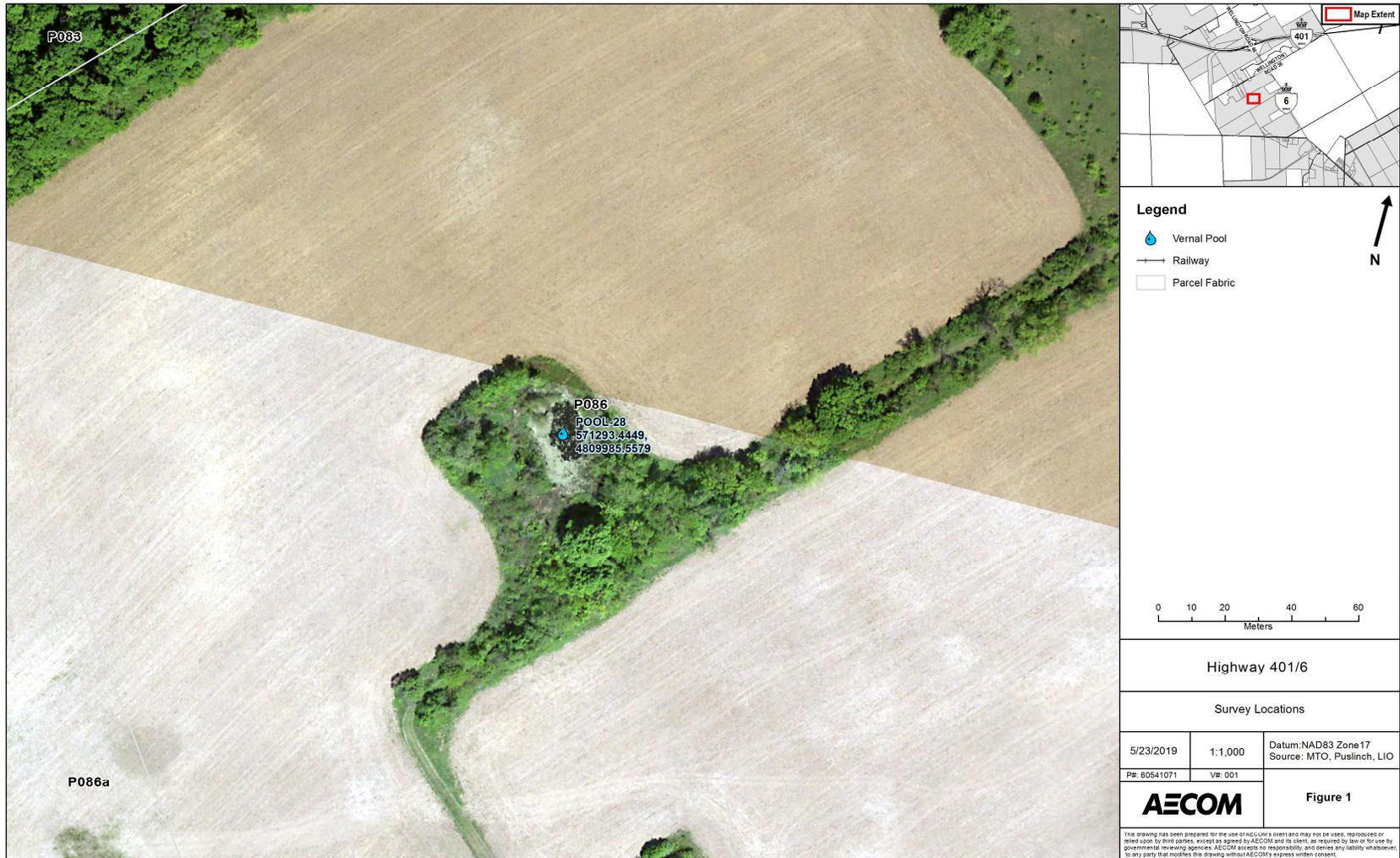




Maps (Please ensure road names and UTM coordinates are clearly visible)



Jefferson Salamander
Presence/Absence Reporting Form



Wildlife Scientific Collector's Authorization # 1095107
ESA Permit # GU-B-004-18

SAMPLING INFORMATION:

Date(s) of sampling: April 7-8, 2020 (dd/mm/yyyy)

Survey Type (circle one):

Minnow Trap Cover Board Road Pitfall Trap Visual Incidental

Sample Type (circle all that apply):

Tail Tip Roadkill Larvae Egg Mass Visual Observation

Search Effort (time spent, number of minnow traps etc.):

2 traps + 12 hours

of salamanders observed: _____

Number of Samples Taken:

of adult tail tips: _____ # mortalities: _____ # of larvae: _____
of larvae tail tips: _____ # roadkills: _____

HABITAT INFORMATION:

Average Pond Depth (m): _____

Pond Description: _____

Terrestrial Vegetation Community Type: _____

Other amphibians observed or heard: SPP E

Egg Attachment Sites Present: Yes No Unknown

Suitable Hydroperiod for Breeding: Yes No Unknown

Photos Taken: Yes No Photo #: _____

SECTION B – TO BE FILLED OUT BY DR. BOGART

Date samples received: _____ (dd/mm/yyyy)

Condition of samples received: _____

JPB #(s): _____



Maps (Please ensure road names and UTM coordinates are clearly visible)



SAMPLING INFORMATION:

Date(s) of sampling: 12/03/2020 to 13/03/2020 (dd/mm/yyyy)

Survey Type (circle one):

Minnow Trap Cover Board Road Pitfall Trap Visual Incidental

Sample Type (circle all that apply):

Tail Tip Roadkill Larvae Egg Mass Visual Observation

Search Effort (time spent, number of minnow traps etc.):

4 traps set for 12 hours

of salamanders observed: 0 zero

Number of Samples Taken:

of adult tail tips: 0

mortalities: 0

of larvae: 0

of larvae tail tips: 0

roadkills: 0

HABITAT INFORMATION:

Average Pond Depth (m): ~1m

Pond Description: Pond approx 60% open water and 40% cattail marsh.

Terrestrial Vegetation Community Type: FOC to south / LUM to north

Other amphibians observed or heard: None

Egg Attachment Sites Present: Yes No Unknown

Suitable Hydroperiod for Breeding: Yes No Unknown

Photos Taken: Yes No Photo #: 19902 to 072344

SECTION B – TO BE FILLED OUT BY DR. BOGART

Date samples received: _____ (dd/mm/yyyy)

Condition of samples received: _____

JPB #(s): _____



Maps (Please ensure road names and UTM coordinates are clearly visible)



Jefferson Salamander 
Presence/Absence Reporting Form

Wildlife Scientific Collector's Authorization # 1095107
ESA Permit # GU-B-004-18

SAMPLING INFORMATION:

Date(s) of sampling: March 18-19, 2020 (dd/mm/yyyy)

Survey Type (circle one):

Minnow Trap Cover Board Road Pitfall Trap Visual Incidental

Sample Type (circle all that apply):

Tail Tip Roadkill Larvae Egg Mass Visual Observation

Search Effort (time spent, number of minnow traps etc.):

6 traps x 12 hours per day

of salamanders observed: 1

Number of Samples Taken:

of adult tail tips: # mortalities: # of larvae:
of larvae tail tips: # roadkills:

HABITAT INFORMATION:

Average Pond Depth (m):

Pond Description:

Terrestrial Vegetation Community Type:

Other amphibians observed or heard:

Egg Attachment Sites Present: Yes No Unknown

Suitable Hydroperiod for Breeding: Yes No Unknown

Photos Taken: Yes No Photo #:

SECTION B – TO BE FILLED OUT BY DR. BOGART

Date samples received: (dd/mm/yyyy)

Condition of samples received:

JPB #(s):



Maps (Please ensure road names and UTM coordinates are clearly visible)





Instructions:

- You must complete a separate form for each pond sampled.
- Each form must be completed in its entirety (including permit numbers).
- Attach two orthophotos showing the location of the pond labelled with UTM coordinates (see example provided):
 - Map 1 must show the pond and local roads or features.
 - Map 2 will be a close-up of the pond (suggested scale 1:1000).
- Pond nomenclature must be consistent for all maps and reports.
- All conditions as per the WSCA and ESA permits must be followed.

Submit this form along with any samples to Dr. Jim Bogart (with permission) at the University of Guelph; 519-824-4120 (extension 58728). Copies of this form (including forms containing negative observations) must also be submitted to the authorizing MNRF District Office along with the ESA permit and WSCA report.

SECTION A – TO BE FILLED OUT BY THE COLLECTOR

Search Result (circle one): Positive Negative

PROJECT TITLE: Highway 401/6

CONTACT INFORMATION:

Name of observer(s): Julie Ellis / Kasey Makenzie

Affiliation: _____

Mailing Address: AECOM Canada Ltd., 105 Commerce Valley Drive West, 7th Floor, Markham, ON L3T 7W3, Canada

Phone Number: 705.797.3283 Email: julie.ellis@aecom.com

PROPERTY INFORMATION:

Site name: Pool 32 Pond ID: _____

Property Address: _____

UTM Coordinates (NAD83): _____ E _____ N (NOT Lat, Long)

(Do not record UTM of each minnow trap, only one coordinate per pond or road location is required)

Land Ownership: Public Private Both

LANDOWNER INFORMATION:

Name: MTO Property Section

Mailing Address: _____

Jefferson Salamander
Presence/Absence Reporting Form



Wildlife Scientific Collector's Authorization # 1095107
ESA Permit # GU-B-004-18

SAMPLING INFORMATION:

Date(s) of sampling: March 19-20, 2020 (dd/mm/yyyy)

Survey Type (circle one):

Minnow Trap Cover Board Road Pitfall Trap Visual Incidental

Sample Type (circle all that apply):

Tail Tip Roadkill Larvae Egg Mass Visual Observation

Search Effort (time spent, number of minnow traps etc.):

6 traps x 12 hrs

of salamanders observed: _____

Number of Samples Taken:

of adult tail tips: _____

mortalities: _____

of larvae: _____

of larvae tail tips: _____

roadkills: _____

HABITAT INFORMATION:

Average Pond Depth (m): _____

Pond Description: _____

Terrestrial Vegetation Community Type: _____

Other amphibians observed or heard: _____

Egg Attachment Sites Present: Yes No Unknown

Suitable Hydroperiod for Breeding: Yes No Unknown

Photos Taken: Yes No Photo #: _____

SECTION B – TO BE FILLED OUT BY DR. BOGART

Date samples received: _____ (dd/mm/yyyy)

Condition of samples received: _____

JPB #(s): _____



Maps (Please ensure road names and UTM coordinates are clearly visible)



Jefferson Salamander
Presence/Absence Reporting Form



Wildlife Scientific Collector's Authorization # 1095107
ESA Permit # GU-B-004-18

Instructions:

- You must complete a separate form for each pond sampled.
- Each form must be completed in its entirety (including permit numbers).
- Attach two orthophotos showing the location of the pond labelled with UTM coordinates (see example provided):
 - Map 1 must show the pond and local roads or features.
 - Map 2 will be a close-up of the pond (suggested scale 1:1000).
- Pond nomenclature must be consistent for all maps and reports.
- All conditions as per the WSCA and ESA permits must be followed.

Submit this form along with any samples to Dr. Jim Bogart (with permission) at the University of Guelph; 519-824-4120 (extension 58728). Copies of this form (including forms containing negative observations) must also be submitted to the authorizing MNR District Office along with the ESA permit and WSCA report.

SECTION A – TO BE FILLED OUT BY THE COLLECTOR

Search Result (circle one): Positive Negative

PROJECT TITLE: Highway 401/6

CONTACT INFORMATION:

Name of observer(s): Julie Ellis / Kasey Mackenzie

Affiliation: _____

Mailing Address: AECOM Canada Ltd., 105 Commerce Valley Drive West, 7th Floor, Markham, ON L3T 7W3, Canada

Phone Number: 705.797.3283 Email: julie.ellis@aecom.com

PROPERTY INFORMATION:

Site name: Pond - 32 Pond ID: _____

Property Address: _____

UTM Coordinates (NAD83): _____ E _____ N (NOT Lat, Long)

(Do not record UTM of each minnow trap, only one coordinate per pond or road location is required)

Land Ownership: Public Private Both

LANDOWNER INFORMATION:

Name: MTO Property Section

Mailing Address: _____

Jefferson Salamander 
Presence/Absence Reporting Form

Wildlife Scientific Collector's Authorization # 1095107
ESA Permit # GU-B-004-18

SAMPLING INFORMATION:

Date(s) of sampling: March 29-30, 2020 (dd/mm/yyyy)

Survey Type (circle one):

Minnow Trap Cover Board Road Pitfall Trap Visual Incidental

Sample Type (circle all that apply):

Tail Tip Roadkill Larvae Egg Mass Visual Observation

Search Effort (time spent, number of minnow traps etc.):

6 traps x 12 hours

of salamanders observed: 25 + 18 newts

Number of Samples Taken:

of adult tail tips: 26

mortalities: 0

of larvae: 0

of larvae tail tips: 0

roadkills: 0

HABITAT INFORMATION:

Average Pond Depth (m): _____

Pond Description: _____

Terrestrial Vegetation Community Type: _____

Other amphibians observed or heard: WOFR SPDE

Egg Attachment Sites Present: Yes No Unknown

Suitable Hydroperiod for Breeding: Yes No Unknown

Photos Taken: Yes No Photo #: _____

SECTION B – TO BE FILLED OUT BY DR. BOGART

Date samples received: _____ (dd/mm/yyyy)

Condition of samples received: _____

JPB #(s): _____



Maps (Please ensure road names and UTM coordinates are clearly visible)



Appendix C

Vegetation Communities and Plants





Appendix C1. Ecological Land Classification Descriptions



Appendix C1: ELC Community Descriptions

Property ID	ELC Code	ELC Inclusion/ Complex	ELC Description
G128	CUW1	CUM1-1	Dominant canopy species included Norway maple (<i>Acer platanoides</i>), hybrid crack willow (<i>Salix X rubens</i>) and Norway spruce (<i>Picea abies</i>). The sub canopy layer consisted of Scots pine (<i>Pinus sylvestris</i>), and to a lesser extent, American elm (<i>Ulmus Americana</i>). The shrub layer was comprised of common buckthorn (<i>Rhamnus cathartica</i>) and Russian olive (<i>Elaeagnus angustifolia</i>). Dominant ground cover species included awlness brome (<i>Bromus inermis</i>), Kentucky blue grass (<i>Poa pratensis</i>) and tall goldenrod (<i>Solidago gigantea</i>).
G128	CUP3	CUM1-1	Scots pine, white pine (<i>Pinus strobus</i>), tamarack (<i>Larix laricina</i>), and black locust (<i>Robinia pseudo-acacia</i>) dominated in the canopy. The shrub layer was comprised of common buckthorn, Russian olive and tatarian honeysuckle (<i>Lonicera tatarica</i>). Dominant ground cover species included awlness brome, orchard grass (<i>Dactylis glomerata</i>) and tall goldenrod. This survey was completed from the roadside.
P006	FOD5-2	-	Sugar maple (<i>Acer saccharum</i>), white ash (<i>Fraxinus americana</i>), and American basswood (<i>Tilia americana</i>) dominated in the canopy and sub canopy. Shrub cover included common buckthorn, tatarian honeysuckle and wild red raspberry. Dominant herbaceous species included goldenrod species (<i>Solidago sp.</i>), Kentucky bluegrass and geranium sp. (<i>geranium sp.</i>).
ROW	FOD5-2	-	Sugar maple (<i>Acer saccharum</i>), white ash (<i>Fraxinus americana</i>), and American basswood (<i>Tilia americana</i>) dominated in the canopy and sub canopy. Shrub cover included common buckthorn, tatarian honeysuckle and wild red raspberry. Dominant herbaceous species included goldenrod species (<i>Solidago sp.</i>), Kentucky bluegrass and geranium sp. (<i>geranium sp.</i>).
P009	FOD5-2	CUT1	The canopy and sub canopy were dominated by sugar maple with American beech (<i>Fagus grandifolia</i>). The shrub layer comprised of species such as common buckthorn, alternate-leaved dogwood (<i>Cornus alternifolia</i>) and sugar maple. Groundcover consisted of yellow trout-lily (<i>Erythronium americanum</i>), cutleaf toothwort (<i>Cardamine concatenata</i>), enchanter's-nightshade (<i>Circaea lutetiana</i>) and sugar maple.
P009b	FOD5-2	CUT1	The canopy and sub canopy were dominated by sugar maple with American beech (<i>Fagus grandifolia</i>). The shrub layer comprised of species such as common buckthorn, alternate-leaved dogwood (<i>Cornus alternifolia</i>) and sugar maple. Groundcover consisted of yellow trout-lily (<i>Erythronium americanum</i>), cutleaf toothwort (<i>Cardamine concatenata</i>), enchanter's-nightshade (<i>Circaea lutetiana</i>) and sugar maple.
ROW	FOD5-2	CUT1	The canopy and sub canopy were dominated by sugar maple with American beech (<i>Fagus grandifolia</i>). The shrub layer comprised of species such as common buckthorn, alternate-leaved dogwood (<i>Cornus alternifolia</i>) and sugar maple. Groundcover consisted of yellow trout-lily (<i>Erythronium americanum</i>), cutleaf toothwort (<i>Cardamine concatenata</i>), enchanter's-nightshade (<i>Circaea lutetiana</i>) and sugar maple.
ROW	CUP3-2	CUW1/CUM1-1	Coniferous species were dominant within the canopy layer with white pine and Norway spruce as the most abundant. The sub canopy layer consisted of white pine, Norway spruce and sugar maple. The shrub layer was comprised of common buckthorn and tatarian honeysuckle. Dominant ground cover species included Kentucky blue grass, awlness brome and orchard grass. This survey was completed from the roadside.
P010	CUP3	-	Scots pine dominated in the canopy and sub canopy. Shrub cover was comprised of species such as common buckthorn and tatarian honeysuckle. Dominant herbaceous species included heart-leaved aster (<i>Symphotrichum cordifolium</i>), early goldenrod (<i>Solidago juncea</i>) and common buckthorn.
P010, P010a, P011	CUP3	SAS1 / CUM1-1	The dominant species was Scots pine at over 60% cover in the sub canopy. Dominant herbaceous species included heart-leaved aster (<i>Symphotrichum cordifolium</i>), early goldenrod and common buckthorn. Shrub cover was comprised of species such as common buckthorn and tatarian honeysuckle.
P010	CUP3-2	CUM1-1	White pine and Scots pine were dominant, consisting of more than 60% of the canopy cover. The sub canopy also consisted of white pine, Scots pine with some American elm present. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry (<i>Prunus virginiana</i>). Ground cover was dominated by common buckthorn, common dandelion (<i>Taraxacum officinale</i>) and thicket-creeper (<i>Parthenocissus inserta</i>).
ROW	CUP3-2	CUM1-1	White pine, Scots pine was dominant and consisted of more than 60% of the canopy cover. The sub canopy contained white pine, Scots pine and American elm. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry. Ground cover was dominated by common buckthorn, common dandelion and thicket-creeper.
P011	CUP3-2	CUM1-1	White pine, Scots pine was dominant and consisted of more than 60% of the canopy cover. The sub canopy contained white pine, Scots pine and American elm. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry. Ground cover was dominated by common buckthorn, common dandelion and thicket-creeper.
P011	CUP3-3	CUM1-1	Scots pine and white pine dominated the community representing more than 60% of the canopy. The sub canopy consisted of white pine, Scots pine and Norway spruce. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry. Ground cover was dominated by common dandelion and heal-all (<i>Prunella vulgaris</i>).
ROW	CUP3-3	CUM1-1	Scots pine and white pine dominated the community representing more than 60% of the canopy. The sub canopy consisted of white pine, Scots pine and Norway spruce. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry. Ground cover was dominated by common dandelion and heal-all (<i>Prunella vulgaris</i>).
P019	CUP3-3	CUM1-1	Scots pine and white pine dominated within the canopy cover. The sub canopy consisted of white pine, Scots pine and Norway spruce. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry. The ground layer was dominated by common dandelion and heal-all.
P019a, P019b	CUP3-3	CUM1-1	Scots pine and white pine dominated within the canopy cover. The sub canopy consisted of white pine, Scots pine and Norway spruce. Shrub species included common buckthorn, tatarian honeysuckle and choke cherry. The ground layer was dominated by common dandelion and heal-all.
P019, P019b	CUW1	-	Dominant tree species included black Scots pine, Manitoba maple (<i>Acer negundo</i>), trembling aspen and basswood. Shrub species included common buckthorn and tatarian honeysuckle. The ground layer was dominated by awnless brome, orchard grass, Kentucky bluegrass and Philadelphia fleabane (<i>Erigeron philadelphicus</i>).
P020	CUW1	-	Dominant tree species included black Scots pine, Manitoba maple (<i>Acer negundo</i>), trembling aspen and basswood. Shrub species included common buckthorn and tatarian honeysuckle. The ground layer was dominated by awnless brome, orchard grass, Kentucky bluegrass and Philadelphia fleabane (<i>Erigeron philadelphicus</i>).
P011	FOD5	-	This community could not be visited due to site access constraints and was delineated though the use of aerial photo interpretation.
P019	FOD5	-	This community could not be visited due to site access constraints and was delineated though the use of aerial photo interpretation.
P009	FOD5-2	-	This dry-fresh sugar maple deciduous forest was located at the south end of P009. Dominant canopy species included sugar maple and American beech. The sub canopy consisted predominantly of sugar maple and choke cherry. The shrub layer comprised of choke cherry and common buckthorn. Groundcover consisted of broadleaf enchanter's-nightshade, garlic mustard (<i>Alliaria petiolata</i>) and sugar maple.
P009	FOD5-2	-	The canopy was dominated by sugar maple and American beech. The sub canopy consisted predominantly of sugar maple, American beech and Ironwood (<i>Ostrya virginiana</i>). The shrub layer comprised of entirely of common buckthorn. The ground layer consisted of yellow trout-lily, broadleaf enchanter's-nightshade and sugar maple.
P009a	FOD5-2	-	The canopy was dominated by sugar maple and American beech. The sub canopy consisted predominantly of sugar maple, American beech and Ironwood (<i>Ostrya virginiana</i>). The shrub layer comprised of entirely of common buckthorn. The ground layer consisted of yellow trout-lily, broadleaf enchanter's-nightshade and sugar maple.
ROW	FOD5-2	-	The canopy was dominant sugar maple and American beech. The sub canopy consisted predominantly of sugar maple, American beech and Ironwood. The shrub layer comprised entirely of common buckthorn. The ground layer consisted of yellow trout-lily, broadleaf enchanter's-nightshade and sugar maple.
P014a	FOD5-2	-	The canopy was dominant sugar maple and American beech. The sub canopy consisted predominantly of sugar maple, American beech and Ironwood. The shrub layer comprised entirely of common buckthorn. The ground layer consisted of yellow trout-lily, broadleaf enchanter's-nightshade and sugar maple.
P014	FOD5-2	-	The canopy was dominant sugar maple and American beech. The sub canopy consisted predominantly of sugar maple, American beech and Ironwood. The shrub layer comprised entirely of common buckthorn. The ground layer consisted of yellow trout-lily, broadleaf enchanter's-nightshade and sugar maple.
P012a	FOD5-6	-	The canopy was dominated by sugar maple, American basswood, white ash, and black cherry (<i>Prunus serotina</i>). The shrub layer was consisted of choke cherry, common buckthorn, and white ash. The herbaceous layer was dominated by yellow trout lily and jack-in-the-pulpit (<i>Arisaema triphyllum</i>).
P012a	FOD6-4	CUP3-3	The canopy was dominated by sugar maple, white elm, American basswood, and black Ash (<i>Fraxinus nigra</i>). The shrub layer was dominated by common buckthorn, choke cherry, and white elm. The herbaceous layer was dominated by scouring rush (<i>Equisetum hyemale</i>), graceful sedge (<i>Carex gracillima</i>), smooth brome, and orchard grass.

Appendix C1: ELC Community Descriptions

Property ID	ELC Code	ELC Inclusion/Complex	ELC Description
P012, P018a, P018d	FOD6-4	CUP3-3	The canopy was dominated by sugar maple, white elm, American basswood, and black Ash (<i>Fraxinus nigra</i>). The shrub layer was dominated by common buckthorn, choke cherry, and white elm. The herbaceous layer was dominated by scouring rush (<i>Equisetum hyemale</i>), graceful sedge (<i>Carex gracillima</i>), smooth brome, and orchard grass.
ROW	FOD5-6	-	The canopy was dominated by sugar maple, American basswood, white ash, and black cherry. The shrub layer was consisted of choke cherry, common buckthorn, and white ash. The herbaceous layer was dominated by yellow trout lily and jack-in-the-pulpit.
P018a	FOD5-6	-	The canopy was dominated by sugar maple, American basswood, white ash, and black cherry. The shrub layer was consisted of choke cherry, common buckthorn, and white ash. The herbaceous layer was dominated by yellow trout lily and jack-in-the-pulpit.
P012	FOD5-6	-	The canopy was dominated by sugar maple, American basswood, white ash, and black cherry. The shrub layer was consisted of choke cherry, common buckthorn, and white ash. The herbaceous layer was dominated by yellow trout lily and jack-in-the-pulpit.
P012a	CUM1-1	-	The community lacked a defined canopy or sub canopy layer. The shrub layer consisted of red-osier dogwood, common buckthorn and tatarian honeysuckle. The ground layer was the dominant vegetation form within the community and consisted of awnless brome orchard grass, blue-joint grass (<i>Calamagrostis canadensis</i>) and common dandelion .
P018a	CUM1-1	-	The community lacked a defined canopy or sub canopy layer. The ground layer was the dominant vegetation form within the community and consisted of daisy fleabane, Philadelphia fleabane, black medick (<i>Medicago lupulina</i>) and yellow wood-sorrel (<i>Oxalis stricta</i>).
P018	FOD7	-	The canopy was dominated by trembling aspen, green ash (<i>Fraxinus pensylvanica</i>), freeman's maple (<i>Acer freemanii</i>) and black walnut. The sub canopy consisted of trembling aspen, green ash and choke cherry. Shrub species were dominated by common buckthorn, red-osier dogwood (<i>Cornus sericea</i>) and grey dogwood (<i>Cornus racemosa</i>). The ground layer could not be recorded as the survey was completed from the roadside, due to access restrictions.
P018c	FOD7	-	The canopy was dominated by trembling aspen, green ash (<i>Fraxinus pensylvanica</i>), freeman's maple (<i>Acer freemanii</i>) and black walnut. The sub canopy consisted of trembling aspen, green ash and choke cherry. Shrub species were dominated by common buckthorn, red-osier dogwood (<i>Cornus sericea</i>) and grey dogwood (<i>Cornus racemosa</i>). The ground layer could not be recorded as the survey was completed from the roadside, due to access restrictions.
P021	FOD7	-	Trembling aspen, green ash, freeman's maple and black willow (<i>Salix nigra</i>). Trembling aspen, green ash and black cherry made up sub canopy. Shrub species were dominated by common buckthorn, red-osier dogwood and grey dogwood. The ground layer could not be recorded as the survey was completed from the roadside, due to access restrictions.
P021a	FOD7	-	Trembling aspen, green ash, freeman's maple and black willow (<i>Salix nigra</i>). Trembling aspen, green ash and black cherry made up sub canopy. Shrub species were dominated by common buckthorn, red-osier dogwood and grey dogwood. The ground layer could not be recorded as the survey was completed from the roadside, due to access restrictions.
P022, P023	FOD7	-	Trembling aspen, green ash, freeman's maple and black willow (<i>Salix nigra</i>). Trembling aspen, green ash and black cherry made up sub canopy. Shrub species were dominated by common buckthorn, red-osier dogwood and grey dogwood. The ground layer could not be recorded as the survey was completed from the roadside, due to access restrictions.
P025	CUW1	-	The canopy consisted of Norway spruce, sugar maple, eastern white cedar (<i>Thuja occidentalis</i>) and black walnut. The sub canopy consisted predominantly of white pine, Norway spruce and choke cherry. The shrub layer comprised of eastern white cedar and tatarian honeysuckle. Ground cover could not be recorded as the survey was completed from the roadside, due to access restrictions.
ROW	CUW1	-	The canopy consisted of Norway spruce, sugar maple, eastern white cedar (<i>Thuja occidentalis</i>) and black walnut. The sub canopy consisted predominantly of white pine, Norway spruce and choke cherry. The shrub layer comprised of eastern white cedar and tatarian honeysuckle. Ground cover could not be recorded as the survey was completed from the roadside, due to access restrictions.
P026	CUW1	-	The canopy consisted of Norway spruce, sugar maple, eastern white cedar (<i>Thuja occidentalis</i>) and black walnut. The sub canopy consisted predominantly of white pine, Norway spruce and choke cherry. The shrub layer comprised of eastern white cedar and tatarian honeysuckle. Ground cover could not be recorded as the survey was completed from the roadside, due to access restrictions.
P018a	FOC2-2	CUM1-1	The canopy consisted of white cedar and Norway spruce with lesser amounts of white pine and tamarack also present. The sub canopy was entirely dominated by white cedar and choke cherry. The shrub layer consisted of glossy buckthorn (<i>Fragula alnus</i>) and common buckthorn. The ground layer was dominated by Pennsylvania sedge (<i>Carex pensylvanica</i>), coltsfoot (<i>Tussilago farfara</i>) and white cedar.
P018d, ROW	FOC2-2	CUM1-1	The canopy consisted of white cedar and Norway spruce with lesser amounts of white pine and tamarack also present. The sub canopy was entirely dominated by white cedar and choke cherry. The shrub layer consisted of glossy buckthorn (<i>Fragula alnus</i>) and common buckthorn. The ground layer was dominated by Pennsylvania sedge (<i>Carex pensylvanica</i>), coltsfoot (<i>Tussilago farfara</i>) and white cedar.
P015	CUW1	-	The community is dominated by eastern white cedar. No sub canopy, shrub or ground cover layers were present.
P015	FOC2-2	-	The community is dominated by eastern white cedar. No sub canopy, shrub or ground cover layers were present.
P014	CUW1	-	The canopy consisted of sugar maple, eastern white cedar, Norway spruce, and trembling aspen. The sub canopy consisted predominantly of eastern white cedar, sugar maple and trembling aspen. Shrub layer was dominated by common buckthorn and tatarian honeysuckle. The ground layer was dominated by awnless brome and goldenrod species.
P015	FOC2-2	-	The community was dominated by eastern white cedar. No shrub or ground cover layers were present.
P016	FOC2-2	-	The community was dominated by eastern white cedar. No shrub or ground cover layers were present.
P014	CUW1	CUM1-1	The canopy consisted of eastern white cedar and sugar maple, while eastern white cedar and Scots pine were dominant within the shrub layer. Within the ground layer tatarian honeysuckle, ribgrass (<i>Plantago lanceolata</i>), and Philadelphia fleabane were abundant.
P017	CUW1	CUM1-1	The canopy consisted of eastern white cedar and sugar maple, while eastern white cedar and Scots pine were dominant within the shrub layer. Within the ground layer tatarian honeysuckle, ribgrass (<i>Plantago lanceolata</i>), and Philadelphia fleabane were abundant.
P017a	CUW1	CUM1-1	The canopy consisted of eastern white cedar and sugar maple, while eastern white cedar and Scots pine were dominant within the shrub layer. Within the ground layer tatarian honeysuckle, ribgrass (<i>Plantago lanceolata</i>), and Philadelphia fleabane were abundant.
ROW	CUW1	CUM1-1	The canopy consisted of eastern white cedar and sugar maple, while eastern white cedar and Scots pine were dominant within the shrub layer. Within the ground layer tatarian honeysuckle, ribgrass (<i>Plantago lanceolata</i>), and Philadelphia fleabane were abundant.
P029	CUP3	-	Scots pine and trembling aspen dominated the canopy; while the sub canopy consisted of Scots pine, black ash and eastern white cedar. The shrub layer included white cedar, green ash and common buckthorn. The ground layer dominated by climbing poison-ivy (<i>Toxicodendron radicans</i>) and wood horsetail (<i>Equisetum sylvaticum</i>).
P029a	CUP3	-	Scots pine and trembling aspen dominated the canopy; while the sub canopy consisted of Scots pine, black ash and eastern white cedar. The shrub layer included white cedar, green ash and common buckthorn. The ground layer dominated by climbing poison-ivy (<i>Toxicodendron radicans</i>) and wood horsetail (<i>Equisetum sylvaticum</i>).
P028	CUP3	-	Scots pine and trembling aspen dominated the canopy; while the sub canopy consisted of Scots pine, black ash and eastern white cedar. The shrub layer included white cedar, green ash and common buckthorn. The ground layer dominated by climbing poison-ivy (<i>Toxicodendron radicans</i>) and wood horsetail (<i>Equisetum sylvaticum</i>).
P028	CUP3	-	The canopy was dominated by Norway spruce and Scots pine; while the sub canopy was contained eastern white cedar, green ash and Norway spruce. Shrub and ground layers could not be observed the survey was completed from the roadside, due to access restrictions.
P029	CUP3	-	The canopy was dominated by Norway spruce and Scots pine; while the sub canopy was contained eastern white cedar, green ash and Norway spruce. Shrub and ground layers could not be observed the survey was completed from the roadside, due to access restrictions.

Appendix C1: ELC Community Descriptions

Property ID	ELC Code	ELC Inclusion/Complex	ELC Description
ROW	CUP3	-	The canopy was dominated by Norway spruce and Scots pine; while the sub canopy was contained eastern white cedar, green ash and Norway spruce. Shrub and ground layers could not be observed the survey was completed from the roadside, due to access restrictions.
P031	FOD5-6	-	The canopy was dominated by sugar maple with, American basswood, white elm and green Ash. The sub canopy and shrub layer were both dominated by common buckthorn with green ash, choke cherry and Riverbank Grape (<i>Vitis riparia</i>). The ground layer was consisted of green ash, goldenrod species, large-leaved aster (<i>Eurybia macrophylla</i>), and blue cohosh (<i>Caulophyllum thalictroides</i>).
P029	FOD5-6	-	The canopy was dominated by sugar maple with, American basswood, white elm and green Ash. The sub canopy and shrub layer were both dominated by common buckthorn with green ash, choke cherry and Riverbank Grape (<i>Vitis riparia</i>). The ground layer was consisted of green ash, goldenrod species, large-leaved aster (<i>Eurybia macrophylla</i>), and blue cohosh (<i>Caulophyllum thalictroides</i>).
ROW	FOD5-6	-	The canopy was dominated by sugar maple with, American basswood, white elm and green Ash. The sub canopy and shrub layer were both dominated by common buckthorn with green ash, choke cherry and Riverbank Grape (<i>Vitis riparia</i>). The ground layer was consisted of green ash, goldenrod species, large-leaved aster (<i>Eurybia macrophylla</i>), and blue cohosh (<i>Caulophyllum thalictroides</i>).
ROW	FOD5-6	-	The canopy was dominated by sugar maple with, American basswood, white elm and green Ash. The sub canopy and shrub layer were both dominated by common buckthorn with green ash, choke cherry and Riverbank Grape (<i>Vitis riparia</i>). The ground layer was consisted of green ash, goldenrod species, large-leaved aster (<i>Eurybia macrophylla</i>), and blue cohosh (<i>Caulophyllum thalictroides</i>).
P010	SWD3-2	-	The canopy was dominated by silver maple with American beech white ash and sugar maple also present. Shrub cover consisted of common buckthorn, silver maple and sugar maple. The ground cover layer was dominated by common buckthorn.
P021a	MAS2-1	MAM2-2	A canopy was not present within the community; however, a sparse sub canopy that consisted of hybrid crack willow, green ash and eastern white cedar was present. The shrub layer was comprised of black-berry elder (<i>Sambucus nigra</i>) and silky dogwood. The ground layer was the dominant vegetation form within the community and consisted of broad-leaved cattail, reed canary grass, tussock sedge and spotted jewelweed (<i>Impatiens capensis</i>). The ELC survey was completed from the roadside, due to access restrictions.
P021	MAS2-1	MAM2-2	A canopy was not present within the community; however, a sparse sub canopy that consisted of hybrid crack willow, green ash and eastern white cedar was present. The shrub layer was comprised of black-berry elder (<i>Sambucus nigra</i>) and silky dogwood. The ground layer was the dominant vegetation form within the community and consisted of broad-leaved cattail, reed canary grass, tussock sedge and spotted jewelweed (<i>Impatiens capensis</i>). The ELC survey was completed from the roadside, due to access restrictions.
ROW	MAS2-1	MAM2-2	A canopy was not present within the community; however, a sparse sub canopy that consisted of hybrid crack willow, green ash and eastern white cedar was present. The shrub layer was comprised of black-berry elder (<i>Sambucus nigra</i>) and silky dogwood. The ground layer was the dominant vegetation form within the community and consisted of broad-leaved cattail, reed canary grass, tussock sedge and spotted jewelweed (<i>Impatiens capensis</i>). The ELC survey was completed from the roadside, due to access restrictions.
P021a	SWT2-5	-	A canopy was not present within the community however a sparse sub canopy of black willow, green ash and American elm. The shrub layer represented the dominate vegetation form of the community and consisted of red-osier dogwood and gray dogwood. The ground layer consisted of sensitive fern, field horsetail (<i>Equisetum arvense</i>) and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
P021	SWT2-5	-	A canopy was not present within the community however a sparse sub canopy of black willow, green ash and American elm. The shrub layer represented the dominate vegetation form of the community and consisted of red-osier dogwood and gray dogwood. The ground layer consisted of sensitive fern, field horsetail (<i>Equisetum arvense</i>) and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
P018c	MAS2-1	SWT2-5	Robust emergent were the dominant vegetation form in this community and was dominated by broad-leaved cattail, tussock sedge and sensitive fern. The ELC survey was completed from the roadside, due to access restrictions.
P018	MAS2-1	SWT2-5	Robust emergent were the dominant vegetation form in this community and was dominated by broad-leaved cattail, tussock sedge and sensitive fern. The ELC survey was completed from the roadside, due to access restrictions.
P023	SWC	-	This community could not be visited due to site access constraints and was delineated though the use of aerial photo interpretation.
P023	MAS	-	This community could not be visited due to site access constraints and was delineated though the use of aerial photo interpretation.
P024	MAS2-1	-	A canopy was not present within the community; however, a sparse sub canopy of American elm was present. The shrub layer was comprised of common buckthorn and American basswood. The ground layer was the dominate vegetation form within the community and consisted of broad-leaved cattail and narrow-leaved cattail (<i>Typha angustifolia</i>) and reed canary grass. The ELC survey was completed from the roadside, due to access restrictions.
P024	SWD3	-	The canopy was dominated by Freeman's maple, black walnut and green ash. The sub canopy consisted of included Freeman's maple, American elm and black cherry. The shrub layer consisted of common buckthorn, black-berry elder and red-osier dogwood. The ELC survey was completed from the roadside, due to access restrictions.
P018c	MAS2-1	SWT2	The ground layer was the dominant vegetation form in this community and consisted of broad-leaved cattail, reed canary grass and goldenrod species.
P018	MAS2-1	SWT2	The ground layer was the dominant vegetation form in this community and consisted of broad-leaved cattail, reed canary grass and goldenrod species.
ROW	MAS2-1	SWT2	The ground layer was the dominant vegetation form in this community and consisted of broad-leaved cattail, reed canary grass and goldenrod species.
P018	SWD3	-	The canopy was dominated by freeman's maple, white elm and black willow. Freeman's maple and white cedar made up the sub canopy. The shrub layer consisted of young freeman's maple. The ground cover layer was dominated by broad-leaved cattail and sedge species. The ELC survey was completed from the roadside, due to access restrictions.
P024	SWD3	-	The canopy was dominated by freeman's maple, white elm and black willow. Freeman's maple and white cedar made up the sub canopy. The shrub layer consisted of young freeman's maple. The ground cover layer was dominated by broad-leaved cattail and sedge species. The ELC survey was completed from the roadside, due to access restrictions.
P018c	SWD3	-	The canopy was dominated by freeman's maple, white elm and black willow. Freeman's maple and white cedar made up the sub canopy. The shrub layer consisted of young freeman's maple. The ground cover layer was dominated by broad-leaved cattail and sedge species. The ELC survey was completed from the roadside, due to access restrictions.
P023, P023a, ROW	MAM2-2	-	A canopy was absent; however, a sparse sub canopy that consisted of green ash and Freeman's maple was present. The ground layer was the dominant vegetation form within the community and consisted of reed canary grass and broad-leaved cattail. The ELC survey was completed from the roadside, due to access restrictions.
P018	SWD7	FOC2-2	The canopy was dominated by white birch, yellow birch (<i>Betula alleghaniensis</i>), eastern white cedar and trembling aspen. The sub canopy included glossy buckthorn, eastern white cedar, yellow birch and white birch. The tall shrub layer consisted of glossy buckthorn, eastern white cedar and common buckthorn. Dominant ground cover species included field horsetail, sarsaparilla (<i>Aralia nudicaulis</i>), bitter nightshade and dwarf raspberry (<i>Rubus pubescens</i>).
P018d	SWD7	FOC2-2	The canopy was dominated by white birch, yellow birch (<i>Betula alleghaniensis</i>), eastern white cedar and trembling aspen. The sub canopy included glossy buckthorn, eastern white cedar, yellow birch and white birch. The tall shrub layer consisted of glossy buckthorn, eastern white cedar and common buckthorn. Dominant ground cover species included field horsetail, sarsaparilla (<i>Aralia nudicaulis</i>), bitter nightshade and dwarf raspberry (<i>Rubus pubescens</i>).
P018	SWT3	MAS3-1	The community lacked a defined canopy and sub canopy. The shrub layer was the dominate vegetation form and consisted of tamarack, black ash, glossy buckthorn, black willow and eastern white cedar. The ground layer consisted of horsetail species (<i>Equisetum sp.</i>), dwarf raspberry and purple angelica (<i>Angelica atropurpurea</i>).
ROW	SWT3	MAS3-1	The community lacked a defined canopy and sub canopy. The shrub layer was the dominate vegetation form and consisted of tamarack, black ash, glossy buckthorn, black willow and eastern white cedar. The ground layer consisted of horsetail species (<i>Equisetum sp.</i>), dwarf raspberry and purple angelica (<i>Angelica atropurpurea</i>).

Appendix C1: ELC Community Descriptions

Property ID	ELC Code	ELC Inclusion/ Complex	ELC Description
P018a	SWT3	MAS3-1	The community lacked a defined canopy and sub canopy. The shrub layer was the dominate vegetation form and consisted of tamarack, black ash, glossy buckthorn, black willow and eastern white cedar. The ground layer consisted of horsetail species (<i>Equisetum sp.</i>), dwarf raspberry and purple angelica (<i>Angelica atropurpurea</i>).
P018d	SWT3	MAS3-1	The community lacked a defined canopy and sub canopy. The shrub layer was the dominate vegetation form and consisted of tamarack, black ash, glossy buckthorn, black willow and eastern white cedar. The ground layer consisted of horsetail species (<i>Equisetum sp.</i>), dwarf raspberry and purple angelica (<i>Angelica atropurpurea</i>).
P018	SWM4-1	MAS3-1	The canopy consisted of eastern white cedar, Norway spruce, tamarack, balsam fir (<i>Abies balsamea</i>), yellow birch, trembling aspen and black ash. The sub canopy consisted of eastern white cedar, yellow birch and green ash. The shrub layer consisted of glossy buckthorn, eastern white cedar and balsam fir. The ground layer consisted of horsetail species, marsh-marigold and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
ROW	SWM4-1	MAS3-1	The canopy consisted of eastern white cedar, Norway spruce, tamarack, balsam fir (<i>Abies balsamea</i>), yellow birch, trembling aspen and black ash. The sub canopy consisted of eastern white cedar, yellow birch and green ash. The shrub layer consisted of glossy buckthorn, eastern white cedar and balsam fir. The ground layer consisted of horsetail species, marsh-marigold and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
P018b	SWM4-1	MAS3-1	The canopy consisted of eastern white cedar, Norway spruce, tamarack, balsam fir (<i>Abies balsamea</i>), yellow birch, trembling aspen and black ash. The sub canopy consisted of eastern white cedar, yellow birch and green ash. The shrub layer consisted of glossy buckthorn, eastern white cedar and balsam fir. The ground layer consisted of horsetail species, marsh-marigold and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
P018	SWT3-1	-	The shrub layer was the dominant vegetation form in this community and consisted of speckled alder (<i>Alnus incana</i>), glossy buckthorn, and red osier dogwood. The ground layer consisted of sensitive fern, marsh-marigold and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
P018b	SWT3-1	-	The shrub layer was the dominant vegetation form in this community and consisted of speckled alder (<i>Alnus incana</i>), glossy buckthorn, and red osier dogwood. The ground layer consisted of sensitive fern, marsh-marigold and tussock sedge. The ELC survey was completed from the roadside, due to access restrictions.
P018	SWC	-	This community could not be visited due to site access constraints and was delineated though the use of aerial photo interpretation.
P027	SWD7-1	-	This community was delineated by roadside.
P014	SWM4-1	MAS3	The canopy was dominated by eastern white cedar and trembling aspen. The sub canopy consisted of eastern white cedar, trembling aspen and sugar maple. The ground layer consisted of sensitive fern, common periwinkle, and marsh marigold.
ROW	SWM4-1	MAS3	The canopy was dominated by eastern white cedar and trembling aspen. The sub canopy consisted of eastern white cedar, trembling aspen and sugar maple. The ground layer consisted of sensitive fern, common periwinkle, and marsh marigold.
P017	SWM4-1	-	The canopy was dominated by eastern white cedar with balsam popular, white ash and yellow birch. Shrub cover consisted of eastern white cedar, white ash and black berry elder. Dominant species within the ground cover layer included Walter's sedge (<i>Carex striata</i>), sensitive fern and wood horsetail.
P017a	SWM4-1	-	The canopy was dominated by eastern white cedar with balsam popular, white ash and yellow birch. Shrub cover consisted of eastern white cedar, white ash and black berry elder. Dominant species within the ground cover layer included Walter's sedge (<i>Carex striata</i>), sensitive fern and wood horsetail.
ROW	SWM4-1	-	The canopy was dominated by eastern white cedar with balsam popular, white ash and yellow birch. Shrub cover consisted of eastern white cedar, white ash and black berry elder. Dominant species within the ground cover layer included Walter's sedge (<i>Carex striata</i>), sensitive fern and wood horsetail.
P014	MAS2-1	MAM2	The ground layer was the dominate vegetation form within the community and consisted of broad-leaved cattail, reed canary grass, water sedge (<i>Carex aquatilis</i>) and sedge species . The shrub layer consisted of glossy buckthorn, red-osier dogwood , silky dogwood and sandbar willow . The canopy layer was comprised of several dead eastern white cedars. A mineral meadow marsh inclusion was present within the community.
P014a	MAS2-1	MAM2	The ground layer was the dominate vegetation form within the community and consisted of broad-leaved cattail, reed canary grass, water sedge (<i>Carex aquatilis</i>) and sedge species . The shrub layer consisted of glossy buckthorn, red-osier dogwood , silky dogwood and sandbar willow . The canopy layer was comprised of several dead eastern white cedars. A mineral meadow marsh inclusion was present within the community.
ROW	MAS2-1	MAM2	The ground layer was the dominate vegetation form within the community and consisted of broad-leaved cattail, reed canary grass, water sedge (<i>Carex aquatilis</i>) and sedge species . The shrub layer consisted of glossy buckthorn, red-osier dogwood , silky dogwood and sandbar willow . The canopy layer was comprised of several dead eastern white cedars. A mineral meadow marsh inclusion was present within the community.
P014a	SWM4-1	-	Dominant canopy species included eastern white cedar and trembling aspen . Eastern white cedar, trembling aspen and sugar maple made up the sub canopy. Dominant ground cover species included sensitive fern, common periwinkle and marsh marigold.
P016a	SWM4-1	-	Dominant canopy species included eastern white cedar and trembling aspen . Eastern white cedar, trembling aspen and sugar maple made up the sub canopy. Dominant ground cover species included sensitive fern, common periwinkle and marsh marigold.
P016	SWM4-1	-	Dominant canopy species included eastern white cedar and trembling aspen . Eastern white cedar, trembling aspen and sugar maple made up the sub canopy. Dominant ground cover species included sensitive fern, common periwinkle and marsh marigold.
P015a	SWM4-1	-	Dominant canopy species included eastern white cedar and trembling aspen . Eastern white cedar, trembling aspen and sugar maple made up the sub canopy. Dominant ground cover species included sensitive fern, common periwinkle and marsh marigold.
P015	SWM4-1	-	Dominant canopy species included eastern white cedar and trembling aspen . Eastern white cedar, trembling aspen and sugar maple made up the sub canopy. Dominant ground cover species included sensitive fern, common periwinkle and marsh marigold.
P014a	MAM2-2	MAS2-1	The ground layer was the dominate vegetation form within the community and consisted of reed canary grass, broad-leaved cattail and spotted jewelweed
P015	MAM2-2	MAS2-1	The ground layer was the dominate vegetation form within the community and consisted of reed canary grass, broad-leaved cattail and spotted jewelweed
P016	MAM2-2	MAS2-1	The ground layer was the dominate vegetation form within the community and consisted of reed canary grass, broad-leaved cattail and spotted jewelweed
ROW	MAM2-2	MAS2-1	The ground layer was the dominate vegetation form within the community and consisted of reed canary grass, broad-leaved cattail and spotted jewelweed
P031	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
ROW	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
P014	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
P014a	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.

Appendix C1: ELC Community Descriptions

Property ID	ELC Code	ELC Inclusion/ Complex	ELC Description
P015	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
P016	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
P017	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
P017a	SWM3	-	The canopy consisted of trembling aspen, white birch, eastern white cedar and green ash. The shrub layer included red-osier dogwood, willow species, riverbank grape and eastern white cedar. Dominant ground cover species included reed canary grass, goldenrod species, Canada thistle (<i>Cirsium arvense</i>) and Joe-pye-weed (<i>Eupatorium maculatum</i>). The ELC survey was completed from the roadside, due to access restrictions.
P031	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
ROW	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
P031a	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
P030a	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
P030	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
P029	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
P028	SWM4-1	-	The canopy was dominated by eastern white cedar with lesser amounts of yellow birch, trembling aspen and white ash. The sub canopy consisted of eastern white cedar yellow birch and white ash. The shrub layer consisted of eastern white cedar, white ash and red osier dogwood. Dominant ground cover species included sensitive fern, poison ivy, and common periwinkle. The ELC survey was completed from the roadside, due to access restrictions.
P028	SWT2	MAS2-1	A sparse canopy was present that consisted of trembling aspen and black ash. The shrub layer was the dominant vegetation form and consisted of glossy buckthorn and silky dogwood. Dominant ground cover species included broad-leaved cattail sensitive fern and enchanter's nightshade.
P028	SWC3-1	OA0/SWT3	The canopy was dominated by eastern white cedar, Norway spruce, balsam poplar and tamarack. The sub canopy consisted of eastern white cedar, balsam fir and black ash. The tall shrub layer consisted of eastern white cedar, glossy buckthorn and balsam fir. Dominant ground cover species included wood horsetail, bulbet bladder fern, oak fern (<i>Gymnocarpium dryopteris</i>) and sensitive fern.
ROW	SWC3-1	OA0/SWT3	The canopy was dominated by eastern white cedar, Norway spruce, balsam poplar and tamarack. The sub canopy consisted of eastern white cedar, balsam fir and black ash. The tall shrub layer consisted of eastern white cedar, glossy buckthorn and balsam fir. Dominant ground cover species included wood horsetail, bulbet bladder fern, oak fern (<i>Gymnocarpium dryopteris</i>) and sensitive fern.
P014	SWD	SWT	This deciduous swamp was in the eastern portion of the property adjacent to one of the properties agricultural fields. Deciduous tree species were dominant in this community with the most frequent species being black willow, trembling aspen and balsam poplar. Shrub cover consisted of red-osier dogwood, common buckthorn, glossy buckthorn and Bebb's willow (<i>Salix bebbiana</i>). Dominant ground cover species included tall buttercup (<i>Ranunculus acris</i>). A swamp thicket inclusion was present within the community.
P028	SWD6-2	-	The canopy was dominated by silver maple with red maple (<i>Acer rubrum</i>), black ash and black cherry. The sub canopy included Freeman's maple, eastern white cedar and trembling aspen. The tall shrub layer consisted of glossy buckthorn and choke cherry. Dominant ground cover species included wood horsetail, eastern bracken-fern and large-leaved aster.
P031	SWM	-	This community could not be visited due to site access constraints and was delineated through the use of aerial photo interpretation.
P030	SWM	-	This community could not be visited due to site access constraints and was delineated through the use of aerial photo interpretation.
P029	SWM	-	This community could not be visited due to site access constraints and was delineated through the use of aerial photo interpretation.
P015	SWM	-	This community could not be visited due to site access constraints and was delineated through the use of aerial photo interpretation.
ROW	SWM	-	This community could not be visited due to site access constraints and was delineated through the use of aerial photo interpretation.
P015	SWT	-	This community was located outside of the updated study area limits and was not visited. The community was delineated through the use of aerial photo interpretation.
P028	SWT	-	This community was located outside of the updated study area limits and was not visited. The community was delineated through the use of aerial photo interpretation.
P027	SWT2-5	-	The shrub layer was the dominate vegetation form and consisted of red osier dogwood, silky dogwood, and narrow leaf willow (<i>Salix exigua</i>). Dominant herbaceous species included reed canary grass and narrow leaf cattail.
P027a	SWT2-5	-	The shrub layer was the dominate vegetation form and consisted of red osier dogwood, silky dogwood, and narrow leaf willow (<i>Salix exigua</i>). Dominant herbaceous species included reed canary grass and narrow leaf cattail.
P027	MAS2-1	OA0	The ground layer was the dominate vegetation form within the community and consisted of broad leaved cattail and common reed and reed canary grass.
P031	SWM4-1	MAS3/ CUT1	The canopy was dominated by eastern white cedar with trembling aspen and white birch. Eastern white cedar, white ash and trembling aspen were present within the sub canopy. The herbaceous layer consisted of eastern bracken fern and sensitive fern.
P005	CUM1-1	CUW	A sparse canopy which consisted of sugar maple, Norway maple and green ash was present. The shrub layer was dominated by tatarian honeysuckle, common buckthorn and Russian olive. The ground layer was the dominate vegetation form within the community and consisted of Kentucky blue grass, orchard grass and awnless brome. The ELC survey was completed from the roadside, due to access restrictions.
ROW	CUM1-1	CUW	A sparse canopy which consisted of sugar maple, Norway maple and green ash was present. The shrub layer was dominated by tatarian honeysuckle, common buckthorn and Russian olive. The ground layer was the dominate vegetation form within the community and consisted of Kentucky blue grass, orchard grass and awnless brome. The ELC survey was completed from the roadside, due to access restrictions.

Appendix C1: ELC Community Descriptions

Property ID	ELC Code	ELC Inclusion/Complex	ELC Description
P009	CUM1-1	-	The community lacked a defined canopy and a sub canopy. The dominant shrubs included common buckthorn, Russian olive and tatarian honeysuckle . The ground layer was the dominant vegetation form within the community and consisted of orchard grass, awnless brome, black medic and ox-eye daisy.
P009a	CUM1-1	-	The community lacked a defined canopy and a sub canopy. The dominant shrubs included common buckthorn, Russian olive and tatarian honeysuckle . The ground layer was the dominant vegetation form within the community and consisted of orchard grass, awnless brome, black medic and ox-eye daisy.
P014	CUM1-1	CUW1	A sparse canopy that consisted of Manitoba maple , American elm , crack willow and silver maple was present . The shrub layer consisted of red-osier dogwood , riverbank grape , Russian olive and tatarian honeysuckle. The ground layer was the dominant vegetation form within the community and consisted of orchard grass , awnless brome , Kentucky bluegrass and reed canary grass
P014a	CUM1-1	CUW1	A sparse canopy that consisted of Manitoba maple , American elm , crack willow and silver maple was present . The shrub layer consisted of red-osier dogwood , riverbank grape , Russian olive and tatarian honeysuckle. The ground layer was the dominant vegetation form within the community and consisted of orchard grass , awnless brome , Kentucky bluegrass and reed canary grass
ROW	CUM1-1	CUW1	The community lacked a defined canopy and a sub canopy. The dominant shrubs included common buckthorn, Russian olive and tatarian honeysuckle . The ground layer was the dominant vegetation form within the community and consisted of orchard grass, awnless brome, black medic and ox-eye daisy.
P014	CUM1-1	-	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of orchard grass , awnless brome , black medic and wild carrot .
P015	CUM1-1	CUT/CUW	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of awnless brome , orchard grass , Kentucky blue grass and common dandelion .
P015a	CUM1-1	CUT/CUW	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of awnless brome , orchard grass , Kentucky blue grass and common dandelion .
P016	CUM1-1	CUT/CUW	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of awnless brome , orchard grass , Kentucky blue grass and common dandelion .
P016a	CUM1-1	CUT/CUW	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of awnless brome , orchard grass , Kentucky blue grass and common dandelion .
P015	CUM1-1	CUT/CUW	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of awnless brome , orchard grass , Kentucky blue grass and common dandelion .
P031	CUM1-1	-	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of awnless brome , orchard grass , timothy grass and quack grass (<i>Elymus repens</i>).
P027a	CUM1-1	-	A sparse canopy of balsam poplar was present. The shrub layer consisted of alder buckthorn (<i>Rhamnus alnifolia</i>) and balsam poplar. The ground layer was the dominant vegetation form within the community and consisted of goldenrod species , aster species, Kentucky blue grass, field horsetail , sedge species and tall buttercup.
P027	CUM1-1	-	A sparse canopy of balsam poplar was present. The shrub layer consisted of alder buckthorn (<i>Rhamnus alnifolia</i>) and balsam poplar. The ground layer was the dominant vegetation form within the community and consisted of goldenrod species , aster species, Kentucky blue grass, field horsetail , sedge species and tall buttercup.
P027	CUM1-1	MAM2	The community lacked a defined canopy or sub canopy layer. The shrub layer consisted of sandbar willow , gray dogwood and tatarian honeysuckle the ground layer was the dominant vegetation form within the community and consisted of grasses, wild carrot , common dandelion , coltsfoot and aster species (<i>symphyotrichum sp.</i>).
P027a	CUM1-1	MAM2	The community lacked a defined canopy or sub canopy layer. The shrub layer consisted of sandbar willow , gray dogwood and tatarian honeysuckle the ground layer was the dominant vegetation form within the community and consisted of grasses, wild carrot , common dandelion , coltsfoot and aster species (<i>symphyotrichum sp.</i>).
ROW	CUM1-1	MAM2	The community lacked a defined canopy or sub canopy layer. The shrub layer consisted of sandbar willow , gray dogwood and tatarian honeysuckle the ground layer was the dominant vegetation form within the community and consisted of grasses, wild carrot , common dandelion , coltsfoot and aster species (<i>symphyotrichum sp.</i>).
ROW	CUM1-1	MAM2	The community lacked a defined canopy or sub canopy layer. The shrub layer consisted of sandbar willow , gray dogwood and tatarian honeysuckle the ground layer was the dominant vegetation form within the community and consisted of grasses, wild carrot , common dandelion , coltsfoot and aster species (<i>symphyotrichum sp.</i>).
ROW	CUM1-1	MAM2-2	The community lacked a defined canopy, sub canopy or shrub layer. The ground layer was the dominant vegetation form within the community and consisted of orchard grass, awnless brome, goldenrod species, reed canary grass and narrow-leaved cattail.

**Appendix C2.
Plant List**

Appendix C2: Plant List

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	GOSEWIC STATUS	GLOBAL STATUS	LOCAL STATUS WELL/DUFF	P005	P006	P009	P010	P011	P012	P014	P015	P016	P017	P018	P019	P020	P021	P022	P023	P024	P026	P027	P028	P029	P030	P031				
<i>Eurybia</i>	<i>macrophylla</i>	Large-leaved Aster	5	5		S5		G5																							X			X		
<i>Symphyotrichum</i>	<i>cordifolium</i>	Heart-leaved Aster	5	5		S5		G5							X							X												X		
<i>Symphyotrichum</i>	<i>lanceolatum</i>	Tall White Aster	3	-3		S5		G5T?							X		X	X																		
<i>Symphyotrichum</i>	<i>lateriflorum</i>	Calico Aster	3	-2		S5		G5T5																										X		
<i>Symphyotrichum</i>	<i>novae-angliae</i>	New England Aster	2	-3		S5		G5							X		X	X																X		
<i>Symphyotrichum</i>	<i>puniceum</i> var. <i>puniceum</i>	Purple-stemmed Aster	6	-5		S5		G5T?																										X		
<i>Carduus</i>	<i>nutans</i> ssp. <i>nutans</i>	Musk Thistle		5	-1	SE?		G?T?												X		X												X		
<i>Centaurea</i>	<i>nigra</i>	Black Knapweed		5		SE5?		G?				X	X		X	X				X	X	X												X		
<i>Leucanthemum</i>	<i>vulgare</i>	Ox-eye Daisy		5	-1	SE5		G?		X	X				X																			X		
<i>Cichorium</i>	<i>intybus</i>	Chicory		5	-1	SE5		G?				X									X	X												X		
<i>Cirsium</i>	<i>vulgare</i>	Bull Thistle		4	-1	SE5		G5					X			X				X	X	X	X											X		
<i>Erigeron</i>	<i>annuus</i>	Eastern Daisy Fleabane	0	1		S5		G5		X	X	X	X	X	X	X				X	X	X	X											X		
<i>Erigeron</i>	<i>philadelphicus</i> ssp. <i>philadelphicus</i>	Philadelphia Fleabane	1	-3		S5		G5T?																		X										
<i>Erigeron</i>	<i>pulchellus</i>	Robin's Plantain	7	3		S5		G5												X	X															
<i>Euthamia</i>	<i>graminifolia</i>	Flat-topped Bushy Goldenrod	2	-2		S5		G5												X						X								X		
<i>Eutrochium</i>	<i>maculatum</i> ssp. <i>bruneri</i>	Spotted Joe-pye-weed	3	-5		S5		G5TU								X																				
<i>Eupatorium</i>	<i>perfoliatum</i>	Perfoliate Thoroughwort/Boneset	2	-4		S5		G5					X			X					X	X		X												
<i>Hieracium</i>	<i>aurantiacum</i>	Devil's Paintbrush		5	-2	SE5		G?				X																								
<i>Hieracium</i>	<i>caespitosum</i>	Field Hawkweed		5	-2	SE5		G?		X	X																									
<i>Hieracium</i>	<i>pilosella</i>	Mouse-ear Hawkweed		5	-1	SE5		G?																											X	
<i>Rudbeckia</i>	<i>hirta</i>	Black-eyed Susan	0	3		S5		G5						X	X	X	X	X		X	X	X	X		X	X										
<i>Prenanthes</i>	<i>alba</i>	White Rattlesnake-root	6	3		S5		G5				X	X	X	X	X	X				X	X	X		X	X										
<i>Solidago</i>	<i>altissima</i>	Tall Goldenrod	1	3		S5		G5		X	X	X								X																
<i>Solidago</i>	<i>canadensis</i>	Canada Goldenrod	1	3		S5		G5		X	X	X	X	X		X	X	X		X	X	X	X		X	X										
<i>Solidago</i>	<i>flexicaulis</i>	Zig-zag Goldenrod	6	3		S5		G5		X	X	X	X	X		X	X	X				X														
<i>Solidago</i>	<i>gigantea</i>	Giant Goldenrod	4	-3		S5		G5		X	X			X		X				X	X	X				X										
<i>Solidago</i>	<i>juncea</i>	Early Goldenrod	3	5		S5		G5		X	X	X																								
<i>Solidago</i>	<i>nemoralis</i> ssp. <i>nemoralis</i>	Gray Goldenrod	2	5		S5		G5T?		X	X		X	X		X	X			X	X	X			X											
<i>Solidago</i>	<i>rugosa</i> ssp. <i>rugosa</i>	Rough Goldenrod	4	-1		S5		G5T?												X																
<i>Sonchus</i>	<i>arvensis</i> ssp. <i>arvensis</i>	Field Sow-thistle		3	-1	SE5		G?T?					X	X	X		X	X		X	X	X	X		X											
<i>Tanacetum</i>	<i>vulgare</i>	Common Tansy		5	-1	SE5		G?				X	X																							
<i>Taraxacum</i>	<i>officinale</i>	Common Dandelion		3	-2	SE5		G5		X	X										X	X	X													X
<i>Tragopogon</i>	<i>dubius</i>	Doubtful Goat's-beard		5	-1	SE5		G?		X			X			X				X	X															
<i>Tragopogon</i>	<i>pratensis</i> ssp. <i>pratensis</i>	Meadow Goat's-beard/Jack go to bed at noon		5	-1	SE5		G?T?		X	X	X																								
<i>Tussilago</i>	<i>farfara</i>	Coltsfoot		3	-2	SE5		G?					X			X	X			X																
<i>Xanthium</i>	<i>strumarium</i>	Tumor-curing Cocklebur	2	0		S5		G?					X			X	X			X																
Balsaminaceae		Touch-me-not Family										X																								X
<i>Impatiens</i>	<i>capensis</i>	Spotted Touch-me-not	4	-3		S5		G5				X	X																							
Berberidaceae		Barberry Family										X																								
<i>Berberis</i>	<i>vulgaris</i>	Common Barberry		3	-2	SE5		G?																												X
<i>Caulophyllum</i>	<i>giganteum</i>	Blue Cohosh	5	5		S5		G4G5	R			X																								
<i>Caulophyllum</i>	<i>thalictroides</i>	Blue Cohosh	5	5		S5		G5						X	X					X	X															X
<i>Podophyllum</i>	<i>peltatum</i>	May-apple	5	3		S5		G5				X																								
Betulaceae		Birch Family																			X															
<i>Alnus</i>	<i>glutinosa</i>	European Black Alder			-2	-2	SE4	G?				X								X	X															X
<i>Alnus</i>	<i>incana</i> ssp. <i>rugosa</i>	Speckled Alder	6	-5		S5		G5T5							X	X					X															X
<i>Carpinus</i>	<i>caroliniana</i> ssp. <i>virginiana</i>	Blue Beech	6	0		S5		G5T				X																								X
<i>Ostrya</i>	<i>virginiana</i>	Hop Hornbeam - Ironwood	4	4		S5		G5					X																							X
Boraginaceae		Borage Family																																		
<i>Echium</i>	<i>vulgare</i>	Blueweed/common vipersbugloss		5	-2	SE5		G?					X			X				X																
<i>Myosotis</i>	<i>scorpioides</i>	Mouse-ear Scorpion-grass		-5	-1	SE5		G5				X																								
Brassicaceae		Mustard Family										X																								
<i>Capsella</i>	<i>bursa-pastoris</i>	Shepherd's Purse		1	-1	SE5		G?				X																								
<i>Cardamine</i>	<i>concatenata</i>	Cut-leaved Toothwort	6	3		S5		G5								X																				

Appendix C2: Plant List

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	GOSEWIC STATUS	GLOBAL STATUS	LOCAL STATUS WELL/DUFF	P005	P006	P009	P010	P011	P012	P014	P015	P016	P017	P018	P019	P020	P021	P022	P023	P024	P026	P027	P028	P029	P030	P031
<i>Stellaria media</i>	Common Chickweed		3	-1	SE5			G?												X												
Convolvulaceae		Morning-glory Family																														
<i>Calystegia sepium ssp. americanum</i>	Hedge Bindweed	2	0		SU			G4G5T?					X		X	X	X	X	X											X	X	X
<i>Convolvulus arvensis</i>	Field Bindweed		5	-1	SE5			G?				X	X			X													X	X	X	
Cornaceae		Dogwood Family																														
<i>Cornus amomum</i>	Silky Dogwood	5	-4		S5			G5T?					X		X					X											X	
<i>Cornus canadensis</i>	Bunchberry	7	0		S5			G5					X		X		X	X		X							X				X	
<i>Cornus racemosa</i>	Red Panicked Dogwood/ Gray dogwood	2	-2		S5			G5?				X																				
<i>Cornus sericea</i>	Red-osier Dogwood	2	-3		S5			G5		X	X																					
Cucurbitaceae		Gourd Family																														
<i>Echinocystis lobata</i>	Prickly Cucumber	3	-2		S5			G5							X																	
Dipsacaceae		Teasel Family																														
<i>Dipsacus fullonum ssp. sylvestris</i>	Wild Teasel		5	-1	SE5			G?T?				X			X																	
Elaeagnaceae		Oleaster Family																														
<i>Elaeagnus angustifolia</i>	Russian Olive		4	-1	SE3			G?			X	X								X	X											
Euphorbiaceae		Spurge Family																														
<i>Euphorbia esula</i>	Leafy Spurge		5	-2	SE5			G5		X	X	X	X														X		X		X	
Fabaceae		Pea Family																														
<i>Securigera varia</i>	Variable Crown-vetch		5	-2	SE5			G?					X		X					X	X						X		X		X	
<i>Gleditsia triacanthos</i>	Honey Locust	3	0		S2?			G5				X	X			X													X			
<i>Lotus corniculatus</i>	Bird's-foot Trefoil		1	-2	SE5			G?																					X			
<i>Medicago lupulina</i>	Black Medick		1	-1	SE5			G?		X	X					X				X							X		X			
<i>Medicago sativa ssp. falcata</i>	Alfalfa		5	-1	SE5			GNR				X	X																			
<i>Melilotus officinalis</i>	Yellow Sweet-clover		3	-1	SE5			G?							X						X	X										
<i>Robinia hispida</i>	Bristly Locust		5	-1	SE1			G5								X																
<i>Robinia pseudo-acacia</i>	Black Locust		4	-3	SE5			G5				X	X																			
<i>Trifolium pratense</i>	Red Clover		2	-2	SE5			G?				X	X		X	X													X		X	
<i>Trifolium repens</i>	White Clover		2	-1	SE5			G?				X			X																	
<i>Vicia cracca</i>	Tufted Vetch		5	-1	SE5			G?		X	X		X	X	X	X												X	X		X	
<i>Vicia sepium</i>	Bush Vetch		5	-1	SEH			G?				X	X	X	X	X												X	X		X	
Fagaceae		Beech Family																														
<i>Fagus grandifolia</i>	American Beech	6	3		S5			G5		X	X																					
<i>Quercus alba</i>	White Oak	6	3		S5			G5						X																		
<i>Quercus macrocarpa</i>	Bur Oak	5	1		S5			G5					X	X	X																	
<i>Quercus rubra</i>	Red Oak	6	3		S5			G5				X	X	X	X																	
Geraniaceae		Geranium Family																														
<i>Geranium maculatum</i>	Spotted Crane's-bill	6	3		S5			G5		X	X		X						X	X								X	X		X	
<i>Geranium robertianum</i>	Herb-robert		5	-2	SE5			G5		X		X																	X			
Grossulariaceae		Currant Family																														
<i>Ribes americanum</i>	Wild Black Currant	4	-3		S5			G5				X							X	X												
<i>Ribes cynosbati</i>	Prickly Gooseberry	4	5		S5			G5					X			X					X	X						X				
<i>Ribes rubrum</i>	Red Currant		5	-2	SE5			G4G5					X								X	X							X			
<i>Ribes triste</i>	Wild Red Currant	6	-5		S5			G5					X																X			
Guttiferae		St. John's-wort Family																														
<i>Hypericum perforatum</i>	Common St. John's-wort		5	-3	SE5			G?		X	X																					
Haloragaceae		Water-milfoil Family																														
<i>Myriophyllum spicatum</i>	Eurasian Water-milfoil		-5	-3	SE5			G?				X																				
Juglandaceae		Walnut Family																														
<i>Carya cordiformis</i>	Bitternut hickory	6	0		S5			G5												X			X		X	X	X					
<i>Juglans nigra</i>	Black Walnut	5	3		S4			G5				X																				
Lamiaceae		Mint Family																														
<i>Clinopodium vulgare</i>	Wild Basil	4	5		S5			G?							X																	
<i>Lamium purpureum</i>	Purple Dead-nettle		5	-2	SE3			G?								X																
<i>Leonurus cardiaca ssp. cardiaca</i>	Common Motherwort		5	-2	SE5			G?T?																						X		
<i>Lycopus americanus</i>	Cut-leaved Water-horehound	4	-5		S5			G5												X												
<i>Lycopus uniflorus</i>	Northern Water-horehound	5	-5		S5			G5												X												
<i>Mentha arvensis</i>	American Wild Mint	3	-3		S5							X	X																			
<i>Nepeta cataria</i>	Catnip		1	-2	SE5			G?					X																			
Lentibulariaceae		Bladderwort Family																														
<i>Utricularia vulgaris</i>	Greater Bladderwort	4	-5		S5			G5																						X		
Moraceae		Mulberry Family																														
<i>Morus alba</i>	White Mulberry		0	-3	SE5			G?													X											
Nymphaeaceae		Water-lily Family																														
<i>Nuphar microphylla</i>	Small Yellow Pond-lily	8	-5		S4?			G				X	X	X	X				X	X									X	X	X	
<i>Nymphaea odorata spp. odorata</i>	Fragrant White Water-lily	5	-5		S5?			G5T5				X			X					X								X	X			

Appendix C2: Plant List

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	GOSEWIC STATUS	GLOBAL STATUS	LOCAL STATUS WELL/DUFF	P005	P006	P009	P010	P011	P012	P014	P015	P016	P017	P018	P019	P020	P021	P022	P023	P024	P026	P027	P028	P029	P030	P031
<i>S1-S3 Species</i>		3																														
<i>S4 Species</i>		5																														
<i>S5 Species</i>		203																														
Co-efficient of Conservatism and Floral Quality Index																																
<i>Co-efficient of Conservatism (CC) (average)</i>		4.34																														
<i>CC 0 to 3</i>	<i>lowest sensitivity</i>	71																														
<i>CC 4 to 6</i>	<i>moderate sensitivity</i>	114																														
<i>CC 7 to 8</i>	<i>high sensitivity</i>	29																														
<i>CC 9 to 10</i>	<i>highest sensitivity</i>	4																														
Floral Quality Index (FQI)		64.07																														
Presence of Weedy & Invasive Species																																
<i>mean weediness</i>		-1.73																														
<i>weediness = -1</i>	<i>low potential invasiveness</i>	45																														
<i>weediness = -2</i>	<i>moderate potential invasiveness</i>	34																														
<i>weediness = -3</i>	<i>high potential invasiveness</i>	19																														
Presence of Wetland Species																																
<i>average wetness value</i>		0.57																														
<i>upland</i>		77																														
<i>facultative upland</i>		72																														
<i>facultative</i>		57																														
<i>facultative wetland</i>		63																														
<i>obligate wetland</i>		47																														

AECOM

Appendix D

Tree Inventory Report



Ministry of Transportation

**Hanlon Expressway / Wellington Road 34
Mid-Block Interchange (GWP 3059-20-00)**

Tree Inventory Report

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Project #: 60541071

Distribution List

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Table of Contents

	page
1. Introduction.....	7
2. Applicable By-laws.....	9
2.1 Exemption under the Municipal Act.....	9
2.2 City of Guelph Tree By-Law (No. 15098)	9
2.3 County of Wellington By-Law (5115-09).....	9
3. Methods.....	10
3.1 Inventory and Assessment of Individual Trees.....	10
3.2 Inventory and Assessment of Groups of Trees	11
4. Results and Discussion.....	13
4.1 Tree Inventory	13
4.2 Tree Assessment	13
4.2.1 Individual Tree Method	15
4.2.2 Prism Sweep Tally Method.....	15
4.2.3 Polygon Tally Method	16
5. Summary and Recommendations	18
6. Certification.....	19
7. References	20

List of Figures

Figure 1: Hanlon Expressway / Wellington Road 34 Mid-Block Interchange Study Area	8
Figure 2: Species Composition Across the Study Area.....	14

List of Tables

Table 1: Tree Totals Within Each Municipality	13
Table 2: Tree Species Composition Within Study Area	13
Table 3: Tree Species Composition Within Study Area (Individual Tree Method).....	15
Table 4: Tree Species Composition Within Study Area (Prism Sweep Tally Method).....	15
Table 5: Tree Species Composition Within Study Area (Polygon Tally Method).....	16

Attachments

- Attachment A. Tree Inventory Map
- Attachment B-1. Polygon Tree Inventory Results
- Attachment B-2. Prism Sweep Tree Inventory Results
- Attachment B-3. Individual Tree Inventory Results
- Attachment C. Tree Significance Rationale

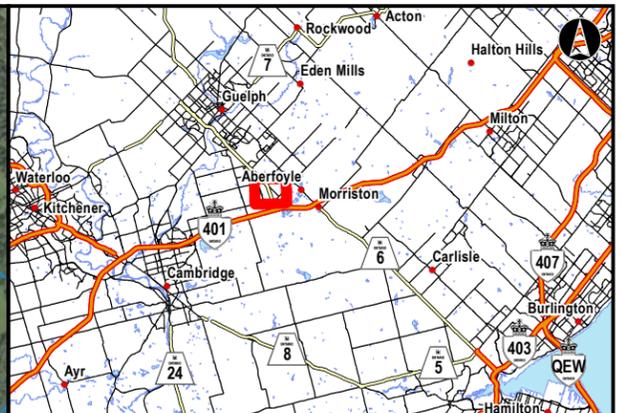
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1. Introduction

AECOM Canada Limited (AECOM) has been retained by the Ontario Ministry of Transportation (MTO) to undertake a Preliminary Design Review, Detailed Design (to a Design-Build-Ready status) under Class Environmental Assessment (EA) for Provincial Transportation Facilities (2000) for improvements to Highways 6 and 401 in the Township of Puslinch, Wellington County, and the City of Hamilton (GWP 3042-14-00). The planned transportation improvements will provide a better connection between the Highways 6 and 401 corridors which will reduce road congestion, collision potential and associated costs and encourage the utilization of Hanlon Expressway (Highway 6 north of Highway 401) which will support municipal planning initiatives.

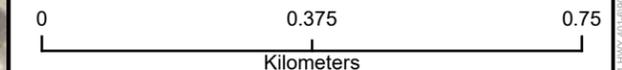
The first phase of implementing the GWP 3042-14-00 improvements will include the improvements along Hanlon Expressway north of Highway 401. This first phase, henceforth referred to as the Hanlon Expressway / Wellington Road 34 Mid-Block Interchange project (GWP 3059-20-00), includes the new Wellington Road 34 flyover structure at Hanlon Expressway, the new interchange on Hanlon Expressway midway between Wellington Road 34 and Maltby Road, and other associated connecting roadways.

The above noted project, the Hanlon Expressway / Wellington Road 34 Mid-Block Interchange project (the Project), is the subject of this tree inventory report. This tree inventory report presents the tree inventory data, as well as their subsequent analyses, that were collected within the Project Study Area (Limits of Work) (**Figure 1**) plus an additional six (6) m buffer, and will form an appendix to the Hanlon Expressway / Wellington Road 34 Mid-Block Interchange Terrestrial Ecosystem Existing Conditions and Impact Assessment Report. This tree inventory report has been prepared in accordance with the MTO's Guide to Roadside Tree Inventory and Assessment (undated) and using accepted standard arboriculture techniques, as outlined in the Tree and Landscape Appraiser's Guide for Plant Appraisal, 9th Edition (ISA, 2000) and the Arborists' Certification Guide (ISA, 2010).



Legend

- Watercourse
- Property Fabric
- Municipality
- Study Area (Limits of Work)



**Hanlon Expressway / Wellington Road 34
Mid-Block Interchange**

Study Area

Mar, 2021	1:10,000 <small>* when printed 11"x17"</small>	Datum: NAD 1983 MTM 10 Source: MNR, MMAH, AECOM, MTO
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P#: 60541071	V#: 001	Figure 1
AECOM		

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2. Applicable By-laws

2.1 Exemption under the Municipal Act

This project is regulated under the *Planning Act*, R.S.O 1990, c. P13 and is thus exempt from municipal legislation for tree protection, as stated in section 135(12) of the *Municipal Act, 2001*, S.O. 2001, c. 25. However, as this project is situated within both the Township of Puslinch and City of Guelph limits, it is recommended that the guidelines under the City of Guelph Tree By-Law and industry “best practices” are followed as to minimize damage to trees as no prescriptive tree protection guidelines are available for the Township of Puslinch.

2.2 City of Guelph Tree By-Law (No. 15098)

In the City of Guelph, trees 10 cm or greater in diameter at breast height (DBH), on private properties of at least 0.2 hectares (ha) are protected under the provisions of By-Law (2010) – 15098 (hereafter referred to as “the Guelph By-Law”). The City of Guelph’s DRAFT Tree Technical Manual, v. 1 (2018) establishes the standards and specifications that facilitate preservation of these trees.

Under the Guelph By-Law, a Tree Inventory and Preservation Plan (TIPP) that outlines tree protection measures as part of the development proposal process is required in preparation for site development and building construction. Where trees are to be removed as part development proposal, the Guelph By-Law requires that the trees be identified and removed or relocated in an orderly process, and that any remaining trees are preserved. In addition, a Vegetation Compensation Plan (VCP) is required for all healthy, non-invasive trees equal to or greater than 10 cm DBH. The VCP will identify compensation for trees that are proposed for removal or are likely to be damaged in the development process, in the form of on and/or off-site plantings or cash-in-lieu.

For certain development applications, a Landscape Plan (LP) may be required as part of Site Plan application. In addition, a Street Tree Plan (STP) may be required if the development requires that trees are planted on or fronting on to City of Guelph Streets or streets to be assumed by the City of Guelph, when an LP is not required or for large scale Street Tree Planting (City of Guelph, 2018).

As stated above, this Project is exempt from municipal legislation for tree protection.

2.3 County of Wellington By-Law (5115-09)

The Township of Puslinch is regulated by the County of Wellington, which includes a Forest Conservation By-Law (No. 5115-09) prohibiting or regulating the destruction or injuring of trees in woodlands. This by-law applies to any species of woody perennial plant, which has reached or can reach a height of at least 4.5 m at maturity.

As stated above, this Project is exempt from municipal legislation for tree protection.

3. Methods

A tree inventory and assessment were completed by AECOM's International Society of Arboriculture (ISA) Certified Arborists on various dates between the months of June and October in both 2017 and 2018, as well as in August 2019 and in March 2021. The inventory and assessment were completed in accordance with the MTO's Guide to Roadside Tree Inventory and Assessment, which states that the tree inventory and assessment should include all trees that may require removal or may be significantly impacted by the works through root disturbance or exposure. Accordingly, trees within the Study Area plus an additional six (6 m) buffer were included in the tree inventory. Single trees were inventoried and assessed where they occurred as individuals (i.e. trees not in windbreaks, continuous rows or contiguous woodlands). Where trees existed within windbreaks, continuous rows of trees, groups of similar species and age (i.e. contiguous woodlands) or recent plantings, they were inventoried and assessed as a group by either using the prism sweep method or included within a polygon tally. Individual prefix IDs were assigned to each polygon, prism and individually surveyed tree to differentiate between which municipality and property parcel they were situated on within the inventory (i.e., P for Township of Puslinch and G for City of Guelph). Figures illustrating polygon, prism and individual tree locations are available in **Attachment A**.

3.1 Inventory and Assessment of Individual Trees

All trees with a measurable DBH that will be affected by the Project were inventoried. The locations of all identified trees were recorded using an SX Blue II GPS unit and Samsung tablet. The assessment included a visual examination of above-ground parts for each tree. These trees were not climbed, probed, cored, or dissected, and excavation for detailed root crown inspection was not completed. Since some symptoms may only be present seasonally, the extent of observation that can be made may be limited by the time of year in which the assessment took place. Trees inventoried during the leaf-on season underwent a full crown assessment through assessing each tree's leaf coverage and its overall vigour; tree's inventoried during leaf-off season underwent a full crown assessment by assessing the proportion of live buds in the crown. It is understood that trees are living organisms and their health and vigour are continually changing over time due to factors such as seasonal variations and changes in site conditions. For this reason, the assessment presented in this report is valid at the time of inspection and no guarantee is made about the continued health of trees that were deemed to be in good, fair or poor condition.

The following information was collected for each individually assessed tree:

Tree Number	identification number for the individual tree
Location	UTM co-ordinates of the tree's location
Species	common and scientific name
Crown Reserve	a visual estimate of the average width of the crown in metres
Condition	rating assigned, as per details below
DBH	stem diameter taken at a height of 1.4 m above the ground
Height	an estimate of the overall height made by eye
Age	estimate of age by non-intrusive methods
Significance	a qualitative assessment based on individual characteristics and the context of the surroundings.

The condition rating for individual trees assigned to each tree was based on the following observations:

Good:..... high to moderate biological health and well-developed crown. Well-suited as a shade tree or screen planting. Will survive at least five (5) years under existing conditions.

Fair: one or more moderate to severe defects in biological health and/or structural condition. Marginally suited as a shade tree or screen planting. Can survive at least three (3) to five (5) years under existing conditions. This category also includes stock planted within past two years that is not yet established.

Poor:..... low biological health and/or severely damaged/defective structural condition.

Dead: a tree that is still standing, but no longer alive

In addition to a condition rating, a significance rating for individual trees was assigned to each tree as required by the MTO, and described in the Guide to Roadside Tree Inventory and Assessment (MTO, undated):

High (H): large healthy trees of desirable, long lived species. A tree or grouping of trees that form the dominant tree cover in the immediate landscape such as a tree-lined highway adjacent to cleared agricultural land or developed areas. Designated heritage trees, trees or groups of trees that have high potential to be recognized by the community, individuals or travelling public for historical, heritage or cultural landscape values, exceptionally large trees, trees with visually distinctive forms, regionally rare species, and trees near dwellings.

Medium (M): less remarkable specimens of common or short-lived species (elm spp., ash spp., poplar spp., Manitoba maples, Norway spruce, Colorado spruce, etc.). Trees near the end of their expected life span and not near a dwelling.

Low (L): fewer desirable species such as Norway maples and Black locust, species not suited to the site conditions, short lived species where more desirable trees are present, trees in poor health, trees that would not be recognized for providing a cultural heritage

Please refer to **Attachment C** for further details on how the significance rating was assigned to each tree.

Tree assessment included the observation of structural defects, scars, external indication of decay, evidence of insects, discoloured foliage, the condition of any visible root structures, the degree and direction of lean and the general condition of the tree. Techniques for tree assessment included visual examination of above-ground parts of each tree. The visual inspection included recording abiotic and biotic disorders as well as structural defects. Structural defects such as cracks and co-dominate stems are often harmless in young trees but can become more serious in larger, older trees with heavier branches. These trees can pose a greater threat of injury and damage to adjacent property or residents should they fail. Since some symptoms may only be present seasonally, the extents of observations that can be made were limited by the time of year in which the assessment took place.

3.2 Inventory and Assessment of Groups of Trees

Prism Sweep Tally Method

For trees represented within contiguous woodlands and recent plantings, prism sweep tallies were conducted using a wedge prism with a basal area factor of 2, in order to give a representative sample of the woodland community. Each tree captured within the prism sweep was given a health condition rating, and DBH was recorded within its representative diameter class (i.e. increments of 10 cm DBH). The condition rating for groups of trees was assigned as per the protocol described previously in **Section 3.1**.

Polygon Tally Method

Where practically possible (i.e. where smaller tree populations existed in hedgerows, windbreaks, woodlots and areas of natural tree regeneration, etc.) the entire tree population was counted using a polygon tally method. Each tree captured within the delineated polygon was given a health condition, and DBH was recorded within its representative diameter class (i.e. increments of 10 cm DBH). The health condition rating for groups of trees was assigned as per the protocol described previously in **Section 3.1**.

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4. Results and Discussion

4.1 Tree Inventory

Tree data were collected from a total 29 properties within the Study Area. This resulted in a total of 3,602 trees that were examined within the Study Area and in the adjacent Six (6) m buffer, which gives a strong representative sample of what is currently present within the Study Area. These trees were either captured using the individual tree inventory method (10 trees), the polygon tally method (2,710 trees) or the prism sweep tally method (882 trees). Detailed information regarding tree location, DBH, and health condition can be found in **Attachments B-1 to B-3. Table 1** provides a comprehensive breakdown of the total number of trees identified in each municipality by inventory method as outlined in **Section 3.1** within the Study Area.

Table 1: Tree Totals Within Each Municipality

Municipality	Total Number of Individual Trees	Total Number of Trees within Prism Sweep Locations	Total Number of Trees within Polygon Locations
City of Guelph	0	0	16
Township of Puslinch	10	882	2,694
Total	10	882	2,710

4.2 Tree Assessment

A total of 47 different tree species were inventoried and assessed within the Study Area (including individually inventoried trees, trees within polygons, and trees within prism sweep locations). The most common tree species identified within the Study Area were eastern white cedar (*Thuja occidentalis*) [26.76%], Scots pine (*Pinus sylvestris*) [20.18%], and white ash (*Fraxinus americana*) [7.55%]. Please refer to **Table 2** for a comprehensive list of tree species identified within the Study Area, and **Figure 2** for a visual representation of the species composition across the Study Area as a percentage of the total 3,602 trees.

Table 2: Tree Species Composition Within Study Area

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
American beech	<i>Fagus grandifolia</i>	8	0.22%
Apple sp.	<i>Malus sp.</i>	22	0.64%
Ash sp.	<i>Fraxinus sp.</i>	3	0.08%
Balsam fir	<i>Abies balsamea</i>	12	0.34%
Balsam poplar	<i>Populus balsamifera</i>	126	3.49%
Basswood	<i>Tilia americana</i>	86	2.39%
Black cherry	<i>Prunus virginiana</i>	44	1.22%
Black locust	<i>Robinia pseudoacacia</i>	124	3.44%
Black walnut	<i>Juglans nigra</i>	6	0.17%
Bur oak	<i>Quercus macrocarpa</i>	1	0.03%
Choke cherry	<i>Prunus virginiana</i>	7	0.19%
Colorado blue spruce	<i>Picea pungens</i>	14	0.39%
Common apple	<i>Malus pumila</i>	3	0.08%
Crack willow	<i>Salix fragilis</i>	46	1.28%
Eastern cottonwood	<i>Populus deltoides</i>	31	0.86%
Eastern redcedar	<i>Juniperus virginiana</i>	4	0.11%
Eastern white cedar	<i>Thuja occidentalis</i>	964	26.76%
Eastern white pine	<i>Pinus strobus</i>	10	0.27%
European alder	<i>Alnus glutinosa</i>	6	0.17%

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
Freeman maple	<i>Acer x freemanii</i>	43	1.19%
Green ash	<i>Franxinus pennsylvanica</i>	88	2.44%
Honey locust	<i>Gleditsia triacanthos</i>	74	2.05%
Ironwood	<i>Ostrya virginiana</i>	9	0.25%
Largetooth aspen	<i>Populus grandidentata</i>	8	0.22%
Manitoba maple	<i>Acer negundo</i>	73	2.03%
Norway maple	<i>Acer platanoides</i>	73	2.03%
Norway spruce	<i>Picea abies</i>	2	0.06%
Pear sp.	<i>Pyrus sp.</i>	2	0.06%
Pin cherry	<i>Prunus pensylvanica</i>	5	0.14%
Red maple	<i>Acer rubrum</i>	10	0.28%
Red oak	<i>Quercus rubra</i>	3	0.08%
Scots pine	<i>Pinus sylvestris</i>	727	20.18%
Serviceberry sp.	<i>Amelanchier sp.</i>	9	0.25%
Siberian elm	<i>Ulmus pumila</i>	5	0.14%
Silver maple	<i>Acer saccharinum</i>	42	1.16%
Speckled alder	<i>Acer pensylvanicum</i>	8	0.22%
Striped maple	<i>Acer pensylvanicum</i>	2	0.06%
Sugar maple	<i>Acer saccharum</i>	143	3.97%
Tamarack	<i>Larix laricina</i>	74	2.05%
Trembling aspen	<i>Populus tremuloides</i>	210	5.83%
White ash	<i>Fraxinus americana</i>	272	7.55%
White birch	<i>Betula papyrifera</i>	52	1.44%
White elm	<i>Ulmus americana</i>	84	2.33%
White mulberry	<i>Morus alba</i>	11	0.30%
White spruce	<i>Picea glauca</i>	37	1.03%
Willow sp.	<i>Salix sp.</i>	1	0.03%
Yellow birch	<i>Betula alleghaniensis</i>	18	0.50%
Total		3,602	100%

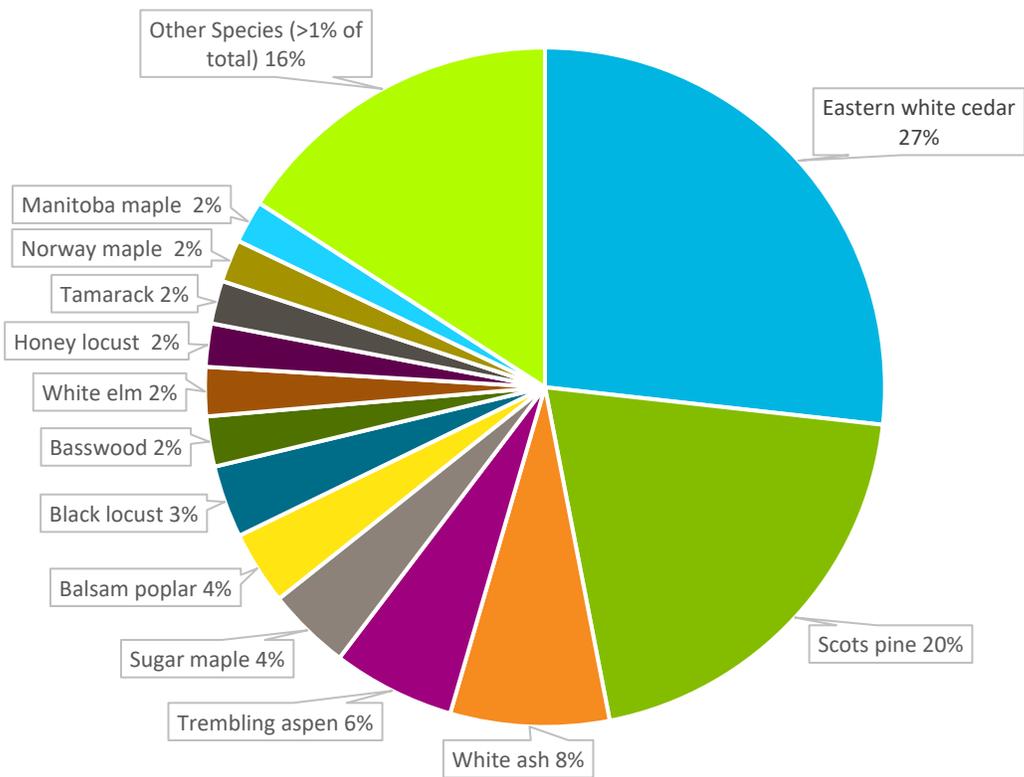


Figure 2: Species Composition Across the Study Area

4.2.1 Individual Tree Method

A total of 10 trees were inventoried and assessed as individuals. All these trees were located within the Township of Puslinch. Please refer to **Table 3** for a comprehensive list of individually assessed tree species identified within the Study Area, whilst further data on these trees are available in **Attachment B-1**. The locations of individual trees are illustrated in **Attachment A**.

Table 3: Tree Species Composition Within Study Area (Individual Tree Method)

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
Basswood	<i>Tilia americana</i>	2	20.00%
Eastern cottonwood	<i>Populus deltoides</i>	1	10.00%
Green ash	<i>Fraxinus pennsylvanica</i>	1	10.00%
Manitoba maple	<i>Acer negundo</i>	2	20.00%
White ash	<i>Fraxinus americana</i>	2	20.00%
White mulberry	<i>Morus alba</i>	2	20.00%
Total		10	100%

4.2.2 Prism Sweep Tally Method

A total of 882 trees were inventoried through the application of the 61 prisms sweep tallies within forested habitat, totalling 9.21 ha, across 13 separate properties within the Study Area. The most abundant tree species recorded were eastern white cedar (*Thuja occidentalis*) [50.79%], sugar maple (*Acer saccharum*) [9.75%], and Scots pine (*Pinus sylvestris*) [5.67%]. A total stem basal area of approximately 262.91 m² is anticipated to be removed for the Project across 9.21 ha of forest habitats. Refer to **Table 4** for a comprehensive list of trees identified within the Study Area using the prism sweep tally method.

Table 4: Tree Species Composition Within Study Area (Prism Sweep Tally Method)

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
American beech	<i>Fagus americana</i>	7	0.79%
Ash sp.	<i>Fraxinus sp.</i>	3	0.34%
Balsam fir	<i>Abies balsamea</i>	4	0.46%
Balsam poplar	<i>Populus balsamifera</i>	7	0.79%
Basswood	<i>Tilia americana</i>	11	1.25%
Black cherry	<i>Prunus serotina</i>	4	0.45%
Bur oak	<i>Quercus macrocarpa</i>	1	0.11%
Choke cherry	<i>Prunus virginiana</i>	2	0.23%
Crack willow	<i>Salix fragilis</i>	6	0.68%
Eastern cottonwood	<i>Populus deltoides</i>	27	3.06%
Eastern white cedar	<i>Thuja occidentalis</i>	448	50.79%
Eastern white pine	<i>Pinus strobus</i>	3	0.34%
European alder	<i>Alnus glutinosa</i>	6	0.68%
Green ash	<i>Fraxinus pennsylvanica</i>	1	0.11%
Ironwood	<i>Ostrya virginiana</i>	1	0.11%
Largetooth aspen	<i>Populus grandidentata</i>	8	0.91%
Manitoba maple	<i>Acer negundo</i>	2	0.23%
Norway maple	<i>Acer platanoides</i>	3	0.34%
Red maple	<i>Acer rubrum</i>	6	0.68%
Scots pine	<i>Pinus sylvestris</i>	50	5.67%
Serviceberry	<i>Amelanchier sp.</i>	9	1.02%
Silver maple	<i>Acer saccharinum</i>	21	2.38%
Speckled alder	<i>Alnus incana</i>	8	0.91%

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
Sugar maple	<i>Acer saccharum</i>	86	9.75%
Tamarack	<i>Larix laricina</i>	20	2.27%
Trembling aspen	<i>Populus tremuloides</i>	36	4.08%
White ash	<i>Fraxinus americana</i>	33	3.74%
White birch	<i>Betula papyrifera</i>	42	4.76%
White elm	<i>Ulmus americana</i>	6	0.68%
White mulberry	<i>Morus alba</i>	1	0.11%
White spruce	<i>Picea glauca</i>	10	1.13%
Yellow birch	<i>Betula alleghsniensis</i>	10	1.13%
Total		882	100%

Attachment B-2 summarizes the data collected for trees collected using the prism sweep tally method within the Study Area, including species name, DBH, location and health condition. The locations of the prism sweep tallies and the areas that they provide a sample representation for are illustrated in **Attachment A**.

The health condition of trees collected using the prism sweep tally method within the Study Area ranged from a rating of good to dead. Out of the 882 trees assessed within the Study Area, 505 were in good condition, 271 in fair condition, 101 in poor condition, and five (5) were dead.

4.2.3 Polygon Tally Method

A total of 2,710 trees were inventoried across 25 separate property parcels using the polygon tally method within the Study Area. A total of 36 separate polygon tallies were conducted across these 25 separate property parcels, totalling an area of 14.77 ha. This encompassed a range of habitats which included the fringes of forest habitats, hedgerows and areas with natural regeneration. The most abundant tree species recorded were Scots pine (*Pinus sylvestris*) [24.98%], eastern white cedar (*Thuja occidentalis*) [19.04%] and white ash (*Fraxinus americana*) [8.75%]. Refer to **Table 5** for a comprehensive list of trees identified within the Study Area using polygon tallies.

Table 5: Tree Species Composition Within Study Area (Polygon Tally Method)

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
American beech	<i>Fagus americana</i>	1	0.04%
Apple sp.	<i>Malus sp.</i>	22	0.82%
Balsam fir	<i>Abies balsamea</i>	8	0.30%
Balsam poplar	<i>Populus balsamifera</i>	119	4.39%
Basswood	<i>Tilia americana</i>	73	2.69%
Black cherry	<i>Prunus serotina</i>	40	1.48%
Black locust	<i>Robinia pseudoacacia</i>	124	4.58%
Black walnut	<i>Juglans nigra</i>	6	0.22%
Choke cherry	<i>Prunus virginiana</i>	5	0.18%
Colorado blue spruce	<i>Picea pungens</i>	14	0.52%
Common apple	<i>Malus pumila</i>	3	0.11%
Crack willow	<i>Salix fragilis</i>	40	1.48%
Eastern cottonwood	<i>Populus deltoides</i>	3	0.11%
Eastern redcedar	<i>Juniperis virginiana</i>	4	0.15%
Eastern white cedar	<i>Thuja occidentalis</i>	516	19.04%
Eastern white Pine	<i>Pinus strobus</i>	7	0.26%
Freeman maple	<i>Acer X freemanii</i>	43	1.59%
Green ash	<i>Fraxinus pennsylvanica</i>	86	3.17%
Honey locust	<i>Gleditsia triacanthos</i>	74	2.73%
Ironwood	<i>Ostrya virginiana</i>	8	0.30%
Manitoba Maple	<i>Acer negundo</i>	69	2.55%

Common Name	Scientific Name	Total Number of Recorded Trees	Species Composition Percentage (%)
Norway maple	<i>Acer platanoides</i>	70	2.59%
Norway spruce	<i>Picea abies</i>	2	0.07%
Pear sp.	<i>Pyrus sp.</i>	2	0.07%
Pin cherry	<i>Prunus pensylvanica</i>	5	0.18%
Red maple	<i>Acer rubrum</i>	4	0.15%
Red oak	<i>Quercus rubra</i>	3	0.11%
Scots pine	<i>Pinus sylvestris</i>	677	24.98%
Siberian elm	<i>Ulmus pumila</i>	5	0.18%
Silver maple	<i>Acer saccharinum</i>	21	0.77%
Striped maple	<i>Acer pensylvanicum</i>	2	0.07%
Sugar maple	<i>Acer saccharum</i>	57	2.10%
Tamarack	<i>Larix laricina</i>	54	1.99%
Trembling aspen	<i>Populus tremuloides</i>	174	6.42%
White ash	<i>Fraxinus americana</i>	237	8.75%
White birch	<i>Betula papyrifera</i>	10	0.36%
White elm	<i>Ulmus americana</i>	78	2.88%
White mulberry	<i>Morus alba</i>	8	0.30%
White spruce	<i>Picea glauca</i>	27	1.00%
Willow sp.	<i>Salix sp.</i>	1	0.04%
Yellow birch	<i>Betula alleghaniensis</i>	8	0.30%
Total		2,710	100%

Attachment B-3 summarizes the data collected for trees collected using the polygon tally method within the Study Area, including species name, DBH, location and health condition. The locations of the polygon tallies for are illustrated in **Attachment A**.

The health condition of trees collected using the polygon tally method within the Study Area ranged from a rating of good to dead. Out of the 2,710 trees assessed within the Study Area, 1,136 were in good condition, 1,229 in fair condition, 234 in poor condition, and 111 were dead. The majority of ash trees (*Fraxinus* spp.) observed in the polygon tallies were found to be in poor health, predominantly due to emerald ash borer (*Agrilus planipennis*) infestation.

5. Summary and Recommendations

A total of 3,602 trees were surveyed within the Study Area. Of the 3,602 trees inventoried, 10 trees were collected individually, 2,710 trees were inventoried using the polygon tally method, and 882 trees were inventoried using the prism sweep tally method. Based on the Project's Limits of Work it is anticipated that a stem basal area of approximately 262.91 m² may be removed for the new road's alignment across 9.21 ha of forest habitat. No tree Species at Risk (SAR) were encountered within the Study Area.

As the design progresses into detailed design, the impact footprint is expected to change and it is anticipated that fewer trees will be impacted based on the desire to limit impacts to forested communities that currently provide bat SAR habitat. It is therefore recommended that a more detailed arborist report be completed during the detailed design stage in order to provide further details regarding construction disturbances and staging area impacts on trees, identify suitable restoration/compensation to accommodate site-specific impacts, mitigation and replacement measures to offset vegetation loss and provide the appraisal values of trees to be removed. It is recommended that these studies and analyses be completed by an ISA Certified Arborist in order to comply with the MTO's Guide to Roadside Tree Inventory and Appraisal (undated).

6. Certification

I certify that all the statements of fact in this assessment are true, complete, and correct to the best of my knowledge and belief, and that they are made in good faith.

AECOM Canada Ltd.

Report Certified By: DRAFT
Alexander MacLeod, B.Sc. (Hons.), M.Sc.
ISA Certified Arborist ON-2142A
Alexander.MacLeod@aecom.com

DRAFT

7. References

AECOM, 2019:

Highways 6 and 401 Improvements from Hamilton North Limits to Guelph South Limits including the New Alignment of a Segment of Highway 6 (G.W.P. 3042-14-00). Terrestrial Ecosystem Existing Conditions and Impact Assessment Report.

Council of Tree and Landscape Appraisers, 2000:

Guide for Plant Appraisal, International Society of Arboriculture. Ninth Edition.

Government of Ontario, 2007:

Endangered Species Act, 2007

Government of Ontario, 1990:

Forestry Act, R.S.O. (1990). c.F.26

Lilly, S.J., 2010:

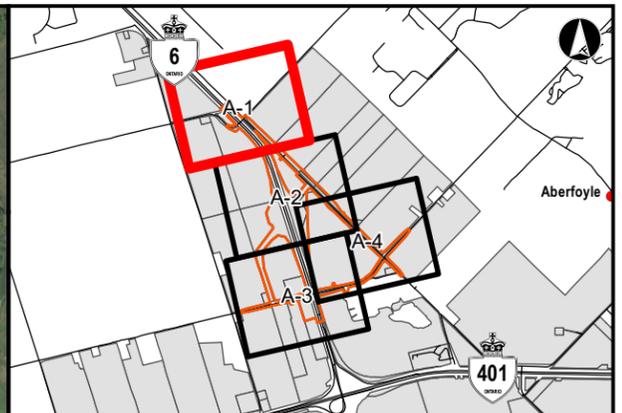
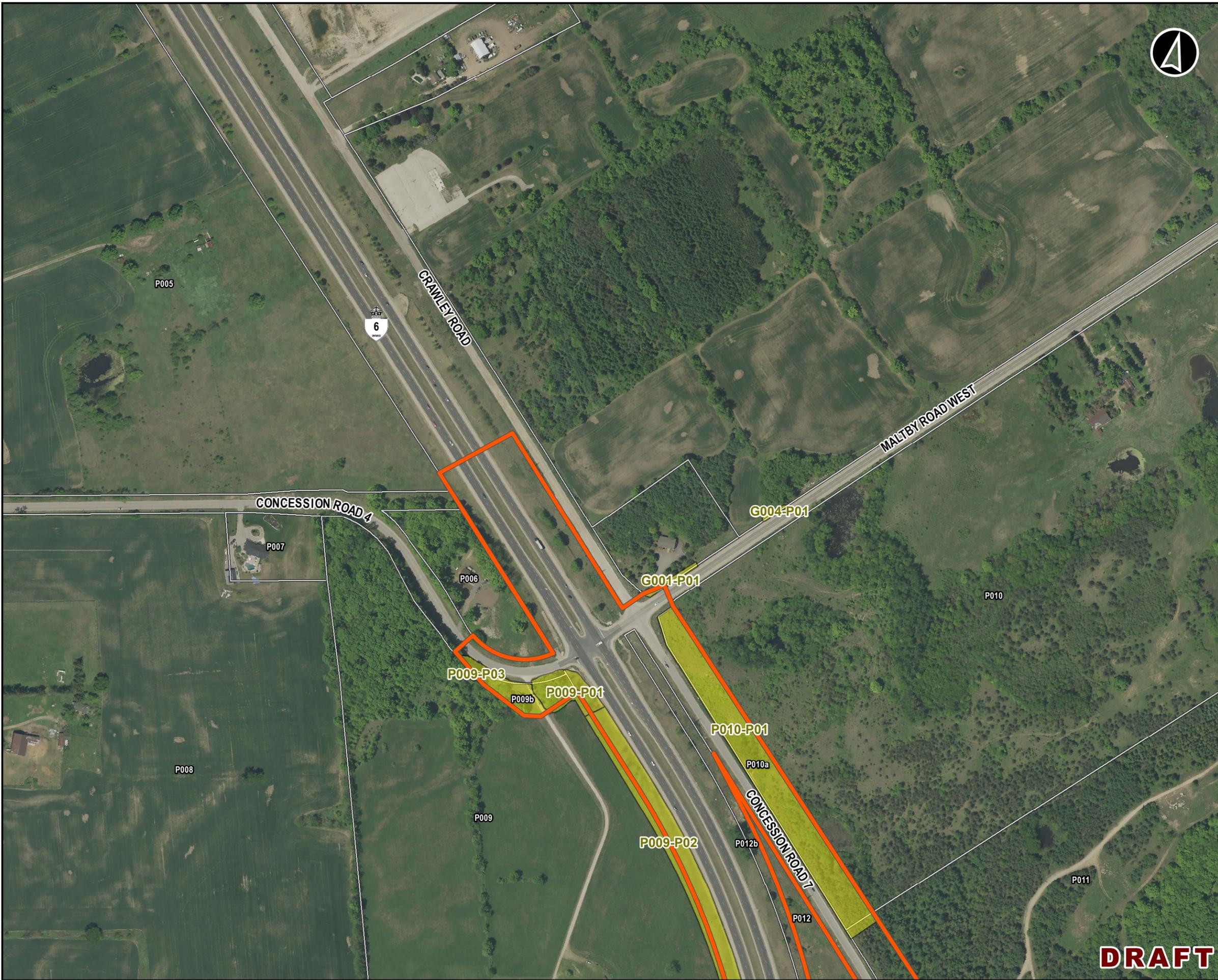
The Arborists' Certification Study Guide. Champaign: International Society of Arboriculture. Third Edition.

Ontario Ministry of Transportation, No date:

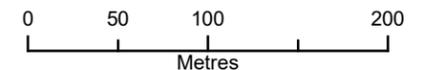
Guide to Roadside Tree Inventory and Assessment.

Attachment **A**

Tree Inventory Map



- Legend**
- Study Area (Limits of Work)
 - Parcel Fabric
- Tree Inventory**
- Individually Surveyed Tree
 - ◆ Prism Sweep Location
 - Surveyed Polygon
 - Prism Sweep Polygon



Hanlon Expressway / Wellington Road 34
Mid-Block Interchange

Tree Inventory

Mar, 2021	1:4,000 <small>* when printed 11"x17"</small>	Datum: NAD 1983 UTM Zone 17N Source: MNR, MMAH, AECOM, MTO
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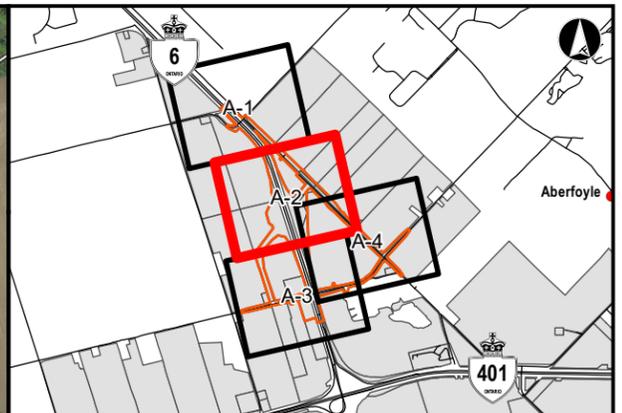
P#: 60541071	V#: 001	Attachment A-1
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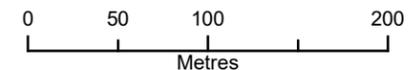
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Date Saved: 3/25/2021 11:08:49 AM User Name: galsab
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 Plot Date: 3/25/2021 11:08:49 AM User Name: galsab



- Legend**
- Study Area (Limits of Work)
 - Parcel Fabric
- Tree Inventory**
- Individually Surveyed Tree
 - ◆ Prism Sweep Location
 - Surveyed Polygon
 - Prism Sweep Polygon



**Hanlon Expressway / Wellington Road 34
Mid-Block Interchange**

Tree Inventory

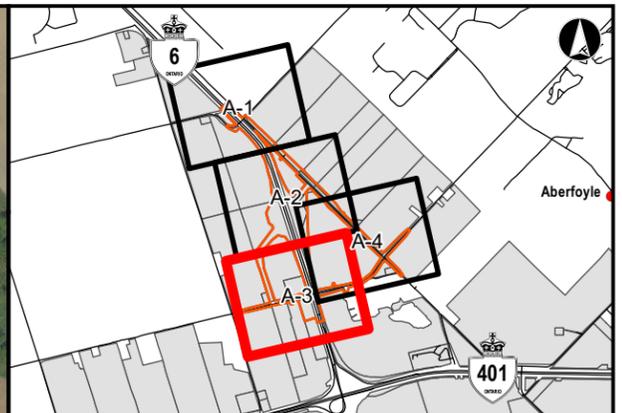
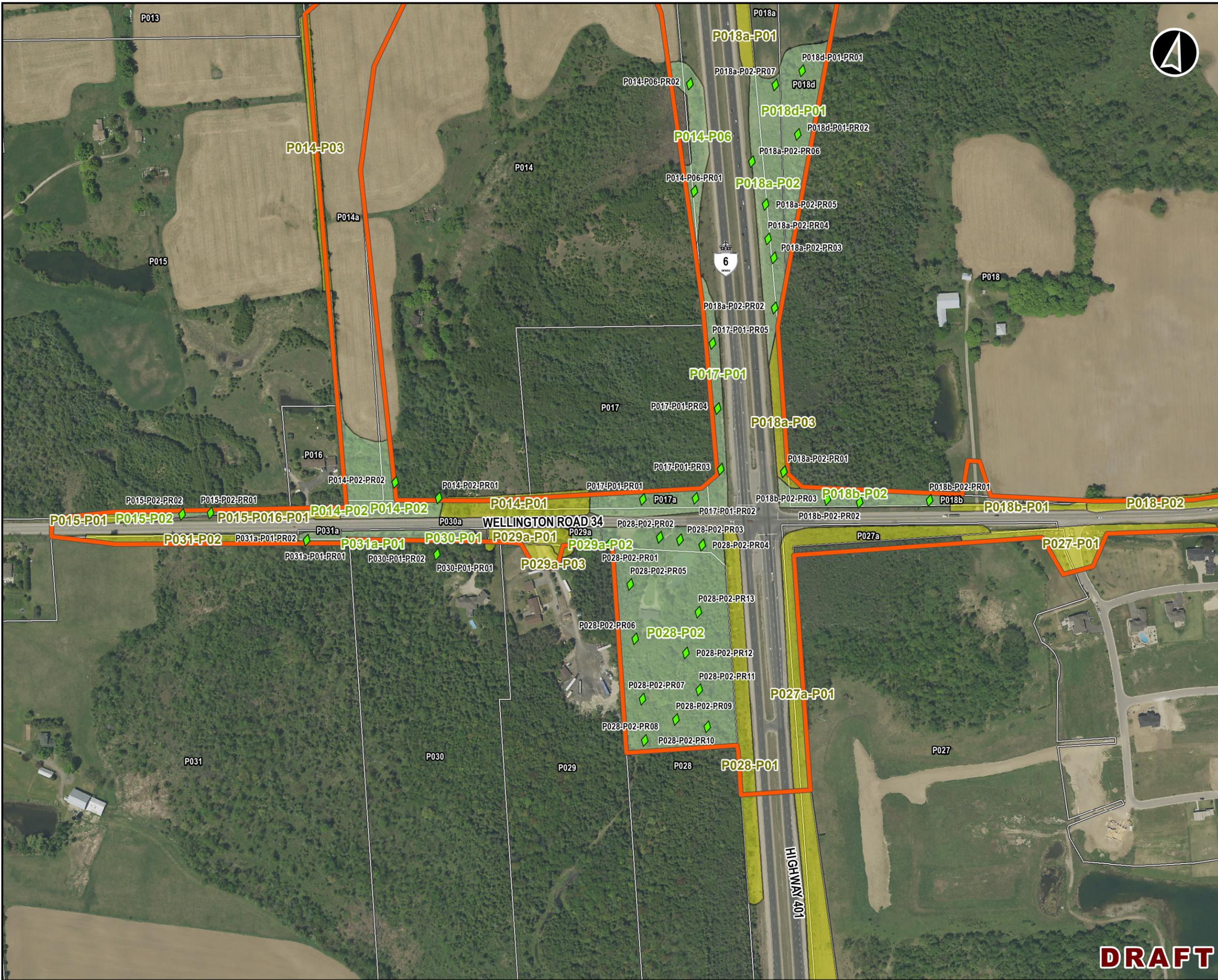
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P#: 60541071	V#: 001	Attachment A-2

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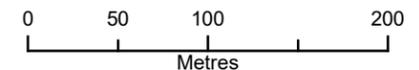


Legend

- Study Area (Limits of Work)
- Parcel Fabric

Tree Inventory

- Individually Surveyed Tree
- ◆ Prism Sweep Location
- Surveyed Polygon
- Prism Sweep Polygon



**Hanlon Expressway / Wellington Road 34
Mid-Block Interchange**

Tree Inventory

Mar, 2021	1:4,000 <small>* when printed 11"x17"</small>	Datum: NAD 1983 UTM Zone 17N Source: MNR, MMAH, AECOM, MTO
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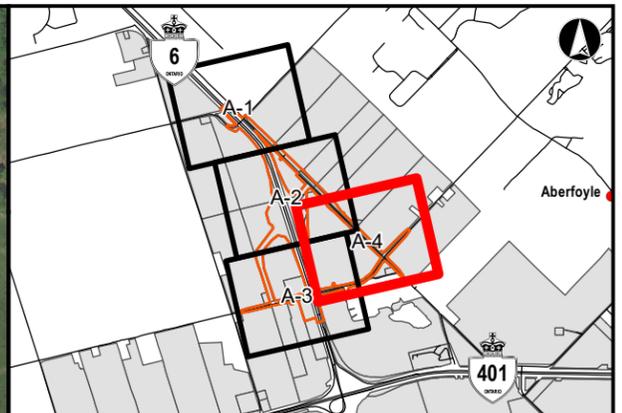
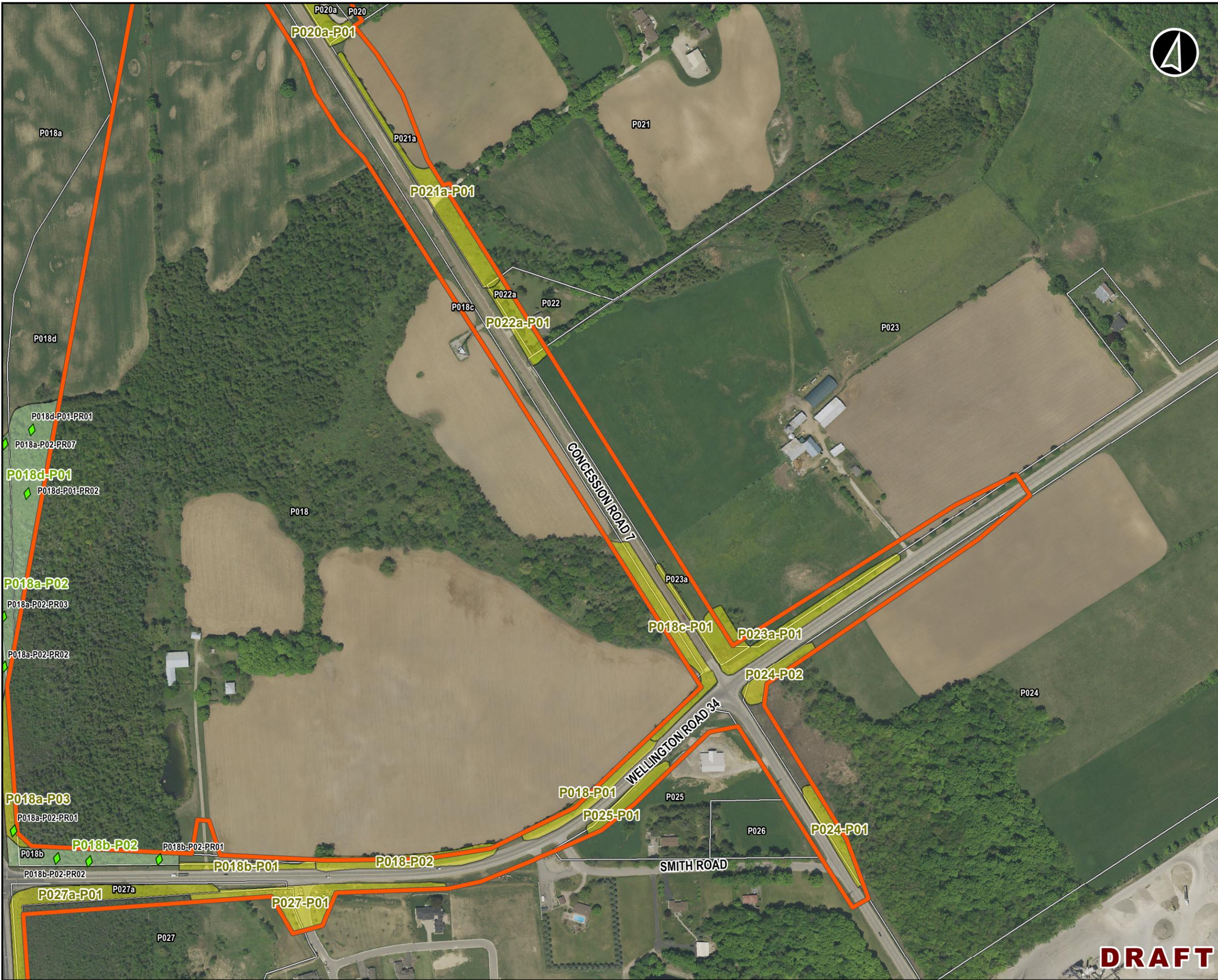
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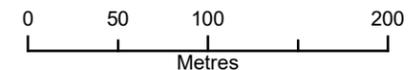
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- Legend**
- Study Area (Limits of Work)
 - Parcel Fabric
- Tree Inventory**
- Individually Surveyed Tree
 - ◆ Prism Sweep Location
 - Surveyed Polygon
 - Prism Sweep Polygon



**Hanlon Expressway / Wellington Road 34
Mid-Block Interchange**

Tree Inventory

Mar, 2021	1:4,000 <small>*when printed 11"x17"</small>	Datum: NAD 1983 UTM Zone 17N Source: MNR, MMAH, AECOM, MTO
P#: 60541071	V#: 001	

AECOM

Attachment A-4

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Attachment **B**

Tree Inventory Results

Attachment B-1: Polygon Tree Inventory Results

Polygon ID	Species: Common Name	Species: Scientific Name	Dead (DBH in cm)						Poor (DBH in cm)						Fair (DBH in cm)						Good (DBH in cm)						Total Per Species	Significance									
			0-10cm	10-20cm	20-30cm	30-40cm	40-50 cm	50+	0-10cm	10-20cm	20-30cm	30-40cm	40-50 cm	50+	0-10cm	10-20cm	20-30cm	30-40cm	40-50cm	50+	0-10cm	10-20cm	20-30cm	30-40cm	40-50cm	50+											
P014-P04	Apple sp.	<i>Malus sp.</i>								1																1	M										
P014-P04	Sugar maple	<i>Acer saccharum</i>																1								1	H										
P014-P05	Basswood	<i>Tilia americana</i>												6	11	1	3									1	22	M									
P014-P05	Black cherry	<i>Prunus serotina</i>												5	1											8	14	M									
P014-P05	Manitoba maple	<i>Acer negundo</i>													1											1	1	L									
P014-P05	Trembling aspen	<i>Populus tremuloides</i>																							1	1	M										
P014-P05	Sugar maple	<i>Acer saccharum</i>																							5	5	H										
P015-P01	Eastern white cedar	<i>Thuja occidentalis</i>							16																	20	61	M									
P015-P01	White ash	<i>Fraxinus americana</i>		1					12																	12	65	L									
P015-P01	Tamarack	<i>Larix laricina</i>							2																	2	2	M									
P015-P01	White birch	<i>Betula papyrifera</i>																							2	2	M										
P015-P01	Black cherry	<i>Prunus serotina</i>																							1	1	M										
P015-P01	Black walnut	<i>Juglans nigra</i>																							1	1	M										
P015-P01	Sugar maple	<i>Acer saccharum</i>																1								1	3	H									
P015-P01	Crack willow	<i>Salix fragilis</i>																								1	2	M									
P015-P016-P01	Tamarack	<i>Larix laricina</i>	2	1										16	2											3	3	27	M								
P015-P016-P01	White birch	<i>Betula papyrifera</i>																							1	1	2	2	M								
P015-P016-P01	Eastern white cedar	<i>Thuja occidentalis</i>							5																	10	45	M									
P015-P016-P01	Balsam poplar	<i>Populus balsamifera</i>								1																1	2	M									
P015-P016-P01	Scots pine	<i>Pinus sylvestris</i>																								1	1	M									
P018-P01	Black locust	<i>Robinia pseudoacacia</i>																								8	4	2	16	L							
P018-P01	Green ash	<i>Fraxinus pennsylvanica</i>	1	1	1						1	2														4	10	10	L								
P018-P01	Manitoba maple	<i>Acer negundo</i>																1								1	2	2	1	10	L						
P018-P01	Silver maple	<i>Acer saccharinum</i>																								2	2	1	2	2	M						
P018-P01	Apple sp.	<i>Malus sp.</i>																												1	M						
P018-P02	Green ash	<i>Fraxinus pennsylvanica</i>		1	1				2	11																	2	18	18	L							
P018-P02	Eastern white cedar	<i>Thuja occidentalis</i>							5																		1	6	6	M							
P018-P02	Silver maple	<i>Acer saccharinum</i>		1																						5	5	2	15	M							
P018-P02	Manitoba maple	<i>Acer negundo</i>									1	3														1	1	1	17	L							
P018-P02	White elm	<i>Ulmus americana</i>																								2	1	3	3	L							
P018-P02	Apple sp.	<i>Malus sp.</i>																												1	M						
P018a-P01	Honey locust	<i>Gleditsia triacanthos</i>							1	1																10	7	3	3	7	12	2	46	M			
P018a-P01	Norway maple	<i>Acer platanoides</i>																												13	1	17	M				
P018a-P01	Colorado spruce	<i>Picea pungens</i>																									1	1	1	1	M						
P018a-P03	Eastern white cedar	<i>Thuja occidentalis</i>	2	12																						33	10					57	M				
P018a-P03	Balsam fir	<i>Abies balsamea</i>		2																						1	3	1				7	M				
P018a-P03	Tamarack	<i>Larix laricina</i>																								5	2					7	2	16	M		
P018a-P03	Freeman maple	<i>Acer x freemanii</i>																								2						2	M				
P018a-P03	Green ash	<i>Fraxinus pennsylvanica</i>	5	8																						1	1					15	L				
P018a-P03	Scots pine	<i>Pinus sylvestris</i>							1																	1						3	M				
P018a-P03	Crack willow	<i>Salix fragilis</i>																								2						3	M				
P018a-P03	Trembling aspen	<i>Populus tremuloides</i>																									3					8	M				
P018a-P03	Balsam poplar	<i>Populus balsamifera</i>		1																						55	6					34	96	M			
P018a-P03	White elm	<i>Ulmus americana</i>										1																				1	L				
P018a-P03	White birch	<i>Betula papyrifera</i>																								4						1	5	M			
P018b-P01	Sugar maple	<i>Acer saccharum</i>																										1	2	1		4	M				
P018b-P01	Eastern white cedar	<i>Thuja occidentalis</i>																								2						2	M				
P018b-P01	White ash	<i>Fraxinus americana</i>		2					2	1																2	2					1	11	M			
P018b-P01	Black locust	<i>Robinia pseudoacacia</i>																										1				1	2	L			
P018b-P01	Green ash	<i>Fraxinus pennsylvanica</i>		2	1				1																		3	1				2	3	13	M		
P018b-P01	Apple sp.	<i>Malus sp.</i>																															1	M			
P018c-P01	White elm	<i>Ulmus americana</i>																								3							3	M			
P018c-P01	Green ash	<i>Fraxinus pennsylvanica</i>	1				1					1														3						1	8	M			
P018c-P01	Freeman maple	<i>Acer x freemanii</i>																								13						2	15	M			
P018c-P01	White ash	<i>Fraxinus americana</i>																								2							2	L			
P018c-P01	Eastern white cedar	<i>Thuja occidentalis</i>																								57						26	83	M			
P018c-P01	Basswood	<i>Tilia americana</i>																														1	1	M			
P018c-P01	Trembling aspen	<i>Populus tremuloides</i>																														1	1	M			
P018c-P01	Manitoba maple	<i>Acer negundo</i>																														2	2	L			
P018c-P01	Apple sp.	<i>Malus sp.</i>																															1	1	M		
P019a-P01	Scots pine	<i>Pinus sylvestris</i>		1																							1	72	14	5			92	9	2	199	M
P019a-P01	White elm	<i>Ulmus americana</i>	2																							1							4	L			
P019a-P01	White ash	<i>Fraxinus americana</i>																								1							3	L			