

City of London

**Environmental Impact Study: Arva Pumping
Station to Huron Street Water Transmission
Main Municipal Class Environmental
Assessment Master Plan
London, Ontario**

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Executive Summary

On behalf of the City of London (the City), AECOM Canada Ltd. completed a Municipal Class Environmental Assessment (MCEA) Master Plan (AECOM 2021a) study to develop short and long-term maintenance and improvement/expansion plans for the Arva Pumping Station to the Huron Street Water Transmission Main (hereafter referred to as the Project). A Natural Heritage Summary Report (NHSR; 2021b) completed by AECOM identified natural heritage features and their significance within the vicinity of the water transmission easement using background information and supplemental field investigations. The results of the NHSR (AECOM 2021b) guided the assessment of alternatives and recommendations outlined in the Master Plan (AECOM 2021a).

The Study Area includes approximately 8 km of water transmission main which extends from the Arva Reservoir and Pump Station to Huron Street plus an additional 120 m (on either side of the transmission main) area of investigation. Land use within the Study Area consists largely of agricultural land, residential communities, a golf course and natural heritage features including Medway Creek, Arva Moraine Wetland Complex Provincially Significant Wetland (PSW), North Branch Park (contains woodlands and unevaluated wetlands), Huron Street Woods (contains a Significant Woodland), and Gibbons Wetland Environmentally Significant Area (ESA).

Proposed repairs and maintenance activities associated with the preferred short-term strategy (to maintain the existing easement) are anticipated to occur within the next 5 years and therefore require an EIS in accordance with the environmental policies of the London Plan (2016). The following EIS has therefore been prepared, consistent with relevant legislation, policies and regulations including the Provincial Policy Statement (PPS; 2020), the Natural Heritage Reference Manual (NHRM; 2010), and the City of London's Environmental Management Guidelines (2007).

The regular inspection and maintenance of the transmission main and its associated chambers, valves and associated appurtenances are essential components of transmission main management. Regular clearing of access routes and the interior clearing of accumulated debris associated with these components can improve response times during a failure. Routine inspection and maintenance of the transmission main and its components are proactive measures to ensure peak performance.

Potential impacts as a result of proposed repair and maintenance activities include short-term indirect and direct impacts such as minimal and localized removal of vegetation (e.g., trees, shrubs, etc.), potential erosion and sedimentation, damage to adjacent vegetation (i.e., trampling or limb/truck damage) during construction and potential encounters with local wildlife including Species at Risk. Overall, impacts associated with the repairs and maintenance of the existing transmission main are localized within the existing easement and can be largely mitigated through the implementation of appropriate construction mitigation and environmental management recommendations. Mitigation measures recommended to reduce/eliminate potential impacts to natural heritage features and their functions include pre-clearance surveys, erosion and sedimentation control measures, creation and implementation of a Construction Mitigation and Monitoring Plan including the Invasive Species Management Plan and Species at Risk and Wildlife Handling Protocol.

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1. Introduction

On behalf of the City of London (the City), AECOM Canada Ltd. completed a Municipal Class Environmental Assessment (MCEA) Master Plan (AECOM 2021a) study to develop short and long-term maintenance and improvement/expansion plans for the Arva Pumping Station to the Huron Street Water Transmission Main (hereafter referred to as the Project). A Natural Heritage Summary Report (NHSR; 2021b) completed by AECOM identified natural heritage features and their significance within the vicinity of the water transmission easement using background information and supplemental field investigations. The results of the NHSR (AECOM 2021b) guided the assessment of alternatives and recommendations outlined in the Master Plan (AECOM 2021a).

In order to properly manage the existing transmission mains and continue to deliver water supply to its current and future users, the City requires access to transmission mains for ongoing monitoring, maintenance, repairs and to expand the service as needed. Due to the relatively long life remaining for the existing transmission main, the Project was separated into short-term and long-term alternatives. A review of the existing transmission main condition and easements, as well as the City's ability to access the transmission main for maintenance and repair over the next 10 to 15 years formed the basis of the short-term solutions. Recommendations outlined within the Master Plan (AECOM 2021a) include the completion of Environmental Impact Study (EIS) to identify potential negative impacts to natural heritage features as a result of proposed short and long-term activities. As the proposed long-term works are not anticipated to commence for another 15-20 years, the Master Plan (AECOM 2021a) recommended completing an EIS at the detailed design stage to avoid significant rework of inventory studies; as outlined within the City of London's EIS guidelines (2007), additional inventory studies are required after 4 years of the initial surveys to confirm existing conditions.

Proposed repair and maintenance activities associated with the short-term strategy are anticipated within the next 5 years and therefore require an EIS in accordance with the environmental policies of the *London Plan* (2016). The following EIS provides a high-level summary of the existing conditions within the vicinity of the short-term strategy, identifies potential negative impacts, provides a summary of mitigation measures and should be read in conjunction with the NHSR (AECOM 2021b). This EIS is consistent with the Provincial Policy Statement (PPS; 2020), the Natural Heritage Reference Manual (NHRM; 2010), City of London's Environmental Management Guidelines (2007) and other relevant legislation, policies and regulations.

1.1 Study Area and Surrounding Land Use

The Study Area includes approximately 8 km of water transmission main which extends from the Arva Reservoir and Pump Station to Huron Street plus an additional 120 m (on either side of the transmission main) area of investigation which allowed for the identification of Adjacent Lands as defined by the Natural Heritage Reference Manual (MNRF2005) (see **Figure 1**).

Land use within the Study Area is comprised primarily of agricultural lands, residential development, commercial development and green space. Existing natural heritage features, as identified on Map 5 (Natural Heritage) and Map 6 (Hazards and Natural Resources) of the London Plan (2016) include the following:

- Thames River North Branch
- Medway Creek
- Arva Moraine Wetland Complex Provincially Significant Wetland (PSW)
- North Branch Park (contains woodland and unevaluated wetlands)

Huron Street Woods (contains a Significant Woodland).
Significant Valleylands;
Gibbons Wetland Environmentally Significant Area;
Significant Groundwater Recharge Areas; and
Highly Vulnerable Aquifers.

Additionally, portions of the Study Area fall within Maximum Hazard Limits and Conservation Authority Regulation Limits. Map 1, 5 and 6 of the London Plan (2016) are provided in Appendix B of the NHSR (AECOM 2021).

North of Sunningdale Road, a portion of the Study Area is located outside of the City of London and is under the jurisdiction of Middlesex County. The Middlesex County Official Plan (Middlesex 1997) identifies Significant Woodlands within the Study Area. The Middlesex Natural Heritage Systems Study (Middlesex 2014) identifies the following features within the Subject Lands:

Significant Valley System;
Vegetation patch within 30 m of a watercourse;
Wetlands;
Woodlands \geq 4 ha; and
Meadow patch connected to a woodland \geq 4 ha

1.2 EIS Scoping

An EIS Scoping meeting was held with the City of London's Ecologist and Water Engineering Division, the Environmental and Ecological Planning Advisory Committee (EEPAC), the County of Middlesex County Engineer, the Middlesex Centre Director of Public Works and Engineering, the Upper Thames River Conservation Authority (UTRCA), and AECOM on June 30, 2020. An EIS Scoping Letter and a draft Issues Summary Checklist were prepared by AECOM in advance of the meeting. The Issues Summary Checklist was reviewed and amended during the meeting. The EIS Scoping Letter, the finalized EIS Issues Summary Checklist, and the minutes of the meeting are provided in Appendix B of the NHSR (2021b).

2. Legislative Requirements

The proposed works require the consideration of federal, provincial, regional and local policies and legislation. Applicable policies and legislation relevant to the Study Area are listed in **Table 1** below.

Table 1. Summary of Relevant Legislation, Policies & Guidelines.

Level of Governance	Legislation	Policies/Regulations	Guidelines	Applicability to the Project
Federal	Fisheries Act, amended 2019.	Fish Protection Policy Statement	N/A	The Fisheries Act was amended in 2012 and focuses on protecting 'serious harm to fish', which is described as the death of fish or any permanent alteration to, or destruction of fish habitat. Fish habitat was identified within the open aquatic ponds and wetlands within the Study Area.
	Species at Risk Act (SARA), amended 2020	Regulations respecting categories of Species at Risk (SAR)	N/A	The SARA provides for the recovery of wildlife species that are extirpated, endangered, or threatened federally. The SARA applies to federally listed aquatic SAR.
	Migratory Bird Convention Act (1994)	Regulations Respecting the Protection of Migratory Birds	N/A	The Migratory Bird Convention Act affords protection to Bird listed under Article 1 of the Migratory Birds Convention.
Provincial	Planning Act (1990)	Provincial Policy Statement (PPS; 2020)	Natural Heritage Reference Manual (2010) Significant Wildlife Habitat Technical Guide (OMNR 2000) Ecoregion Criterion Schedule 7E (2015)	The PPS, NHRM and Ecoregion Criterion Schedules outline protection of natural heritage features within Ontario including Significant Wetlands, Significant Woodlands and Significant Wildlife Habitat.
	Conservation Authorities Act (1990)	Ontario Regulation 157/06	Upper Thames River Conservation Authority Policies for the Development, Interference, with Wetlands and Alterations to Shorelines and Water Courses Regulation.	The Study Area falls within the UTRCA regulation limits. As such, any proposed activities will require review and input from the UTRCA.

Level of Governance	Legislation	Policies/Regulations	Guidelines	Applicability to the Project
			Environmental Planning Policy Manual for the Upper Thames River Conservation Authority (June 28, 2006).	
	Fish and Wildlife Act (1997)	N/A	N/A	The Fish and Wildlife Act affords protection for some species of birds, amphibians, reptiles and mammals in Ontario.
	Endangered Species Act (ESA; 2007)	Ontario Regulation 242/08 Ontario Regulation 230/08	N/A	The ESA and its associated regulations list Species at Risk within Ontario and afford species listed as Threatened or Endangered protection, as well as their habitat.
Municipal	The London Plan (2016)	Environmental Policies	Environmental Management Guidelines (2007) London Invasive Plant Management Strategy (2017)	The City of London's Official Plan (The London Plan) outlines the requirement for an EIS should lands within or adjacent to proposed activities be evaluated as a component of the City of London's Natural Heritage System. The guidelines for the completion of an EIS are articulated in the City's Environmental Management Guidelines (EMG) dated January 2007.
	Middlesex County Official Plan (1997)	N/A	N/A	The Official Plan guides the County in land use policy and physical planning on a broad basis. It establishes a policy framework that provides guidance to local municipalities in the preparation of local official plans and zoning by laws.
	City of London Tree Protection By-law (2016)	N/A	Tree Planting and Protection Guidelines (2015)	The City of London's Tree Protection by-law outlines the requirements for a tree removal permit within the City of London. Note: the City of London is exempt from this By-law.

3. Existing Natural Heritage Summary

The NHR (2021b) completed by AECOM for the Project provides the basis for recommendations regarding environmental protection of natural heritage features and their functions within the Study Area. The following provides a summary of the report's findings and recommendations as they relate to the Study Area for the short-term strategy as described in **Section 1** above.

1. Aquatic features within the Study Area include the North Thames River, a tributary to the North Thames River, Masonville Creek, Medway Creek and unnamed Municipal Drain 1. Aquatic features within the Study Area are described in detail in Section 3.1 of the NHR (AECOM 2021b) and are indicated on **Figure 2**.
2. Multiple vegetation community types were identified within the Study Area during ELC assessments. These include cultural meadows, cultural woodlands, shallow and meadow marshes, swamp thickets, deciduous swamps as well as deciduous forests and cultural plantations. Vegetation communities identified through a review of background information and field investigations are described in detail in Section 3.2.2 of the NHR (AECOM 2021b) and are delineated on **Figure 2**.
3. The Arva Moraine Wetland Complex Provincially Significant Wetland (PSW) is a large wetland complex in north London that is distributed across a wide area bordered by Richmond Street, Medway Road, Highbury Avenue and Fanshawe Park Road. Portions of the wetland complex are present within the Study Area (see **Figure 2**). Unevaluated wetlands were also identified within North Branch Park north of the Thames River (North Branch) and are further described in Section 3.2.2 of the NHR (AECOM 2021b).
4. The Gibbons Wetland Environmentally Significant Area (ESA) is present within the Study Area (see **Figure 2**) and is located east of Richmond Street and north of Fanshawe Park Road East. Portions of the Arva Moraine Wetland Complex are present within the Gibbons Wetland ESA.
5. Significant Valleylands are present within the Study Area and are associated with Medway Creek, and the Thames River (North Branch). A portion of the Arva Moraine Wetland Complex PSW is also classified as Significant Valleylands.
6. Significant Woodlands (located in Huron Street Woods Park) are present within the Study Area south of the Thames River (North Branch). Woodlands were also identified along both shorelines of the Thames River (North Branch) (portions of North Branch Park and Huron Street Woods). The Richmond Street Significant Woodland was also evaluated as significant (AECOM 2016).
7. Species at Risk (SAR) (Appendix F of the NHR) confirmed within the Study Area include the following:
 - a. Butternut (*Juglans cinerea*) has been previously reported within the Gibbons Wetland ESA (NRSI 2013). This species may also occur in other wooded communities within the Study Area.
 - b. Barn swallows (*Hirundo rustica*) were previously observed within a culvert crossing Richmond Street (AECOM 2016). Potential habitat for this species is present within the remainder of the Study Area including existing culverts and bridges.
 - c. Red Mulberry (*Morus rubra*) was observed in the southwest portion of the Gibbons Lands (NRSI 2013). This species was observed along a roadway and is suspected to have been planted. Suitable habitat for this species was identified within the Gibbons Lands (NRSI 2013).
 - d. Black Redhorse (THR), Silver Shiner (THR) and Wavy-rayed Lampmussel (THR) were identified as occurring in several watercourses associated with the Project including Medway Creek, Unnamed Municipal Drain 1, and the Thames River (North Branch; DFO 2020).

8. Candidate habitat for 14 terrestrial SAR was identified through the SAR screening process (Appendix F of the NHR). These species and their associated habitats are summarized in **Table 2** below.

Table 2: Terrestrial Species at Risk with Candidate Habitat

Common Name	Scientific Name	ESA Status	S-Rank	Candidate Habitat
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SC	S2N, S4B	Deciduous Forest
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	S3	Deciduous Swamp, Shallow Marsh
Butternut	<i>Juglans cinerea</i>	END	S2	Deciduous Forest
Chimney Swift	<i>Chaetura pelagica</i>	THR	S4B, S4N	Chimneys within Study Area
Eastern Flowering Dogwood	<i>Cornus florida</i>	END	S2	Deciduous Forest
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	THR	S3	Deciduous Forest with Sandy Soil
Eastern Meadowlark	<i>Sturnella magna</i>	THR	S4B	Cultural Meadow
False Rue-anemone	<i>Enemion biternatum</i>	THR	S2	Deciduous Forest
Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	THR	S2	Deciduous Forest
Little Brown Myotis	<i>Myotis lucifugus</i>	END	S4	Deciduous Forest, Deciduous Swamp, Cultural Woodland
Northern Myotis	<i>Myotis septentrionalis</i>	END	S3	Deciduous Forest, Deciduous Swamp, Cultural Woodland
Queensnake	<i>Regina septemvittata</i>	END	S2	Thames River (North Branch)
Red Mulberry	<i>Morus rubra</i>	END	S2	Deciduous Forest
Tri-colored Bat	<i>Perimyotis subflavus</i>	END	S3	Deciduous Forest, Deciduous Swamp, Cultural Woodland

9. Confirmed Significant Wildlife Habitat within the Study Area includes Amphibian Breeding Habitat (both Woodland and Wetland), Terrestrial Crayfish Habitat and Special Concern and Rare Wildlife Species habitat (for eastern wood-pewee (*Contopus virens*) and monarch). Thirteen Significant Wildlife Habitats remain as Candidate within the Study Area (see Appendix G of the NHR).

4. Proposed Transmission Line Activities & Assessment of Potential Impacts

In order to properly manage the existing transmission main(s) and continue to deliver water supply to its current and future customers, the City requires access for ongoing monitoring, maintenance, repairs and to expand service as needed. The regular inspection and maintenance of the transmission main and its associated chambers, valves and associated appurtenances are essential components of transmission main management. Regular clearing of access routes and the interior clearing of accumulated debris associated with these components can improve response times during a failure. Routine inspection and maintenance of the transmission main and its components are proactive measures to ensure peak performance. **Table 3** below outlines the recommended inspection, maintenance and monitoring activities for the transmission line.

Table 3. Inspection, Maintenance and Monitoring Activities

Action	Frequency	Comment
Inspection and Maintenance of Valves and Chambers	Annual	Inspection and maintenance of valves and valve chambers is required to avoid impacts to the loss of physical integrity of the chamber and valves. This includes ensuring proper valve operation, replacing damaged valves, chamber cleaning where required, missing air vents, minor rehabilitation of chambers, etc. 100% of the valves and chambers should be inspected/maintained annually.
Soil Sampling and Testing of ground near transmission mains, including coring into ground, sample collection, and laboratory testing.	Every 15 Years	Reduced resistivity of soil is one of the contributing factors to increased deterioration of PCCP. Due to de-icing, chloride levels may elevate and would further decrease the resistivity levels. Therefore, understanding the soil characteristics on a frequent basis would provide additional insights for interventions.
Test Pits to inspect the surface of the transmission main by excavating to the transmission main and inspecting the surface of the concrete pipe for signs of pitting, cracking or damage.	Every 15 Years	Test pits would offer direct information about the condition of the pipe, depending on the type of examination. The evaluation of joints located within corrosive soils should be monitored at a certain frequency to understand the level of intervention required.
Free-Swimming use long form for Electro Magnetic (EM) or (e.g. Pipe Diver) tools to inspect the inside of the transmission main for damage while the line is in service	Every 15 Years	The City currently monitors the pipeline using Acoustic Fiber Optics (AFO) technology that provides an estimated location for wire breaks in the concrete piping. It is recommended to deploy a Free-Swimming EM (e.g. or Pipe Diver) tool to inspect, detect and quantify potential wire breaks inside the pipeline and provide a baseline of the state of the pipeline periodically.
Repair of Joints	Based on Assessment	Joints are mostly assessed based on the above internal or external examinations. The deterioration of joints is difficult to assess with EM technologies due to their configuration and joints in PCCP pipes do not include prestressing wires. The impact of soil envelope may also, increase the degradation level of joints.

The existing easement was reviewed from the Arva Pumping Station to Chamber 13 near Huron Street. **Table 4** below provides an overview of the infrastructure reviewed and recommended actions to be taken with respect to repairs and/or maintenance and associated potential impacts anticipated as a result of the activity. The location of the transmission line and associated chambers can be found on **Figures 3a, 3b** and **3c**.

Table 4. Recommended Transmission Line Repair/Maintenance Activities & Associated Potential Impacts.

Pipe / Chamber ID	Site Condition	Repair/Maintenance Recommendations	Potential Impacts
Arva Pumping Station to Sunningdale Road			
Twinned transmission mains from Arva Pumping Station to Sunningdale Rd.	The twinned line is located on farmland, county roads, and forested areas. In some areas, the twinned mains appear to be near or under mature trees. The trees are also within the City owned easement.	Recommend reviewing the sites and assess the need to remove trees and other obstacles to reduce risk of damage by tree roots, and to allow for maintenance and/or monitoring access.	Impacts to natural heritage features and their functions are anticipated to be isolated to a few locations as land use within this stretch is primarily agricultural row crop and golf course. Potential impacts to two natural heritage features (Arva Moraine PSW and the deciduous forest adjacent to Medway Creek) include the following: <ul style="list-style-type: none"> ▪ removal of vegetation (e.g., Trees, shrubs, etc.); ▪ erosion and sedimentation of adjacent natural heritage features during construction; ▪ damage to adjacent vegetation (i.e., trampling or limb/truck damage) during construction; ▪ removal of Woodland (i.e., deciduous forest) and associated potential SAR habitat and candidate Significant Wildlife Habitat; ▪ impacts to local wildlife including potential for incidental take and harm to local frogs, toads, snakes and turtles (i.e., vehicle mortality) during vegetation clearing activities.
Chambers 1 and 1A	Chamber 1 and 1A are drain chambers located on farmland. There is access to these two chambers on a dirt access road through the landowner's property.	Maintain access and clear vegetation on a regular basis. Inspect chambers and replace valves when required.	These chambers are located within an agricultural field (i.e., row crop). Impacts to natural heritage features, or their functions are not anticipated.
Chambers 2 and 2A	Chamber 2 and 2A are air valve chambers. There is no developed access road to the chambers on farmland.	Maintain access and clear vegetation on a regular basis. Inspect chambers and replace valves when required. Consider constructing a gravel access road, within the easement with owner approval, to facilitate access by City operators.	Impacts are anticipated to be minimal and include the following: <ul style="list-style-type: none"> ▪ potential localized removal of marginal cultural meadow habitat. ▪ potential isolated removals of trees and shrubs for the installation of gravel access road.
Chambers 3 and 3A	Chambers 3 and 3A are drain valves chambers. The trees are within the City owned	Maintain access and clear vegetation on regular basis.	Impacts are anticipated to be localized within the vicinity of the chambers and include the following:

Pipe / Chamber ID	Site Condition	Repair/Maintenance Recommendations	Potential Impacts
	easement. There is no developed access road to the chambers on the farmland.	Inspect chambers and replace valves when required. It is difficult to construct a new access road at this location.	<ul style="list-style-type: none"> ▪ removal of trees and shrubs within the deciduous forest community; ▪ removal of Candidate Significant Wildlife Habitat; ▪ potential erosion and sediment deposition over vegetation and into Medway Creek; ▪ potential impacts to Candidate SAR and SAR habitat (i.e., bats, birds, vegetation, herps) associated with deciduous forest community.
Chambers 4 and 4A	Chambers 4 and 4A are air valve chambers, located near a drainage pond on the Sunningdale Gold Course. There is an access road to this site from Richmond Street.	Maintain access and clear vegetation on regular basis. Inspect chambers and replace valves when required.	Chambers are located within a golf course. Vegetation removal is limited to anthropogenic mown lawn. Negative impacts to natural heritage features and their functions are not anticipated.
Chambers 5 and 5A	Chambers 5 and 5A are drain chambers located within a Provincially Significant Wetland (PSW). Vegetation is located within the City owned easement. There is a non-paved access path to this site from Richmond Street.	Maintain access. Inspect chambers and replace valves when required.	Chambers are located within a portion of the Arva Moraine Wetland Complex (PSW). Impacts associated with works proposed for Chambers 5 and 5A include: partial removal of shallow marsh and thicket swamp communities within the PSW; damage to adjacent vegetation during activities (e.g., trampling, damage to tree trunks/limbs, etc.) erosion and sedimentation of adjacent vegetation during activities with machinery; impacts to local wildlife which use the PSW as habitat (e.g., frogs, snakes, turtles) such as vehicle mortality.
Chambers 6 and 6A	Chambers 6 and 6A are critical air valve chambers. There is no developed access road to the chambers on farmland.	Maintain access and clear vegetation on a regular basis. Inspect chambers and replace valves when required. Consider constructing a gravel access road, within the easement with owner approval, to facilitate access by City operators.	Impacts are anticipated to be localized and minimal within the vicinity of the chambers and include the following: <ul style="list-style-type: none"> ▪ partial removal of vegetation within the cultural meadow, cultural thicket, as well as potential removal of individual trees for installation of gravel access road. ▪ construction impacts including erosion and sedimentation of adjacent vegetation, harm/harassment to local wildlife such as migratory birds (i.e., incidental take).
Chambers 7 and 7A	Chambers 7 and 7A are drain valve chambers. There is access to these chambers from Sunningdale Rd.	Maintain access and clear vegetation on regular basis.	<ul style="list-style-type: none"> ▪ Partial removal of vegetation within the cultural meadow for installation of gravel access road. ▪ Construction impacts including erosion and sedimentation of adjacent vegetation, harm/harassment to local wildlife such as migratory birds (i.e., incidental take).

Pipe / Chamber ID	Site Condition	Repair/Maintenance Recommendations	Potential Impacts
		Inspect chambers and replace valves when required.	
Chamber 7SA	Chamber 7SA is an air valve chamber.	Maintain access, inspect the chamber and replace the valve when required.	Marginal removal of vegetation within the cultural meadow for installation of gravel access road. Significant negative impacts are not anticipated.
Sunningdale Road to Fanshawe Park Road			
Twinned transmission mains from Sunningdale Rd. to Fanshawe Park Rd	The twin transmission mains are in a developed area, with several mature trees, hedges and fences within the easement and near the transmission mains. The trees are also within the City owned property.	Recommend reviewing the sites and assess the need to remove trees and other obstacles to reduce risk of damage by tree roots, and to allow for maintenance and/or monitoring access.	Impacts to natural heritage features and their functions are anticipated to be isolated to a few locations within this stretch as most of the land use within this section consists predominately of residential communities. Potential impacts to the Gibbons Wetlands ESA are anticipated to be minor as the transmission line extends along the eastern boundary of this feature. Potential minor impacts to the Gibbons Wetland ESA include: <ul style="list-style-type: none"> ▪ removal of edge vegetation (e.g., trees, shrubs, etc.); ▪ erosion and sedimentation of adjacent natural heritage features during construction; ▪ damage to adjacent vegetation (i.e., trampling or limb/truck damage) during construction; ▪ potential removal of confirmed SWH (i.e., eastern wood-pewee), candidate SAR habitat (e.g., bats, etc.) and Candidate SWH; ▪ impacts to local wildlife including potential for incidental take and harm to local frogs, toads, snakes and turtles (i.e., vehicle mortality) during vegetation clearing activities.
Chambers 8 and 8A	Chambers 8 and 8A are air valve chambers located in a park like setting with mature trees and vegetation near the chambers.	Maintain access, inspect chambers and replace valves when required.	Potential impacts are minor and limited to potential removal of isolated residential trees.
Chambers 9 and 9A	Chamber 9 is an air and drain valve chamber with a check valve, and chamber 9A is an air valve chamber. Chambers are located at Uplands Trail Park next to Fanshawe Park Rd. This area is accessible to the City and the general public.	Maintain access, inspect chambers and replace valves when required. Consider constructing fencing or adding removable barricade or bollards to protect City infrastructure and prevent the public from parking on top of the chamber covers.	Impacts associated with vegetation clearing for access to chambers is considered marginal as these chambers are located within municipally owned trail with limited natural vegetation.
Fanshawe Park Road to Huron Street			

Pipe / Chamber ID	Site Condition	Repair/Maintenance Recommendations	Potential Impacts
Single transmission main from Fanshawe Park Rd. to Huron St.	The transmission main is located in a highly developed area, with several mature trees, hedges and fences within the easement and near the transmission main. There are several manmade and natural obstacles near or on top of the transmission main and the valve chambers within the easement. Some areas have limited or no direct access by City crews or their representatives.	Depending on the area, it is recommended to review the site and assess the need to remove trees and other obstacles to reduce risk of damage by tree roots, and to allow for maintenance and/or monitoring access. New gates or removable fence sections in existing fencing are required in some areas to allow for chamber access.	Impacts to natural heritage features and their functions are anticipated to be isolated to a few locations within this stretch as most of the land use consists of residential communities. Potential impacts to Significant Woodlands, Woodlands and the Thames River include the following: <ul style="list-style-type: none"> ▪ removal of vegetation (e.g., trees, shrubs, etc.); ▪ erosion and sedimentation of adjacent natural heritage features during construction; ▪ damage to adjacent vegetation (i.e., trampling or limb/truck damage) during construction; ▪ partial removal of Significant Woodland and Woodlands and associated potential SAR habitat and Candidate Significant Wildlife Habitat; and ▪ impacts to local wildlife including potential for incidental take and harm to local frogs, toads, snakes and turtles (i.e., vehicle mortality) during vegetation clearing activities.
Chamber 10	The transmission main enters and exists several properties: 27 Shetland Cres., 18 Shetland Cres., 186, and 190 Sunnyside Drive. Several manmade and natural obstacles such as playsets, sheds, fencing, concrete pads, trees and shrubs are on top of the transmission main within the City's easement. Chamber 10 is a drain chamber located on 186 Sunnyside Drive property. There is access to this chamber for inspections and repairs through the homeowner's fence. There is a large playset and a shed near the chamber and the transmission main. The City owns an easement next to this property as shown on the Figure.	The drain chamber is a low spot in the transmission main and would cause major damage to property and infrastructure in case of damage or a break in the line, or the valve in this location. The City is considering abandoning this chamber and constructing an alternative on Shetland Crescent, or Sunnyside Drive. In the meantime, it's highly recommended to remove all obstacles within the easement around the chamber. There is an existing maintenance easement to access the property from Sunnyside Drive, and a small gate into the property. It's recommended to widen the gate to allow for City maintenance trucks to enter the property when	Impacts are limited to potential removal of individual trees within the residential property and are considered to be minor.

Pipe / Chamber ID	Site Condition	Repair/Maintenance Recommendations	Potential Impacts
		required for repairs. Recommend installing gates or removable fence sections for rapid access to the easement when required where the pipeline enters and exits these properties	
Chamber 10A	Transmission main continues between Doon Dr. and Windermere Rd. through several properties on Orkney Cres., and Windermere Rd.: 127, 131, 139, 143, 147, 151, 155, 159, 163, 167, 171, 175, 179 Orkney Cres., and 542 Windermere Rd. Chamber 10A is an air release chamber located on 163 Orkney Cres. The City owns an easement on the property to access the chamber going through the south end of the property.	Recommend removing all obstacles around the chamber within the easement and widen the existing gate in the fencing for the 163 Orkney Cres. property, where Chamber 10A is located to allow City maintenance trucks to enter the property when required for repairs.	Potential impacts are limited to potential removal of individual trees within the residential property and are considered negligible.
Chamber 11	Chamber 11 is an air and drain valve chamber with access through Scouts Canada.	Recommend removing all obstacles around the chamber within the easement and continue to inspect and maintain the valves and chamber.	Impacts associated with repair/maintenance of Chamber 11 are limited to minor tree removals along the existing pathway.
Chambers 12 and 12A	Chamber 12 is a drain valve chamber, and Chamber 12A is an air valve chamber with access from the trail system behind St. Peter's Seminary through City parks. A short section of the main enters and exists the north end corner of the property on 430 Huron Street. This area is relatively dense with mature trees and close to the City parks.	Chambers are within City owned lands and the easement and can be accessed without the need to access private property. Recommend maintaining access and clearing vegetation on regular basis. Inspect chambers and replace valves when required. Where the main enters the property on 430 Huron Street, the City should consider obtaining a working easement in that section	Chambers are located within a portion of the Significant Woodlands south of the Thames River. Potential impacts associated with repair/maintenance activities include: Localized removal of the small portion of FOD7 and SWD4 community within the Significant Woodland; FOD7 identified as Candidate SAR habitat and Candidate SWH; damage to adjacent vegetation during activities (e.g., trampling, damage to tree trunks/limbs, etc.); erosion and sedimentation of adjacent vegetation and watercourse during activities with machinery; and potential for construction impacts to local wildlife including harm/harassment of migratory bird (i.e.,

Pipe / Chamber ID	Site Condition	Repair/Maintenance Recommendations	Potential Impacts
		to facilitate any repairs to the main. The City can access that section of the main from the east through City owned parks.	incidental take) and local herpetofauna (i.e., turtles, snakes, frogs and toads).
Chamber 13	Chamber 13 is a drain and a distribution chamber with unobstructed access to City staff.	Chamber is within City ROW and easement and can be accessed without the need to access private property. This chamber will be replaced in 2021.	Minimal impacts anticipated and may include: localized tree and vegetation removal within the Significant Woodland (FOD5-1 community); minor loss in potential Candidate SAR and Candidate SWH; damage to adjacent vegetation during activities (e.g., trampling, damage to tree trunks/limbs, etc.); erosion and sedimentation of adjacent vegetation and watercourse during activities with machinery; and potential for construction impacts to local wildlife including harm/harassment of migratory bird (i.e., incidental take) and local herpetofauna (i.e., turtles, snakes, frogs and toads).

Presently, there are no in-water works anticipated for repair and maintenance activities for the transmission main. Impacts to watercourses and water features are limited to potential erosion and sedimentation as a result of machinery use within riparian areas.

Overall, impacts associated with the repairs and maintenance of the existing transmission main are localized within the existing easement and can be largely mitigated through the implementation of appropriate construction mitigation and environmental management recommendations. These recommendations are summarized in **Section 5** below.

5. Environmental Management Recommendations

Due to the nature of the proposed activities and lack of access to portions of the Study Area, a comprehensive assessment of impacts could not be completed. The following environmental management recommendations outline a precautionary approach to reduce the potential for negative impacts as a result of the proposed maintenance and/or repair activities. The following summarizes the environmental management recommendations for the Arva Pumping Station to Huron Street Water Transmission Line.

1. Where proposed activities fall within the UTRCA's Regulation Limits (e.g., the Arva Moraine Complex PSW, Medway Creek and riparian areas, the Gibbons Wetland ESA, and Huron Street Woods), a Section 28 permit (under O.Reg. 157/06 the Development Interference with Wetlands and Alteration to Watercourses and Shoreline Regulation) may be required. Consultation with the UTRCA must be completed to determine permitting requirements.
2. Where proposed activities are required within or adjacent to natural heritage features, a qualified Ecologist must be retained to complete a pre-clearance survey:
 - a. 24 hours before construction activities, to identify potential impacts to significant/sensitive species.
 - b. As part of Construction Mitigation and Monitoring Plan to identify potential impacts to significant/sensitive habitats.
 - c. Where tree removal is required a bat cavity tree assessment must be completed to determine potential SAR bat habitat.
3. To limit the amount of removals and disturbance to natural heritage features (including construction of any gravel access roads), the area of disturbance must be limited to as small an area as possible and avoid the feature where possible. Activities must also avoid sensitive timing windows. Where urgent repair activities cannot avoid sensitive timing windows, additional mitigation measures shall be implemented to reduce impacts to these features to extent possible. Existing pathways must be utilized for site access wherever feasible.
4. An Erosion and Sediment Control Plan (ESC) must be developed that includes the installation of appropriate sediment and erosion control measures such as silt fencing and haybale check dams prior to construction activities. Daily monitoring must be conducted to identify and remedy any deficiencies in control measures implemented.
5. All vegetation removal required for maintenance/repair activities must occur outside of applicable sensitive timing windows including the breeding bird nesting period (**April 1 to August 31**), bat roosting season (**March 31 to September 1**) and turtle overwintering (where works are proposed within shallow water wetlands; **October to April**).
6. A detailed **Construction Mitigation and Monitoring Plan (CMMP)** must be developed in advance of the proposed activities and should incorporate mitigation measures identified herein. The plan must be reviewed and approved by a city ecologist. The CMMP must include the following:
 - a. A Species at Risk and Wildlife Handling Protocol;
 - b. An Invasive Plant Management Plan which incorporates recommendations within the London Invasive Plant Management Strategy (City of London 2017). The Invasive Plant Management Plan

- must target management of invasive species commonly known throughout the Study Area, including, but not limited to common buckthorn (*Rhamnus cathartica*) and glossy buckthorn (*Frangula alnus*). Any phragmites (*Phragmites australis*) observed within the area of impact must be treated in advance of construction following the *Invasive Phragmites (Phragmites australis) Best Management Practices in Ontario (2020)*;
- c. Erosion and Sediment Control Plan; and
 - d. The Clean Equipment Protocol for Industry (Halloran *et al.* 2013)
7. Where works are required within wetland communities, including the Arva Moraine Complex PSW and the Gibbons Wetland ESA, it is anticipated that a fish and/or wildlife rescue may be required in advance of the proposed activities to avoid contravention of the *Fish and Wildlife Act*. A Licence to Collect Fish and/or a Wildlife Collectors Authorization will be required in advance of any fish and wildlife rescue.
 8. Where work is required within or immediately adjacent to significant natural heritage features (i.e., Significant Woodlands, Provincially Significant Wetlands, SAR habitat and/or SWH), environmental monitoring of repair and maintenance activities must be conducted to identify potential negative impacts and provide additional mitigation recommendations.
 9. If activities are required to occur below the high-water mark (i.e., the 1:2 year return event) for a watercourse, a qualified fisheries biologist should screen the project to determine if a Request for Review (RfR) should be submitted to the Department of Fisheries and Oceans (DFO) to initiate regulatory review under the *Fisheries Act*. During regulatory review, DFO may decide to issue a Letter of Advice or require an Authorization under the *Fisheries Act*. During regulatory review, DFO may also require additional mitigation measures, or in the case of an Authorization, require offsetting for the potential impacts to fish and fish habitat.
 10. The proposed maintenance and/or repair activities for the existing water transmission main fall within the Health and Safety projects under the Endangered Species Act (i.e., repair of water systems). Should impacts to SAR and SAR habitat be identified, registration of the activity and the affected species with the Ministry of Environment, Conservation and Parks (MECP) will be required. Additionally, a mitigation plan which outlines steps to minimize effects on SAR and SAR habitat would also be required.
 11. Consideration must be given to the restoration of disturbed areas where feasible (it is anticipated that some areas will remain cleared for accessibility purposes). A Planting Plan for post-construction activities must be prepared and include plantings of native trees, shrubs, forbs, grasses and sedges with the intent to enhance adjacent natural heritage features. Where future access is required and tree and shrub plantings are not possible, restoration plantings must consider native herbaceous vegetation. In areas where removals are required within SAR habitat or SWH, restoration must include suitable plantings to support identified habitats (e.g., common milkweed (*Asclepias syriaca*) plantings to support Monarch). A compensation plan must be developed where restoration of significant natural heritage features is not feasible (i.e., need to maintain access for future inspections and maintenance). Opportunities for compensation must be considered within the existing corridor or adjacent features where feasible, include native plantings at a minimum of 1:1 ratio, and should be reviewed by the City of London's Ecologist for their input and approval.

With the implementation of the above environmental management recommendations, it is anticipated that the majority of impacts to natural heritage features can be avoided or significantly reduced. Recommendations provided herein must be included within the Construction Mitigation and Monitoring Plan.

6. Conclusion

The Arva Pumping Station to Huron Street Water Transmission Main Environmental Impact Study, documented herein, provides an assessment of potential impacts to natural heritage features identified within the Natural Heritage Summary Report (AECOM 2021b). This EIS was completed in accordance with the City of London's requirements for an EIS and provides environmental management recommendations which will avoid or reduce negative impacts to natural heritage features and their functions.

7. References

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Ministry of Municipal Affairs and Housing (MAH), 2020: 2020 Provincial Policy Statement. Provincial Planning Policy Branch. Queen's Printer for Ontario.

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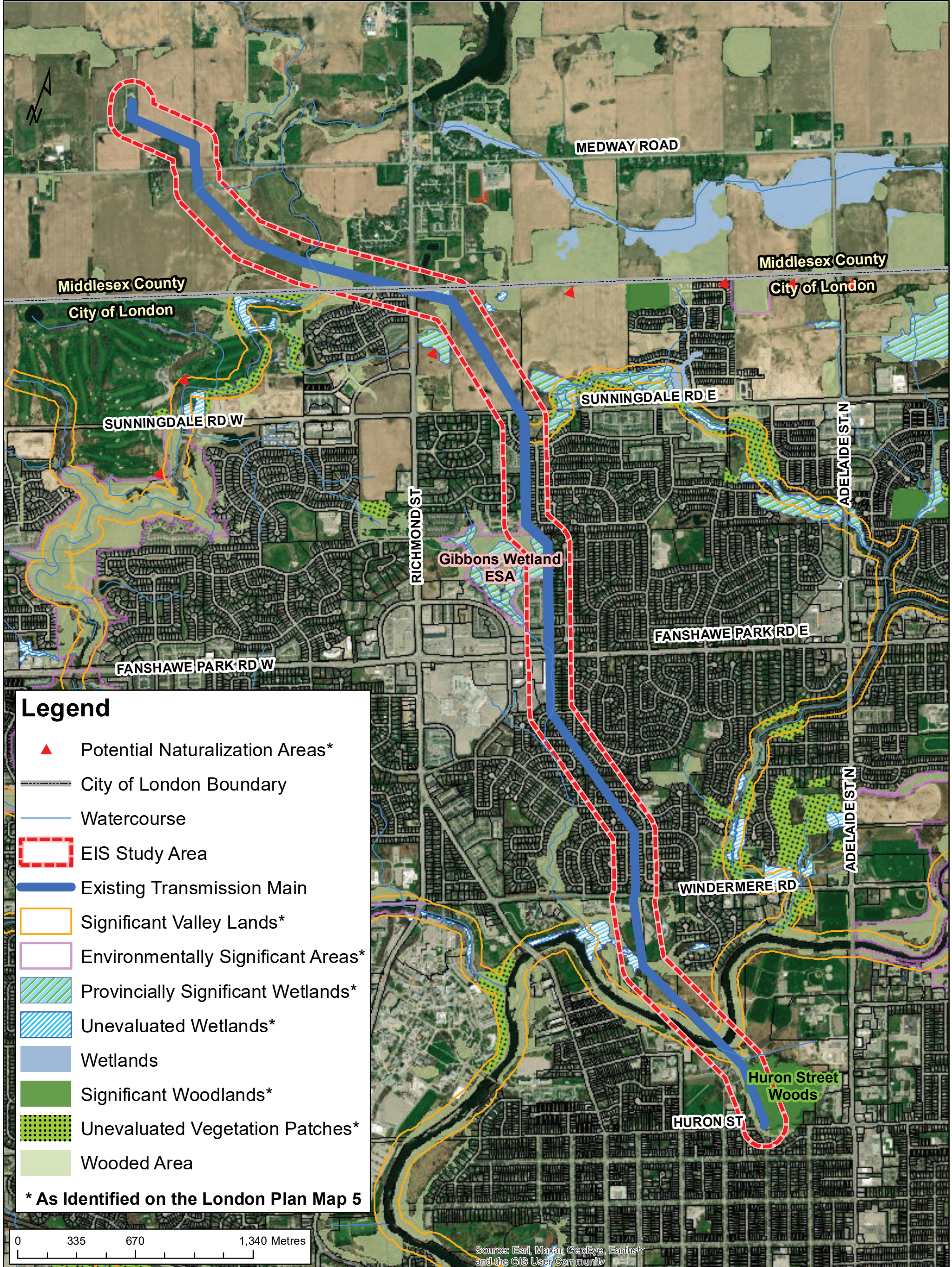
Ontario Ministry of Natural Resources and Forestry (MNRF), 2000: Significant Wildlife Habitat Technical Guide. October. Queen's Printer for Ontario. 151p.

Ontario Ministry of Natural Resources and Forestry (MNRF), 2015: Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. January 2015.

Appendix **A**

Figures

- Figure 1. Study Area and Surrounding Land Use
- Figure 2a, 2b & 2c. Natural Heritage Features
- Figure 3a, 3b & 3c. Potential Impact Assessment

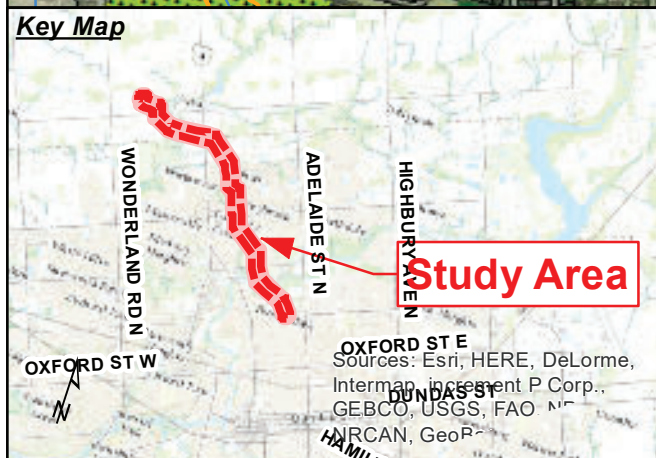


Legend

- ▲ Potential Naturalization Areas*
- City of London Boundary
- Watercourse
- EIS Study Area
- Existing Transmission Main
- Significant Valley Lands*
- Environmentally Significant Areas*
- Provincially Significant Wetlands*
- Unevaluated Wetlands*
- Wetlands
- Significant Woodlands*
- Unevaluated Vegetation Patches*
- Wooded Area

* As Identified on the London Plan Map 5

Source: Esri, Maxar, GeoEye, Earthstar and the GIS User Community



City of London
Environmental Impact Study: Arva Pumping Station to Huron Street Water Transmission Main Municipal Class Environmental Assessment Master Plan

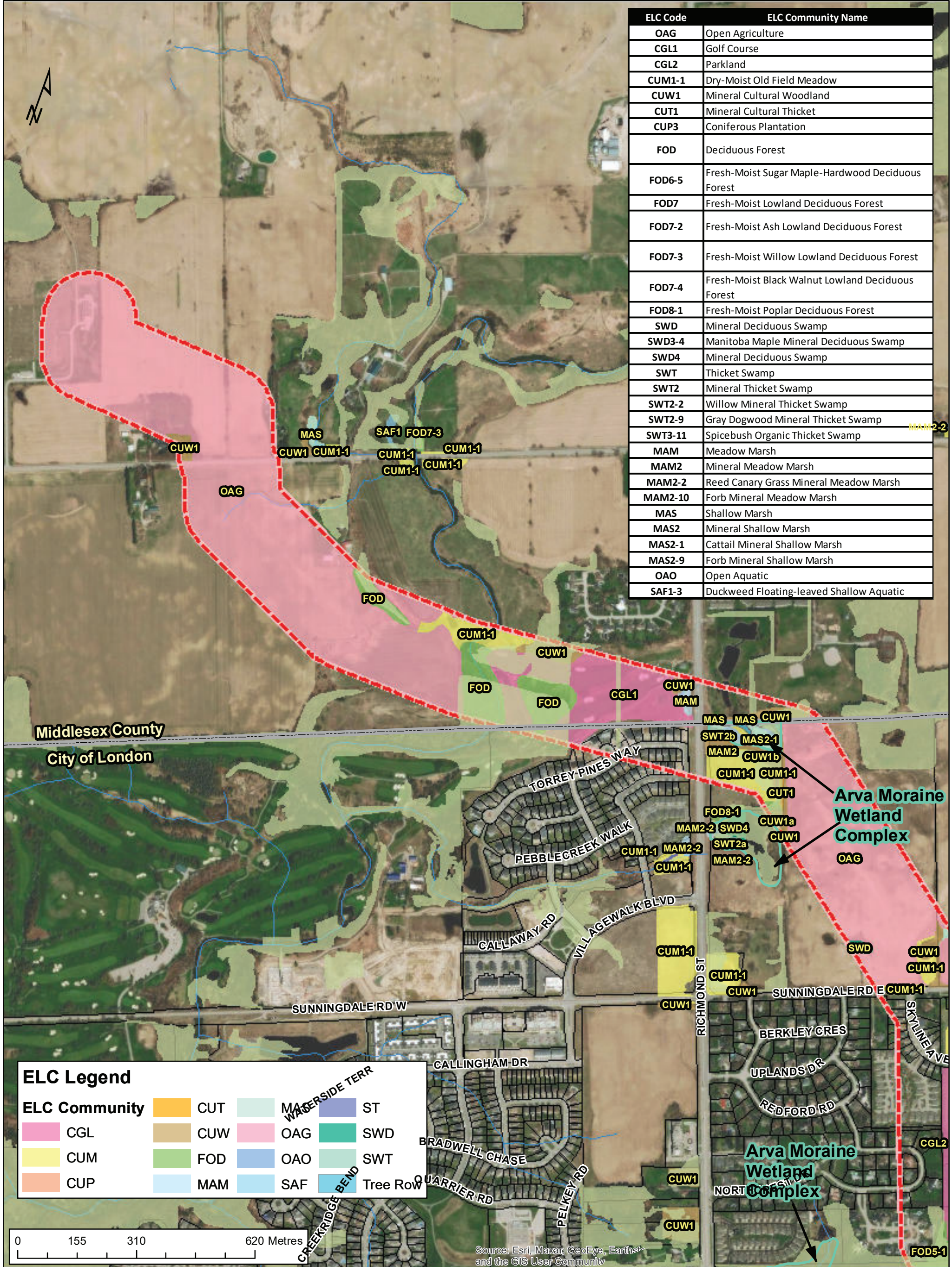
Figure 1: Study Area and Surrounding Land Use

Date: March 2021	PN: 60619503	Datum: NAD83 UTM17 Source: City of London
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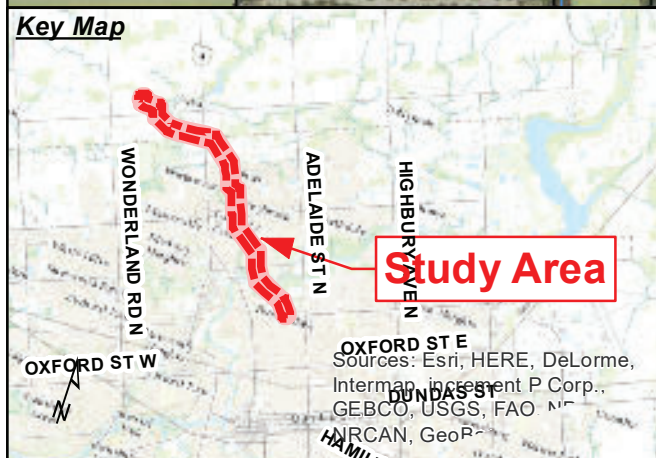
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ELC Code	ELC Community Name
OAG	Open Agriculture
CGL1	Golf Course
CGL2	Parkland
CUM1-1	Dry-Moist Old Field Meadow
CUW1	Mineral Cultural Woodland
CUT1	Mineral Cultural Thicket
CUP3	Coniferous Plantation
FOD	Deciduous Forest
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest
FOD7-4	Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest
SWD	Mineral Deciduous Swamp
SWD3-4	Manitoba Maple Mineral Deciduous Swamp
SWD4	Mineral Deciduous Swamp
SWT	Thicket Swamp
SWT2	Mineral Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp
SWT2-9	Gray Dogwood Mineral Thicket Swamp
SWT3-11	Spicebush Organic Thicket Swamp
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAS	Shallow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
MAS2-9	Forb Mineral Shallow Marsh
OAO	Open Aquatic
SAF1-3	Duckweed Floating-leaved Shallow Aquatic



ELC Legend			
ELC Community	CUT	MAM	ST
CGL	CUW	OAG	SWD
CUM	FOD	OAO	SWT
CUP	MAM	SAF	Tree Row



**City of London
Environmental Impact Study: Arva Pumping
Station to Huron Street Water Transmission
Main Municipal Class Environmental
Assessment Master Plan**

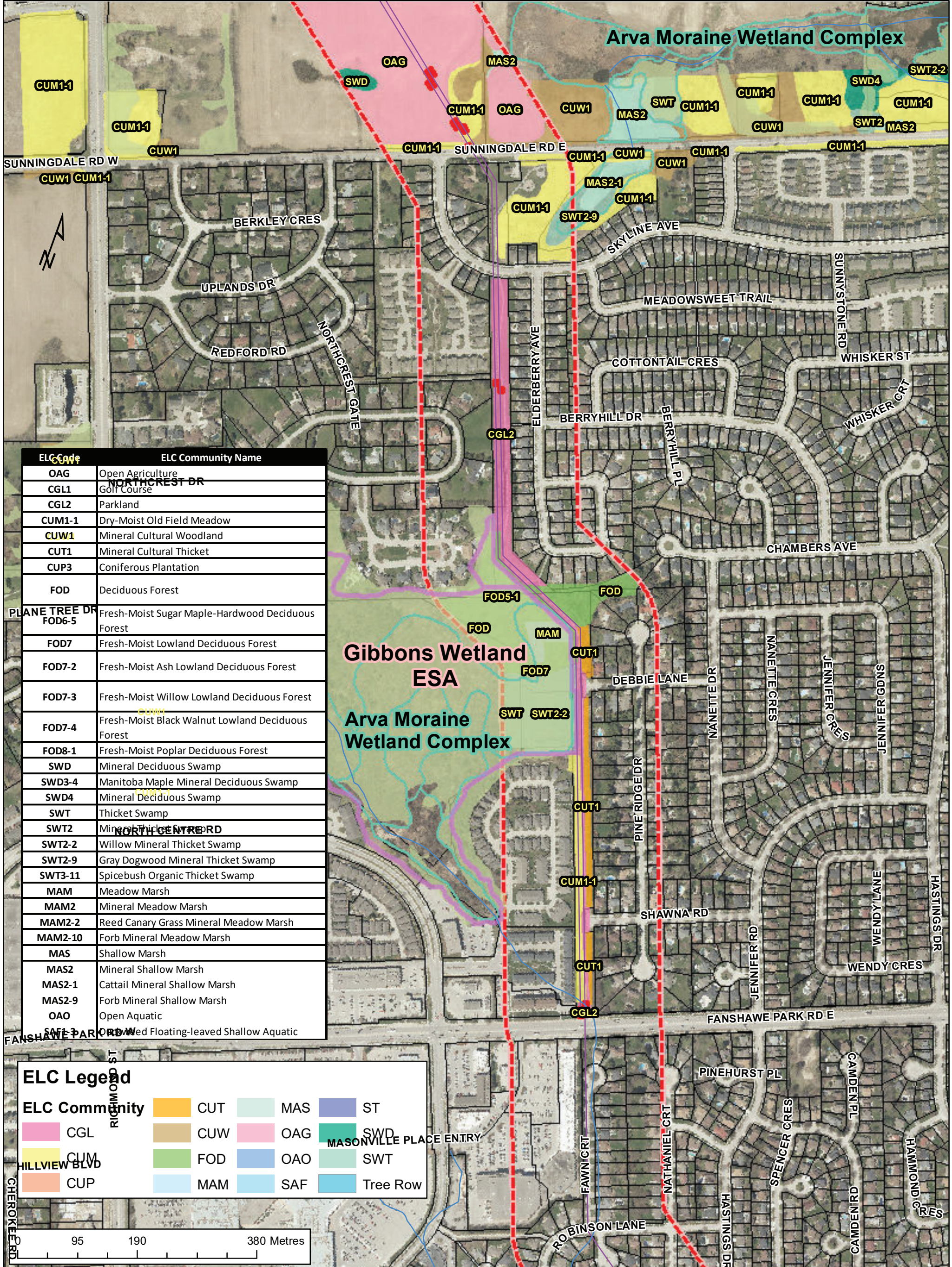
City of London Boundary	Wooded Area
Environmentally Significant Areas	EIS Study Area
Significant Woodlands	
Provincially Significant Wetlands	

**Figure 2a:
Natural Heritage
Existing Conditions**

Date: March 2021	PN: 60619503	Datum: NAD83 UTM17 Source: City of London
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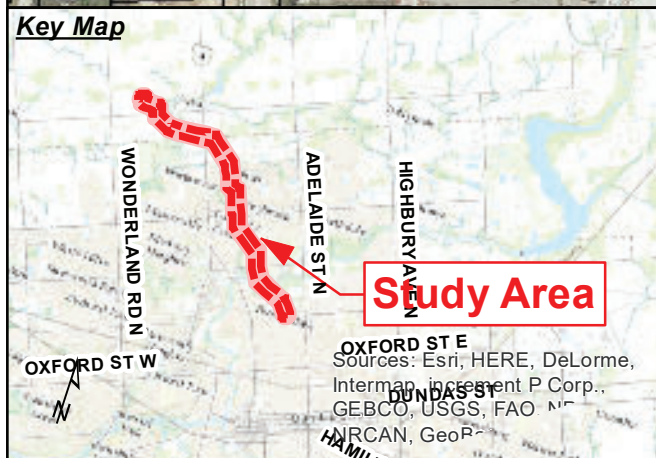
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ELC Code	ELC Community Name
OAG	Open Agriculture
CGL1	Golf Course
CGL2	Parkland
CUM1-1	Dry-Moist Old Field Meadow
CUW1	Mineral Cultural Woodland
CUT1	Mineral Cultural Thicket
CUP3	Coniferous Plantation
FOD	Deciduous Forest
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest
FOD7-4	Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest
SWD	Mineral Deciduous Swamp
SWD3-4	Manitoba Maple Mineral Deciduous Swamp
SWD4	Mineral Deciduous Swamp
SWT	Thicket Swamp
SWT2	Mineral Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp
SWT2-9	Gray Dogwood Mineral Thicket Swamp
SWT3-11	Spicebush Organic Thicket Swamp
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAS	Shallow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
MAS2-9	Forb Mineral Shallow Marsh
OAO	Open Aquatic
OAO1	Red Floating-leaved Shallow Aquatic

ELC Legend			
ELC Community			
CGL	CUT	MAS	ST
CUM	CUW	OAG	SWD
CUP	FOD	OAO	SWT
	MAM	SAF	Tree Row



**City of London
Environmental Impact Study: Arva Pumping
Station to Huron Street Water Transmission
Main Municipal Class Environmental
Assessment Master Plan**

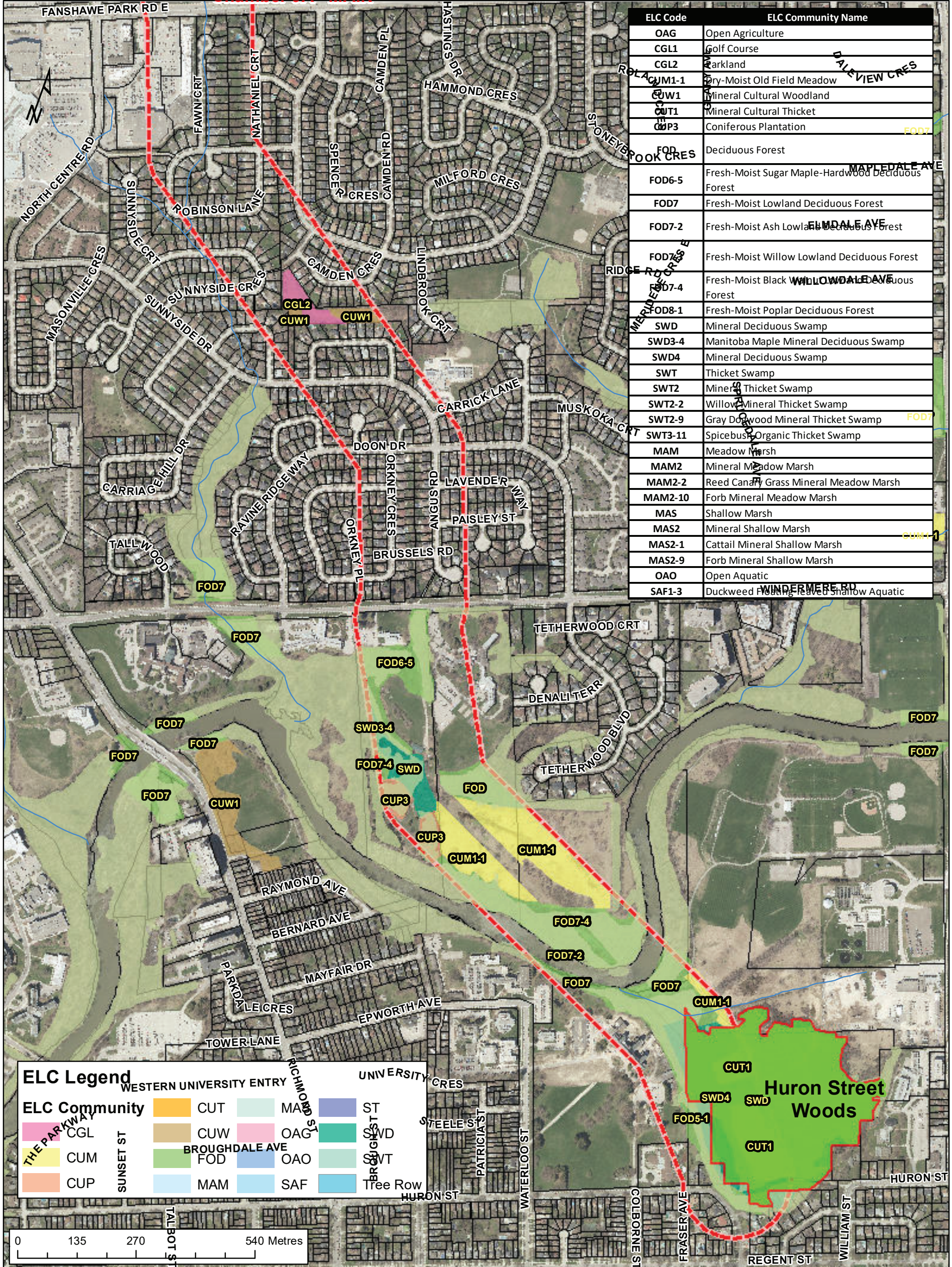
- City of London Boundary
- Environmentally Significant Areas
- Significant Woodlands
- Provincially Significant Wetlands
- Wooded Area
- EIS Study Area

**Figure 2b:
Natural Heritage
Existing Conditions**

Date: March 2021
 PN: 60619503
 Datum: NAD83 UTM17
 Source: City of London



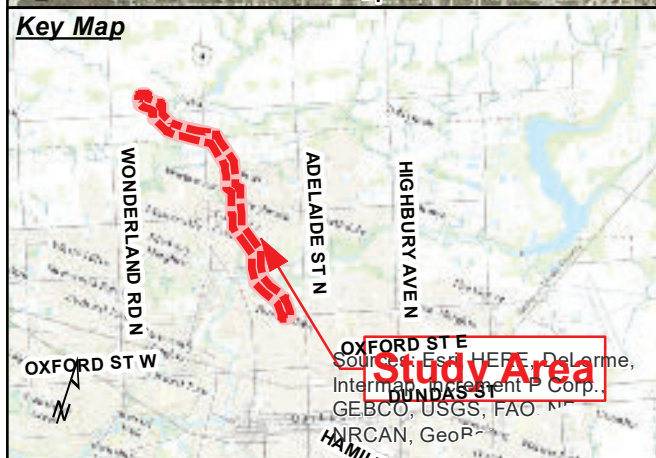
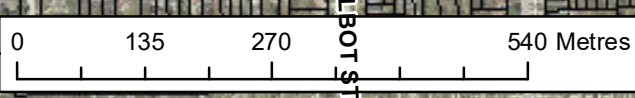
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ELC Code	ELC Community Name
OAG	Open Agriculture
CGL1	Golf Course
CGL2	Parkland
CUM1-1	Dry-Moist Old Field Meadow
CUW1	Mineral Cultural Woodland
CUT1	Mineral Cultural Thicket
CUP3	Coniferous Plantation
FOD	Deciduous Forest
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
FOD7-4	Fresh-Moist Willow Lowland Deciduous Forest
FOD7-4	Fresh-Moist Black Willow Lowland Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest
SWD	Mineral Deciduous Swamp
SWD3-4	Manitoba Maple Mineral Deciduous Swamp
SWD4	Mineral Deciduous Swamp
SWT	Thicket Swamp
SWT2	Mineral Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp
SWT2-9	Gray Dogwood Mineral Thicket Swamp
SWT3-11	Spicebush Organic Thicket Swamp
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed Candy Grass Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAS	Shallow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
MAS2-9	Forb Mineral Shallow Marsh
OAO	Open Aquatic
SAF1-3	Duckweed Floating Leaved Shallow Aquatic

ELC Legend

ELC Community	Color
CGL	Light Green
CUM	Yellow
CUP	Orange
CUT	Light Blue
CUW	Light Green
FOD	Light Green
MAM	Light Blue
OAG	Light Green
OAO	Light Blue
SAF	Light Blue
MA2	Light Green
ST	Light Blue
SWD	Light Green
SWT	Light Green



**City of London
Environmental Impact Study: Arva Pumping
Station to Huron Street Water Transmission
Main Municipal Class Environmental
Assessment Master Plan**

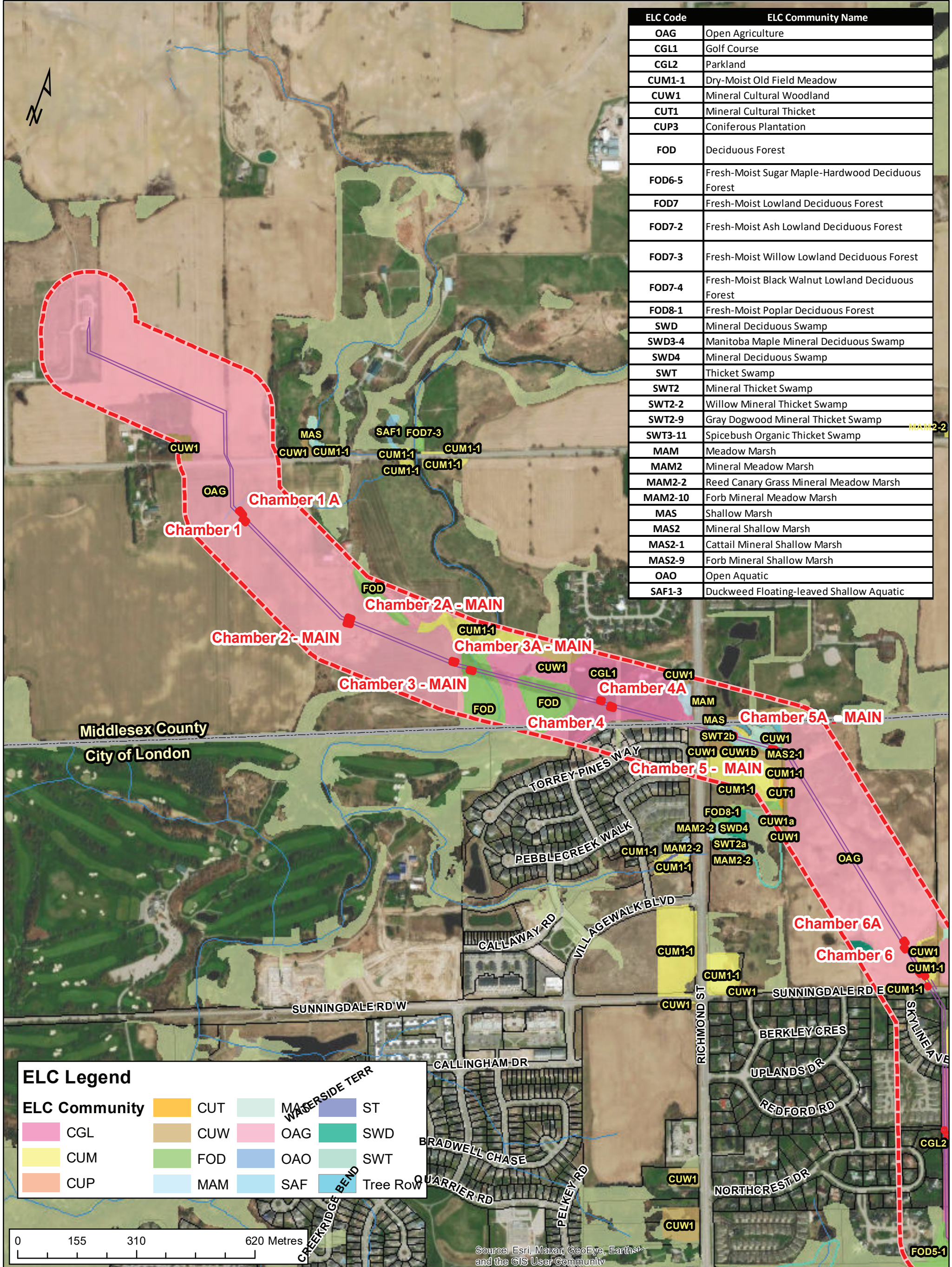
City of London Boundary	Wooded Area
Environmentally Significant Areas	EIS Study Area
Significant Woodlands	
Provincially Significant Wetlands	

**Figure 2c:
Natural Heritage
Existing Conditions**

Date: March 2021
 PN: 60619503
 Datum: NAD83 UTM17
 Source: City of London

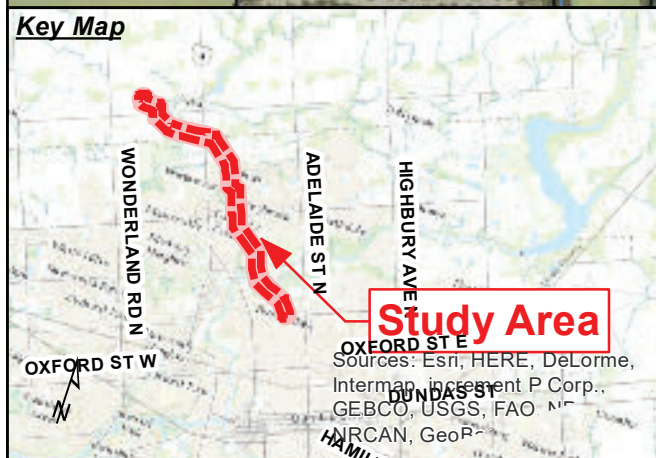
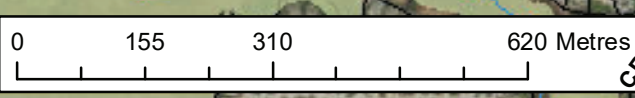


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ELC Code	ELC Community Name
OAG	Open Agriculture
CGL1	Golf Course
CGL2	Parkland
CUM1-1	Dry-Moist Old Field Meadow
CUW1	Mineral Cultural Woodland
CUT1	Mineral Cultural Thicket
CUP3	Coniferous Plantation
FOD	Deciduous Forest
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest
FOD7-4	Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest
SWD	Mineral Deciduous Swamp
SWD3-4	Manitoba Maple Mineral Deciduous Swamp
SWD4	Mineral Deciduous Swamp
SWT	Thicket Swamp
SWT2	Mineral Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp
SWT2-9	Gray Dogwood Mineral Thicket Swamp
SWT3-11	Spicebush Organic Thicket Swamp
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAS	Shallow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
MAS2-9	Forb Mineral Shallow Marsh
OAO	Open Aquatic
SAF1-3	Duckweed Floating-leaved Shallow Aquatic

ELC Legend			
ELC Community	CUT	MAM	ST
CGL	CUW	OAG	SWD
CUM	FOD	OAO	SWT
CUP	MAM	SAF	Tree Row



**City of London
Environmental Impact Study: Arva Pumping
Station to Huron Street Water Transmission
Main Municipal Class Environmental
Assessment Master Plan**

Legend

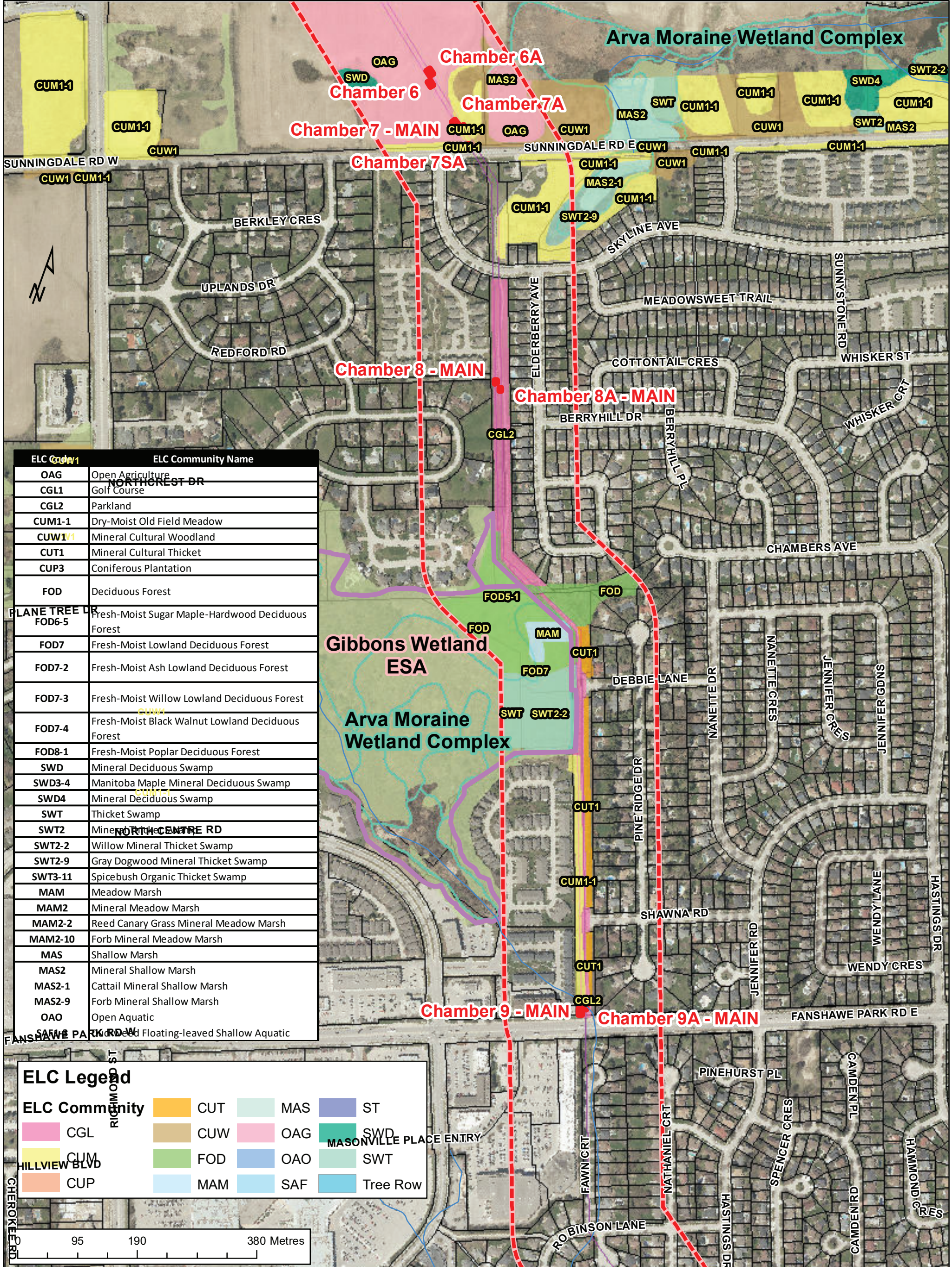
- Existing Transmission Main
- Watercourse
- City of London Boundary
- EIS Study Area
- Existing Valve Chambers
- Significant Woodlands
- Provincially Significant Wetlands
- Wooded Area

**Figure3a:
Potential Impact
Assessment**

Date: March 2021
PN: 60619503
Datum: NAD83 UTM17
Source: City of London

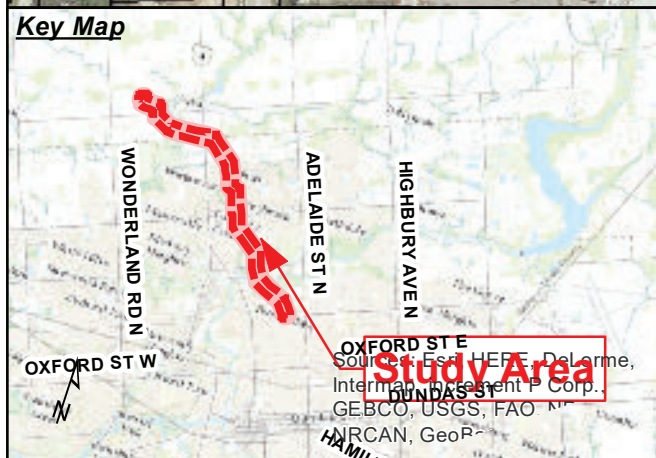
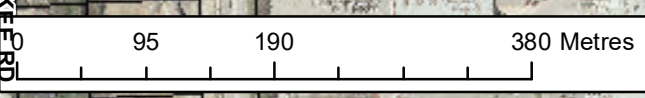
AECOM

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ELC Code	ELC Community Name
OAG	Open Agriculture
CGL1	Golf Course
CGL2	Parkland
CUM1-1	Dry-Moist Old Field Meadow
CUW1/1	Mineral Cultural Woodland
CUT1	Mineral Cultural Thicket
CUP3	Coniferous Plantation
FOD	Deciduous Forest
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest
FOD7-4	Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest
SWD	Mineral Deciduous Swamp
SWD3-4	Manitoba Maple Mineral Deciduous Swamp
SWD4	Mineral Deciduous Swamp
SWT	Thicket Swamp
SWT2	Mineral Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp
SWT2-9	Gray Dogwood Mineral Thicket Swamp
SWT3-11	Spicebush Organic Thicket Swamp
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAS	Shallow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
MAS2-9	Forb Mineral Shallow Marsh
OAO	Open Aquatic
SAF	Shallow Floating-leaved Shallow Aquatic

ELC Legend			
ELC Community	CUT	MAS	ST
CGL	CUW	OAG	SWD
CUM	FOD	OAO	SWT
CUP	MAM	SAF	Tree Row



City of London Arva to Huron Transmission Main Municipal Class Environmental Assessment

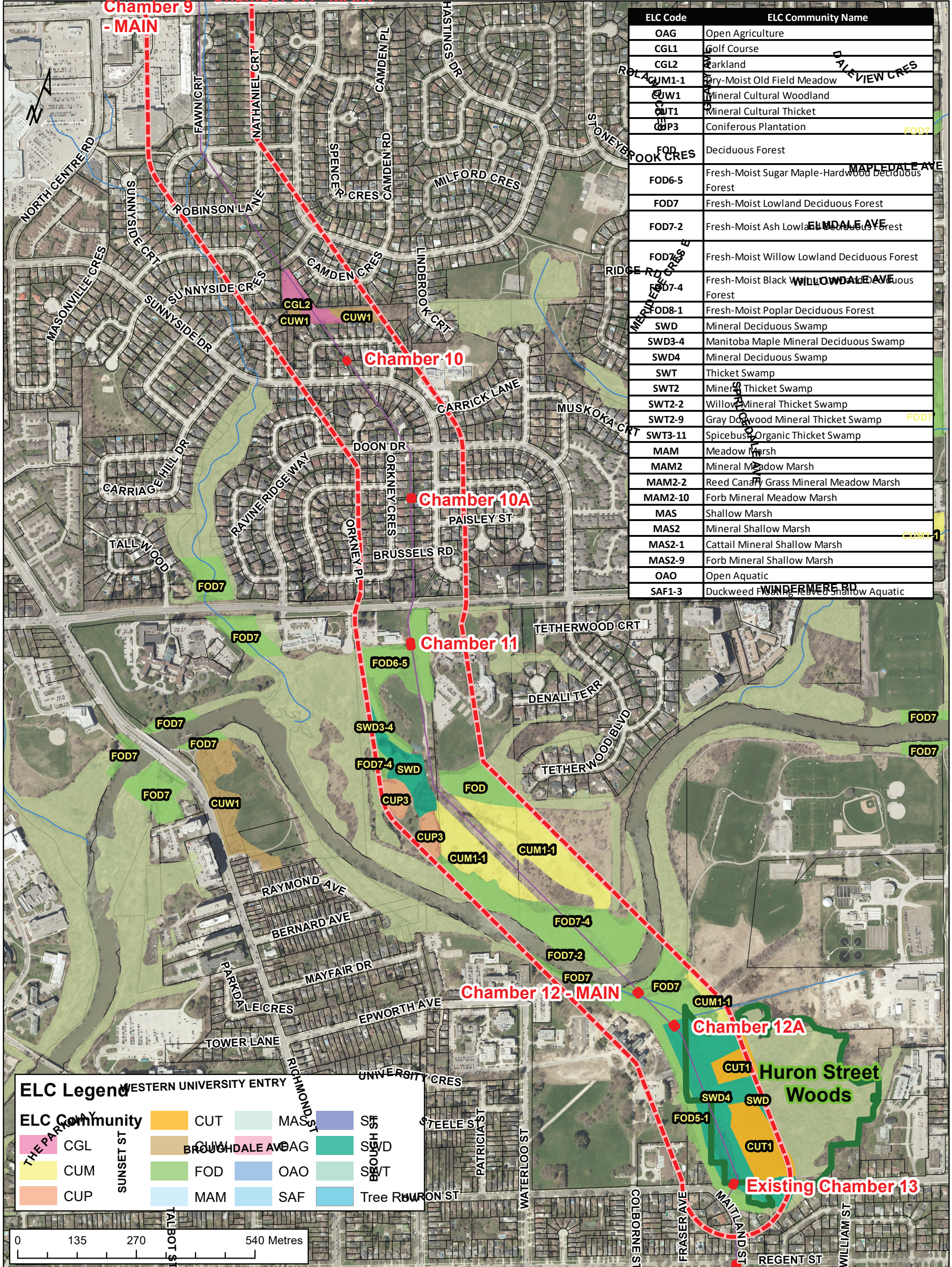
Legend	
Existing Transmission Main	Significant Woodlands
Watercourse	Provincially Significant Wetlands
Existing Valve Chambers	Wooded Area
EIS Study Area	Environmentally Significant Area

**Figure 3b:
Potential Impact
Assessment**

Date: March 2021
 PN: 60619503
 Datum: NAD83 UTM17
 Source: City of London



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ELC Code	ELC Community Name
OAG	Open Agriculture
CGL1	Golf Course
CGL2	Parkland
CUM1-1	Dry-Moist Old Field Meadow
CUW1	Mineral Cultural Woodland
CUT1	Mineral Cultural Thicket
CUP3	Coniferous Plantation
FOD	Deciduous Forest
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest
FOD7	Fresh-Moist Lowland Deciduous Forest
FOD7-2	Fresh-Moist Ash Lowland Deciduous Forest
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest
FOD7-4	Fresh-Moist Black Willow Lowland Deciduous Forest
FOD8-1	Fresh-Moist Poplar Deciduous Forest
SWD	Mineral Deciduous Swamp
SWD3-4	Manitoba Maple Mineral Deciduous Swamp
SWD4	Mineral Deciduous Swamp
SWT	Thicket Swamp
SWT2	Mineral Thicket Swamp
SWT2-2	Willow Mineral Thicket Swamp
SWT2-9	Gray Dogwood Mineral Thicket Swamp
SWT3-11	Spicebush Organic Thicket Swamp
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed Candy Grass Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAS	Shallow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
MAS2-9	Forb Mineral Shallow Marsh
OAO	Open Aquatic
SAF1-3	Duckweed Freshwater Shallow Aquatic

ELC Legend

ELC Community	Color	ELC Community	Color	ELC Community	Color
CGL	Pink	CUT	Orange	MAS	Light Green
CUM	Yellow	CUW	Brown	OAG	Light Blue
CUP	Light Orange	FOD	Green	OAO	Light Green
		MAM	Light Blue	SAF	Light Blue
				Tree Row	Light Blue

**City of London
Environmental Impact Study: Arva Pumping
Station to Huron Street Water Transmission
Main Municipal Class Environmental
Assessment Master Plan**

Legend

Existing Transmission Main	Significant Woodlands
Watercourse	Provincially Significant Wetlands
Existing Valve Chambers	Wooded Area
EIS Study Area	

**Figure 3c:
Potential Impact
Assessment**

Date: July 2021
 PN: 60619503
 Datum: NAD83 UTM17
 Source: City of London



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