7 SWS was prepared to identify and recommend how water resources and related resource features are managed on the landscape of Subwatershed Areas 2 & 7. The information in the following sub-sections was identified as applicable to the Subject Lands.

Study Area characterization:

Based on the Sixteen Mile Creek Areas 2 & 7 SWS, the portion of Centre Tributary on the Subject Land is described as an intermittent watercourse that has been channelized/straightened. Bank material was found to be silty, and the surrounding area was identified to be under active agricultural use with increasing residential land use on adjacent sites. The on-site stream was evaluated as a medium fisheries constraint ranking (Drawing 2 of the SWS). The watercourse was not assigned a low, medium or high constraint (as shown on Drawings 2 and 3 of the SWS).

Applicable management measures/recommendations described in the Sixteen Mile Creek Areas 2 & 7 SWS:

1. Subwatershed-wide recommendations
    - Watercourse Systems
        - Allow removal / alteration of all watercourses not identified as blue / red streams in the SWS as long as function is replicated.
    - Natural Heritage Systems
        - Provide / enhance naturalized linkages along tributaries to be retained or modified – this includes a 50 m minimum corridor target for streams with a medium fisheries constraint, such as the tributary on the Subject Lands;
        - Establish wetland and terrestrial habitat along stream channels to provide opportunities for wildlife;
        - Promote the widespread use of native plant material; and
        - Work towards a target of 30% forest and successional cover and 6% wetland /riparian cover within the subwatershed as a whole.
    - Fisheries Resources
        - Realignment of intermittent streams is generally supported as long as natural channel design principles are adopted, including the Federal Department of Fisheries and Oceans “No Net Loss” policy objective for fish habitat;
        - Consider opportunities to reduce the amount of hardened and straightened channels within the watershed;
        - Consider opportunities to enhance or facilitate fish passage within the watershed; and
        - Enhance riparian plantings to improve stream habitat and reduce thermal impacts.
    - Stormwater Management (SWM)
        - Incorporate end-of-pipe SWM quality / quantity storage for all new development areas > 5 ha;
        - Ensure all SWM facilities meet Level 1 sizing criteria;
        - Ensure all SWM facilities provide extended detention storage for erosion control and short-term storage for flood control;

  - Limit drainage areas to SWM facilities to a maximum of 40-80 ha;
  - Incorporate thermal mitigation practices; and
  - Ensure existing levels of infiltration are maintained on a regional scale.

2. Phase 1 / Bristol Survey specific recommendations
   - Integrate larger natural features, evaluated wetlands, and natural features that are linked to nearby features and watercourses to achieve a net gain in ecological function and habitat;
   - Target a minimum of 15% natural cover in Phase 1;
   - Consider opportunities to enhance local tributaries and off-site fish habitat;
   - Implement passive/diffuse infiltration methods;
   - Implement post- to pre-development peak flow control to achieve flood control objectives;
   - Avoid significant watercourse lowering to prevent sediment aggradation;
   - Implement the preferred SWM strategy for Phase 1 (Bristol Survey Area) outlined in the SWS, which includes the following general components (please refer to the SWS for details);
     - Full urban servicing;
     - Maintenance of on-site watercourses (Centre Tributary) with local areas of deepening;
     - Diversion of minor system flow to the Main Branch of Sixteen Mile Creek as required; and
     - Overland flow routes for major system drainage .
   - Control stormwater runoff to maintain flow-duration exceedance characteristics for the Main and East branches of Sixteen Mile Creek; and
   - Implement quality controls for SWM runoff to a Level 1 Standard (80% removal of total suspended solids).

Ultimately, the following channel requirements were estimated for the portion of Centre Tributary on the Subject Lands through the SWS (channel segment 6, as per Table 7.12 of the SWS):

Drainage Area (ha)	Estimated Channel Width (m)	Channel Length (m)	Estimated Land Requirement (ha)	Estimated Regional Peak Flow (m^3/s)	Estimated 2 Year Peak Flow (Bankfull) (m^3/s)	Matches Existing Alignment (Y/N)
392	60	550	3.3	32.5	0.5	Y

<u>Applicable setbacks described in the Sixteen Mile Creek Areas 2 & 7 SWS:</u>

- A slope setback allowance (buffer zone) of 7.5 m from the “stable top of bank” for minor watercourses, such as the one on the Subject Lands; and
- An erosion allowance of 1 m from minor watercourses.

<u>Monitoring requirements described in the Sixteen Mile Creek Areas 2 & 7 SWS:</u>

- The SWS prescribed both basic monitoring for important features identified in the SWS and site-specific monitoring of defined areas;

- The SWS identified that monitoring should include natural heritage, hydrogeology, stormwater management, and stream morphology characteristics; and
- A monitoring and adaptive management plan for the Bristol Survey area is found on Table 8.6 of the SWS.

Centre Tributary SIS

The Sixteen Mile Creek Areas 2 & 7 SWS also recommended preparation SIS reports as an intermediate level of information between high-level SWS reporting and finer scale stormwater management plans to allow better coordination of land use, infrastructure design, and natural systems in areas with multiple landowners. The Centre Tributary SIS provided details on the implementation of the proposed realigned Centre Tributary and cost sharing. The information in the following sub-sections was identified as applicable to the Subject Lands.

Study Area characterization:

- Aside from the Main Branch of Sixteen Mile Creek, all streams within the Phase 1 (Bristol Survey) area are intermittent, with dry or isolated pools found to be common in the summer months;
- Fine textured soils in this area also contribute to low infiltration of water resulting in many ephemeral swales across the landscape;
- Generally, the Centre Tributary was found to lack baseflow, resulting in limited fish production. The tributary has also been altered, and to some degree degraded, due to surrounding agricultural land use; and
- Fish data collected in 1998 found Brook Stickleback (*Culaea inconstans*), Pumpkinseed (*Lepomis gibbosus)* and Common Carp (*Cyprinus carpio*) within the Centre Tributary. This is characteristic of a warmwater fish community.

Applicable management measures/recommendations described in the Centre Tributary SIS:

1. Design considerations
   - Implement the proposed characteristics of Reach F on the Subject Lands. As per Tables 4.3, 4.4, and 5.1 of the SIS, the proposed characteristics of Centre Tributary within Reach F are as follows:

Channel width (m)	60
1.25 year flow (cms)	0.18
Estimated ultimate invert (m) • Upstream • Downstream	 198.1 195.25
Channel length (m)	1127
Sinuosity	1.2
Bankfull width (m)	2.10-2.70
Bankfull depth (m)	0.30-0.50
Bankfull gradient/Stream gradient (%)	0.26
Meander belt width (m)	35
Valley Length (m)	938
Valley gradient (%)	0.31
Proposed valley slope (m/m)	0.0031

   - Incorporate gravel-sized materials in riffles to accommodate erosion potential and bed shear in reach F.

2. Ecological considerations
    - Incorporate varied habitat types including: shallow, open water, wetland, and upland;
    - Shape floodplains to maximize micro-topography and provide a range of habitat sizes;
    - Design riparian habitats to ensure resilience under predicted urban conditions;
    - Incorporate native species, preferably of local origin;
    - Choose plant species based on their successional role and ecological compatibility with the intended habitat type;
    - Design, install, and monitor plantings to ensure herbaceous cover establishes in the first year; and
    - Where possible, incorporate soil propagule banks and seed banks into habitat creation, excluding areas where Reed Canary Grass (*Phalaris arundinacea*) is dominant.

3. Construction practices
    - Wherever possible, undertake watercourse construction while reaches are dry;
    - Excavate the new channel and stabilize soils prior to flow diversion into the new channel. Where the new channel overlaps with the existing channel, time construction during the dry season and employ conveyance measures to isolate flow from the construction site; and
    - Avoid in-water works during fish spawning and nursery periods. Spring spawning fish observed in the Centre Tributary indicate that no in-water work should be undertaken between April 1 and July 1.

Applicable setbacks described in the Centre Tributary SIS:

- Consistent with the SWS, the Centre Tributary SIS identified the setbacks on site to be 7.5 m from the stable top-of-bank; and
- This setback area would not contain active use, aside from trails, and would generally not exceed 10% slope.

Site Characterization

In August of 2024, GEI completed several ecological studies to confirm existing conditions on the Subject Lands, including:

- Preliminary Ecological Land Classification and a botanical inventory;
- An aquatic habitat assessment;
- A bat habitat assessment; and
- A general wildlife habitat assessment for any other wildlife habitat on site.

These surveys confirmed that the majority of the Subject Lands still consist of actively managed agricultural lands, as described in the SWS and SIS. Specifically, the entire tablelands was cropped with soy plants. All natural heritage features were identified within the Centre Tributary corridor. Specifically, the Centre Tributary Corridor is assumed to support direct (permanent) fish habitat. Additionally, three candidate bat snags were identified within the Subject Lands that could support species at risk. No other natural heritage features were identified within the Subject Lands; this is consistent with the SWS and SIS findings. Additional details regarding the findings from the site visit are provided below.

Centre Tributary Characterization

The Centre Tributary flows through the centre of the Subject Lands between two actively managed agricultural fields. Limited meanders were noted within the channel with the majority of the reach being characterized as a uniform run with limited habitat morphology (e.g., limited evidence of riffle or pool morphology). The wetted width and depth at the time of the survey were measured at 0.88 m and 0.36 m, respectively. Some erosion was noted near the upstream tie-in location of the site, where the upstream realigned channel converged with the existing reach on site. No fish barriers were documented within the realigned channel. The culvert at the downstream extent of the Subject Lands (Derry Road) was a large span bridge with an open bottom that appeared to facilitate both aquatic and terrestrial wildlife movement. No fish were observed within the reach at the time of the survey; however, given that there are no obvious fish barriers within the site it is likely that fish occupy the reach. Within the riparian corridor of the channel, meadow habitat was identified with some scattered shrubs and trees (Poplar (*Populus* sp.), Willow (*Salix* sp.) and Manitoba Maple (*Acer negundo*)). Two Category 1 invasive species were recorded within the channel corridor including European Reed (*Phragmites australis*) and Purple Loosestrife (*Lythrum salicaria*). Both species appeared established within the adjacent realigned watercourse corridors.

As previously noted, channel realignment has already been completed upstream and downstream of the Subject Lands. The proposed channel realignment for the remaining portion of Centre Tributary on the Subject Lands is discussed further in the Proposed Development Strategy section below.

Wildlife Observations

Regarding observed wildlife, three species were recorded during the site visit: Monarch, Green Darner and Mallard.

A single Monarch butterfly was detected on site and was determined to be foraging given that large congregations of Milkweed (*Asclepias sp*.) was not observed within the Subject Lands. In general, Monarch habitat is limited on the Subject Lands, and no associated Significant Wildlife Habitat (SWH) potential was noted during the wildlife habitat assessment. Additionally, one Green Darner was also observed foraging within the channel corridor. GEI recommends that nectaring species could be considered as part of the channel realignment on the Subject Lands to provide foraging opportunities for pollinators, such as Monarchs. The incorporation of wetland habitat within the realigned channel corridor could also support Green Darners.

One male Mallard was also recorded within the watercourse corridor. This species was likely foraging within the watercourse corridor and could be breeding within larger open aquatic habitats within the adjacent realigned channel corridors. Larger open pools are not present within the existing reach on site; therefore, it is not expected that this site supports significant thresholds to meet SWH requirements. This area is also not known to support significant waterfowl (e.g., not noted on eBird or iNaturalist). Suitable nesting habitat within the Subject Lands is limited given that the majority of the site is actively managed and would not result in successful nesting opportunities.

A bat habitat assessment was completed during the site visit. It is acknowledged that typically these assessments are completed during leaf-off condition; however, given that the trees were scattered, the ecologists were able to review the totality of the tree to review for the potential of bat habitat. The three candidate bat snags were observed on the Subject Lands, all three associated with Manitoba Maples. One candidate snag was identified along the northern property boundary, while the other two were located on the eastern side of the watercourse corridor. The documentation of candidate snags will require engagement with MECP during the detailed design stage. The bat habitat assessment had already gathered the information required to engage the ministry, and engagement will be completed prior to any proposed snag removals. No additional bat surveys (e.g., acoustic) is warranted at this time.

Proposed Development Strategy

Overview

The Subject Lands are approximately 5.6 ha and are proposed to be developed for residential use. The development consists of the following proposed land uses:

- 205 townhouse units totaling 2.8 ha;
- 160 high density residential units totaling 0.26 ha;
- A 0.53 ha area of village square;
- 0.76 ha of channel and 0.19 ha of channel buffer;
- 0.88 ha designated to right of ways; and
- 0.21 ha of road widening associated with Derry Road.

Consistent with the SWS/SIS characterizations of the on-site stream, the development proposes to realign the portion of Centre Tributary running through the centre of the Subject Lands. Flows are planned to continue south within the realigned channel through a culvert under Derry Road. The watercourse corridor will tie into the existing realigned channels immediately upstream and downstream of the Subject Lands. The channel corridor will incorporate a 7.5 m wide buffer on either side of the watercourse, which will be planted with native plant materials. The watercourse corridor will form the Natural Heritage System (NHS) within the Subject Lands.

No new watercourse crossings are proposed.

Proposed Drainage Concept

As described in the Draft Functional Servicing Report (DSEL 2024), the Subject Lands currently predominantly drain to the existing channel. Under the proposed development, the Subject Lands will be serviced by a gravity storm sewer system designed to support the capture of the 100-year return frequency.

Storm flows for the western portion of the Subject Lands will be directed to two culverts under Derry Road and will eventually be captured in an offsite SWM pond with existing quality and quantity control measures. Storm flows for the eastern portion of the Subject Lands will be collected in a SWM tank and treated by a private Oil Grit Separator (OGS) before discharging to a new storm sewer. Drainage from Fourth Line will be conveyed to the realigned channel through a storm pipe while drainage from Derry Road will be conveyed directly to the channel through existing storm infrastructure. The village square and rear lots are proposed to drain directly into the realigned channel through overland flow as these inputs are considered clean.

Proposed SWM Concept

As outlined in the draft FSR (DSEL 2024), the proposed stormwater management plan for the Subject Lands involves treatment in an offsite SWM pond south of the Subject Lands (for drainage from the western half of the site) as well as one on-site storm tank in the southeast corner of the site (for drainage from the eastern half of the site). The SWM plan has been developed in accordance with the criteria outlined in the Sixteen Mile Creek Areas 2 & 7 SWS as follows:

- Water Quality Control
  - Sized in accordance with the SWMP Design Manual for enhanced water quality protection.
- Water Quantity Control
  - 25-year flood storage: 714 m^3/imp-ha cumulative;
  - 25-year discharge rate: 0.01 m^3/s/ha;
  - 100-year flood storage: 795 m^3/imp-ha cumulative; and
  - 100-year discharge rate: 0.034 m^3/s/ha.
- Erosion Control
  - 430 m^3/imp-ha extended detention storage and unit extended detention discharge rate of 0.0011 m^3/s/ha.

The prescribed enhanced water quality protection corresponds with the end-of-pipe storage volumes required for the long-term average removal of 80% of suspended solids, consistent with the Level 1 SWM standards prescribed in the SWS. In addition, the proposed design provides extended detention storage for erosion control and short-term storage for flood control, as specified in in the SWS.

Proposed Realigned Channel

As per the draft FSR, the proposed realigned channel consists of:

- A 60 m wide channel realignment including 43.0 m bottom width and 3:1 side slopes extending 8.5 m to each side of the bottom width; and
- 7.5 m buffers on each side of the realigned channel, with the western buffer containing a maximum of 2% slopes and a future trail, and the eastern buffer containing a maximum of 10% slopes.

This is consistent with the setbacks, land usage (i.e., trails permitted within buffers), slope requirements, and channel width prescribed in the SWS and SIS reports. This channel design would also provide an enhanced naturalized linkage along the watercourse compared to existing conditions, consistent with the Natural Heritage Systems recommendations from the SWS. The realigned channel will be planted with native plant materials and opportunities to locally source the plant materials will be reviewed during the detailed design and construction stages. This is further discussed below.

The channel will be designed by GEO Morphix. These parameters may be refined during the detailed design stage but will incorporate the natural channel design principles within the allotted channel design.

Other Considerations

<u>Water Balance</u>

As described in the draft FSR, a site-wide water balance will be completed at detailed design to assess the infiltration potential for both pre- and post-development conditions.

The proposed development will also consider the use of Low Impact Development measures (LIDs) to meet pre-development infiltration targets, including:

- Additional topsoil depth;
- Rooftop disconnect for both freehold detached and townhouse residential units; and
- Installation of pocket wetlands within the channel blocks.

The site-wide water balance and LID measures will assist the development in meeting the guidance provided in the SWS to maintain existing levels of infiltration on a regional scale.

Riparian Habitat

The proposed realigned channel will also incorporate plantings to create riparian habitat along the realigned channel. This will allow the development to address Natural Heritage Systems recommendations from the SWS and SIS, including:

- Improving and creating stream habitat within the realigned watercourse corridor to provide potential direct fish habitat (e.g., in wetland pools that may provide refuge);
- Reducing thermal impacts (i.e., through shading);
- Establishing habitat along streams to provide opportunities for wildlife;
- Contributing towards the target of 6% wetland /riparian cover within the subwatershed, and 15% natural cover in the Phase 1 / Bristol Survey planning district;
- Incorporating varied habitat types along the channel (both upland and wetland vegetation types will be considered along the channel); and
- Shaping floodplains to provide variable micro-topography and a range of habitat sizes.

These recommendations will be reviewed during the detailed design stage and incorporated into GEO Morphix's design, as appropriate and applicable.

Natural Channel Design

As described above, the SWS supported realignment of intermittent, "minor" streams as long as natural channel design principles are adopted. The realigned channel design prepared by GEO Morphix will be designed using the natural channel design principles, which will enhance the existing morphology of the reach and thus create additional in-stream habitat opportunities for benthos and fish communities. The incorporation of riffle habitats will increase oxygenation and provide spawning opportunities for a variety of fish, while the inclusion of pool habitats will create refuge and resting areas for fish. This will create a physical gain of in-stream habitats.

Mitigation measures will be instituted during construction to prevent harmful alteration, disruption or destruction (HADD) to fish and fish habitat. These mitigation measures will include in-stream mitigation (e.g., flow diversions and fish salvage) as well as adjacent mitigation (e.g., installation and monitoring of erosion and sediment control (ESC) measures, enactment of spill prevention measures). In alignment with the SWS and SIS requirements, realignment efforts will occur outside of the active warmwater fish window. These mitigation measures are further discussed below.

A Request for Review will be submitted to Fisheries and Oceans Canada (DFO) during the detailed design stage.

Recommendations

To ensure no negative impacts to the natural heritage features on and within 120 m of the Subject Lands, the following recommendations are provided:

Recommended mitigation measures

- Consistent with the recommendations of the SWS and SIS, an ESC plan should be prepared and implemented with associated mitigation measures to minimize the potential for negative impacts (i.e., silt fencing). ESC measures should be monitored throughout the construction period to ensure that they are functioning as designed. Where deficiencies are identified, ESC measures must be repaired immediately to prevent adverse impacts to receiving features;
- Construction equipment should be regularly maintained to prevent spills within and adjacent to the NHS. Preparation and implementation of a spill prevention and response plan to prevent or minimize the potential for spills of potentially toxic materials during construction. All spills (e.g., sediment, gasoline) must be reported to MECP's Spill Action Centre;
- SWM infrastructure should maintain or improve all relevant water quality criteria (e.g., TSS, temperature) and maintain site water balance (e.g., infiltration) consistent with what is recommended in the SIS and SWS;
- Tree removals should be completed outside of the migratory bird breeding period (generally April 15 to August 15) and outside of the bat active period (generally April 1 to September 30), where possible. All ESA requirements will be addressed for the three identified bat snags with MECP during the detailed design stage;
- In-water work will be completed outside of the spring spawning fisheries window identified in the SIS (April 1 to July 1), with a preference for work to be completed in the summer when the water levels within the watercourse are lower. The workplace will be isolated (e.g., a cofferdam with pump-around or diversion channel) and a fish and wildlife salvage will occur prior to realignment activities; and
- As recommended in the SIS, where the construction of the new channel and the existing channel overlap, temporary diversion and work-site isolation measures will be implemented to minimize in-water work requirements and ensure downstream flows are maintained at all times.

Recommended restoration measures to achieve no net loss

- Ensure no loss of length within the realigned watercourse channel;
- Incorporate new riffle-pool habitat within the realigned channel;
- Incorporate natural channel design principles to mimic natural aquatic habitats to provide a diverse range of dynamically stable habitat conditions to support potential direct and indirect habitat functions of the realigned watercourse (e.g., benthic invertebrate production, flow conveyance and sediment supply);
- Incorporate native vegetation within the realigned channel in accordance with Conservation Halton's Native Species List (2018). This will also be applied to the 7.5 m wide vegetated buffers. This will assist the development in meeting several of the objectives outlined in the SIS and SWS, including facilitating resilience under predicted urban conditions;
- Consider restoration targets and ecological succession when choosing plant materials;
- Where feasible, consider incorporating soil propagule banks and seed banks into habitat creation, excluding areas where invasive species are present; and

- Incorporate input from a qualified ecologist into the proposed realigned channel design to ensure the channel adequately addresses the natural heritage-related recommendations provided in the SWS and SIS.

Recommended monitoring measures

- Monitoring should occur in accordance with Table 8.6 of the SWS.

Next Steps

The following next steps should be taken as part of this development application:

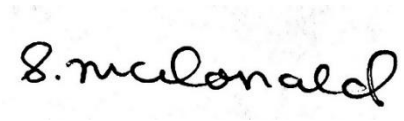
- Since the preparation of the SWS and SIS reports, the Fisheries Act has been updated (DFO, 1985, last amended 2019). As a result, a DFO Request for Review will be required as part of the proposed channel realignment to ensure no HADD. This will be completed prior to any channel works;
- On the Subject Lands, Conservation Halton's (CH's) regulated area includes watercourses and natural hazards (such as floodplains and meander belts). As such, permits from CH will be obtained prior to any work associated with the on-site watercourse; and
- As previously stated, the three bat snags on the Subject Lands will require engagement with MECP through completion of an Information Gathering Form (IGF). This will be completed prior to any snag removal.

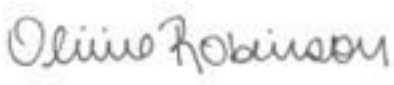
Conclusions

We trust that this memo adequately documents how the 9755-9875 Derry Road, Milton (DeMarchi) proposal is in compliance with the information and recommendations provided in the Sixteen Mile Creek Subwatershed Study Areas 2 & 7 and Centre Tributary SIS. If you have any questions, please contact the undersigned.

Sincerely,

GEI Consultants Canada Ltd.





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