Terrestrial Ecosystems

- Existing Conditions
  - 12 Designated Natural Areas
  - 13 Species at Risk
  - 18 Species of Conservation Concern.
- Key Works and Activities
  - Vegetation removal: ~133 ha
    - Provincially Significant Wetlands: ~42.75 ha
    - Unevaluated wetlands: ~2.33 ha
  - Disturbance or displacement of Species of Conservation Concern and Species at Risk.
- Mitigation Strategies
  - Design refinements (e.g. restrict clearing of trees, minimize impact by following edges of habitat areas)
  - Ecological restoration and landscaping plans
  - Wildlife crossings (proposed between 2nd Concession Road and Leslie Street) as well as opportunity areas at the Holland River and Holland River East Branch
  - Edge management recommendations
  - Potential exclusionary fence.

- Next Steps
  - Preliminary Terrestrial Ecosystems Impact Assessment Report
  - Documentation in the EIAR
  - Detail Design Impact Assessment
  - Species specific surveys, as required
  - Potential approvals: Migratory Birds Convention Act and Endangered Species Act.

Example of a wildlife crossing (under the freeway)

Holland River East Branch Within the Bradford Bypass Study Area. AECOM, 2020

Holland Marsh and Lake Simcoe Watershed

- Holland Marsh Provincially Significant Wetland
  - The Bradford Bypass will cross the Holland Marsh:
    - Holland River
    - Holland River East Branch.
  - Anticipated impacts of approximately 42.14 ha (amounting to approximately 1% of the entire Provincially Significant Wetland)*.

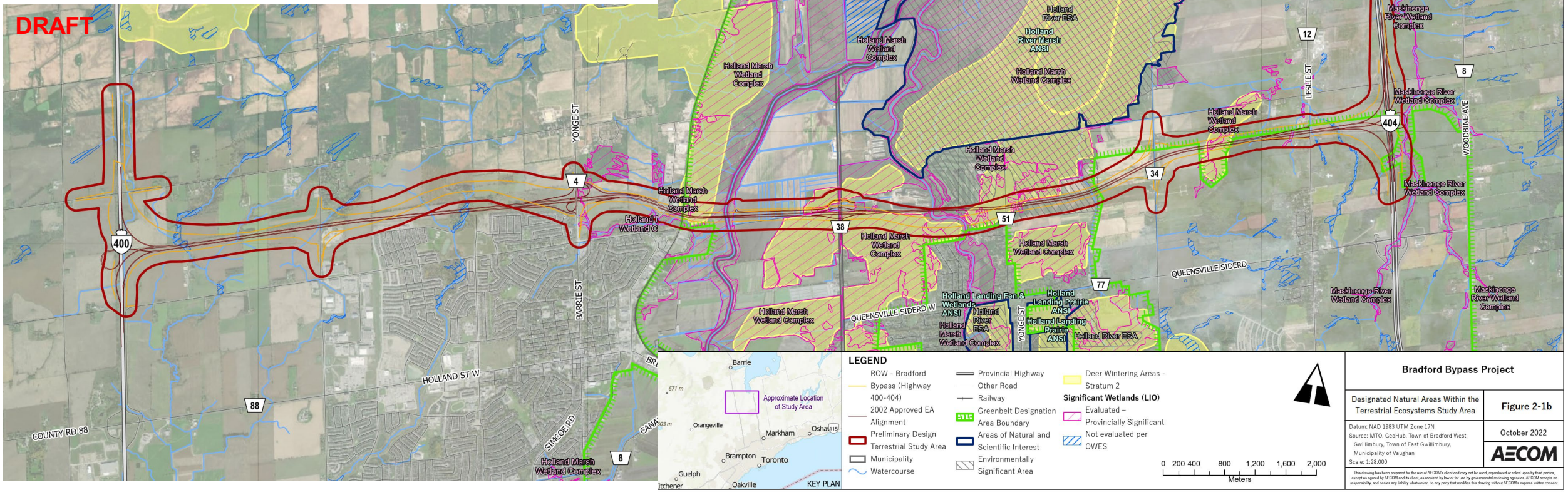
*The anticipated wetland impacts have been reviewed with a conservative approach and will be refined during Preliminary Design. Additional wetland enhancements, such as invasive species removal, native plantings around wetland edges will be considered where feasible.

- Maskinonge Provincially Significant Wetland
  - Anticipated impacts of approximately 0.61 ha (amounting to approximately 0.15% of the entire Provincially Significant Wetland).

- Lake Simcoe Watershed
  - The Bradford Bypass is located within the Lake Simcoe Region Conservation Authority regulation limits, south of Lake Simcoe
  - The Ministry will assess impacts with respect to the Lake Simcoe Protection Act and the Lake Simcoe Protection Plan
  - Precautions taken to prevent salt and treated sand from entering watercourses and salt-sensitive areas will be in accordance with the Ministry of Environment, Conservation and Parks “Guidelines on Snow Disposal and De-icing Operations in Ontario”.

Holland Marsh Within the Bradford Bypass Study Area. AECOM, 2020

Designated Natural Areas



Fish and Fish Habitat

- Existing Conditions
  - 34 crossings within Study Area
  - Sensitive Species or habitat
    - Muskellunge spawning habitat
    - American Eel (potentially present).
- Key Works and Activities
  - In-water Works include:
    - Modification of existing crossings
    - New crossings
    - Channel modifications.
  - Land-based activities include:
    - Vegetation removal.

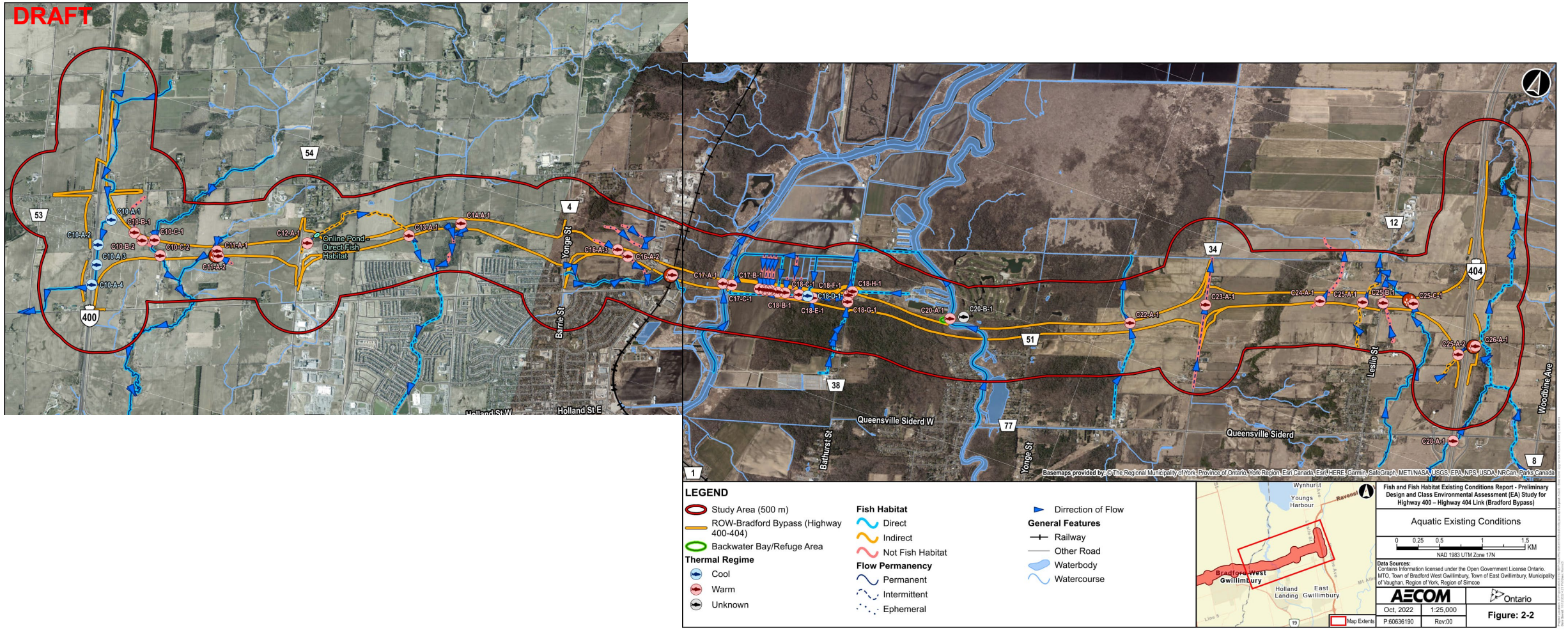
Examples of fisheries mitigation strategies. AECOM, 2022

Holland River Within the Bradford Bypass Study Area. AECOM, 2020

Downstream (east) from the proposed Bradford Bypass right of way. AECOM, 2022

- Mitigation Strategies
  - Culvert and bridge designs (e.g., fish friendly design, embedded culverts, open bottom culverts)
  - Natural channel designs (e.g., morphology pools, runs, riffles, substrates)
  - Landscaping and restoration (e.g., riparian plantings).
- Next Steps
  - Preliminary Fish and Fish Habitat Impact Assessment Report
    - Ministry Routine Works
    - Ministry Best Management Practices
    - Site Specific Assessment and Mitigation Measures.
  - Documentation in the EIAR
  - Detail Design Impact Assessment
  - Potential approvals: Fisheries Act and Endangered Species Act.

Fish and Fish Habitat

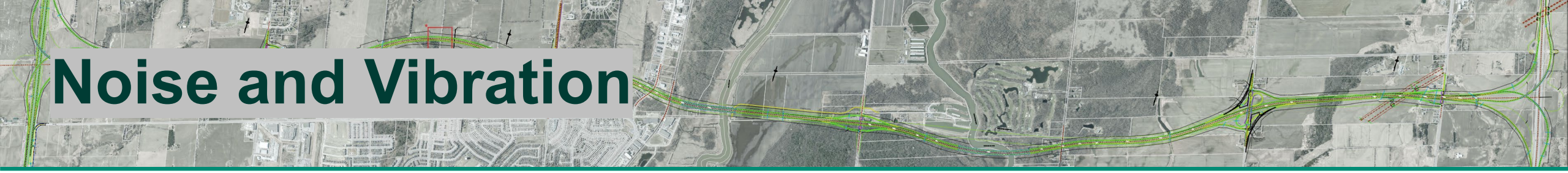


Fluvial Geomorphology

- Existing Conditions
  - Holland River
  - Holland River East Branch
  - Additional 26 ephemeral and 17 permanent/intermittent features.
- Key Works and Activities
  - In-water Works include:
    - Modification of existing crossings
    - New crossings
    - Channel modifications
    - Grading.
- Mitigation Strategies
  - Design of bridges and culverts
    - Avoid or minimize alterations to current watercourses.
  - Natural channel designs
  - Erosion and scour protection.
- Next Steps
  - Preliminary Fluvial Geomorphological Assessment Report
  - Documentation in the EIAR
  - Refinement of the fluvial assessment and development of drawings
  - Potential approvals: Fisheries Act and Endangered Species Act.

Groundwater and Hydrogeology

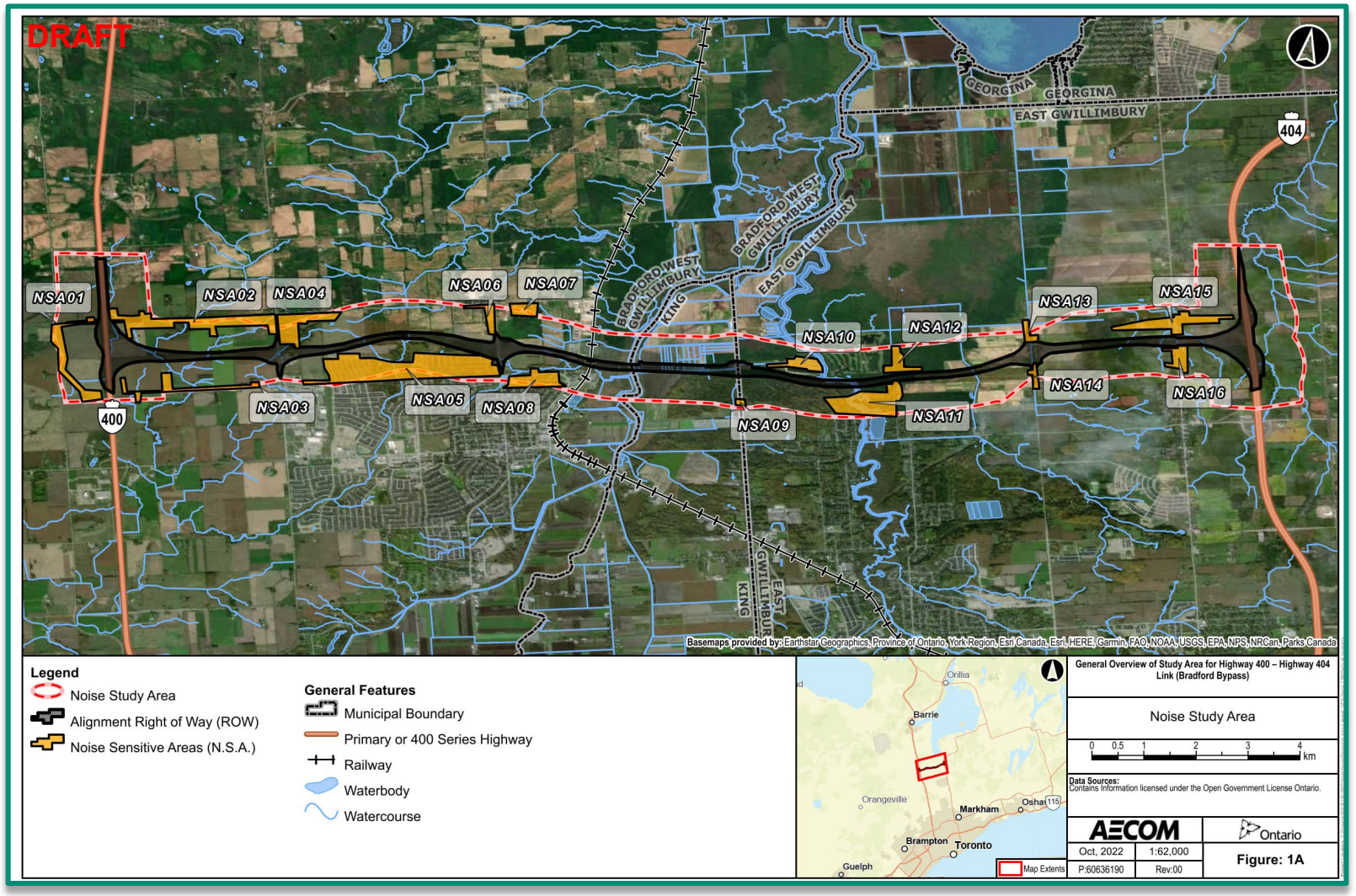
- Existing Conditions
  - Three physiographic regions
  - Soil combinations of clay, silt and sand
  - 413 MECP Water Wells
  - Wellhead Protection Areas
  - Highly Vulnerable Aquifers
  - Intake Protection Zones
  - Significant Groundwater Recharge Areas.
- Key Works and Activities
  - Drilling and excavation
    - Subsurface construction activities.
  - Dewatering.
- Mitigation Strategies
  - Design refinements for cut profile adjustments
  - Domestic water wells (shallow and deep) monitored during construction
    - Water quality and quantity testing
    - Water level monitoring.
  - General groundwater monitoring
  - Source water protection.
- Next Steps
  - Groundwater Protection and Well Monitoring Plan
  - Documentation in the EIAR
  - Potential approvals: dewatering permits and discharge approvals
  - Construction: updated Groundwater and Well Monitoring Plans and best management practices.

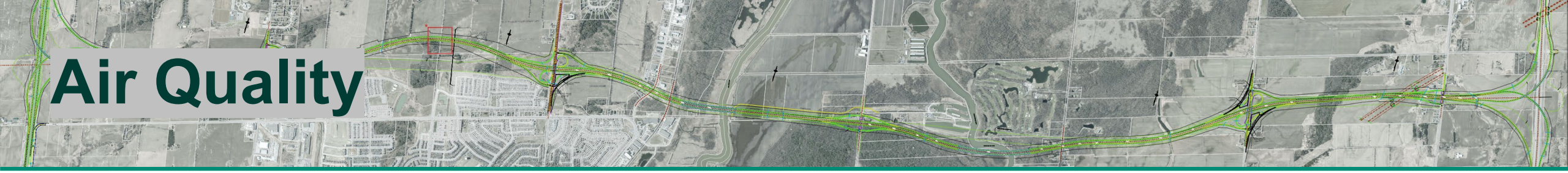


Noise and Vibration

- Existing Conditions
  - 16 Noise Sensitive Areas
    - Detached Dwellings and Residential Neighbourhoods
    - Schools and Recreational Areas
- Key Works and Activities
  - Assessment of traffic noise
  - Assessment of construction activities noise.
- Mitigation Strategies
  - Preliminary results indicate that noise mitigation may not be required
  - Mitigation strategies will be further assessed as more information is gathered
  - Existing developer built noise barriers are present
  - Construction:
    - Timing constraints
    - Equipment management and staging
    - Construction management plans.
- Next Steps
  - Noise and Vibration Impact Assessment Report
  - Documentation in the EIAR.

Noise Receptor Locations





Air Quality

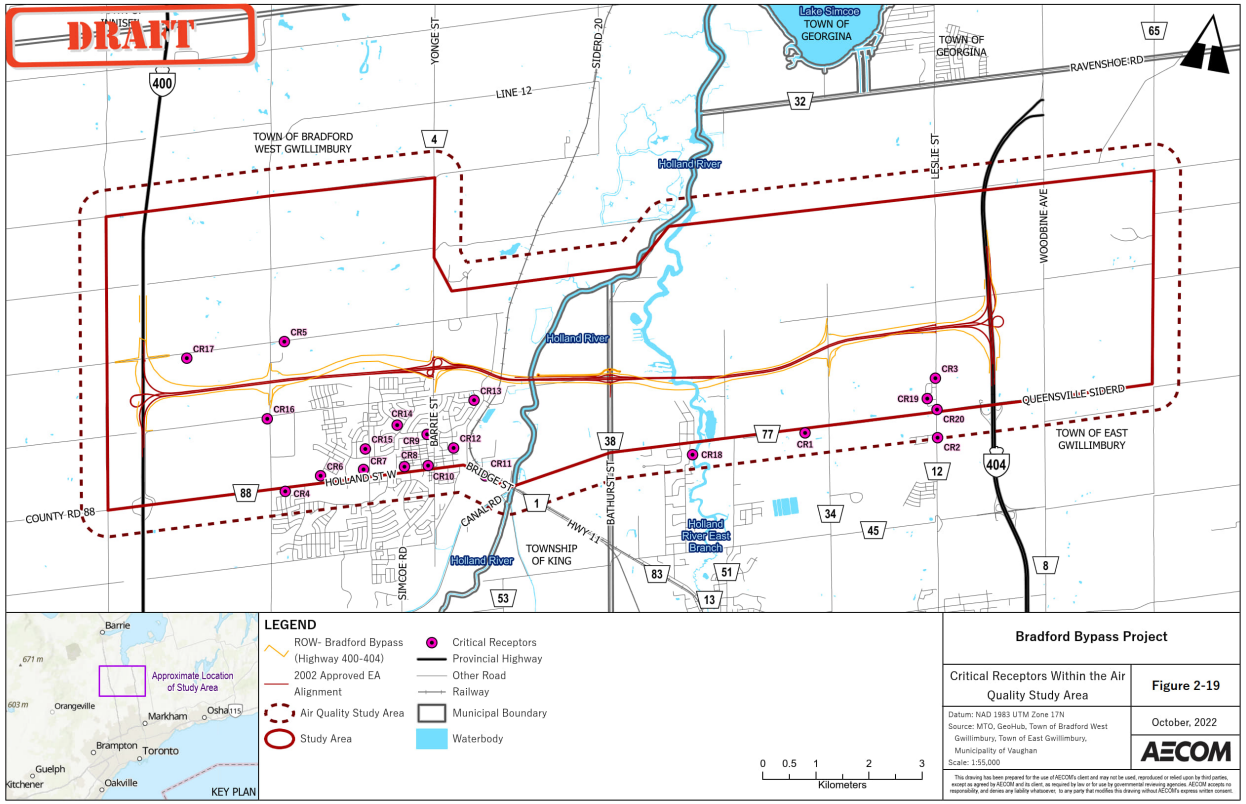
- Existing Conditions
  - 160 Sensitive Receptors
  - 20 Critical Receptors
  - Findings indicate existing exceedances at:
    - County Road 4 (Yonge Street)
    - Highway 400 and 9th Line
    - 10th Sideroad.

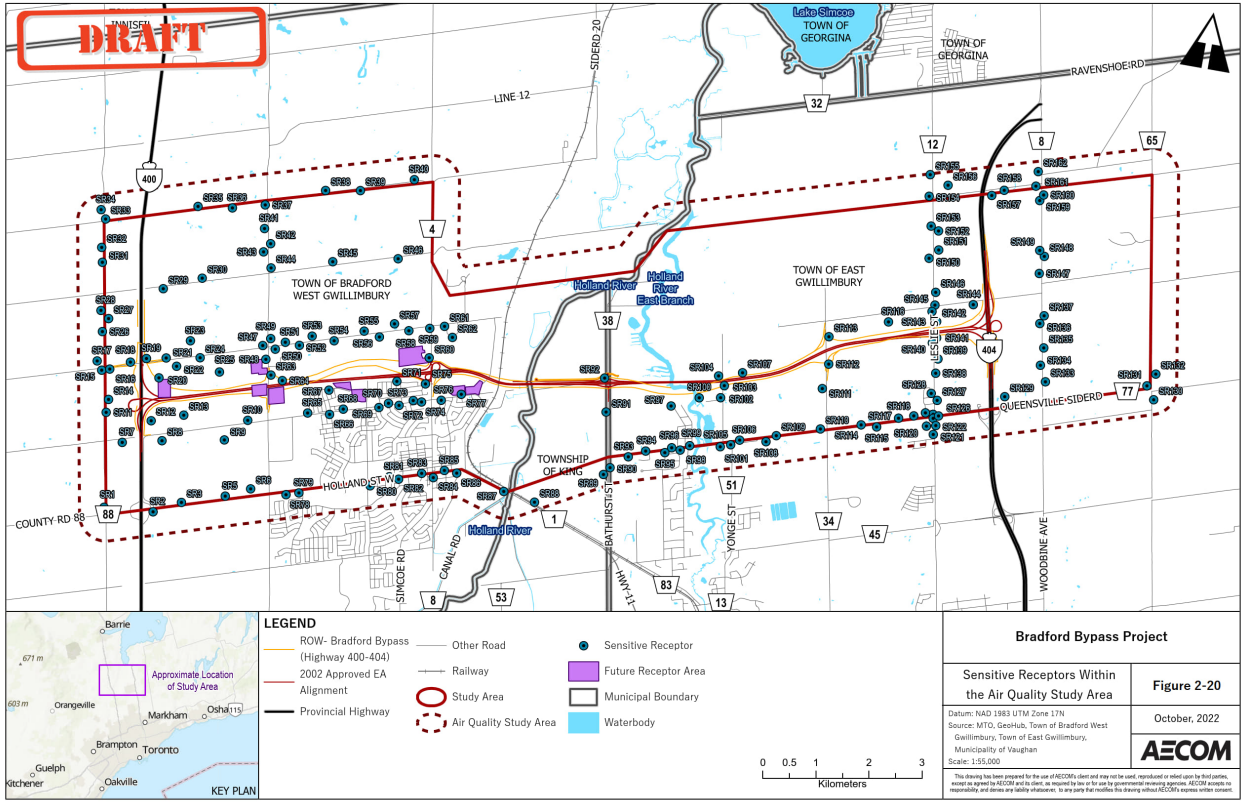
The exceedances are anticipated to be reduced over time with project implementation due to vehicle technology improvements.

- Key Works and Activities
  - Temporary dust as a result of construction
  - Highway traffic emissions.

- Mitigation Strategies
  - Vegetation plantings or other types of screening/barriers may be considered within the Study Area to decrease ground level dispersion of particulates
  - Construction:
    - Minimize idling time for construction equipment
    - Dust suppressants (i.e., water truck spraying)
    - Maintenance and operation of equipment in accordance with manufacturer's specifications
  - Operations:
    - The implementation of High Occupancy Vehicle lanes promotes the use of carpooling and reduces congestion and traffic on the road.
  - Air Quality Impact Assessment Report
  - Climate Change Assessment Report
  - Documentation in the EIAR
  - Detail Design: refinement of air quality and climate change mitigation measures.

Air Quality Critical and Sensitive Receptors





Sensitive receptors are defined as “residential dwellings” and critical receptors are defined as “retirement homes, hospitals, childcare centres, schools and similar institutional buildings” within the Ministry’s Air Quality Guide.

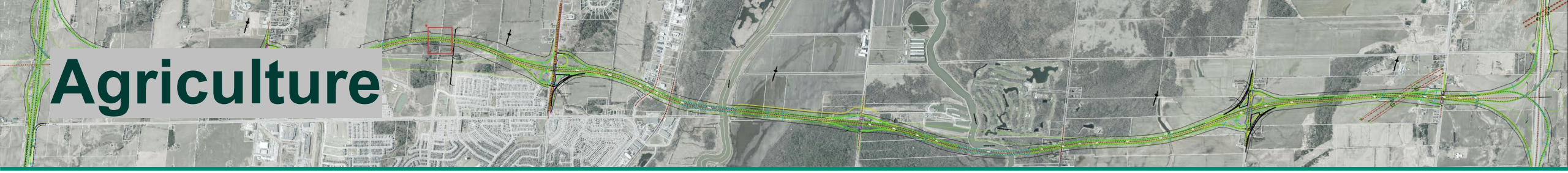
Human Health

- The Project Team will study the potential impacts (positive and negative) on human health, such as air quality, noise, land use, traffic congestion and safety, economic, social cohesion, and neighbourhood resources
- Strategies will be recommended to mitigate negative impacts and enhance positive outcomes of the project
- Findings from these studies will be consolidated in a report detailing the impacts of the project on human health.

Land Use

- Existing Conditions
  - Land Uses within the Study Area:
    - Industrial, Commercial, Agricultural, Residential, Employment Area, Open Space, Natural Heritage System and Environmental Protection Area, and Recreation Area.

- Key Works and Activities
  - Property acquisition.
- Mitigation Strategies
  - Design refinements
  - Corridor control and property access
  - Considerations for noise, lighting and landscape components
  - Considerations for environmentally sensitive areas
  - Ongoing consultation and feedback.
- Next Steps
  - Preliminary Land Use Factors Report
  - Documentation in the EIAR
  - Ongoing consultation.



Agriculture

- Existing Conditions
  - Prime Agricultural Lands, Specialty Crop lands, Candidate Prime Agricultural Areas
  - Agricultural Land Capability:
    - 39.1% Class 1
    - 14.3% Class 2
    - 13.5% Class 3
    - 17% Class 4
    - 3.3% Class 5.
- Key Works and Activities
  - Vegetation clearing and removals.
- Mitigation Strategies
  - Where possible, avoid and/or minimize impacts to agricultural lands, features and operations.
- Next Steps
  - Agricultural Impact Assessment Report
  - Documentation in the EIAR.

The trade-off of farmland loss is enhanced access to markets (e.g., 10th Concession Road or 2nd Concession Road)

Preliminary Landscape Composition Plan

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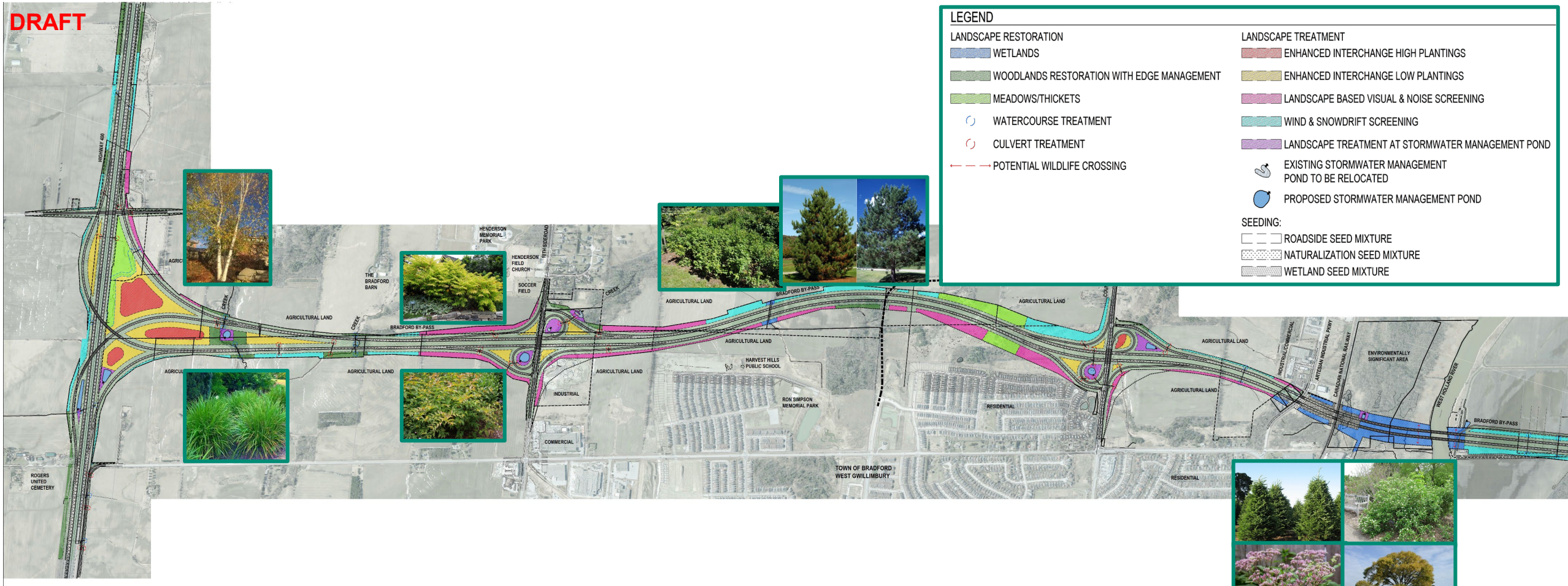

LEGEND

LANDSCAPE RESTORATION
- WETLANDS
- WOODLANDS RESTORATION WITH EDGE MANAGEMENT
- MEADOWS/THICKETS
- WATERCOURSE TREATMENT
- CULVERT TREATMENT
- POTENTIAL WILDLIFE CROSSING

LANDSCAPE TREATMENT
- ENHANCED INTERCHANGE HIGH PLANTINGS
- ENHANCED INTERCHANGE LOW PLANTINGS
- LANDSCAPE BASED VISUAL & NOISE SCREENING
- WIND & SNOWDRIFT SCREENING
- LANDSCAPE TREATMENT AT STORMWATER MANAGEMENT POND
- EXISTING STORMWATER MANAGEMENT POND TO BE RELOCATED
- PROPOSED STORMWATER MANAGEMENT POND

SEEDING:
- ROADSIDE SEED MIXTURE
- NATURALIZATION SEED MIXTURE
- WETLAND SEED MIXTURE

Preliminary Landscape Composition Plan

LEGEND

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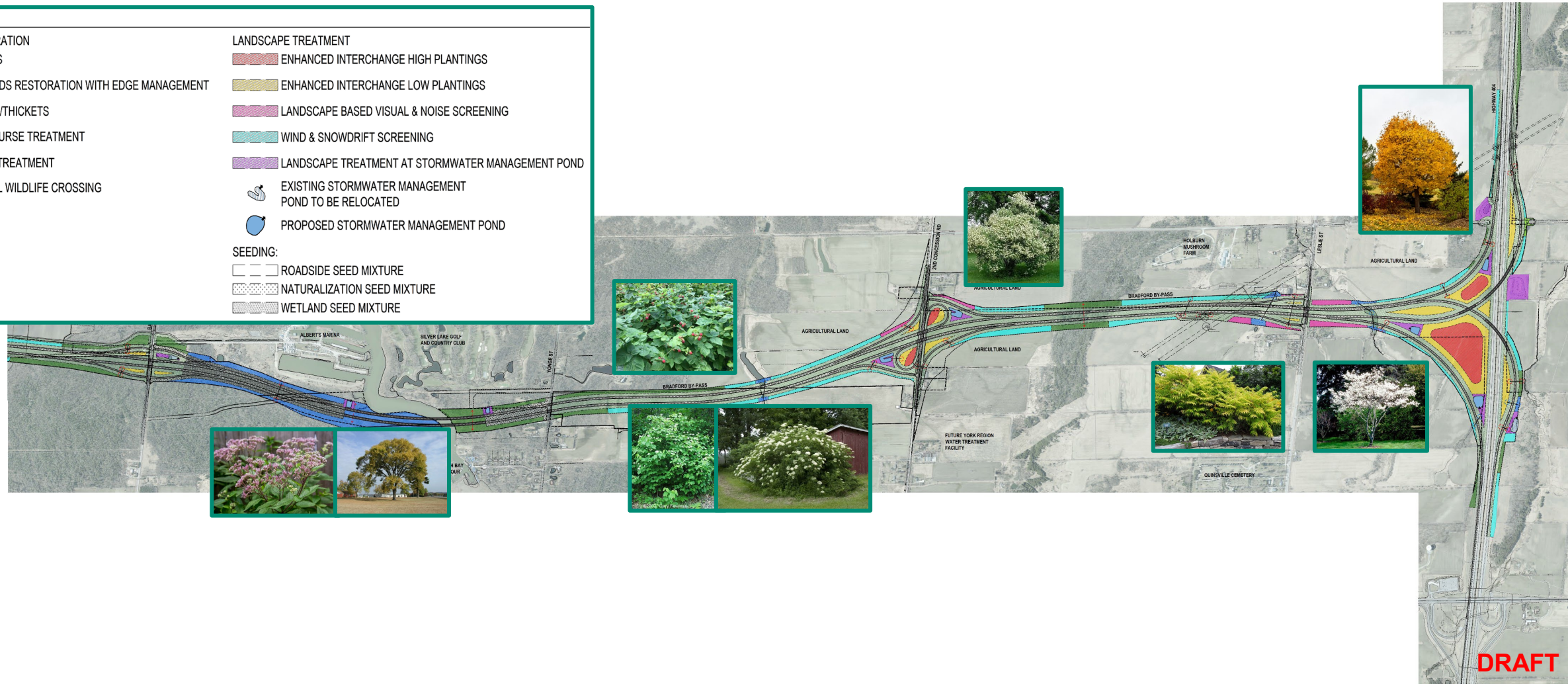

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Snowdrift Assessment

- Snowdrift is the movement of snow across a road surface or near the ground
- The snowdrift assessment identified several areas with potential for snowdrift
- A model was developed that included climate data, land cover data and terrain data to identify potential snowdrift areas and develop snowdrift mitigation measures
- The risks associated with snowdrift can be mitigated through:
  - Living fences (trees)
  - Shrubs in locations with potential for snowdrift
  - Snowdrift signage.

Locations of Snow Mitigation for 2m Shrubs (4DM, 2022)

Examples of Coniferous Tree Snow fence and Signage (4DM, 2022)

Waste and Contamination

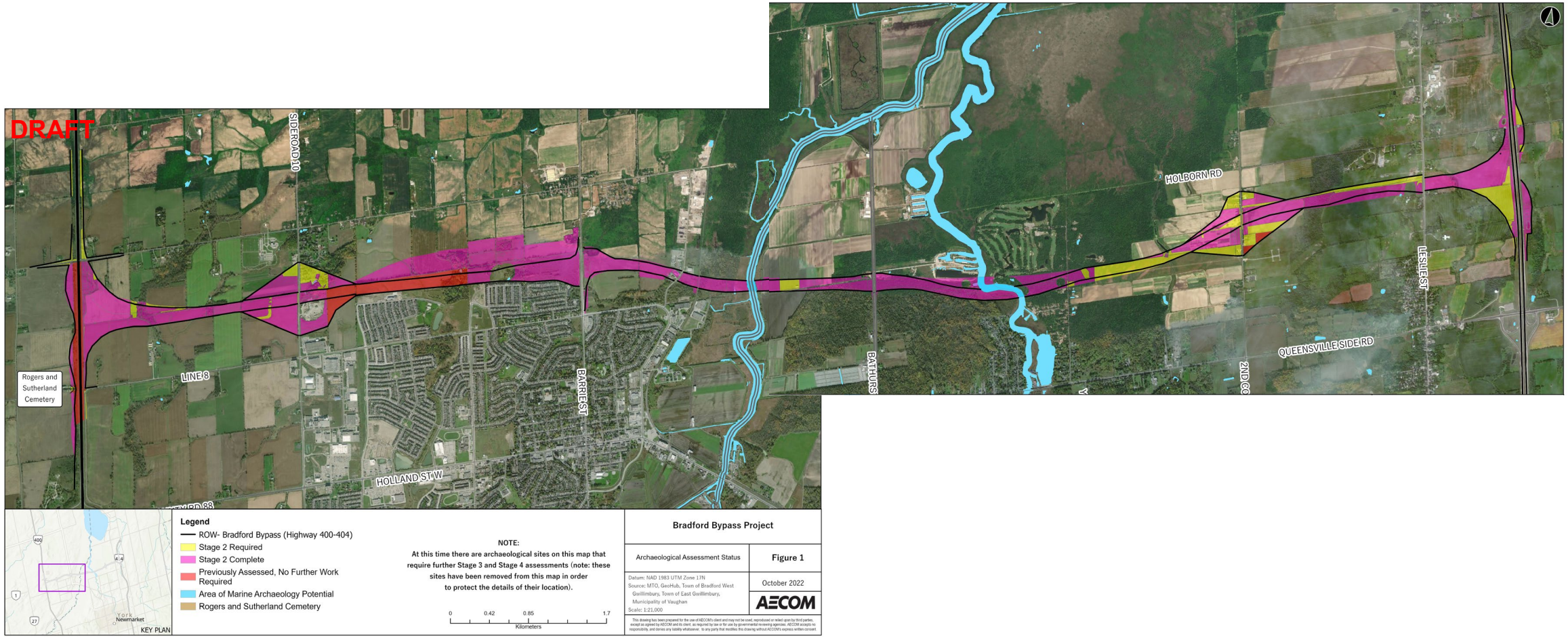
- Existing Conditions
  - 29 high potential properties
  - 14 medium potential properties
  - Six high potential significant spill locations.
- Key Works and Activities
  - Cut and fill
  - Excavation activities
  - Grading
  - Dewatering.
- Mitigation Strategies
  - Compliance with O.Reg 406/19
  - Encroachment avoidance of medium/high risk areas
  - Design refinements.
- Next Steps
  - Documentation of findings in the EIAR.

Cultural Heritage Assessment

- Existing Conditions
  - Initial research has identified 17 properties with potential cultural heritage value. These properties are currently being assessed to determine existing cultural heritage conditions within the Study Area.
- Key Works and Activities
  - Construction activities
  - Road alignment design which may have the potential to impact built heritage resources and cultural heritage landscapes.
- Mitigation Strategies
  - Cultural Heritage mitigation will be determined through Heritage Impact Assessment(s).
- Next Steps
  - Documentation in the Environmental Impact Assessment Report
  - Heritage Impact Assessments to be completed, as required.

Photos of a Potential Heritage Property within the Study Area (AECOM, 2022)

Archaeological Assessments

- AECOM conducted a Stage 1 Archaeological Assessment in 2019 for the overall study corridor (23 km^2 in size) in order to determine the presence/absence of archaeological potential
- Stage 2 and 3 Archaeological Assessments are ongoing in accordance with the Ministry of Citizenship and Multiculturalism Standards and Guidelines for Consultant Archaeologists and with engagement with Indigenous Nations
- The Project Team is working to avoid/mitigate impacts to sites that demonstrate more intensive occupations (e.g., Bradford Hill Site, East Holland River Site (partial)).

Status of Stage 2 Archaeological Assessments