Appendix E

Environmental Investigations

BT ENGINEERING

509 Talbot Street
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TECHNICAL MEMORANDUM

TO:	File	**DATE:**	July 17, 2025 **Revision 1**
FROM:	Brooke Finlay	**PROJECT #:**	23-041
PROJECT:	County of Essex, County Road 46 and Concession Roads 8 and 9 Environmental Assessment		
SUBJECT:	Natural Environment Site Reconnaissance Memorandum		

1.0 INTRODUCTION

BT Engineering Inc. (BTE) has been retained by the County of Essex in partnership with the Town of Tecumseh to complete a Municipal Class Environmental Assessment (MCEA) for County Road 46, from Highway 401 to County Road 19, and 8th and 9th Concession Roads in the Town of Tecumseh, from County Road 46 northerly to the Town boundary. The Environmental Assessment (EA) includes a Schedule C undertaking for County Road 46, an arterial road under the jurisdiction of the County of Essex, and a Schedule B undertaking for collector roads under the jurisdiction of the Town of Tecumseh.

2.0 PURPOSE

The purpose of this memorandum is to summarize the existing conditions of the study area from a site reconnaissance conducted on November 17, 2023, and provide a preliminary desktop review of online natural environment information resources. The study area is predominantly comprised of industrial/commercial and residential uses, agricultural fields, and small pockets of woodlands. The study area is illustrated in **Figure 1**.

3.0 PRELIMINARY DESKTOP REVIEW

Prior to a site visit, the following online tools were used to obtain background information on potential Natural Heritage Features (NHF) and Species at Risk (SAR) in the study area:

- Natural Heritage Information Centre (NHIC) Online GIS Tool (MNR).
- Aquatic Resource Area Line Segment (ARALS) mapping (Land Information Ontario).
- Atlas of Breeding Birds of Ontario (online version).
- Ontario Watershed Information Tool (OWIT) (MNR)
- Ontario Nature Reptile & Amphibian Atlas (ONRAA).
- Species at Risk list in Ontario (MECP).
- Aquatic Species at Risk Map Online GIS Tool (DFO).
- Toporama Online GIS Tool (Natural Resources Canada).
- Fish ON-Line GIS Tool (MNR).

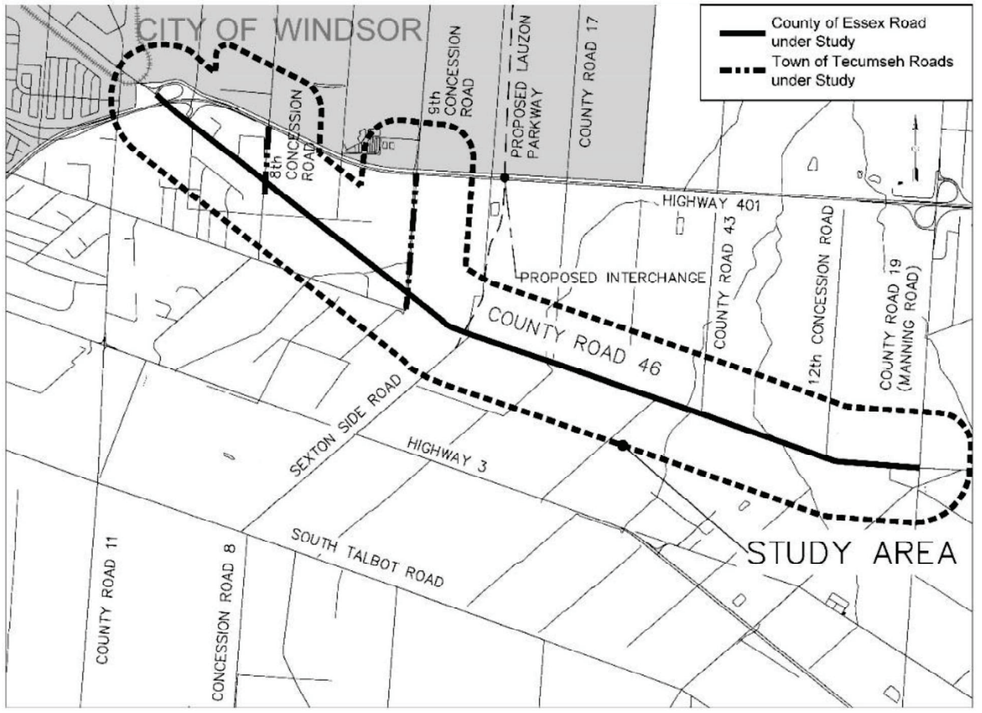

Figure 1: Study Area

3.1 Surface Water Features

The study area is located within the Detroit River Watershed and Sydenham River - St. Clair River Watershed and is under the jurisdiction of the Essex Region Conservation Authority (ERCA). Nine (9) watercourses are within the study area limits which are identified on **Figure 2**. Site Photos of each of the watercourse crossings within the study area (**Photos 1-16**) are documented in **Attachment 1**.

The drainage area of Little River and Pike Creek was generated using the Ontario Watershed Information Tool (OWIT) by the Ministry of Natural Resources (MNR) and is provided in **Figure 3**. The OWIT watershed tool indicates that the watercourse crossings within the study area are tributaries of Little River or Pike Creek.

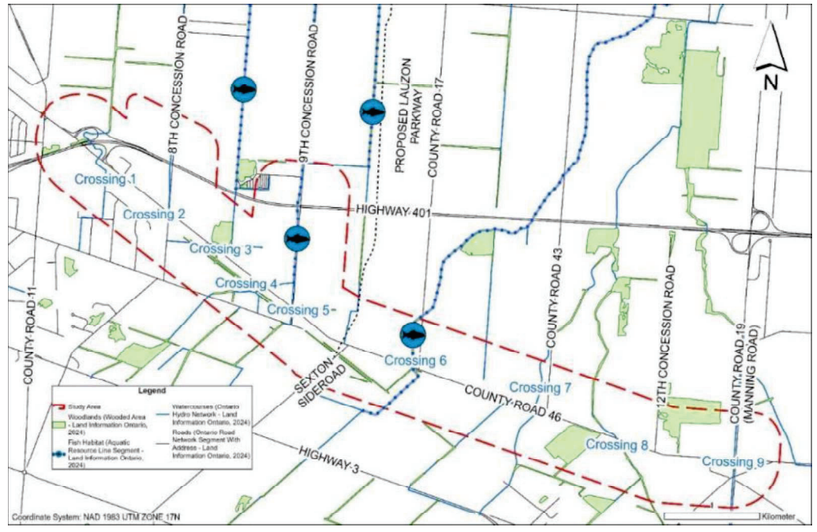

Figure 2: Watercourse Crossings

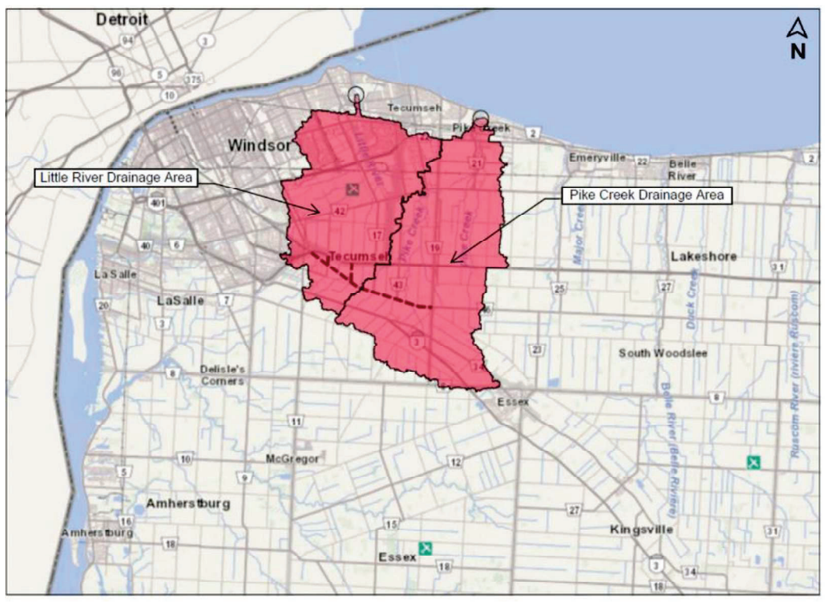

Figure 3: Drainage Area

Fish habitat is present within the study area, according to Aquatic Resource Area Line Segment (ARALS) mapping by Land Information Ontario (LIO). Records of a tributary north of County Road 46, parallel to 9th Concession Road, included the following fish species:

- Banded Killifish
- Bluntnose Minnow
- Central Mudminnow
- Common Carp
- Creek Chub
- Fathead Minnow
- Golden Shiner
- Goldfish (non-native)
- Green Sunfish
- Northern Pike
- Pumpkinseed
- White Sucker

Potential barriers to fish passage were not documented during the initial field reconnaissance completed in the fall of 2023.

Records available via ARALS mapping for the portion of Pike Creek that intersects County Road 46 indicate that White Sucker have been observed in Watercourse Crossing 6. The location of Watercourse Crossing 6 (**Photo 12**) within the study area is illustrated in **Figure 2**.

3.2 Herptafauna

The following reptiles and amphibians have been recorded within the study area according to the Ontario Nature Reptile and Amphibian Atlas (ONRAA):

- Blanding's Turtle (*Emydoidea blandingii*)
- Midland Painted Turtle (*Chrysemys picta*)
- Northern Map Turtle (*Graptemys geographica*)
- Snapping Turtle (*Chelydra serpentina*)
- Eastern Foxsnake (*Pantherophis vulpinus*)
- American Toad (*Anaxyrus americanus*)
- Dekay's Brownsnake (*Storeria dekayi*)
- Eastern Massasauga (*Sistrurus catenatus*)
- Red-bellied Snake (*Storeria occipitomaculata*)
- Eastern Gartersnake (*Thamnophis sirtalis sirtalis*)
- American Bullfrog (*Lithobates catesbeianus*)
- Green Frog (*Rana clamitans*)
- Northern Leopard Frog (*Lithobates pipiens*)
- Western Chorus Frog (*Pseudacris triseriata*)
- Eastern Musk Turtle (*Sternotherus*)
- Red-eared Slider (*Trachemys scripta elegans*)
- Butler's Gartersnake (*Thamnophis butleri*)

The above species are afforded protection under the Endangered Species Act (ESA) include Blanding's Turtle (Threatened), Eastern Massasauga (Endangered), Butler's Gartersnake (Endangered), and Eastern Foxsnake (Endangered). Northern Map Turtle, Eastern Musk Turtle and Snapping Turtle have a status of Special Concern under the ESA.

3.3 Avifauna

The Atlas of Breeding Birds of Ontario online tool has reported records of several avifauna species within the study area. The Breeding Birds of Ontario Summary Sheet is provided as **Attachment 2**.

3.4 Species at Risk

Records of the following species were available on the NHIC within the study area during the desktop review. Species of Special Concern are not afforded protection under the ESA as they are not yet considered Endangered or Threatened. However, threats have been identified for species of Special Concern that could alter the species' status. Pending Royal Assent of Bill 5, the ESA is expected to change to the Species Conservation Act in 2025 requiring that SAR present are registered if found in the project area.

Eastern Wood-pewee (*Contopus virens*), a species designated a status of Special Concern by the Committee on the status of Species at Risk in Ontario (COSSARO), has been recorded in the study area in the NHIC. The preferred habitat of Eastern Wood-pewee includes deciduous or mixed forests with an open to semi-open canopy, often near forest edges, clearings, or gaps that provide suitable perching sites for foraging. Suitable habitats for the species may be present in the study area.

Wood Thrush (*Hylocichla mustelina*), a species designated a status of Special Concern by the COSSARO and Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has been recorded in the study area by NHIC. The species' preferred habitat is the interior of mature deciduous or mixed forests with dense canopy covers. The interiors of the forests in the study area may provide suitable habitat for Wood Thrush.

Butler's Gartersnake (*Thamnophis butleri*) a species designated a status of Endangered by COSSARO has been recorded in the study area in the NHIC. Populations of Butler's Gartersnake are concentrated near Lake St. Clair, Detroit River, and further north near St. Clair River and Lake Huron. The preferred habitat of Butler's Gartersnake includes dense grasslands and old fields with small pockets of wetlands, localized environments of which can be found in the study area.

Kentucky Coffee-tree (*Gymnocladus diocus*) is designated as Threatened by both the COSSARO and the COSEWIC and has been recorded in the study area in the NHIC. The species is commonly found in moist floodplain forests, bottomlands, and open woodlands and often occurs in calcareous soils. Known populations in Ontario are restricted primarily to the Carolinian Zone in southwestern Ontario. No individual Kentucky Coffee-trees were observed within the study area during the site reconnaissance. If the species is identified during future phases of the project, further assessment and coordination with the Ministry of the Environment, Conservation and Parks (MECP) may be required to ensure compliance with the ESA.

Climbing Prairie Rose (*Rosa setigera*) is designated as Special Concern by both the COSSARO and the COSEWIC and has been recorded in the study area by the NHIC. It occurs in open, early successional habitats such as prairies, meadows, and roadsides primarily in southwestern Ontario. Climbing Prairie Rose was not observed within the study area during the site reconnaissance.

Grass Pickerel (*Esox americanus vermiculatus*), a fish species, designated as Special Concern by both the COSSARO and the COSEWIC has been recorded in the study area in the NHIC. The species is found is slow

Subject: Natural Environment Site Reconnaissance Memorandum
Project: BTE File 23-041, County of Essex, County Road 46 and Concession Roads 8 and 9 Environmental Assessment
Date: July 17, 2025, Revision 1

moving vegetated waters including ponds, marshes, and lowland streams. There is potential for suitable habitat for Grass Pickerel to be present in the study area.

4.0 EXISTING SITE CONDITIONS

4.1 Incidental Wildlife Observations

None of the SAR reported in the area were identified during the site reconnaissance on November 17, 2023. One incidental wildlife observation was made of a Mink (*Mustela vison*). Roadkill of eight small mammals, including an Eastern Cottontail (*Sylvilagus floridanus*) and a Virginia Opossum (*Didelphis virginiana*), was noted within the study area during the field reconnaissance.

4.2 Terrestrial Features

Terrestrial features are limited to the naturalized stream corridors in the study area, several hedgerows in-between agricultural fields and alongside the right-of-way of County Road 46, and two woodlots that abut County Road 46.

Watercourse Crossing 3 (**Figure 2**)meanders through a forested ravine +/- 5 hectares in size north of County Road 46 in the west terminus of the study area. The forested ravine is comprised of both deciduous and coniferous trees. An additional woodlot is located south of County Road 46 in the east terminus of the study area and is +/- 12 hectares in size, comprised predominately of deciduous trees. Existing vegetation outside of the naturalized watercourse corridors is a mix of non-native cultural species and common native plants. No provincially rare or endangered plant species were observed during site reconnaissance. In addition, no large-diameter trees (DBH >25 cm) with the potential to support bird nesting or roosting habitat for *Myotis* (bat) species were identified.

4.3 Aquatic Features

No fish community sampling or water sampling was undertaken during the site reconnaissance on November 17, 2023. However, the characteristics of each of the nine (9) watercourses were noted during site reconnaissance and are summarized in **Table 1.**

Table 1: Watercourse Characteristics Summary

Watercourse ID	Photo ID	Coordinates (Latitude/Longitude)	Existing Structure	Type	Morphology	Streambed Composition	Vegetation	Potential Fish Habitat
1	1-5	**Lat:** 42.24632° N **Lon:** 82.95625° W	4 Concrete Culverts	Channelized	Flat	Muck Detritus	Emergent Vegetation: Phragmites, Cattails Algal Blooms	Unknown
2	6,7	**Lat:** 42.24173° N **Lon:** 82.94686° W	Linear Roadside Ditch	Channelized	Run/ Flat	Detritus	Emergent Vegetation: Phragmites	Unknown
3	8,9	**Lat:** 42.23892° N **Lon:** 82.94214° W	Corrugated Steel Pipe and Concrete Headwall	Channelized	Run	Detritus Muck	Emergent Vegetation/ Submergent Vegetation: Phragmites Algal Blooms	Potential Fish Habitat
4	10	**Lat:** 42.23459° N **Lon:** 82.93440° W	Corrugated Steel Pipe and Concrete Headwall	Channelized	Run/Flat	Unknown	Emergent Vegetation Submergent Vegetation	Fish Habitat
5	11	**Lat:** 42.23305° N **Lon:** 82.93002° W	Corrugated Steel Pipe and Concrete Headwall	Channelized	Run/Flat	Unknown	Emergent Vegetation	Fish Habitat
6	12	**Lat:** 42.22830° N **Lon:** 82.91661° W	Twin Culvert and Concrete Headwall	Stream	Run/ Flat	Muck	Emergent Vegetation	Fish Habitat
7	13	**Lat:** 42.22458° N **Lon:** 82.90120° W	Boxed Concrete Culvert	Stream	Run/Riffle/Flat	Detritus Muck Cobble	Algal Blooms	Unknown
8	14	**Lat:** 42.22159° N **Lon:** 82.88995° W	Concrete Culvert Gabion Basket retaining wall	Stream	Run/Riffle	Detritus Muck Silt	Algal Blooms	Unknown
9	15, 16	**Lat:** 42.22000° N **Lon:** 82.87501° W	Concrete Boxed Culvert	Stream	Run	Muck Silt	Emergent Vegetation	Unknown

5.0 DESCRIPTION OF PROPOSED WORK

The preliminary design includes the extension or replacement of several existing culverts to accommodate the proposed road widening, which consists of a 40 m cross-section along County Road 46 and a 36 m rural cross-section along Concession Road 8. Existing centreline culverts at Crossings 3, 5, and 6 (as shown on **Figure 2**) are either connected to, or have the potential to support, fish habitat. The watercourses in the study area should be further assessed during detail design to confirm the presence of fish, the quality of fish habitat and to determine the need for permitting or mitigation under the Fisheries Act and associated guidelines.

The preliminary design includes stormwater ponds in eight (8) locations, three (3) of which may be online connections to drains or watercourses with existing fish habitat (Crossings 4, 5, and 6 on **Figure 2**). The preliminary design also includes shallow stormwater quantity-only ponds with control berms to attenuate large storm flows while allowing smaller, more frequent storm flows to drain. The detail design should incorporate measures to ensure the protection of downstream aquatic habitat, including maintenance of baseflow conditions, control of thermal and sediment inputs, and avoidance of barriers to fish passage.

6.0 PRE-DESIGN RECOMMENDATIONS

Further assessment of potential fish habitat in the receiving systems is recommended during detail design to confirm the need for mitigation or review under the Fisheries Act. Likewise, a fish inventory is recommended to be done as part of the preliminary design, so that the impacts due to the proposed stormwater management plan can be assessed at a stage early enough to secure the necessary land required.

The timing restriction window in southern Ontario for the spring spawning fish species identified during the desktop review is between March 15-July 15 of any given year as defined by the Ministry of Natural Resources, however the timing restriction should be confirmed following further assessment and consultation with DFO. The following permits and approvals may be required during detail design phase, subject to confirmation once site-specific conditions and construction details are finalized:

- License to Collect Fish for Scientific Purposes (MNRF): A license to collect fish is required from the Ministry of Natural Resources and Forestry (MNRF) to confirm existing conditions and complete a fish habitat assessment during the design phase.
- *Migratory Birds Convention Act (*MBCA): MBCA requires vegetation removal be completed outside of the nesting period for breeding birds (April 1 to August 31 of any given year).
- *Fisheries Act* Fisheries and Oceans Canada (DFO): A Request for Review submission to DFO for In-water works during culvert replacements is required if the work has the potential to harm fish or fish habitat.
- *Endangered Species Act*, 2007 (ESA): If species at risk or their habitat are confirmed, consultation with the Ministry of the Environment, Conservation and Parks (MECP) is required. A Letter of Advice or an ESA 17(2)(c) permit may be required depending on the level of anticipated impact. The Government of Ontario has proposed replacing the ESA with the Species at Risk Conservation Act; however, the ESA remains the applicable legislation to date.

- Essex Region Conservation Authority (ERCA) permit: Works in or near watercourses including stormwater management ponds and culvert replacements may require a permit under Ontario Regulation 165/06 from ERCA for any proposed development and/or interference with watercourses, shorelines, and wetlands.

7.0 CONCLUSIONS

Field reconnaissance did not identify the presence of any Species at Risk (SAR), significant natural features, or rare plant communities within the study area. Records of Blanding's Turtle, Northern Map Turtle, Midland Painted Turtle, and Snapping Turtle within the study area are available on ONRAA, however no potential turtle habitat was identified within the limits during field reconnaissance.

Natural features within the study area are limited to two woodlots adjacent to County Road 46 and the watercourse crossings which may provide potential fish habitat. Further field investigations, including species-specific flora and fauna surveys, will be completed during the detail design phase of the project to determine the presence of SAR and suitable habitats in the study area.

Of the nine watercourses, 4 have been identified as containing fish habitats, while the remaining five have unknown characteristics. The habitat characteristics of all nine watercourses should be confirmed before proceeding to detail design, particularly as some may be retrofitted to provide online stormwater quantity control.

Prepared by:

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Reviewed by:

Shawn R. Taylor, M.Sc., R.P. Bio
Senior Biologist

Attachments: 1. Site Photos
2. Breeding Birds of Ontario Summary Sheet

Attachment 1

Site Photos

Photo 1: Concrete culvert west of Study Area Limits, north of County Road (CR) 46.

Photo 2: Culvert under Highway 401 overpass further west of Study Area, connected to Watercourse Crossing 1.

Photo 3: Watercourse Crossing 1 inlets into four (4) concrete culverts north of CR 46, east of the 401 overpass.

Photo 4: Channel of Watercourse Crossing 1 that inlets into concrete culverts pictured in Photo 3.

BT ENGINEERING BTE	Study Area Representative Photographs	Date: March 2024 Project No: 23-041 Attachment: 1

Photo 5: Culvert outlet of Watercourse Crossing 1, located south of CR 46.

Photo 6: Watercourse Crossing 2, linear ditch inundated with water, north of 401 underpass, parallel to Concession Road 8.

Photo 7: Watercourse Crossing 2 is conveyed under a concrete bridge culvert located north of the Highway 401 underpass.

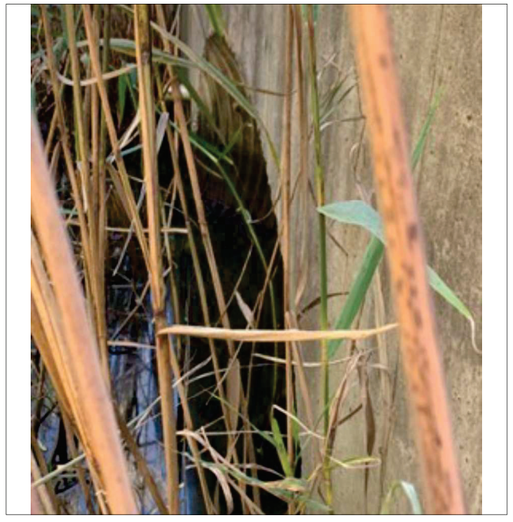

Photo 8: At Watercourse Crossing 3, a large culvert and concrete headwall conveys stream from forested ravine north of CR 46.

BT ENGINEERING BTE	Study Area Representative Photographs	Date: March 2024 Project No: 23-041 Attachment: 1

Photo 9: Outlet of forested ravine (Watercourse Crossing 3) inundates the linear ditch south of and parallel to CR 46.

Photo 10: Watercourse Crossing 4, inundated ditch parallel to Concession Road 9.

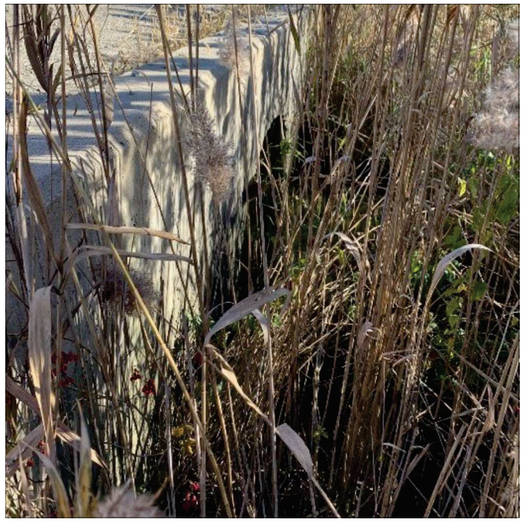

Photo 11: Watercourse Crossing 5 is a large culvert and concrete headwall conveyed under CR 46.

Photo 12: Watercourse Crossing 6, large culvert and concrete headwall conveyed under CR 46.

BT ENGINEERING BTE	Study Area Representative Photographs	Date: March 2024 Project No: 23-041 Attachment: 1

Photo 13: Watercourse Crossing 7 is conveyed under a large concrete boxed culvert before exiting east a flowing parallel to CR 46 and continuing south.

Photo 14: Watercourse Crossing 8 is a tributary of Pike Creek.

Photo 15: Watercourse Crossing 9 at the intersection of County Road 46 and County Road 19 (Manning Road).

Photo 16: Stream composition of Watercourse Crossing 9.

BT ENGINEERING BTE	Study Area Representative Photographs	Date: March 2024 Project No: 23-041 Attachment: 1

Attachment 2

Breeding Birds of Ontario Summary Sheet

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BIRDS CANADA
OISEAUX CANADA

Square Summary (17TLG47) [change]

	#species				#hours		#pc done	
	poss	prob	conf	total	total	peak	road	offrd
Curr.	18	10	13	41	33.7	24.9	0	0
Prev.	12	27	41	80	76.4	—	25	

Region summary (#1: Essex, ON)

#squares	#sq with data	#species	#squares (pc)	
			target	compl.
38	32	139	38	7
38	38	151	0	23

Target number of point counts in this square: 25 in total: 20 road side, 5 off road (Broadleaf Forest in 3, Wetland in 2). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Prev.	Code	%
Canada Goose	FY	FY	81
Mute Swan			34
Trumpeter Swan ‡			18
Wood Duck	FY	FY	62
Blue-winged Teal §			12
Northern Shoveler ‡			0
Gadwall ‡			3
American Wigeon ‡			0
Mallard	FY	FY	84
American Black Duck ‡			6
Northern Pintail ‡			0
Green-winged Teal ‡			3
Redhead †			3

Hooded Merganser ‡			6
Ruddy Duck ‡			3
Wild Turkey	H		65
Ring-necked Pheasant ‡	S		12
Pied-billed Grebe		FY	15
Rock Pigeon (Feral Pigeon)	T	M	53
Mourning Dove	NE	M	93
Yellow-billed Cuckoo	S		56
Black-billed Cuckoo	FS		28
Coccyzus sp. ‡	T		0
Common Nighthawk §	T	D	12
Chuck-will's-widow †			0
Eastern Whip-poor-will ‡			0
Chimney Swift §	D	H	59
Ruby-throated Hummingbird	H	H	65
King Rail †			3
Virginia Rail			9
Sora			9
Common Gallinule §			12
American Coot ‡			6

SPECIES	Prev.	Code	%
Sandhill Crane			15
Killdeer §	FY	A	90
American Woodcock	T		31
Wilson's Snipe ‡			0
Wilson's Phalarope †			3
Spotted Sandpiper	FY	H	65
Ring-billed Gull §	NE		6
Herring Gull §			9
Caspian Tern ‡			0
Black Tern † §			6
Forster's Tern † §			0
Common Tern § ‡			0
Double-crested Cormorant §			28
American White Pelican † §			0
American Bittern ‡	H		9

Least Bittern †	T		21
Black-crowned Night Heron † §			9
Green Heron §	H	FY	50
Great Egret † §			3
Great Blue Heron §	H		18
Turkey Vulture	T	H	78
Osprey			46
Northern Harrier			12
Sharp-shinned Hawk ‡			0
Cooper's Hawk	NY		50
Bald Eagle §			56
Broad-winged Hawk ‡			0
Red-tailed Hawk	AE	P	75
Eastern Screech-Owl	T		46
Great Horned Owl	T		59
Long-eared Owl ‡	T		0
Short-eared Owl †			0
Belted Kingfisher		FY	59

SPECIES	Prev.	Code	%
Red-headed Woodpecker †			25
Red-bellied Woodpecker	D		78
Downy Woodpecker	FY	FY	87
Hairy Woodpecker	NY		40
Pileated Woodpecker ‡			3
Northern Flicker	FY		84
American Kestrel §	FY	H	25
Merlin ‡			0
Peregrine Falcon ‡			3
Eastern Wood-Pewee §	T	S	84
Acadian Flycatcher †			6
Alder Flycatcher ‡			0
Willow Flycatcher	T		75
Least Flycatcher ‡			12
Eastern Phoebe			56
Great Crested Flycatcher	D		78
Eastern Kingbird	FY	A	84

White-eyed Vireo †			6
Yellow-throated Vireo	A		12
Warbling Vireo	T	A	87
Red-eyed Vireo	D		81
Blue Jay	AE	H	84
American Crow	P		56
Black-capped Chickadee	FY		81
Tufted Titmouse			34
Horned Lark §	FY		59
Bank Swallow §			37
Tree Swallow	FY	H	96
Purple Martin §			81
Northern Rough-winged Swallow	T		46
Barn Swallow §	NY	AE	90
Cliff Swallow §	AE	H	68
White-breasted Nuthatch	FY		68

Breeding Bird Atlas - Summary Sheet for Square 17TLG47 (page 2 of 2)

SPECIES	Prev.	Code	%
Brown Creeper ‡			3
Blue-gray Gnatcatcher	P		53
House Wren	FY	S	90
Sedge Wren ‡			0
Marsh Wren			21
Carolina Wren		S	78
European Starling	CF	FY	90
Gray Catbird	FY		78
Brown Thrasher	P		56
Northern Mockingbird			3
Eastern Bluebird	P		46
Veery ‡	S		0
Wood Thrush §	T		43
American Robin	FY	FY	96
Cedar Waxwing	CF	H	87
House Sparrow	AE	NY	90
House Finch	FY		75
American Goldfinch	FY	P	87
Grasshopper Sparrow ‡			0
Chipping Sparrow	FY	S	90
Field Sparrow §	T		50
Vesper Sparrow	P		53
Savannah Sparrow	A	S	71
Song Sparrow	CF	CF	84
Swamp Sparrow			18
Eastern Towhee §	S		31
Yellow-breasted Chat †			12
Yellow-headed Blackbird † §			0
Bobolink §	CF		43
Eastern Meadowlark §	H		31
Orchard Oriole	S		53
Baltimore Oriole	FY	S	90
Red-winged Blackbird	CF	A	96

SPECIES	Prev.	Code	%

Brown-headed Cowbird	FY	CF	96
Brewer's Blackbird ‡			0
Common Grackle	FY	H	96
Ovenbird ‡			3
Blue-winged Warbler			6
Prothonotary Warbler †			21
Mourning Warbler ‡			3
Common Yellowthroat	T		75
Hooded Warbler ‡			6
American Redstart			31
Cerulean Warbler †			0
Yellow Warbler	FY	H	90
Chestnut-sided Warbler ‡			0
Pine Warbler ‡			3
Scarlet Tanager	S		6
Northern Cardinal	FY	M	90
Rose-breasted Grosbeak	FY		56
Indigo Bunting	CF	S	84
Dickcissel †			37

This list includes all breeding species expected in the region #1 (Essex). Underlined species are those that you should try to add to this square (17TLG47). They have not yet been reported in this square, but have been reported in more than 50% of the squares in this region so far. "Prev." is the code for the highest breeding evidence for that species in square 17TLG47 in the previous atlas. "Code" is the code for the highest breeding evidence for that species in square 17TLG47 over the last 5 years. The % columns give the percentage of squares in that region where that species was reported (this gives an idea of the expected chance of finding that species in region #1). Rare/Colonial Species Report Forms should be completed for species marked: § (Species of interest), ‡ (regionally rare), † (provincially rare). An up-to-date version of this sheet is available from https://naturecounts.ca//nc//atlas/squaresummaryform.jsp?squareID=17TLG47&lang=EN Data current as of **27/03/2024 18:08.**

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MEMORANDUM

TO:	File	**DATE:**	September 18, 2025
FROM:	Shawn R. Taylor M.Sc., R.P. Bio.	**PROJECT #:**	23-041
PROJECT:	County of Essex, County Road 46 and Concession Roads 8 and 9 Environmental Assessment		
SUBJECT:	Fish Inventory and Fish Habitat Assessment Memorandum		

1.0 INTRODUCTION

BT Engineering Inc. (BTE) has been retained by the County of Essex in partnership with the Town of Tecumseh to complete a Municipal Class Environmental Assessment (MCEA) for County Road 46, from Highway 401 to County Road 19, and 8th and 9th Concession Roads in the Town of Tecumseh, from County Road 46 northerly to the Town boundary.

2.0 PURPOSE

Field work was conducted on September 12, 2025 to inventory the fish species present at each of the nine watercourse crossings identified during the site reconnaissance of November 17, 2023. Fish habitat characteristics were identified, along with an inventory of the riparian vegetation found along the watercourse at each location. The purpose of this memorandum is to summarize the fish inventory, document the fish habitat characteristics of the watercourses crossing the roadway, and where impacts may occur on habitat as a result of road improvements. The study area is predominantly comprised of industrial/commercial and residential uses, agricultural fields, and small pockets of woodlands.

3.0 FIELD STUDY AREA

The study area is illustrated in **Figure 1** and is located within the Detroit River Watershed and Sydenham River - St. Clair River Watershed which are under the jurisdiction of the Essex Region Conservation Authority (ERCA). Nine (9) watercourses found within the study area limits are identified on **Figure 2**.

The drainage area of Little River and Pike Creek was generated using the Ontario Watershed Information Tool (OWIT) by the Ministry of Natural Resources (MNR) and is provided in **Figure 3**. The OWIT watershed tool indicates that the watercourse crossings within the study area are tributaries of Little River or Pike Creek. Several, if not all of the watercourses have been previously improved as Municipal Drains as identified by the Ontario Agriculture Mapping tool.

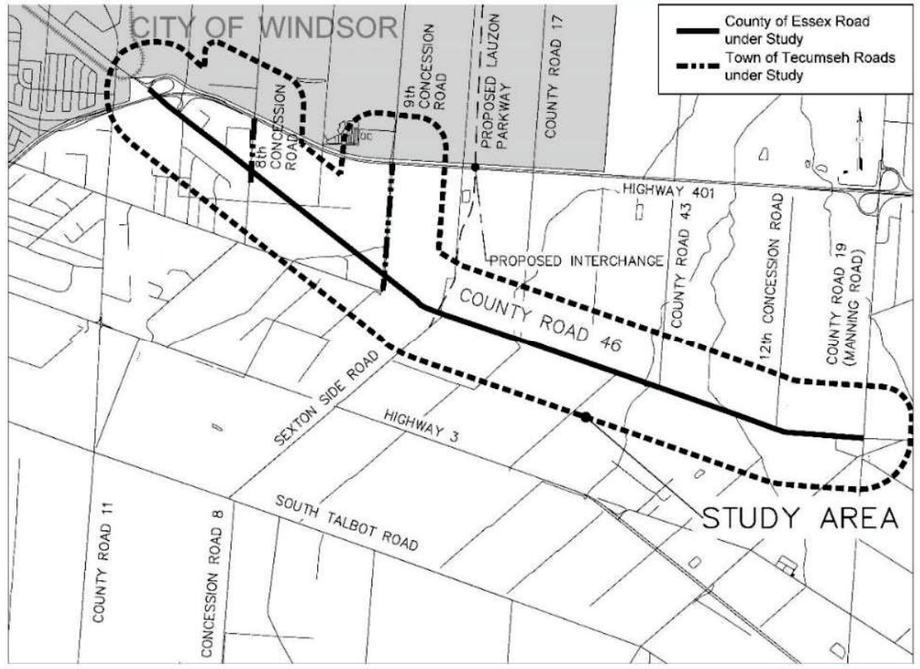

Figure 1: Study Area

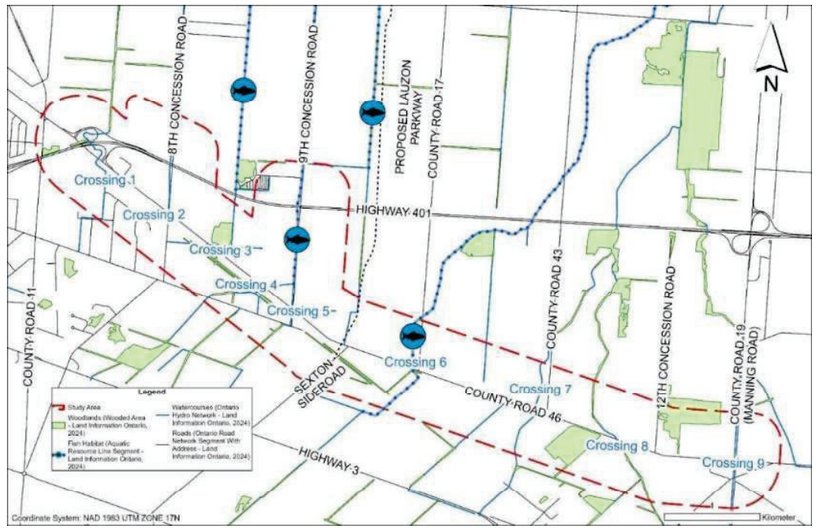

Figure 2: Watercourse Crossings

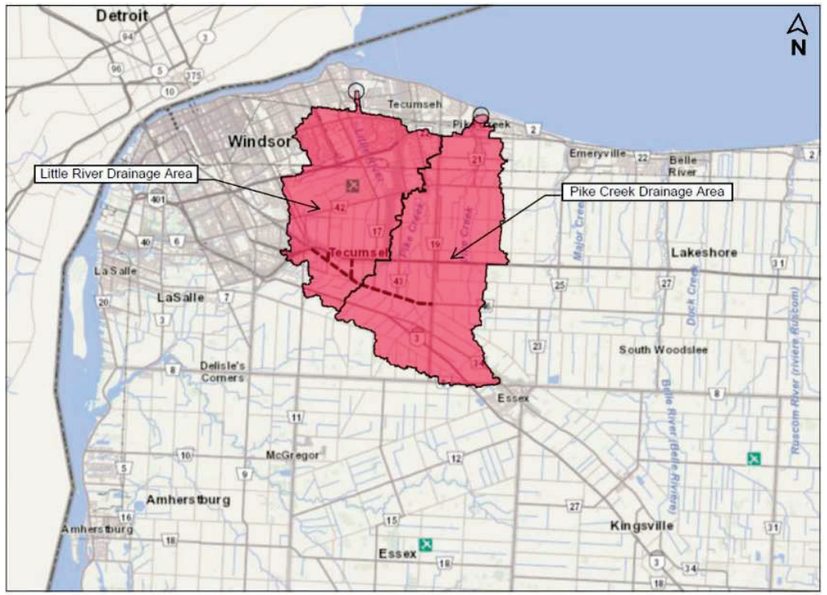

Figure 3: Drainage Area

4.0 FISH INVENTORY AND FISH HABITAT DETERMINATION

4.1 Methodology

A permit to Collect Fish for Scientific Purposes was secured from the Ontario Ministry of Natural Resources (OMNR) Aylmer District before conducting field work. The fish inventory was completed while wading the watercourse while using a backpack Electrofisher (Halltech HT2000B) and dip net. A certified electrofisher-person operated the unit, normally set at 150 Watts at 80 Hz frequency, for approximately 500 seconds of effort at each location. Stunned fish were captured by an assistant using a dip net, transferred to a bucket of clean water and held for identification by the senior biologist. After identification, all fish were returned to their waters of origin unharmed. One sample was taken for verification of species identification. Results of the species captured will be reported back to the OMNR who will in turn update the provincial database records for these watercourses.

A sketch map was drawn for each watercourse investigated and is included in the documentation along with the Fish Community Inventory Forms. These documents are provided in **Attachment 1**. Descriptive notes on the channel morphology, substrate type, culvert opening, shading of the water, water depth, water movement and possible seepage locations were noted. A list of riparian plants were recorded at each site, with the primary species found in the watercourse noted for abundance.

Subject: Fish Inventory and Fish Habitat Assessment Memorandum
Project: BTE File 23-041, County of Essex, County Road 46 and Concession Roads 8 and 9 EA
Date: September 18, 2025

Site Photos of each of the watercourse crossings within the study area taken on September 12, 2025 (**Photos 1-45**) are documented in **Attachment 2** grouped by crossing number.

In several cases, the invasive species *Phragmites australis* was found in such high densities, that electrofishing or wading the watercourse was not possible. Experience has demonstrated that waters surrounded by dense colonies of *Phragmites* provide very poor fish habitat resources as they are not a significant source of food, nutrients or spawning substrates. Recent initiatives by the Provincial government towards eradicating this nuisance plant suggest that infrastructure projects of this nature should participate, by removing Phragmites and the surrounding soil to a safe disposal site wherever practical.

Potential barriers to fish passage were documented during the field work and documented on the Fish Community Information Form and accompanying sketches (**Attachment 1**). In addition to instances of dense *Phragmites* colonization, Crossing #9 had a significant barrier to fish travel and upstream impoundment, a result of the stone side slope protection lining that has eroded and now occludes the bottom of the culvert and watercourse at the downstream end of the culvert at the intersection of County Road 19 and County Road 46.

4.2 Inventory Sampling Results

The fish inventory progressed from west to east along County Road 46, with inventories at all major culvert crossings and where municipal drains are adjacent to proposed roadway widening from two to four lanes. Crossing #2 on Concession 8 was assessed as a watercourse due to its proximity to County Road 46 and as it coincides with a planned linear stormwater management facility.

Crossing #1

Location: 50 m North of the intersection of the ramp to Highway 401.
GPS Coordinates: 42° 14’ 46.21: N / 82° 57’ 22.34” W
Species at Risk Map Check: No Species at Risk (SAR) identified at this location
Tributary of: Little River
Municipal Drain Name: 7th Concession Drain
Fish Species Captured: No Catch – 1 crayfish
Fish Habitat Designation: Not Direct Fish Habitat
Expected Impact from Preliminary Design: No significant changes. Already four lanes.
Mitigation Requirements: Department of Fisheries and Oceans Canada (DFO) protocols; basic sediment and erosion control, fish screens if pumping.
Notes: Immediately downstream of the Highway 401 offramp stormwater management pond. No persistent water flow.

Crossing #2

Location: Ditch on west side of Concession 8, South of the Highway 401 overpass.
GPS Coordinates: 42° 14’ 29.75 “N / 82° 56’ 49.55” W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Little River

Municipal Drain Name: 8th Concession Drain
Fish Species Captured: No Catch
Fish Habitat Designation: Not Fish Habitat
Expected Impact from Preliminary Design: New linear Stormwater Management (SWM) Pond #1 on northwest corner of intersection.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping and fish are observed.
Notes: Dry ditch colonized by grasses and Phragmites. No trees or shrubs providing shade. Unlikely to provide fish habitat at any time of the year.

Crossing #3

Location: 563 m southeast of Concession 8 / County Road 46 intersection.
GPS Coordinates: 42° 14' 18.59" N / 82° 56' 29.59" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Little River
Municipal Drain Name: Hurley Drain; Hurley Relief Drain
Fish Species Captured: No catch because could not electrofish in dense Phragmites.
Fish Habitat Designation: Indirect Fish Habitat outside of the ROW
Expected Impact from Preliminary Design: Culvert Replacement.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping and fish salvage if fish are observed during construction.
Notes: Trickle of water through large Phragmites colony. Unable to complete electrofishing due to high plant density. Box culvert approx. 2.4 X 1.2 m high. North of the ROW the creek flows through a large woodlot. Within the ROW there are a few isolated shrubs or trees that may be impacted. Because the flow originates in the woodlot, the creek may provide indirect fish habitat resources such and food and nutrients to downstream fish populations – but not immediately within the ROW due to the dense Phragmites colony.

Crossing #4

Location: 340 m Northwest of the intersection of County Road 46 with Concession 9.
GPS Coordinates:42° 14' 04.11" N / 82° 56' 03.91" W
Species at Risk Map Check: No fish SAR identified at this location. Red mulberry (SARA Schedule 1 – Endangered; Ontario - Endangered).
Note: One red mulberry shrub was found on the south side of the road, west side of the watercourse at the top of slope lying within the ROW and has the potential to be impacted by the planned culvert replacement – this observation, identified through the app Plant Net™ should be confirmed by a qualified terrestrial ecologist before a species at risk mitigation strategy is determined.
Tributary of: Little River
Municipal Drain Name: Washbrook Drain
Fish Species Captured: Brook Stickleback (4), Channel Darter (1), Crayfish (1) – all warmwater species
Fish Habitat Designation: Direct Fish Habitat.

Subject: Fish Inventory and Fish Habitat Assessment Memorandum
Project: BTE File 23-041, County of Essex, County Road 46 and Concession Roads 8 and 9 EA
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Expected Impact from Preliminary Design: Culvert replacement on Washbrook Drain. Potential realignment of Washbrook Drain on north side of County Road 46.
Mitigation Requirements: Enhanced DFO protocols to be determined during detail design; Detailed sediment and erosion control, use of rolled blankets following earthworks, fish screens if pumping and fish salvage when water is present during construction. Provincial warmwater fish timing guidelines to be followed or as directed by DFO.
Notes: Washbrook Drain is a stone-lined watercourse that intersects County Road 46 on a skew. Several shrubs and trees shade the watercourse on the north side, while the south side is an open canopy. Ditches flow from agricultural lands into the drain from two directions on each side of County Rd 46. Small grove of young Black Walnut trees located 100 m south of culvert outside of ROW, with at least two trees on the north side of the ditch that are close to the road, but unlikely to be impacted by the road improvements.

Crossing #5

Location: Traverse culvert under County Road 46, 10 m northwest of the Concession 9 intersection.
GPS Coordinates: 42° 13' 57.83" N / 82° 55' 52.60" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Little River
Municipal Drain Name: 9th Concession Drain
Fish Species Captured: No captures.
Fish Habitat Designation: Dry watercourse – no Direct Fish Habitat.
Expected Impact from Preliminary Design: New linear Stormwater Management (SWM) Pond #2 on northwest corner of intersection. Culvert replacement, relocation of 9th Concession Drain west to bypass pond and continue south to rail line.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping.
Notes: Small drainage catchment arising in soybean field to the southwest. Very low vegetative diversity in the channel, predominantly *Phragmites*, Goldenrod, Scotch thistle, grasses, Riverbank grape – typical dry plant assemblage. Periodically flows under culvert to the northeast. No flow present and no pools of water remain after last precipitation event. No catch result.

Crossing #6

Location: 65 m Northwest of the intersection of County Road 46 with Concession 11 / County Road 17.
GPS Coordinates: 42° 13' 38.40" N / 82° 54' 56.73" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Pike Creek
Municipal Drain Name: Little River Drain (North), O'Keefe Drain (South), Sullivan Drain (West)
Fish Species Captured: No Catch; Shallow water, electrofishing attempted.
Fish Habitat Designation: Indirect fish habitat.
Future Lauzon Parkway Intersection at GPS Coordinates: 42° 13'46.09" N / 82° 55' 28.38" W

Expected Impact from Lauzon Parkway Pre Design: Realign Little River Drain. Place three culverts. New linear SWM Pond #3 on SW corner of the intersection. Realign O'Keefe Drain east to County Road 17. No direct fish habitats were found here.
Expected Impact from County Road 46 Preliminary Design: Replace Sullivan Drain culvert, New SWM Pond #4 on north side, New SWM Pond #5 on south side to intercept McLean Hergott Drain, Partial realignment of McLean Hergott Drain.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping.
Notes: Small trickle of flow south to north, but not enough water to electrofish. Double elliptical culvert pipes in good condition. Two hedgerows seem to contribute flow and resources, coming together west of the road within the ROW. Eastern hedgerow seems to be the primary source, the northern hedgerow the minor source. First appearance of the native Narrow Leaved Cattail in a large colony on the south side – spread of Phragmites eastwards seem to be limited, sparse colonization here. North side of road watercourse in deep shade of overhanging trees and shrubs that contribute resources to downstream fish communities. Wildlife tracks observed crossing beneath road in culvert – either muskrat or racoon. Channel downstream of culvert has been altered to a drain but upstream appears natural (unimproved).

Crossing #7

Location: 150 m Northwest of the intersection of County Road 46 with Concession 12 / County Road 43.
GPS Coordinates: 42° 13' 25.18" N / 82° 54' 01.55" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Pike Creek
Municipal Drain Name: Gzowski Drain, Grondin Drain.
Fish Species Captured: Bluegill (2), Banded Killifish (19), Crayfish (2) – sample retained, all warmwater species
Fish Habitat Designation: Direct fish habitat.
Expected Impact from Preliminary Design: Replace culvert and realign Gzowski Drain. New SWM pond #6 to intercept Delisle Drain – west branch of Grondin Marshall Drain.
Mitigation Requirements: Enhanced DFO protocols; Detail design to determine sediment and erosion control, fish screens and fish salvage if pumping. Provincial warmwater fish timing guidelines to be followed.
Notes: Large (6 m wide X 15 m long) pool, well shaded on upstream side of a large, relatively new culvert (**Att. B. Photo 35**) retains water as the headwater source. Ditches entering from east and west were dry. Highly eroded bank on the south side of the pool. Very steep side slopes; channel invert deeply entrenched below ground surface. Can easily walk through culvert on eroded topsoil substrates. North (downstream) reaches are deeply shaded with hedgerow trees and shrubs in deep, well protected valley although this reach was dry suggesting the pool acts as a refuge for fish and aquatic animals.

Crossing #8

Location: 770 m Southeast of the intersection of Concession 12 / County Road 43.
GPS Coordinates: 42° 13' 16.07" N / 82° 53' 24.00" W
Species at Risk Map Check: No SAR identified at this location on current DFO mapping.
Tributary of: Pike Creek

Municipal Drain Name: Pike Creek Drain
Fish Species Captured: Banded Killifish (3), Silver Shiner (3) (**SAR - Threatened**), Channel Darter (1). All warmwater species**.**
Fish Habitat Designation: Direct fish habitat. Potential federal critical habitat designation.
Expected Impact from Preliminary Design: A new linear SWM Pond #7 is to be considered during detail design for the north side with two culvert replacements, one online and one offline.
Mitigation Requirements: Due to potential presence of a Species at Risk and Critical Habitat for this species, a SARA Compliant DFO Authorization is likely required for any changes that may affect the habitat quality or amount, and that may have the potential to kill fish. A detailed mitigation plan, potentially with offsetting habitat creation may be required. DFO protocols; basic sediment and erosion control, fish screens if pumping. Provincial warmwater fish timing guidelines to be followed or as directed by DFO.
Notes: Deep, previously improved channel with steep slopes that are fully vegetated with shrubs and small trees on both sides of County Road 46. Channel diagonally skewed flowing south to north. Water depth up to 20 cm deep in stable channel with heavy shade and overhanging vegetation including Boneset and Marsh Marigold. Small area of Phragmites on eastern bank below gabion baskets. North of road, dense shade from trees and shrubs leaving the watercourse well protected although grass is mown right to the top of bank.

SAR Note: Occurrence of Silver Shiner is currently being confirmed with a DFO subject specialist as it has not been previously found outside of the Grand River and Thames River drainages in southwestern Ontario.

Crossing #9

Location: Channel lies along west side of County Road 19. Sampled at the intersection of County Road 46 and County Road 19.
GPS Coordinates: 42° 13' 09.93" N / 82° 52' 30.29" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Mooney Creek tributary to Pike Creek
Municipal Drain Name: West Townline Drain
Fish Species Captured: Blue Gill (1), Emerald Shiner (13). No SAR. All warmwater species**.**
Fish Habitat Designation: Direct fish habitat.
Expected Impact from Preliminary Design: New linear SWM Pond #8 at northwest corner of intersection. Culvert Replacement, Realign West Townline and Mooney Creek Drain north and south of intersection.
Mitigation Requirements: Remove instream barrier to fish passage. Enhanced DFO protocols; Detail design to determine sediment and erosion control, fish screens and fish salvage if pumping. Improve dangerous side slopes particularly adjacent to County Road 19. Provincial warmwater fish timing guidelines to be followed or as directed by DFO.
Notes: Deeply incised (> 7 m) municipal drain with very steep slopes bordering County Road 19 leaving little room for road improvements without relocating the drain. Eastern slopes are highly eroded, rock protection is missing, and the slopes are unvegetated in several areas; west slopes are very steep, rock lined but stabilized with trees and shrubs. Significant migration barrier occurs below and through the culvert, prohibiting upstream travel for fish during low flow periods. A significant impoundment occurs on the upstream side of the County Road 46 culvert perhaps due to excess stone spread over the bottom (**Att B. Photo 44**) occluding flow. The

culvert may need to be cleaned out of the large rip rap creating this barrier to relieve the unintended impoundment. Shrubs and small trees stabilize some of the slopes, but in general the watercourse appears unstable and erosion prone and therefore the fish habitat is highly variable.

5.0 DESCRIPTION OF PROPOSED WORK

The preliminary design includes the extension or replacement of several existing culverts to accommodate the proposed road widening to four lanes, which consists of a 40 m rural cross-section along County Road 46 and a 36 m rural cross-section along Concession Road 8. Existing centreline culverts, stormwater management ponds and drain realignments at Crossings 3, 4, 6, 7, 8 and 9 (as shown on **Figure 2**) are either connected to, or have the potential to support, fish habitat. We have identified crossings 3 and 6 as providing indirect habitat resources, and as such basic mitigation measures are intended to protect these resources. Watercourse crossings 4, 7, 8 and 9 were found to contain resident fish species and are to be considered as year-round, direct fish habitat. Alterations to watercourses that may negatively effect fish or fish habitats may require additional screening and/or referrals to the DFO during detail design.

Watercourse crossing Number 8, located 770 m east of Concession 12, contained the threatened species at risk Silver Shiner, pending confirmation by DFO specialist staff. Pending consultation with the aquatic species at risk group of the DFO and further investigation, the habitats of this watercourse and connected waters may be considered as critical habitat requiring additional considerations of avoidance, mitigation and restoration planning to protect this nationally protected species. Reconsideration of the planned linear SWM facility at this location may be necessary, or at a minimum ensuring that the pond is built offline and does not result in the loss of fish habitat.

The preliminary design includes linear stormwater ponds in eight (8) locations, five (5) of which may connect to municipal drains or natural watercourses with existing fish habitat (Crossings 2, 5, 6, 7 and 8 on **Figure 2**). The preliminary design also includes shallow stormwater quantity-only ponds with control berms to attenuate large storm flows while allowing smaller, more frequent storm flows to drain freely. The detail design should incorporate measures to ensure the protection of downstream aquatic habitat, including maintenance of baseflow conditions, control of thermal and sediment inputs, and avoidance of barriers to fish passage.

6.0 PRE-DESIGN RECOMMENDATIONS

Further assessment of the quantity of fish habitat in the receiving systems to be directly impacted is recommended during detail design to confirm the need for mitigation or review under the Fisheries Act.

All fish captured are considered by the Ministry of Natural Resources to be warm water fish species. Therefore, all in-water work will be required to respect the warmwater fish timing restriction guidelines of March 15 to July 15 to protect the spawning period of these species as defined by the Ministry of Natural Resources for the Southern Region of Ontario. To be clear, no in-water work, or work that may negatively affect any watercourse, runoff water or ditch conveyance is permitted throughout this restrictive period.

Subject: Fish Inventory and Fish Habitat Assessment Memorandum
Project: BTE File 23-041, County of Essex, County Road 46 and Concession Roads 8 and 9 EA
Date: September 18, 2025

Ontario Southern Region Warmwater Fish Timing Restriction: March 15 to July 15

Pending the resolution of the protection mechanisms for the Threatened Species at Risk Silver Shiner and potentially its' critical habitat within the Pike Creek watershed, additional mitigation measures and timing windows may govern the construction timing and staging of in-water works.

The following permits and approvals may be required during detail design phase, subject to confirmation once site-specific conditions and construction details are finalized:

- *Fisheries Act*: A Request for Review submission to DFO for In-water works during culvert replacements is required if the work has the potential to harm fish or fish habitat. Consultation with interested Indigenous Groups is a requirement of the *Fisheries Act*.
- *Species at Risk Act (Federal)*: A SARA permit may be required to disturb or alter the general or critical habitat of a Schedule 1 listed species at risk.
- *Endangered Species Act*, 2007 (Provincial ESA): If species at risk or their habitat are confirmed, consultation with the Ministry of the Environment, Conservation and Parks (MECP) is required. A Letter of Advice or an ESA 17(2)(c) permit may be required depending on the level of anticipated impact. The Government of Ontario has proposed replacing the ESA with the Species at Risk Conservation Act; however, the ESA remains the applicable legislation to date.
- Essex Region Conservation Authority (ERCA) permit: Works in or near watercourses including stormwater management ponds, culvert replacements and watercourse realignments may require a permit under Ontario Regulation 165/06 from ERCA for any proposed development and/or interference with watercourses, shorelines, and wetlands.
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) governs the alteration of Municipal Drains. A Drainage Engineer will need to arrange public consultations and notify affected landowners. This process is to be integrated with the Fisheries Act review in all watercourses containing Direct or Indirect Fish Habitats.

7.0 CONCLUSIONS

Field inventories did identify the presence of an aquatic SAR, and one plant SAR. No other significant natural features, or rare plant communities have been found within the study area. Several watercourses were found to contain common warm water fish species, or valued resources contributing to fish abundance and diversity that have resulted in the positive designation of fish habitats for six of the nine watercourses studied.

Impacts to the habitat characteristics of the six watercourses providing fish habitat resources should be considered further while proceeding to detail design, particularly as some drains may be relocated or may be retrofitted to provide online stormwater quality and quantity control. Watercourse Crossing #8 may provide critical habitat for a species at risk and will need consultation with DFO to ensure that impacts to SAR Silver Shiner are either avoided or mitigated to the highest practical level.

Subject: Fish Inventory and Fish Habitat Assessment Memorandum
Project: BTE File 23-041, County of Essex, County Road 46 and Concession Roads 8 and 9 EA
Date: September 18, 2025

Prepared by:

Shawn R. Taylor, M.Sc., R.P. Bio
Senior Biologist

Reviewed by:

Brooke Finlay, B.ES.,
Environmental Planner

Attachments: 1. Fish Community Inventory Forms and Habitat Mapping
2. Site Photos grouped by Crossing Number.

Attachment 1

Fish Community Inventory Forms and Habitat Mapping

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Cty Rd 46 Crossing No. 1

GENERAL INFORMATION		
Project # 23-041 County Rd 46	Project Description: Road Improvements	Date: Sept 11, 2025
Collectors: S. Taylor, B. Finlay, M. Kolsa.	Time Started: 9:25 am	Time Finished: 9:55
Weather Conditions: Clear, sunny, few high clouds	Surface Conditions (If Applicable): Calm ✓ / Rippled O / Wavy O / Rough O	

LOCATION		
Name of Waterbody: 7th Conc. Drain Headwater Trib to Little River	Crossing #: 1	Station #: 1
Location Of Crossing/Station: 50 m N. of Hwy 401 Ramp.	7th Conc. Drain to Washburn Dr.	
GPS Coordinates: 42°14' 46.21" N / 82°57' 22.34" W	~~MTO Chainage~~: SAR map check. - No identified SAR	
Township: ~~Tecumseth~~ Sandwich	MNRF District: Essex Region C.A.	

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
✓	O	O	O	O _____

GEAR

Electrofisher: Halltech HT 2000 B

Cty Rd 46 Crossing No. 1

Length (m): 1 5m wide pool	Settings: 150 volts PC frequency	Seconds: 500

Nets and Traps:

Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock): Set Time:	Clear Time:

Size of Net:

Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept? O Yes O No	Number of Bags	Preservative: Formalin O	Frozen O	Alcohol O	Other (specify) O

ADDITIONAL COMMENTS

1 min. Merlin recording - no bird calls recorded
- bottom sediment is fine, black muck. -

Additional Notes Appended? ☐ No ☑ Yes number of pages _____

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

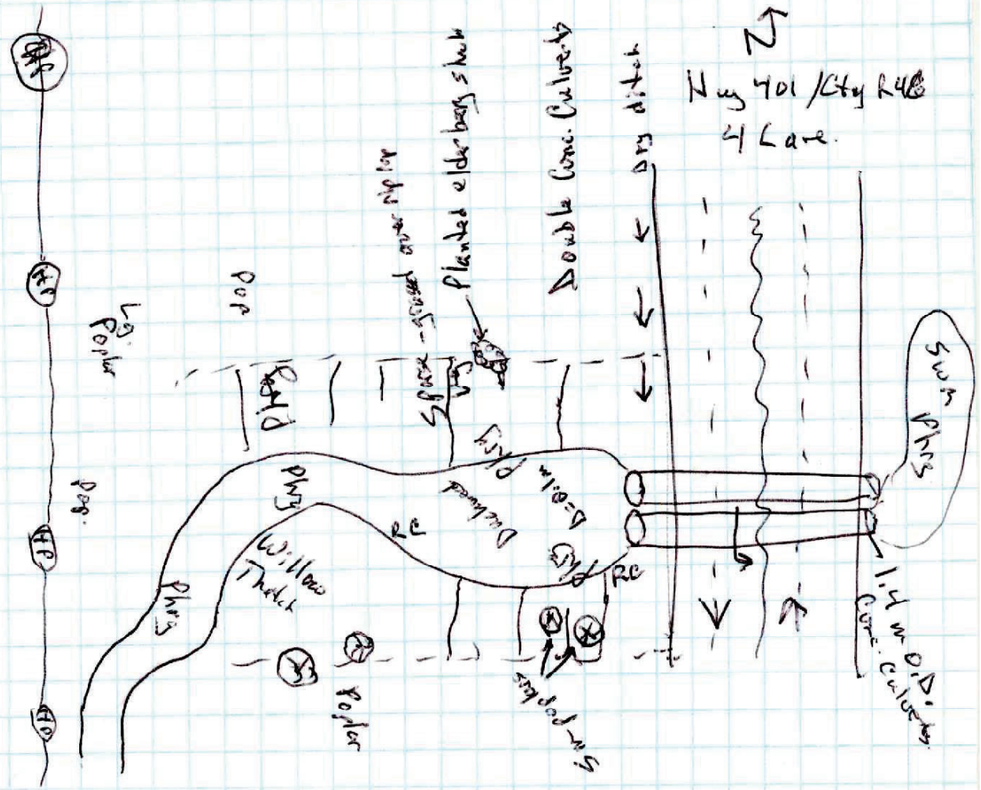
Cty Rd 46
Crossing No. 1.

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Crayfish - juvenile				
	does not appear to be				
	a rusty crayfish				
	No fish caught				

Note: Circle number if a sample was kept

Cty Rd 46
Crossing No. 1

Sept 11/25
Shawn Taylor



Surrounding Plants

Phragmites - dominate
Goldenrod, Duckweed
River bank grape, Arrowhead
Ragweed, Burreed
Cultural shrubs - Elderberry
Red Osier dogwood
Red Raspberry
New England Aster
Teasle
Purple loosestrife
Artic Willow
Poplar - Trembling Aspen
Carex sp. - Sedges - few
R-C - Red Cedar - planted
Wild Rose - 1/1
Buckthorn - 1

Channel Description

- Rip rap lined channel
- more over 10 year old fully colonized w/ Phragmites, Willow, herbs.
- altered now naturally restored
- deeply shaded w/ Phrag.
- water source from ramp swm basin
- flows during runoff only
- no ground water discharge

- Conc. culverts look OK, no blockages; 1.4 m D.

City Rd 46
Crossing #2
23-041
Concession 8.

Sept 11/2025
S. Taylor

- Ditch on W. side of Conc 8 - S. of 401 overpass.
- N of City Rd 46.
- Dry ditch
- colonized w/ Phragmites, goldenrod, grasses & forbs
- no trees, few shrubs
- no fish habitat.

- large commercial dev. on E. side of Conc 8 - not on Google Earth
- SWM pond at far end that must lead into Crossing #2; piped, no culvert.

- unnamed tributary to Little River - drains to Lake St. Clair

- GPS Location
  42° 14' 29.75" N.
  82° 56' 49.55" W

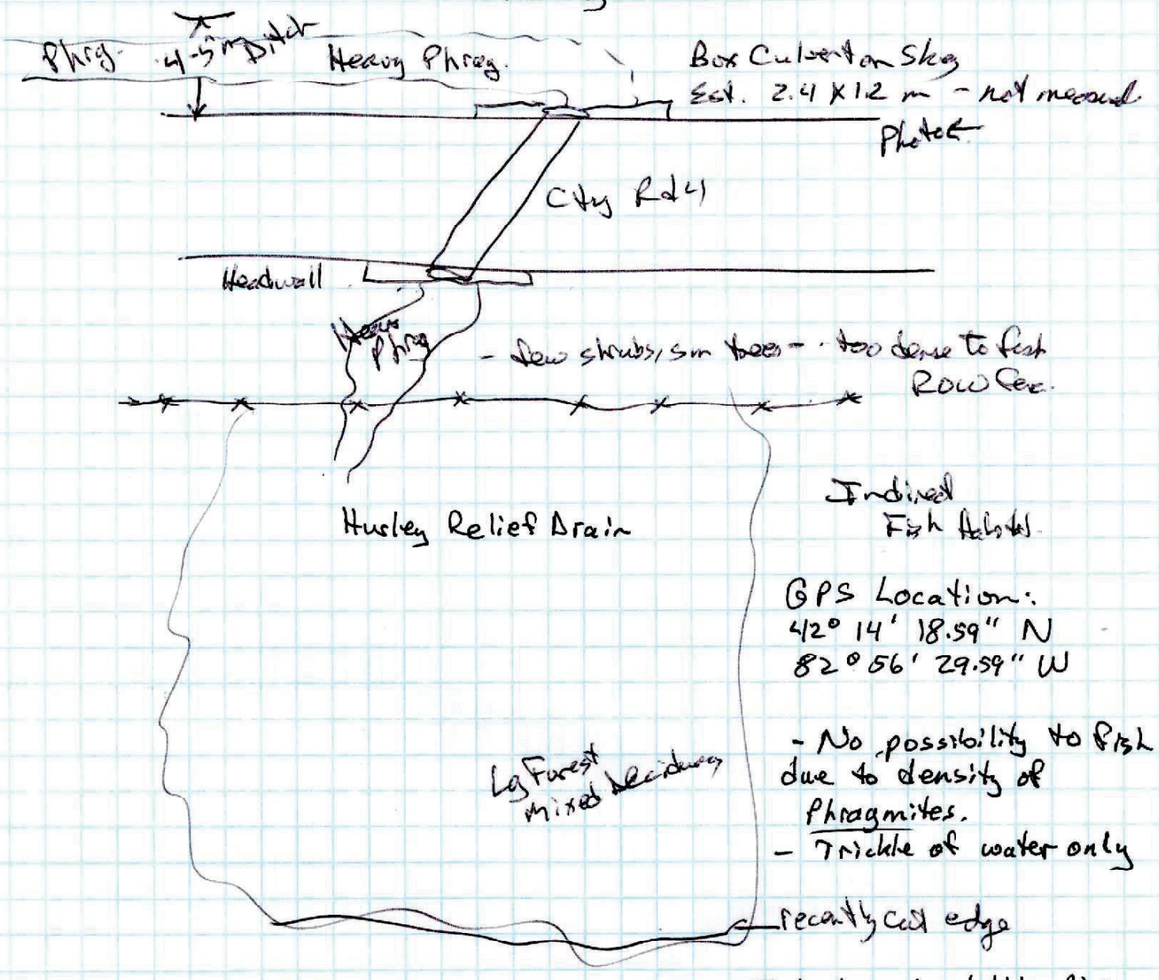
- No fish habitat at location
- No fish catch

Drain: None
- 8th Concession Drain

City Rd 46
Crossing #3
23-041

Sept 11/25
S. Taylor

Hurley Drain



APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing #4
Cty Rd 46

GENERAL INFORMATION						
Project # 23-041 Cty Rd. 46.	Project Description: Road Improvements	Date: Sept 11/2025				
Collectors: S. Taylor H. Kalsa B. Finlay	Time Started: 11:20	Time Finished: 12:05				
Weather Conditions: Clear sky, Sunny	Surface Conditions (If Applicable): Calm ✓	Rippled O	Wavy O	Rough O		
LOCATION						
Name of Waterbody: Trib. to Little River - Lake St. Clair	Crossing #: 4	Station #: 1				
Location Of Crossing/Station: 200m N. of Conc 9 Intersection	- Part of Washbrook Drain					
GPS Coordinates: 42° 14' 04.11" N / 82° 56' 03.91" W	~~MTO Chainage~~: SAR mapping Check No SAR mapped					
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA.					
SAMPLING LOCATIONS AND WATER CHEMISTRY						
Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						
Water Colour:						
Colourless O	Yellow/Brown ✓	Blue/Green O	Turbid O	Other O		
GEAR						
Electrofisher: Halltech HT 2000B						

Length (m): 7. min	Settings: 150 Watt 80 Hz frq	Seconds: 480 s
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept?	Number of Bags	Preservative: Formalin	Frozen	Alcohol	Other (specify)
O Yes ✗ No		O	O	O	O

ADDITIONAL COMMENTS

- 4 Brook Stickleback
- 1 Channel darter
- 1 Common crayfish

Additional Notes Appended? ☐ No ☑ Yes number of pages Habitat Map

CAPTURE INFORMATION

Project #:	Crossing/Station #:

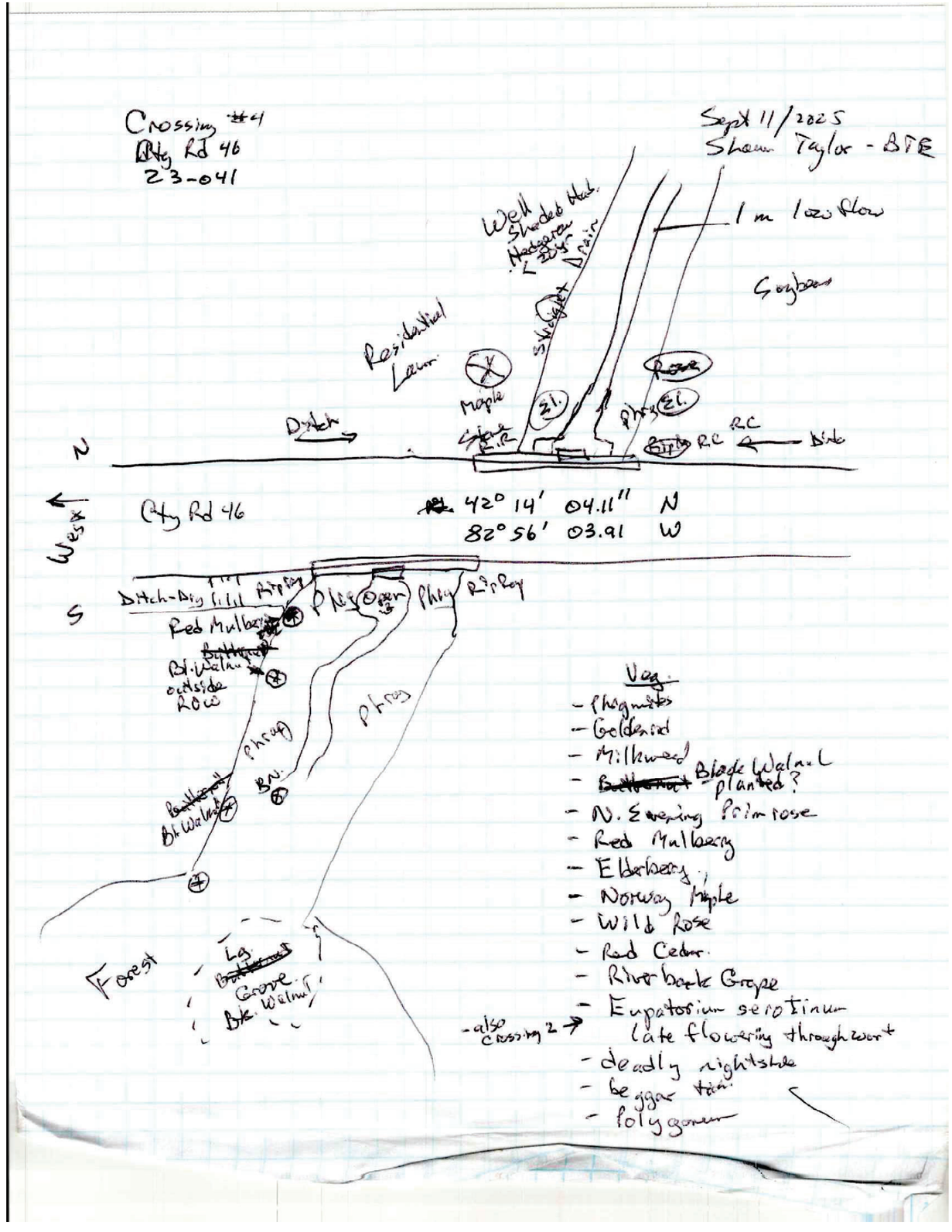
No.	Scientific Name /	Physical Condition	Top Predator

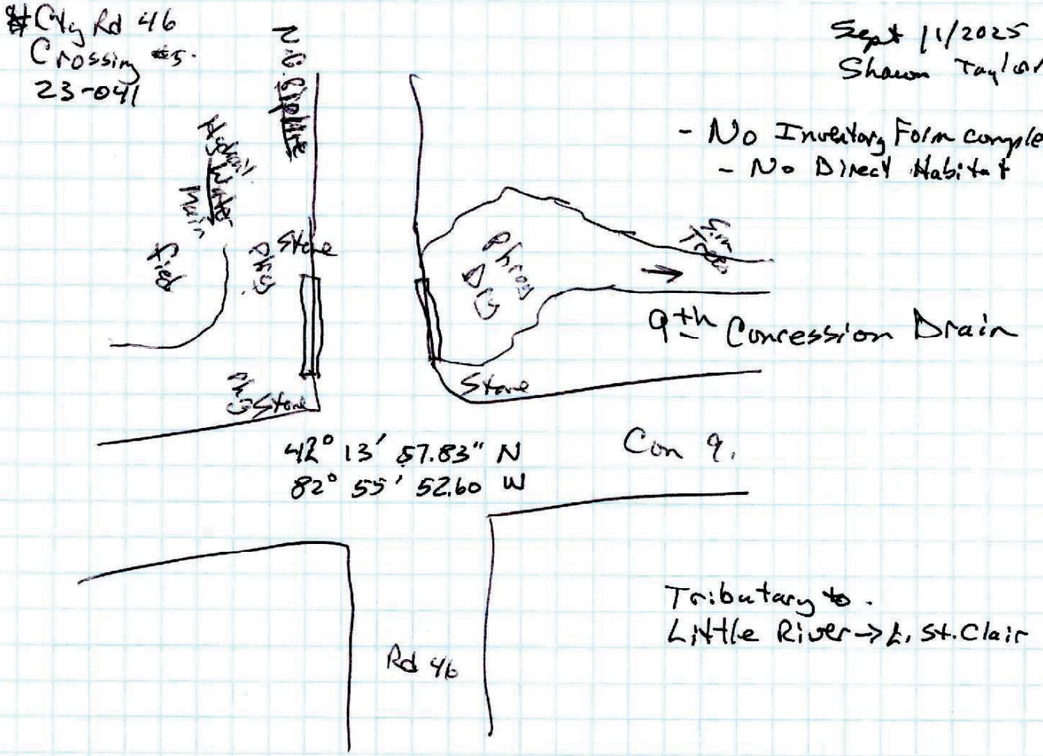
Cty Rd 46

Crossing No 4

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Brook Stickleback	N/A	No	L-24mm	YOY
1	" "	No	No	L-30.mm	YOY
1	" "	No	No	L-27mm	YOY
1	" "	No	No	L-22mm	YOY
1	Gray Fish - not rusty	—	—	—	YOY
1	Channel darter	No	No.	L-45mm	Adult

Note: Circle number if a sample was kept





Veg

- Phragmites
- Goldenrod
- Grasses.
- Sc. Thistle.
- Riverbank Grape
- Nightshade

- Very low district
- no habitat for fish
- ~~small drainage catchment~~.
- small drainage catchment

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing No 6
Cty Rd 46

GENERAL INFORMATION		
Project # 23-041 County Rd. 46 N. Talbot Road	Project Description: Road Improvements	Date: Sept 11/2025

Collectors:	Time Started:	Time Finished:
S. Taylor B. Finlay H. Kalsa	10:00	10:40

Weather Conditions:	Surface Conditions (If Applicable):			
	Calm	Rippled	Wavy	Rough
Clear, cloudless - no precip.	☒	○	○	○

LOCATION		
Name of Waterbody: Little River Drain Pike Creek Tributary - Conflicting names	Crossing #: 6	Station #: 1
Location Of Crossing/Station: 50 m west of Cty Rd 17 / Conc 10 Intersection		
GPS Coordinates: 42° 13' 38.40" N / 82° 54' 56.73" W	MTO ~~Chainage~~: DFO SAR check - No SAR mapped	
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA	

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
○	☒	○	○	○ _____

GEAR

Electrofisher: HallTech HT 2000 B

Length (m): 1 pool.	Settings: 150 Watt 80 Hz	Seconds: 500 sec.
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION					
Fish Kept? O Yes ⊗ No	Number of Bags	Preservative:			
		Formalin O	Frozen O	Alcohol O	Other (specify) O

ADDITIONAL COMMENTS

- No catch at all
- too little water depth / fully colonized by Phragmites
- water depth ≈ 2-3 cm - bottom mucky

Additional Notes Appended? ☐ No ☐ Yes number of pages _____

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
	- No Catch -				
	- shallow water				
	- attempted, no catch				

Note: Circle number if a sample was kept

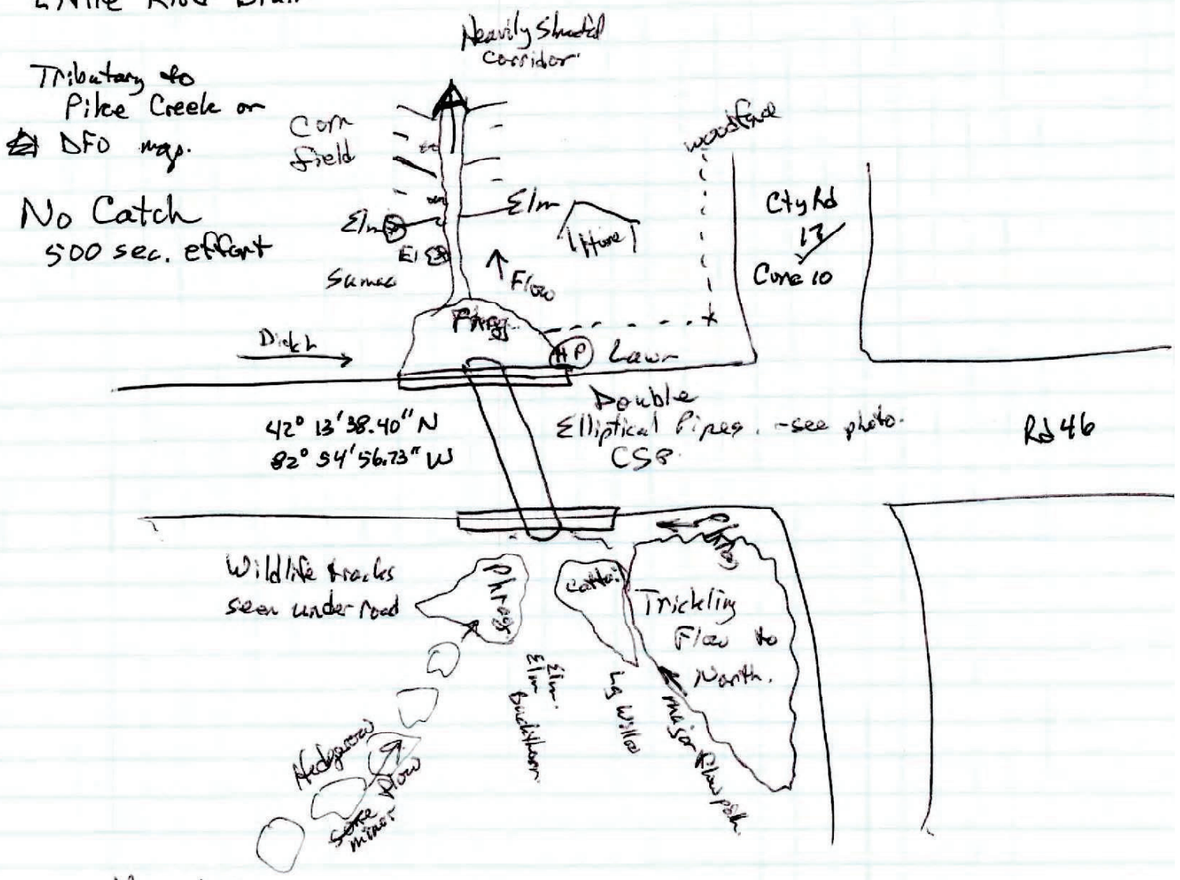
Crossing #6
Cty Rd 46
23-041

Sept 11/2025
Shawn Taylor

Little River Drain

Tributary to Pike Creek on DFO map.

No Catch
500 sec. effort



Veg list
- Phragmites
- Narrow leaved cattail
- Staghorn sumac
- Am. Elm.
- Riverbank Grape
- Wild Rose
- Burdock
- Manitoba Maple
- Goldenrod
- Thistle
- Tartarian Honeysuckle
- Water Plantain
- Queen Ann's Lace

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Cty Rd 46 Crossing #7

GENERAL INFORMATION						
Project # 23-041 Cty Rd 46	Project Description: Road Widening/ Improvements			Date: Sept 11/25.		
Collectors: S. Taylor N. Kalsa B. Finlay			Time Started: 10:45		Time Finished: 11:45	
Weather Conditions: Clear, no clouds, no recent rain	Surface Conditions (If Applicable):					
	Calm (X)	Rippled ( )	Wavy ( )	Rough ( )		

LOCATION		
Name of Waterbody: ~~Sutherland Creek~~ Drain Pike Creek Tributary	Crossing #: 7	Station #: 1
Location Of Crossing/Station: 100 N. of Conc 11 / Cty Rd 17 on S. side of Cty Rd 46		
GPS Coordinates: 42° 13' 25.18" N / 82° 54' 01.55" W	~~MTO Chainage~~: DFO SAR Chade No SAR mapped	
Township: ~~Tecumseh~~ Sandwich	MNRF District: ERCA	

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
( )	(X)	( )	( )	( )

GEAR

Electrofisher: NalMech HT 2000 B

Cty Rd 46
Crossing No. 7.
Crossing #7.

Length (m): Pool only. 15 m long	Settings: 150 Watt 80 Hz	Seconds:
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept?	Number of Bags	Preservative:			
		Formalin	Frozen	Alcohol	Other (specify)
✓ Yes O No Banded killifish.	1	O	✓	O	O

ADDITIONAL COMMENTS

- only pool on S. side of culvert holds water -
- pool is appx approx 6.0 m w x 15.0 m long
- very large box culvert under road, but downstream all dry + colonized with Phragmites.

Additional Notes Appended? ☐ No ☐ Yes number of pages _____

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

Cty Rd 46
Crossing No. 7.

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Bluegill - Lepomis gibbosus	- No	No	50 mm	YOY
	~~unknown darter/minnow sp.~~ killifish			54 mm	YOY
19 IIII IIII IIII IIII	Banded killifish			84/94 mm	Adult.
1	Bluegill			43 mm	YOY
11	Crayfish				

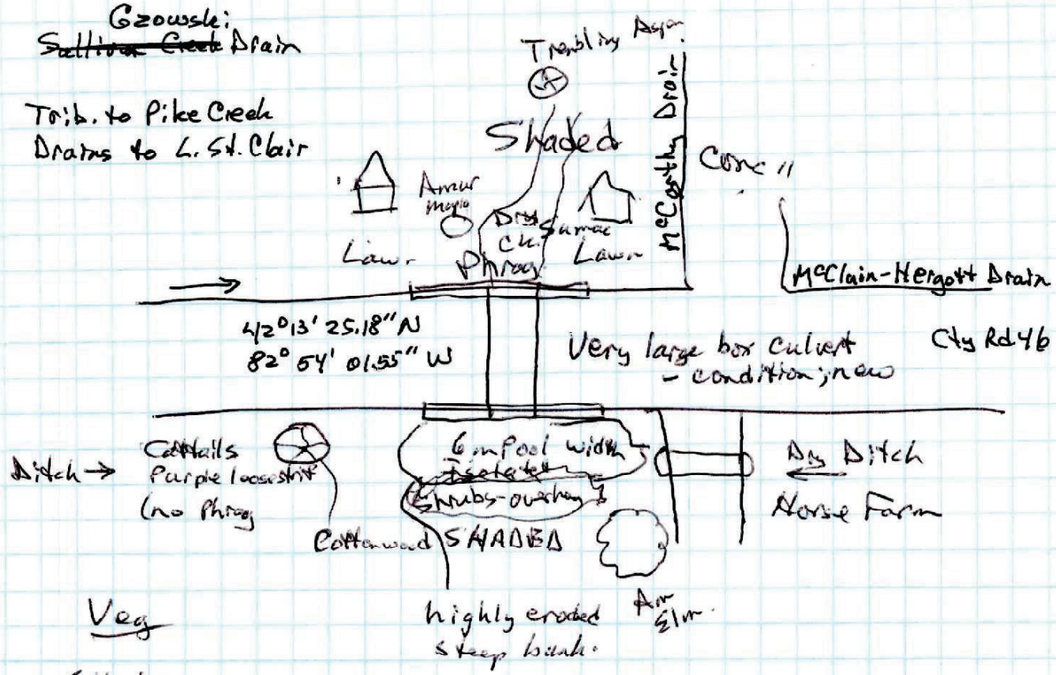
Note: Circle number if a sample was kept

Crossing #7
Cty Rd 46
23-041

Sept 11/25
Shaun Taylor

Czowski
~~Sullivan Creek~~ Drain

Trib. to Pike Creek
Drains to L. St. Clair



Veg

- Elderberry
- Phragmites
- Cattail
- Purple loosestrife
- Goldenrod
- Trembling Aspen
- Am Elm
- Cottonwood
- Ragweed
- Scotch Thistle
- Tartarian Honeysuckle

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing #8
Cty Rd 46

GENERAL INFORMATION		
Project # 23-041 Cty Rd. 46	Project Description: Road Improvements	Date: Sept 11/25

Collectors:	Time Started:	Time Finished:
S. Taylor B. Finlay H. ~~Kanse~~	3:20	4:10

Weather Conditions:	Surface Conditions (If Applicable):			
	Calm	Rippled	Wavy	Rough
Clear, no clouds, warm ~ 25°C	⊙	○	○	○

LOCATION		
Name of Waterbody: Pike Creek Pike Creek / ~~Brzoski~~ Drain	Crossing #: 8	Station #: 1

Location Of Crossing/Station:
midway btwn Conc 11 & 12 - near house at No. 11595 Rd 46.

GPS Coordinates:	~~MTO Chainage~~: DFO SAR map check
42° 13' 16.07" N / 82° 53' 24.00" W	No SAR mapped
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
○	○	○	○	○ _____

GEAR

Electrofisher: Halltech HT2000 B

Length (m): 50 m upstream a S. side	Settings: 150 Watt 80 Hz	Seconds: 450s
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept?	Number of Bags	Preservative:			
		Formalin	Frozen	Alcohol	Other (specify)
O Yes ✓ No		O	O	O	O

ADDITIONAL COMMENTS

Additional Notes Appended? ☐ No ☑ Yes number of pages 1

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

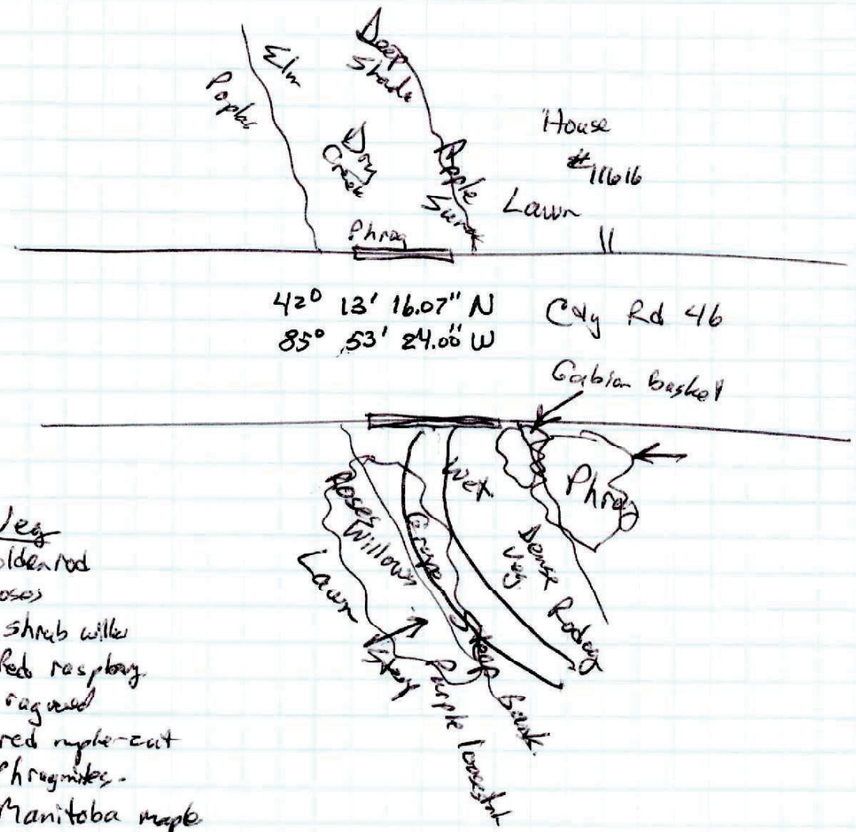
	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
2	Banded killifish	No		L 45/L50	YOY
38	Silver Shiner			L 35	YOY
1	Banded killifish			L 47	YOY
1	Channel Darter			L 29	YOY

Note: Circle number if a sample was kept

Crossing #8
Cty Rd 46.
23-041

Sept 11/25.
Shaw Taylor

Pike Creek
~~Crowski~~ Drain - Trib to Pike Creek



Veg
- Goldenrod
- roses
- shrub willow
- Red raspberry
- ragweed
- red nyple-eat
- Phragmites.
- Manitoba maple
- Boneset
- Marsh marigold
- Red Osier Dogwood

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing # 9
Cty Rd 46

GENERAL INFORMATION		
Project # 23-041 Cty Rd 46 Middle Road	Project Description: Road Improvements	Date: Sept 11/25

Collectors:	Time Started:	Time Finished:
S. Taylor B. Finlay H. Kalsa	3:55	4:35

Weather Conditions:	Surface Conditions (If Applicable):			
	Calm	Rippled	Wavy	Rough
Clear, Cloudless	⊗	○	○	○

LOCATION		
Name of Waterbody: Mooney Creek / Pike Creek Tributary (Mooney Ch) West Townline Dr.	Crossing #: 9	Station #: 1

Location Of Crossing/Station:
Corner of Essex Cty Rd 46 & Cty Rd 19 - along W. side of Cty Rd 19

GPS Coordinates:	~~MTO Chainage~~: DFO SAR map check.
42° 13' 09.93" N / 82° 52' 30.29" W	No SAR - not shown as watercourse here
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
○	⊗	○	○	○ _____

GEAR

Electrofisher: Halltech NT2000B

Cty Rd 46
Crossing # 9

Length (m): 20-25 m	Settings: 150 Watts 80 Hz	Seconds: 425

Nets and Traps:

Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:

Size of Net:

Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept? O Yes ☒ No	Number of Bags	Preservative: Formalin O	Frozen O	Alcohol O	Other (specify) O

ADDITIONAL COMMENTS

- almost all Emerald Shiner
- severe barrier of rock at the culvert under City Rd 46
  - ponded upstream - not fished

Additional Notes Appended? ☐ No ☒ Yes number of pages 1

CAPTURE INFORMATION

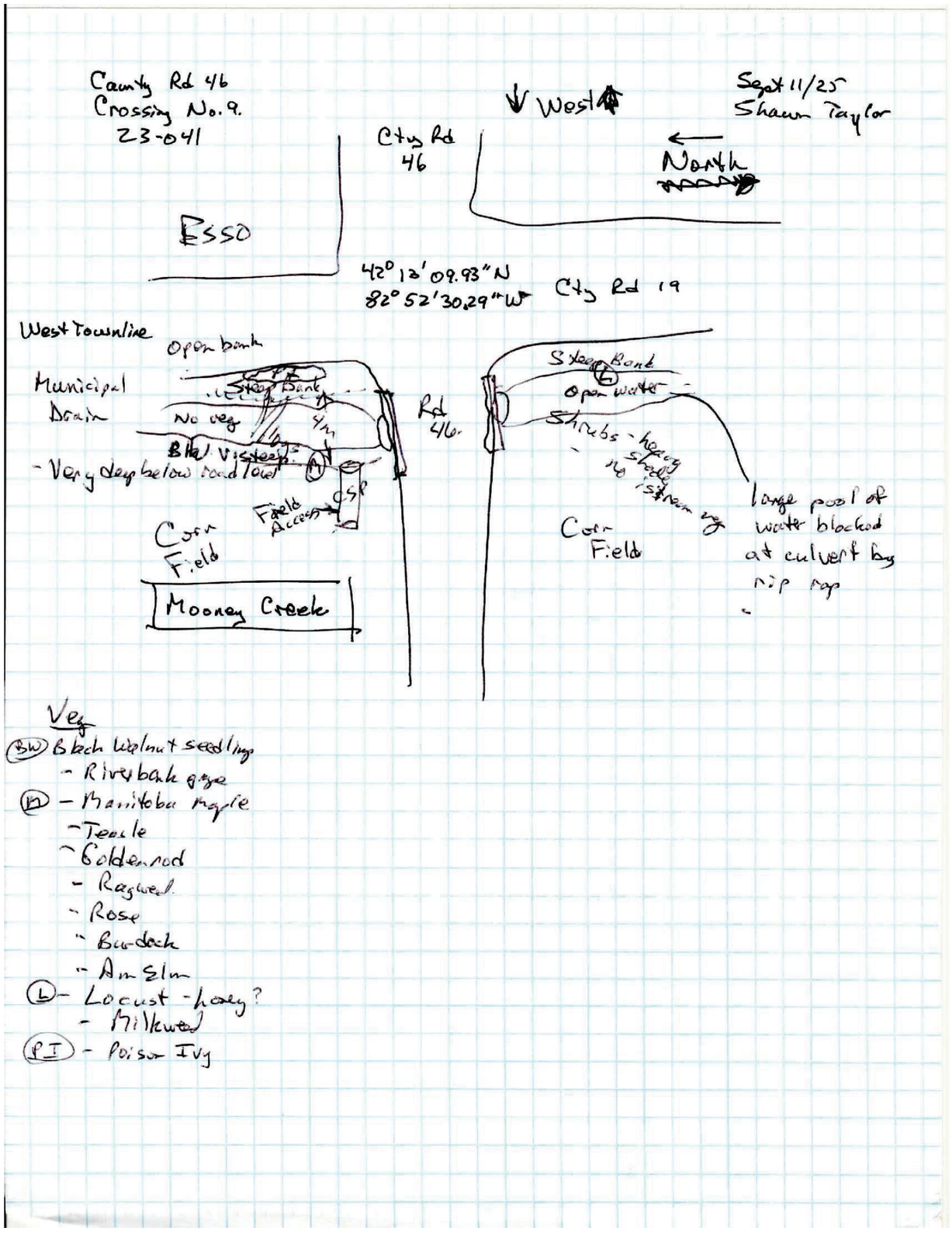
Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

Cty Rd 46
Crossing # 9
Ministry of Transportation Environmental Guide for Fisheries

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Bluegill			F 70mm	YOY
111	Emerald Shiner			L 85 mm	Adult
1	" "			F 120 mm	A
1	" "			F 95	A
2	" "	1	Blackspot	F 40	YOY
1	" "	1	Blackspot	F 50	YOY
1	" "			F 95	A
1	" "			F 114	A
1	" "			F 70	A
1	" "			F 70	A
1	" "			F 80	A
				F 78	A

Note: Circle number if a sample was kept



Attachment 2

Site Photos Taken Sept 12, 2025

BT ENGINEERING

Crossing 1 – West limits of Study Area east of 401 overpass

Photo 1: Crossing 1 south of the shoulder of Country Road 46 (facing south).

Photo 2 : Facing north of twin concrete culverts at Crossing 1.

Photo 3: Facing west towards 401 overpass at Crossing 1.

Photo 4: One Crayfish was caught at Crossing 1. Channel consisted of a soft muck bottom (facing south).

Photo 5: East channel of Crossing 1 – phragmites present (facing east).

Crossing 2– Ditch north of County Road 46, west side of Concession Road 8

Photo 6: Linear ditch along the west side of Concession Road 8 (facing north).

Photo 7: Linear ditch along the west side of Concession Road 8 (facing south).

Crossing 3– 560 m east of Concession Road 8

Photo 8: Facing west at Crossing 3, from the north side of County Road 46.

Photo 9 : Facing north at Crossing 3, from the north side of County Road 46.

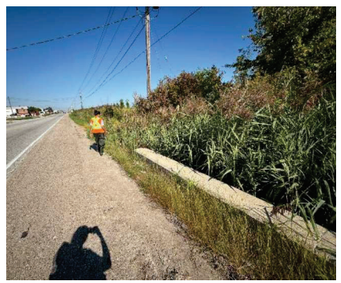


Photo 11: Facing northwest at Crossing 3, from the north side of County Road 46.

Photo 10: Crossing 3 was not fished due to minimal flow and densely populated invasive phragmites.

Photo 12: Facing northeast at Crossing 3, from the north side of County Road 46.

Crossing 3– 560 m east of Concession Road 8

Photo 13: Facing Southeast at Crossing 3, from the south side of County Road 46. Too many Phragmites to fish the watercourse.

Photo 14: Facing southwest at Crossing 3, from the south side of County Road 46.

Photo 15: Facing south at Crossing 3, from the south side of County Road 46.

Photo16: Facing south at Crossing 3, from the south side of County Road 46.

Crossing 4 – West of Intersection of County Road 46 and Concession Road 9

Photo 17: Pooled water at culvert outlet of Crossing 4, north side of County Road 46.

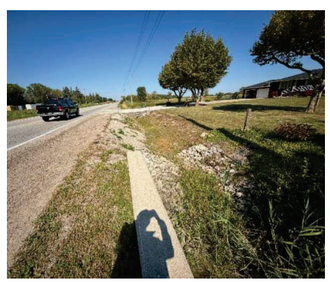


Photo 18: Facing west at Crossing 4, from north side of County Road 46.

Photo 19: Facing east at Crossing 4, from the north side of County Road 46.

Photo 20: Culvert inlet at Crossing 4, south side of County Road 46.

Photo 21: Facing west at Crossing 4, south side of County Road 46.

Photo 22: Facing east at Crossing 4, south side of County Road 46.

Crossing 5 – Intersection of County Road 46 and Concession Road 9

Photo 23: Facing northeast at Crossing 5, north side of County Road 46. Dry channel.

Photo 24: Facing west at Crossing 5, north side of County Road 46. Dry Channel.

Photo 25: Facing north at Crossing 5, north side of County Road 46.

Photo 26: No defined channel present at Crossing 5.

Photo 27: Facing east from north side of County Road 46, at Crossing 5.

Photo 28: Culvert inlet at Crossing 5, south side of County Road 46.

Crossing 6 – West of County Road 46 and County Road 17

Photo 29: Culvert outlet of Crossing 6, north side of County Road 46.

Photo 30: Culvert outlet at Crossing 6, south side of County Road 46.

Photo 31: Facing southwest, at outlet of twin-barrel concrete pipe culvert at Crossing 6.

Photo 33: Birds eye view of channel south side of County Road 46.

Photo 33: Animal tracks present in bottom of east barrel of concrete pipe culvert at Crossing 6 (facing south).

Photo 34: West barrel of concrete pipe culvert at Crossing 6 (facing south).

Crossing 7 – West of Intersection of County Road 46 and County Road 43

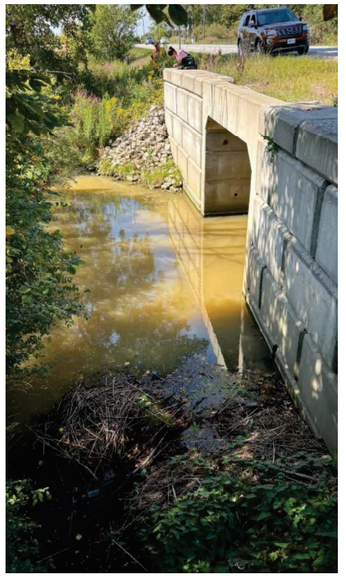


Photo 35: Inlet of concrete box culvert, facing west from south side of County Road 46.

Photo 36: Pooled water at culvert inlet at Crossing 7, south side of County Road 46.

Photo 38: Ditch on south side of County Road 46, east of Crossing 7, confluences with the channel through the culvert pictured on far right.

Photo 37: Facing east at Crossing 7, from the south side of County Road 46.

Photo 39: Habitat structure and Muskrat observed within concrete culvert at Crossing 7.

Crossing 8 – East 770 m from Intersection of County Road 46 and County Road 12

Photo 40: Facing south at Crossing 8, from south side of County Road 46.

Photo 41: Facing southwest at Crossing 8, from south side of County Road 46.

Photo 42: Culvert inlet at Crossing 8, south side of County Road 46.

Crossing 9 – West of Intersection of County Road 46 and County Road 19

Photo 43: Outlet of Crossing 9, north side of County Road 46, facing west.

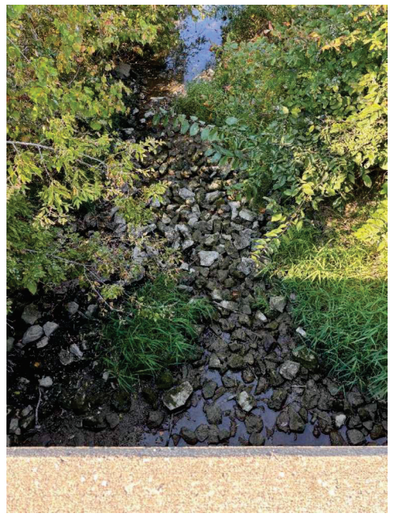


Photo 44: Channel of Crossing 9, north of County Road 46. Significant barrier to upstream fish movements.

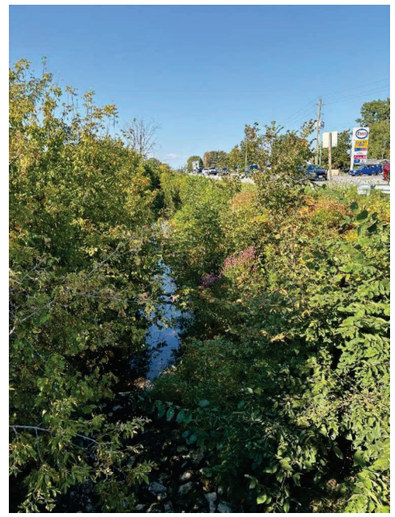


Photo 45: Facing north along County Road 19, at Crossing 9, north side of County Road 46. Right hand slope is extremely steep and unstable due to erosion and loss of protective stone lining.

509 Talbot Street
London, ON N6A 2S5
519-672-2222

MEMORANDUM

TO:	File	**DATE:**	November 10, 2025
FROM:	Shawn R. Taylor M.Sc., R.P. Bio. Kyle Fleming, B.Sc. (Wildlife)	**PROJECT #:**	23-041
PROJECT:	County of Essex, County Road 46 and Concession Roads 8 and 9 Environmental Assessment		
SUBJECT:	Revision 1 - Fish Inventory and Fish Habitat Assessment Memorandum		

1.0 INTRODUCTION

BT Engineering Inc. (BTE) has been retained by the County of Essex in partnership with the Town of Tecumseh to complete a Municipal Class Environmental Assessment (MCEA) for County Road 46, from Highway 401 to County Road 19, and 8th and 9th Concession Roads in the Town of Tecumseh, from County Road 46 northerly to the Town boundary.

2.0 PURPOSE

Field work was conducted on September 11 and October 15, 2025, to complete a terrestrial assessment and inventory of fish species present at each of the nine watercourse crossings identified during a site reconnaissance on November 17, 2023. The purpose of this memorandum is to summarize the terrestrial assessment and fish inventories, and where impacts may occur on habitat as a result of road improvements. The study area is predominantly comprised of industrial/commercial and residential uses, agricultural fields, and small pockets of woodlands.

3.0 FIELD STUDY AREA

The study area is illustrated in **Figure 1** and is located within the Detroit River Watershed and Sydenham River - St. Clair River Watershed which are under the jurisdiction of the Essex Region Conservation Authority (ERCA). Nine (9) watercourses and three woodlots found within the study area limits are identified on **Figure 2**. The remainder of the study area is predominantly agricultural fields, industrial/commercial development and rural residential uses.

The drainage area of Little River and Pike Creek was generated using the Ontario Watershed Information Tool (OWIT) by the Ministry of Natural Resources (MNR) and is provided in **Figure 3**. The OWIT watershed tool indicates that the watercourse crossings within the study area are tributaries of Little River or Pike Creek. Several, if not all the watercourses have been previously improved as Municipal Drains as identified by the Ontario Agriculture Mapping tool.

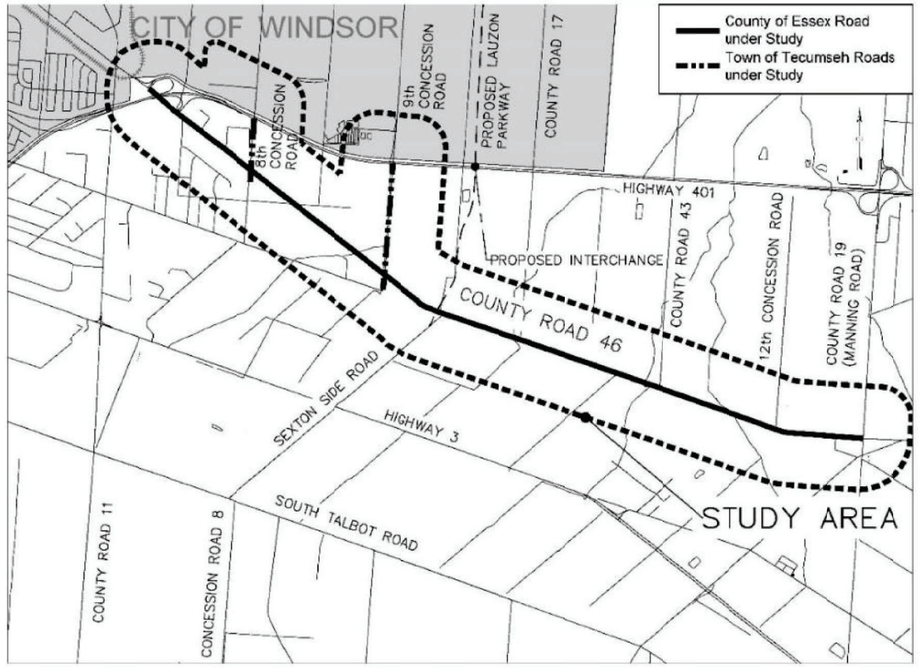


Figure 1: Study Area

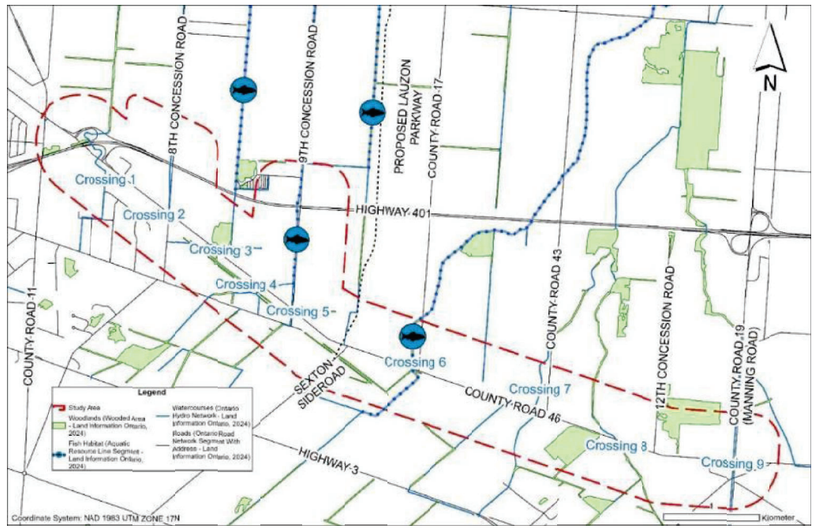


Figure 2: Watercourse Crossings and Woodlots

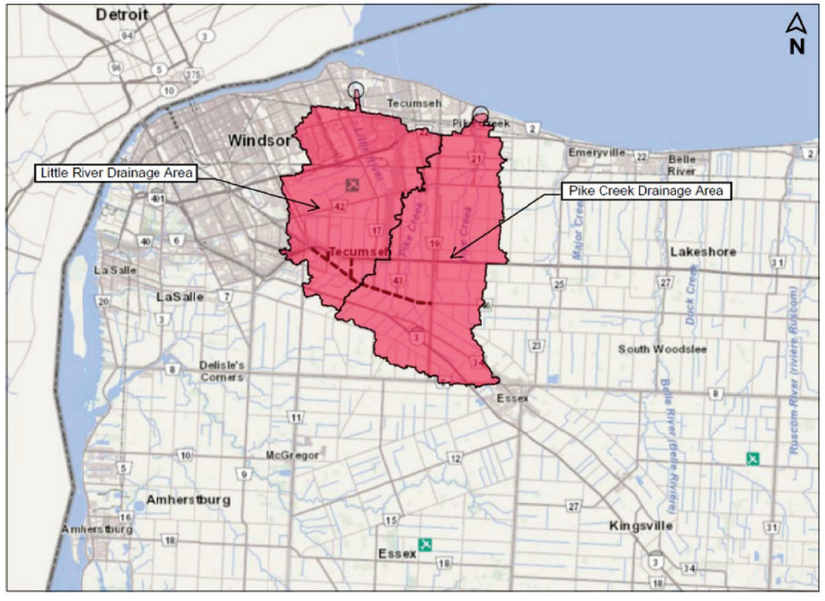


Figure 3: Drainage Area

4.0 FISH INVENTORY AND FISH HABITAT DETERMINATION

A sketch map was drawn for each watercourse investigated and is included in the documentation along with the Fish Community Inventory Forms. These documents are provided in **Attachment 1**. Descriptive notes on the channel morphology, substrate type, culvert opening, shading of the water, water depth, water movement and possible seepage locations were noted. A list of riparian plants was recorded at each site, with the primary species found in the watercourse noted for abundance.

Site Photos of each of the watercourse crossings within the study area taken on September 11, 2025 (**Photos 1-45**) are documented in **Attachment 2** grouped by crossing number.

In several cases, the invasive species *Phragmites australis* was found in such high densities, that electrofishing or wading the watercourse was not possible. Experience has demonstrated that waters surrounded by dense colonies of *Phragmites* provide very poor fish habitat resources as they are not a significant source of food, nutrients or spawning substrates. Recent initiatives by the Provincial government towards eradicating this nuisance plant suggest that infrastructure projects of this nature should participate, by removing Phragmites and the surrounding soil to a safe disposal site wherever practical.

Potential barriers to fish passage were documented during the field work and documented on the Fish Community Information Form and accompanying sketches (**Attachment 1**). In addition to instances of dense

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Phragmites colonization, Crossing #9 had a significant barrier to fish travel and upstream impoundment, a result of the stone side slope protection lining that has eroded and now occludes the bottom of the culvert and watercourse at the downstream end of the culvert at the intersection of County Road 19 and County Road 46.

4.1 Methodology

A permit to Collect Fish for Scientific Purposes was secured from the Ontario Ministry of Natural Resources (OMNR) Aylmer District before conducting field work. The fish inventory was completed while wading the watercourse while using a backpack Electrofisher (Halltech HT2000B) and dip net. A certified electrofisher-person operated the unit, normally set at 150 Watts at 80 Hz frequency, for approximately 500 seconds of effort at each location. Stunned fish were captured by an assistant using a dip net, transferred to a bucket of clean water and held for identification by the senior biologist. After identification, all fish were returned to their waters of origin unharmed. One sample was taken for verification of species identification. Results of the species captured will be reported back to the OMNR who will in turn update the provincial database records for these watercourses.

Photos of a species captured at Crossing #8 were thought to be the Silver Shiner (*Notropis photogenis)*, a species at risk not previously found in the Pike Creek watershed. The photo set was provided to a DFO specialist for confirmation, who identified the species as Fathead Minnow (*Pimephales promelas*), a fish species commonly present in the local watersheds that is not at risk. This memo revision and attached field sheet for Crossing #8 corrects the identification and subsequent mitigation strategy.

4.2 Inventory Sampling Results

The fish inventory progressed from west to east along County Road 46, with inventories at all major culvert crossings and where municipal drains are adjacent to proposed roadway widening from two to four lanes. Crossing #2 on Concession 8 was assessed as a watercourse due to its proximity to County Road 46 and as it coincides with a planned linear stormwater management facility.

Crossing #1

Location: 50 m North of the intersection of the ramp to Highway 401.
GPS Coordinates: 42° 14’ 46.21: N / 82° 57’ 22.34” W
Species at Risk Map Check: No Species at Risk (SAR) identified at this location
Tributary of: Little River
Municipal Drain Name: 7th Concession Drain
Fish Species Captured: No Catch – 1 crayfish
Fish Habitat Designation: Not Direct Fish Habitat
Expected Impact from Preliminary Design: No significant changes. Already four lanes.
Mitigation Requirements: Department of Fisheries and Oceans Canada (DFO) protocols; basic sediment and erosion control, fish screens if pumping.
Notes: Immediately downstream of the Highway 401 offramp stormwater management pond. No persistent water flow.

Crossing #2

Location: Ditch on west side of Concession 8, South of the Highway 401 overpass.
GPS Coordinates: 42° 14' 29.75 "N / 82° 56' 49.55" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Little River
Municipal Drain Name: 8th Concession Drain
Fish Species Captured: No Catch
Fish Habitat Designation: Not Fish Habitat
Expected Impact from Preliminary Design: New linear Stormwater Management (SWM) Pond #1 on northwest corner of intersection.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping and fish are observed.
Notes: Dry ditch colonized by grasses and Phragmites. No trees or shrubs providing shade. Unlikely to provide fish habitat at any time of the year.

Crossing #3

Location: 563 m southeast of Concession 8 / County Road 46 intersection.
GPS Coordinates: 42° 14' 18.59" N / 82° 56' 29.59" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Little River
Municipal Drain Name: Hurley Drain; Hurley Relief Drain
Fish Species Captured: No catch because could not electrofish in dense Phragmites.
Fish Habitat Designation: Indirect Fish Habitat outside of the ROW
Expected Impact from Preliminary Design: Culvert Replacement.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping and fish salvage if fish are observed during construction.
Notes: Trickle of water through large Phragmites colony. Unable to complete electrofishing due to high plant density. Box culvert approx. 2.4 X 1.2 m high. North of the ROW the creek flows through a large woodlot. Within the ROW there are a few isolated shrubs or trees that may be impacted. Because the flow originates in the woodlot, the creek may provide indirect fish habitat resources such and food and nutrients to downstream fish populations – but not immediately within the ROW due to the dense Phragmites colony.

Crossing #4

Location: 340 m Northwest of the intersection of County Road 46 with Concession 9.
GPS Coordinates:42° 14' 04.11" N / 82° 56' 03.91" W
Species at Risk Map Check: No fish SAR identified at this location. Red mulberry (SARA Schedule 1 – Endangered; Ontario - Endangered).
Note: One red mulberry shrub was found on the south side of the road, west side of the watercourse at the top of slope lying within the ROW and has the potential to be impacted by the planned culvert replacement –

this observation, identified through the app Plant Net™ should be confirmed by a qualified terrestrial ecologist before a species at risk mitigation strategy is determined.
Tributary of: Little River
Municipal Drain Name: Washbrook Drain
Fish Species Captured: Brook Stickleback (4), Channel Darter (1), Crayfish (1) – all warmwater species
Fish Habitat Designation: Direct Fish Habitat.
Expected Impact from Preliminary Design: Culvert replacement on Washbrook Drain. Potential realignment of Washbrook Drain on north side of County Road 46.
Mitigation Requirements: Enhanced DFO protocols to be determined during detail design; Detailed sediment and erosion control, use of rolled blankets following earthworks, fish screens if pumping and fish salvage when water is present during construction. Provincial warmwater fish timing guidelines to be followed or as directed by DFO.
Notes: Washbrook Drain is a stone-lined watercourse that intersects County Road 46 on a skew. Several shrubs and trees shade the watercourse on the north side, while the south side is an open canopy. Ditches flow from agricultural lands into the drain from two directions on each side of County Rd 46. One immature Red Mulberry (*Morus rubra*) tree (SAR Endangered in Ontario) was found within a few meters south of the road ditch on the west bank of the watercourse. Ditch relocation works may impact this tree. Small grove of young Black Walnut trees is located 100 m south of culvert outside of the ROW, with at least two trees on the north side of the ditch that are close to the road, but all are unlikely to be impacted by the road improvements.

Crossing #5

Location: Traverse culvert under County Road 46, 10 m northwest of the Concession 9 intersection.
GPS Coordinates: 42° 13' 57.83" N / 82° 55' 52.60" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Little River
Municipal Drain Name: 9th Concession Drain
Fish Species Captured: No captures.
Fish Habitat Designation: Dry watercourse – no Direct Fish Habitat.
Expected Impact from Preliminary Design: New linear Stormwater Management (SWM) Pond #2 on northwest corner of intersection. Culvert replacement, relocation of 9th Concession Drain west to bypass pond and continue south to rail line.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping.
Notes: Small drainage catchment arising in soybean field to the southwest. Very low vegetative diversity in the channel, predominantly *Phragmites*, Goldenrod, Scotch thistle, grasses, Riverbank grape – typical dry plant assemblage. Periodically flows under culvert to the northeast. No flow present and no pools of water remain after last precipitation event. No catch result.

Crossing #6

Location: 65 m Northwest of the intersection of County Road 46 with Concession 11 / County Road 17.
GPS Coordinates: 42° 13' 38.40" N / 82° 54' 56.73" W

Species at Risk Map Check: No SAR identified at this location
Tributary of: Pike Creek
Municipal Drain Name: Little River Drain (North), O'Keefe Drain (South), Sullivan Drain (West)
Fish Species Captured: No Catch; Shallow water, electrofishing attempted.
Fish Habitat Designation: Indirect fish habitat.
Future Lauzon Parkway Intersection at GPS Coordinates: 42° 13'46.09" N / 82° 55' 28.38" W
Expected Impact from Lauzon Parkway Pre Design: Realign Little River Drain. Place three culverts. New linear SWM Pond #3 on SW corner of the intersection. Realign O'Keefe Drain east to County Road 17. No direct fish habitats were found here.
Expected Impact from County Road 46 Preliminary Design: Replace Sullivan Drain culvert, New SWM Pond #4 on north side, New SWM Pond #5 on south side to intercept McLean Hergott Drain, Partial realignment of McLean Hergott Drain.
Mitigation Requirements: DFO protocols; Basic sediment and erosion control, fish screens if pumping.
Notes: Small trickle of flow south to north, but not enough water to electrofish. Double elliptical culvert pipes in good condition. Two hedgerows seem to contribute flow and resources, coming together west of the road within the ROW. Eastern hedgerow seems to be the primary source, the northern hedgerow the minor source. First appearance of the native Narrow Leaved Cattail in a large colony on the south side – spread of Phragmites eastwards seem to be limited, sparse colonization here. North side of road watercourse in deep shade of overhanging trees and shrubs that contribute resources to downstream fish communities. Wildlife tracks observed crossing beneath road in culvert – either muskrat or racoon. Channel downstream of culvert has been altered to a drain but upstream appears natural (unimproved).

Crossing #7

Location: 150 m Northwest of the intersection of County Road 46 with Concession 12 / County Road 43.
GPS Coordinates: 42° 13' 25.18" N / 82° 54' 01.55" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Pike Creek
Municipal Drain Name: Gzowski Drain, Grondin Drain.
Fish Species Captured: Bluegill (2), Banded Killifish (19), Crayfish (2) – sample retained, all warmwater species
Fish Habitat Designation: Direct fish habitat.
Expected Impact from Preliminary Design: Replace culvert and realign Gzowski Drain. New SWM pond #6 to intercept Delisle Drain – west branch of Grondin Marshall Drain.
Mitigation Requirements: Enhanced DFO protocols; Detail design to determine sediment and erosion control, fish screens and fish salvage if pumping. Provincial warmwater fish timing guidelines to be followed.
Notes: Large (6 m wide X 15 m long) pool, well shaded on upstream side of a large, relatively new culvert (**Att. B. Photo 35**) retains water as the headwater source. Ditches entering from east and west were dry. Highly eroded bank on the south side of the pool. Very steep side slopes; channel invert deeply entrenched below ground surface. Can easily walk through culvert on eroded topsoil substrates. North (downstream) reaches are deeply shaded with hedgerow trees and shrubs in deep, well protected valley although this reach was dry suggesting the pool acts as a refuge for fish and aquatic animals.

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Crossing #8

Location: 770 m Southeast of the intersection of Concession 12 / County Road 43.
GPS Coordinates: 42° 13' 16.07" N / 82° 53' 24.00" W
Species at Risk Map Check: No SAR identified at this location on current DFO mapping.
Tributary of: Pike Creek
Municipal Drain Name: Pike Creek Drain
Fish Species Captured: Banded Killifish (3),Fathead Minnow (3), Channel Darter (1). All warmwater species**.**
Fish Habitat Designation: Direct fish habitat.
Expected Impact from Preliminary Design: A new linear SWM Pond #7 is to be considered during detail design for the north side with two culvert replacements, one online and one offline.
Mitigation Requirements: Enhanced DFO protocols; Detail design to determine sediment and erosion control, fish screens and fish salvage if pumping. Provincial warmwater fish timing guidelines to be followed.
Notes: Deep, previously improved channel with steep slopes that are fully vegetated with shrubs and small trees on both sides of County Road 46. Channel diagonally skewed flowing south to north. Water depth up to 20 cm deep in stable channel with heavy shade and overhanging vegetation including Boneset and Marsh Marigold. Small area of Phragmites on eastern bank below gabion baskets. North of road, dense shade from trees and shrubs leaving the watercourse well protected although grass is mown right to the top of bank.

SAR Note: Mistaken identification of Silver Shiner was confirmed with a DFO subject specialist on October 1 2025 as the common species Fathead Minnow.

Crossing #9

Location: Channel lies along west side of County Road 19. Sampled at the intersection of County Road 46 and County Road 19.
GPS Coordinates: 42° 13' 09.93" N / 82° 52' 30.29" W
Species at Risk Map Check: No SAR identified at this location
Tributary of: Mooney Creek tributary to Pike Creek
Municipal Drain Name: West Townline Drain
Fish Species Captured: Blue Gill (1), Creek Chub (13). No SAR. All warmwater species**.**
Fish Habitat Designation: Direct fish habitat.
Expected Impact from Preliminary Design: New linear SWM Pond #8 at northwest corner of intersection. Culvert Replacement, Realign West Townline and Mooney Creek Drain north and south of intersection.
Mitigation Requirements: Remove instream barrier to fish passage. Enhanced DFO protocols; Detail design to determine sediment and erosion control, fish screens and fish salvage if pumping. Improve dangerous side slopes particularly adjacent to County Road 19. Provincial warmwater fish timing guidelines to be followed or as directed by DFO.
Notes: Deeply incised (> 7 m) municipal drain with very steep slopes bordering County Road 19 leaving little room for road improvements without relocating the drain. Eastern slopes are highly eroded, rock protection is missing, and the slopes are unvegetated in several areas; west slopes are very steep, rock lined but stabilized with trees and shrubs. Significant migration barrier occurs below and through the culvert, prohibiting upstream

travel for fish during low flow periods. A significant impoundment occurs on the upstream side of the County Road 46 culvert, perhaps due to excess stone spread over the bottom (**Attachment 2, Photo 44**) occluding flow. The culvert may need to be cleaned out of the large rip rap creating this barrier to relieve the unintended impoundment. Shrubs and small trees stabilize some of the slopes, but in general the watercourse appears unstable and erosion prone and therefore the fish habitat is highly variable.

5.0 TERRESTRIAL ASSESSMENT

A desktop review of available information identified the presence of three woodlots within the study area as illustrated in Figure 4. No other natural heritage features (i.e., Provincially Significant Wetlands, Areas of Natural and Scientific Interest (ANSI), etc.) are mapped in this area.

Based on the proposed work, two of these woodlots (A & B) overlap or are in close proximity to the proposed work and have potential to be impacted.

The remaining areas within the study area are comprised of active agricultural fields and operations, hedgerows, rural residential development, commercial/industrial development and municipal/provincial highways and roadways. Limited potential is present within anthropogenically disturbed areas to support Species at Risk (SAR) or rare species, however; further study may be required in hedgerows or other naturalized areas (ex. – cultural meadows) when in close proximity to the planned road improvements.

Woodlot A

Woodlot A is approximately 12.25 ha in size illustrated in **Figure 4**. Based on roadside observations, it is best described as a Dry-Fresh Deciduous Forest Ecosite within a species composition including Hackberry (*Celtis occidentalis)*, Red Oak (*Quercus rubra*), Sugar Maple (*Acer saccharum*), Basswood (*Tillia americana*) and Green Ash (*Fraxinus pennsylvanica*). Along the edges of the woodlot, dense cover of Common Buckthorn (*Rhamnus cathartica*) and White Mulberry (*Morus alba*) was visible.

Figure 4: Woodlots

The County of Essex Official Plan Schedule B (Natural Environment Overlay) identifies this woodlot as a component of its natural heritage system. Table 7-1 in the Official Plan identifies that all woodlots ≥2 ha in size are considered significant, therefore Woodlot A is considered as significant in the County of Essex.

Potential bat roost trees were visible in the woodlot, which can provide habitat to Species at Risk (SAR) bat species. Refer to **Attachment 2 (Site Photos)**.

The Ontario Ministry of Natural Resources (OMNR) Natural Heritage Information Centre (NHIC) occurrence records for the area identify the presence of the Eastern Wood-Pewee (*Contopus virens*), a species of Special Concern listed in the *Endangered Species Act* (ESA). As this species is known to inhabit mature deciduous forests, there is a high likelihood that the Eastern Wood-Pewee utilizes this woodlot as nesting habitat.

The woodlot would also provide nesting habitat for other bird species listed and protected through the *Migratory Bird Convention Act* (MBCA) and has potential to support other rare or SAR plant and wildlife species.

Woodlot B

Woodlot B is approximately 4.21 ha in size and therefore Woodlot B is considered significant in the County of Essex. Based on roadside observations, it is best described as a Dry-Fresh Deciduous Forest Ecosite within a species composition including Hackberry (*Celtis occidentalis*), Red Oak (*Quercus rubra*), Carolina Poplar (*Populus x canadensis*) and Green Ash (*Fraxinus pennsylvanica*). Visual observations were limited due to private lands between the road allowance and main body of the woodlot.

The County of Essex Official Plan Schedule B (Natural Environment Overlay) identifies this woodlot as a component of its natural heritage system.

The OMNR Natural Heritage Information Centre (NHIC) occurrence records for the area identify the presence of the Eastern Wood-Pewee (*Contopus virens*), a species of Special Concern listed in the *Endangered Species Act* (ESA). As this species is known to inhabit mature deciduous forests, there is a high likelihood that the Eastern Wood-Pewee utilizes this woodlot as nesting habitat.

The woodlot would also provide nesting habitat for other bird species listed and protected through the *Migratory Bird Convention Act* (MBCA) and has potential to support other rare or SAR plant and wildlife species.

6.0 DESCRIPTION OF PROPOSED WORK

The preliminary design includes the extension or replacement of several existing culverts to accommodate the proposed road widening to four lanes, which consists of a 40 m rural cross-section along County Road 46 and a 36 m rural cross-section along Concession Road 8.

Existing centreline culverts, stormwater management ponds and drain realignments at Crossings 3, 4, 6, 7, 8 and 9 (as shown on **Figure 2**) are either connected to, or have the potential to support, fish habitat. Culverts are also being used as wildlife passage corridors for small mammals, amphibians and possibly reptiles. This study has identified crossings 3 and 6 as providing indirect fish habitat resources, and as such basic mitigation measures are intended to protect these resources. Watercourse crossings 4, 7, 8 and 9 were found to contain

resident fish species and are to be considered as year-round, direct fish habitat. Alterations to watercourses that may negatively effect fish or fish habitats may require additional screening and/or referrals to the DFO during detail design at these four culvert crossings.

The preliminary design includes linear stormwater ponds in eight (8) locations, five (5) of which may connect to municipal drains or natural watercourses with existing fish habitat (Crossings 2, 5, 6, 7 and 8 on **Figure 2**). The preliminary design also includes shallow stormwater quantity-only ponds with control berms to attenuate large storm flows while allowing smaller, more frequent storm flows to drain freely. The detail design should incorporate measures to ensure the protection of downstream aquatic habitat, including maintenance of baseflow conditions, control of thermal and sediment inputs, and avoidance of barriers to fish passage.

Proposed widening of CR46 has the potential to impact Woodlots A and B through direct removal of trees and grading activities, which can affect the rooting zones of adjacent species. It is expected that any removal will be minor in nature and retained parts of the woodlots will continue to meet size requirements for significance and to provide wildlife habitats in the future.

7.0 PRE-DESIGN RECOMMENDATIONS

Further assessment of the quantity of fish habitat in the receiving systems to be directly impacted is recommended during detail design to confirm the need for mitigation or review under the *Fisheries Act*.

All fish captured are considered by the Ministry of Natural Resources to be warm water fish species. Therefore, all in-water work will be required to respect the warmwater fish timing restriction guidelines of March 15 to July 15 to protect the spawning period of these species as defined by the Ministry of Natural Resources for the Southern Region of Ontario. To be clear, no in-water work, or work that may negatively affect any watercourse, runoff water or ditch conveyance is permitted throughout this restrictive period.

Ontario Southern Region Warmwater Fish Timing Restriction: March 15 to July 15

Further assessment is also recommended for Woodlots A and B, as well as all naturalized habitats (i.e., hedgerows, drains, cultural meadows, etc.) during detailed design to confirm the presence of natural heritage features and habitat for SAR. Preliminary recommendations that can be implemented to mitigate impacts on these habitats include:

- No clearing of vegetation between April 1 – August 31st to avoid destruction or harm to nesting migratory bird species protected through the Migratory Bird Convention Act.
- No clearing of trees between April 1 – September 31st to avoid potential impacts to roosting bat species.
- Installation of silt fence along the limit of disturbance where it abuts Woodlots A and B or naturalized areas.

- Restoration of disturbed areas, where feasible, with native species suitable to site conditions and to increase native biodiversity.
- Replacement of tree cover associated with Woodlots A and B, if removed, to maintain canopy cover and wildlife habitats.

The following permits and approvals may be required during detail design phase, subject to confirmation once site-specific conditions and construction details are finalized:

- *Fisheries Act*: A Request for Review submission to DFO for In-water works during culvert replacements is required if the work has the potential to harm fish or fish habitat. Consultation with interested Indigenous Groups is a requirement of the *Fisheries Act*.
- Essex Region Conservation Authority (ERCA) permit: Works in or near watercourses including stormwater management ponds, culvert replacements and watercourse realignments may require a permit under Ontario Regulation 41/24 from ERCA for any proposed development and/or interference with watercourses, shorelines, and wetlands.
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) governs the alteration of Municipal Drains. A Drainage Engineer will need to arrange public consultations and notify affected landowners. This process is to be integrated with the Fisheries Act review in all watercourses containing Direct or Indirect Fish Habitats.
- *Endangered Species Act:* if surveys completed during detailed design identifies the presence of species listed as threatened or endangered under the ESA, registration or appropriate authorizations should be obtained through consultation with the Ministry of Environment, Conservation and Parks (MECP).

8.0 CONCLUSIONS

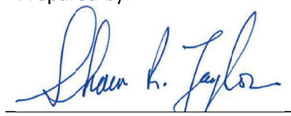
Field inventories and assessment confirmed:

- No aquatic SAR occur in the study area, and
- The presence of two County-Significant woodlots, and potentially other naturalized areas, could support SAR and other natural heritage features.
- Several watercourses were found to contain common warm water fish species, or ecologically-valued resources contributing to fish abundance and diversity that have resulted in the positive designation of fish habitats for six of the nine watercourses studied.

Preliminary mitigation measures have been recommended to assist in mitigating impacts to these features.

Impacts to the habitat characteristics of the six watercourses providing fish habitat resources, woodlots and naturalized areas should be considered further during detail design to ensure compliance with applicable legislation and policies.

Prepared by:



Shawn R. Taylor, M.Sc., R.P. Bio
Senior Aquatic Biologist

Prepared by:

Kyle Fleming, B.Sc., (Wildlife)
Senior Terrestrial Ecologist

Attachments: 1. Fish Community Inventory Forms and Habitat Mapping
2. Site Photos – Ecology Field Work

Attachment 1

Fish Community Inventory Forms and Habitat Mapping

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

City Rd 46 Crossing No. 1

GENERAL INFORMATION		
Project # 23-041 County Rd 46	Project Description: Road Improvements	Date: Sept 11, 2025
Collectors: S. Taylor, B. Finley, M. Kolsa	Time Started: 9:25 am	Time Finished: 9:55
Weather Conditions: Clear, sunny, few high clouds	Surface Conditions (If Applicable): Calm ✓ / Rippled O / Wavy O / Rough O	

LOCATION		
Name of Waterbody: 7th Conc. Drain Headwater Trib to Little River	Crossing #: 1	Station #: 1
Location Of Crossing/Station: 50 m N. of Hwy 401 Ramp.	7th Conc. Drain to Washburn Dr.	
GPS Coordinates: 42°14' 46.21" N / 82°57' 22.34" W	~~MTO Chainage~~: SAR map check. - No identified SAR	
Township: ~~Tecumseth~~ Sandwich	MNRF District: Essex Region C.A.	

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
✓	O	O	O	O _____

GEAR

Electrofisher: Halltech HT 2000 B

City Rd 46 Crossing No. 1

Length (m): 1 5m wide pool	Settings: 150 volts PC frequency	Seconds: 500

Nets and Traps:

Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock): Set Time:	Clear Time:

Size of Net:

Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept? O Yes O No	Number of Bags	Preservative: Formalin O	Frozen O	Alcohol O	Other (specify) O

ADDITIONAL COMMENTS

1 min. Merlin recording - no bird calls recorded
- bottom sediment is fine, black muck. -

Additional Notes Appended? ☐ No ☑ Yes number of pages _____

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

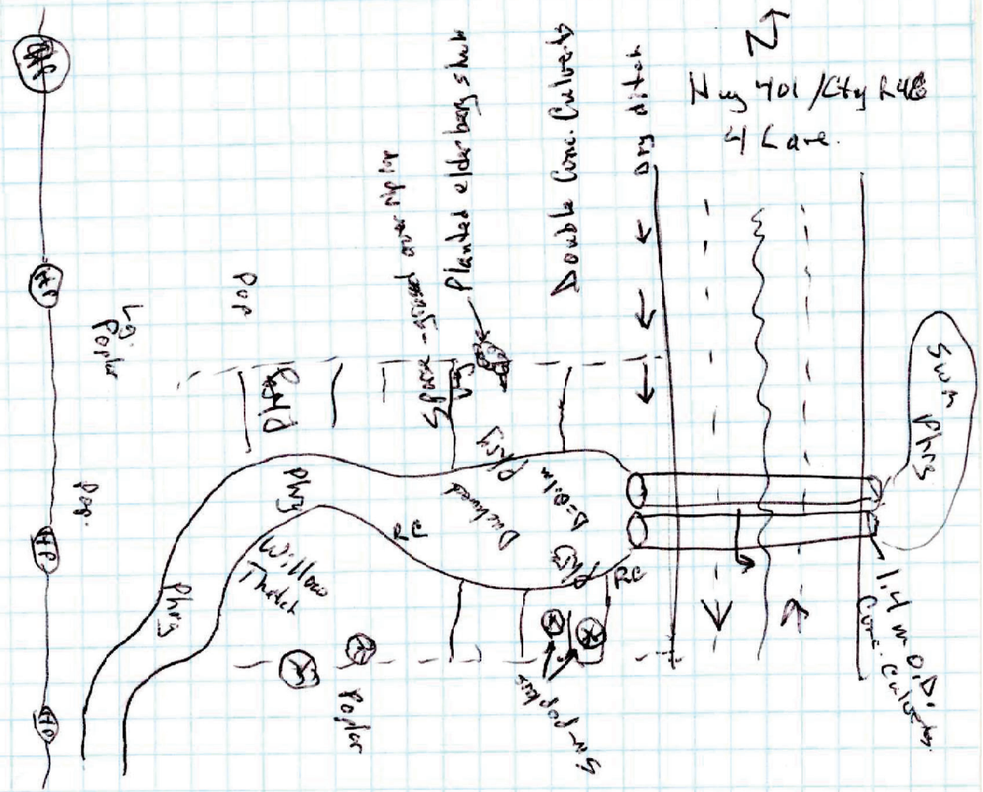
Cty Rd 46
Crossing No. 1.

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Crayfish - juvenile				
	does not appear to be				
	a rusty crayfish				
	No fish caught				

Note: Circle number if a sample was kept

Cty Rd 46
Crossing No.1

Sept 11/25
Shawn Taylor



Surrounding Plants

Phragmites - dominate
Goldenrod, Dutchweed
River bank grape Arrowhead
Ragweed Burreed
Cultural shrubs - Elderberry
Red Osier dogwood
Red Raspberry
New England Aster
Teasle
Purple loosestrife
Artic Willow
Poplar - Trembling Aspen
Carex sp. - Sedges - few
R-C - Red Cedar - planted
Wild Rose - 1/1
Buckthorn - 1

Channel Description

- Rip rap lined channel
- more over 10 yrs old fully colonized w/ Phragmites, Willow, herbs.
- altered now naturally restored
- deeply shaded w/ Phrag.
- water source from ramp swm basin
- flows during runoff only
- no ground water discharge

- Conc. culverts look OK, no blockages; 1.4 O.D.

City Rd 46
Crossing #2
23-041
Concession 8.

Sept 11/2025
S. Taylor

- Ditch on W. side of Conc 8 - S. of 401 overpass.
- N of City Rd 46.
- Dry ditch
- colonized w/ Phragmites, goldenrod, grasses & forbs
- no trees, few shrubs
- no fish habitat.

- large commercial dev. on E. side of Conc 8 - not on Google Earth
- SWM pond at far end that must lead into Crossing #3; piped, no culvert.

- unnamed tributary to Little River - drains to Lake St. Clair

- GPS Location
  42° 14' 29.75" N.
  82° 56' 49.55" W

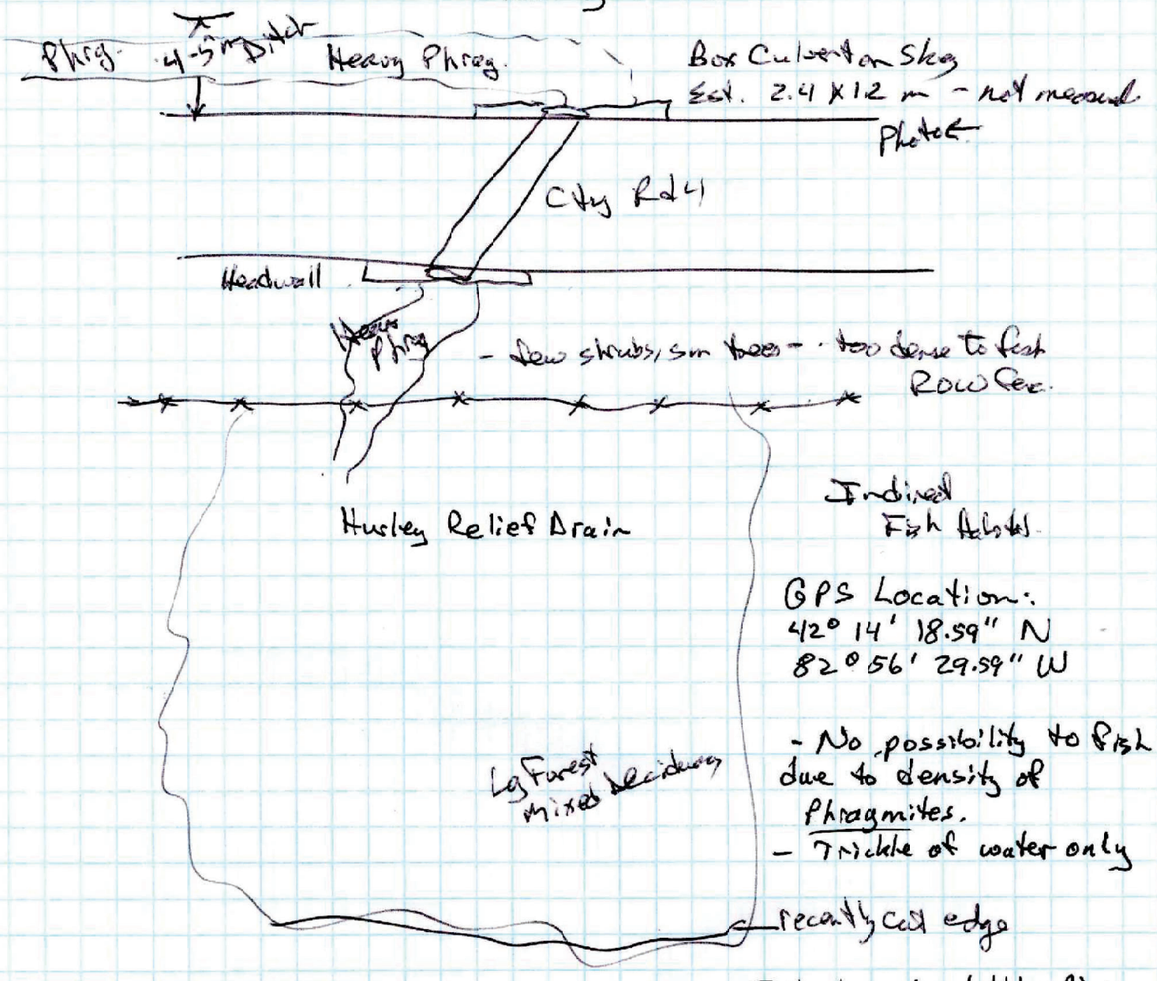
- No fish habitat at location
- No fish catch

Drain: None
- 8th Concession Drain

City Rd 46
Crossing #3
23-041

Sept 11/25
S. Taylor

Hurley Drain



APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing #4
Cty Rd 46

GENERAL INFORMATION						
Project # 23-041 Cty Rd. 46.	Project Description: Road Improvements	Date: Sept 11/2025				
Collectors: S. Taylor H. Kalsa B. Finlay	Time Started: 11:20	Time Finished: 12:05				
Weather Conditions: Clear sky, Sunny	Surface Conditions (If Applicable): Calm ✓	Rippled O	Wavy O	Rough O		
LOCATION						
Name of Waterbody: Trib. to Little River - Lake St. Clair	Crossing #: 4	Station #: 1				
Location Of Crossing/Station: 200m N. of Conc 9 Intersection	- Part of Washbrook Drain					
GPS Coordinates: 42° 14' 04.11" N / 82° 56' 03.91" W	~~MTO Chainage~~: SAR mapping Check No SAR mapped					
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA.					
SAMPLING LOCATIONS AND WATER CHEMISTRY						
Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						
Water Colour:						
Colourless O	Yellow/Brown ✓	Blue/Green O	Turbid O	Other O		
GEAR						
Electrofisher: Halltech HT 2000B						

Length (m): 7 min	Settings: 150 Watt 80 Hz frq	Seconds: 480 s
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept?	Number of Bags	Preservative: Formalin	Frozen	Alcohol	Other (specify)
O Yes ✗ No		O	O	O	O

ADDITIONAL COMMENTS

- 4 Brook Stickleback
- 1 Channel darter
- 1 Common crayfish

Additional Notes Appended? ☐ No ☑ Yes number of pages Habitat Map

CAPTURE INFORMATION

Project #:	Crossing/Station #:

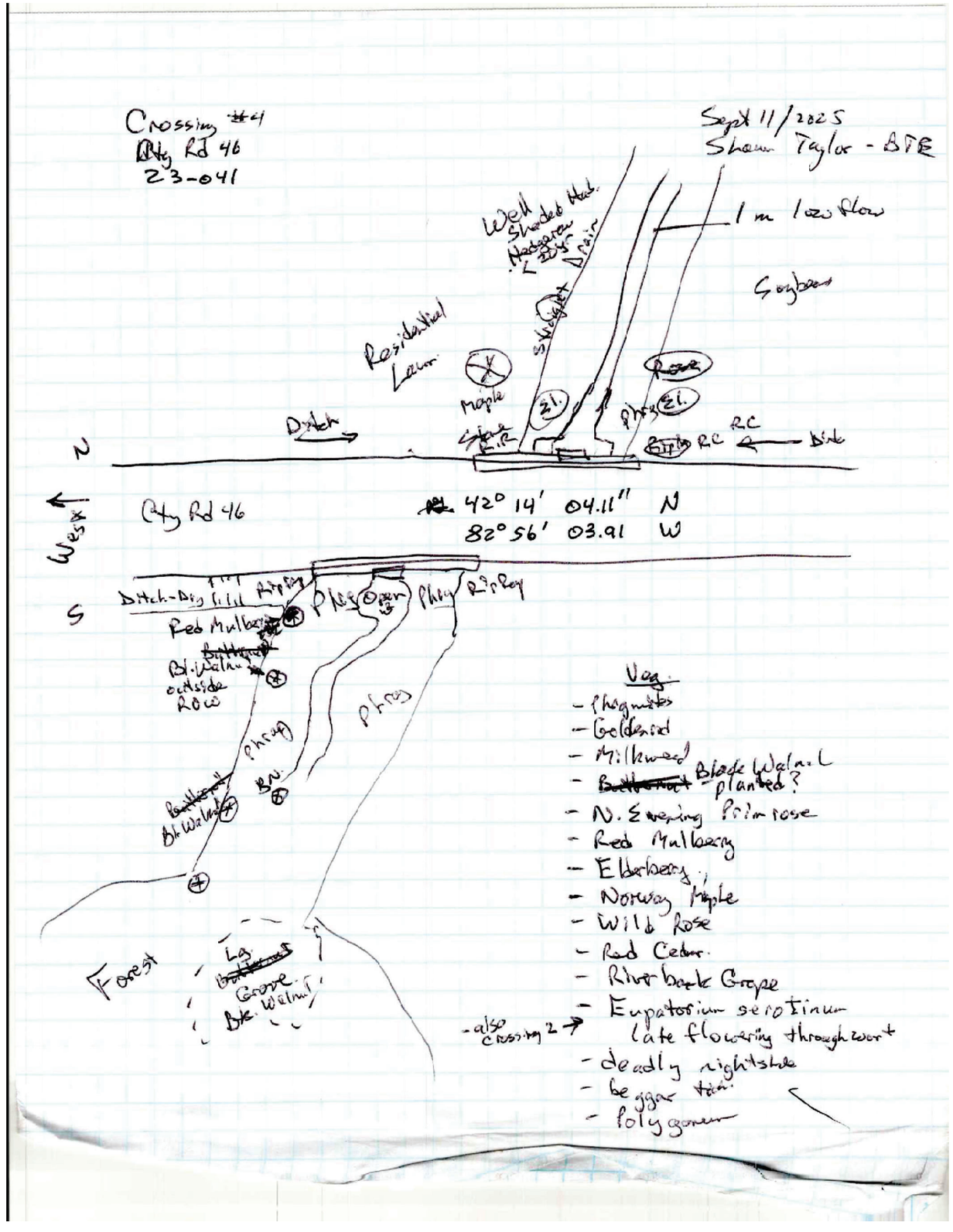
No.	Scientific Name /	Physical Condition	Top Predator

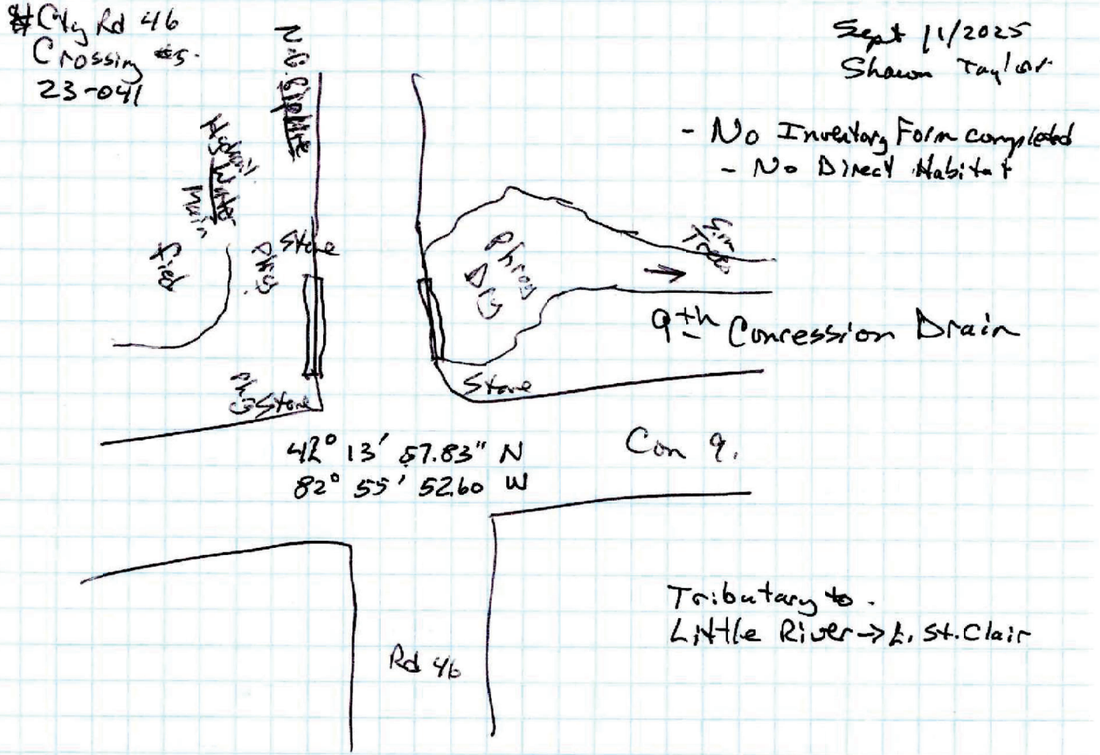
Cty Rd 46

Crossing No 4

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Brook Stickleback	N/A	No	L-24mm	YOY
1	" "	No	No	L-30mm	YOY
1	" "	No	No	L-27mm	YOY
1	" "	No	No	L-22mm	YOY
1	Gray Fish - not rusty	—	—	—	YOY
1	Channel darter	No	No.	L-45mm	Adult

Note: Circle number if a sample was kept





Veg

- Phragmites
- Goldenrod
- Grasses.
- Sc. Thistle.
- Riverbank Grape
- Nightshade

- Very low diversity
- no habitat for fish
- ~~small drainage catchment~~.
- small drainage catchment

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing No 6
Cty Rd 46

GENERAL INFORMATION		
Project # 23-041 County Rd. 46 N. Talbot Road	Project Description: Road Improvements	Date: Sept 11/2025

Collectors:	Time Started:	Time Finished:
S. Taylor B. Finlay H. Kalsa	10:00	10:40

Weather Conditions:	Surface Conditions (If Applicable):			
	Calm	Rippled	Wavy	Rough
Clear, cloudless - no precip.	☒	○	○	○

LOCATION		
Name of Waterbody: Little River Drain Pike Creek Tributary - Conflicting names	Crossing #: 6	Station #: 1
Location Of Crossing/Station: 50 m west of Cty Rd 17/Conc 10 Intersection		
GPS Coordinates: 42° 13' 38.40" N / 82° 54' 56.73" W	~~MTO Chainage~~: DFO SAR check - No SAR mapped	
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA	

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
○	☒	○	○	○ _____

GEAR

Electrofisher: Halltech HT 2000 B

Length (m): 1 pool.	Settings: 150 Watt 80 Hz	Seconds: 500 sec.
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION					
Fish Kept? O Yes ⊗ No	Number of Bags	Preservative:			
		Formalin O	Frozen O	Alcohol O	Other (specify) O

ADDITIONAL COMMENTS

- No catch at all
- too little water depth/ fully colonized by Phragmites
- water depth ≈ 2-3 cm - bottom mud.

Additional Notes Appended? ☐ No ☐ Yes number of pages _____

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

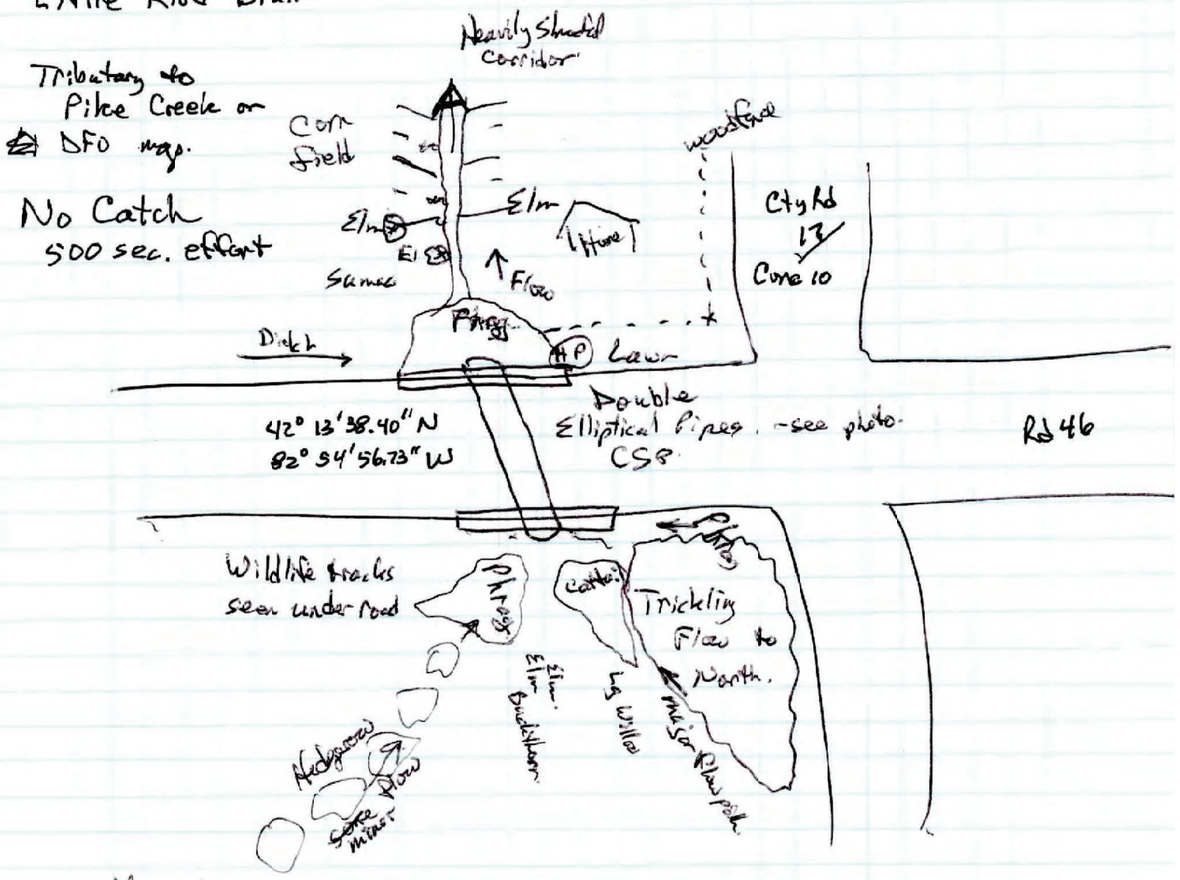
	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
	- No Catch -				
	- shallow water				
	- attempted, no catch				

Note: Circle number if a sample was kept

Crossing #6
City Rd 46
23-041

Sept 11/2025
Shawn Taylor

Little River Drain



No Catch
500 sec. effort

Veg list
- Phragmites
- Narrow leaved cattail
- Staghorn sumac
- Am. Elm
- Riverbank Grape
- Wild Rose
- Burdock
- Manitoba Maple
- Goldenrod
- Thistle
- Tartarian Honeysuckle
- Water Plantain
- Queen Ann's Lace

APPENDIX C3: FISH COMMUNITY INVENTORY FORM City Rd 46 Crossing #7

GENERAL INFORMATION		
Project # 23-041 City Rd 46	Project Description: Road Widening/ Improvements	Date: Sept 11/25.

Collectors: S. Taylor N. Kalsa B. Finlay	Time Started: 10:45	Time Finished: 11:45

Weather Conditions:	Surface Conditions (If Applicable):			
	Calm	Rippled	Wavy	Rough
Clear, no clouds, no recent rain	X	O	O	O

LOCATION Czowski

Name of Waterbody: ~~Sutherland Creek~~ Drain	Crossing #:	Station #:
Pike Creek Tributary	7	1

Location Of Crossing/Station:
100 N. of Conc 11 / City Rd 17 on S. side of City Rd 46

GPS Coordinates:	~~MTO Chainage~~: DFO SAR Chade
42° 13' 25.18" N / 82° 54' 01.55" W	No SAR mapped

Township:	MNRF District:
~~Tecumseh~~ Sandwich	ERCA

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
O	X	O	O	O ____

GEAR

Electrofisher: NalMech HT 2000 B

Cty Rd 46
Crossing No 7.

Crossing #7.

Length (m): Pool only. 15 m long	Settings: 150 Watt 80 Hz	Seconds:
Nets and Traps:		
Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept?	Number of Bags	Preservative:			
		Formalin	Frozen	Alcohol	Other (specify)
✓ Yes O No Banded killifish.	1	O	✓	O	O

ADDITIONAL COMMENTS

- only pool on S. side of culvert holds water -
- pool is open approx 6.0 m w x 15.0 m long
- very large box culvert under road, but downstream all dry + colonized with Phragmites.

Additional Notes Appended? ☐ No ☐ Yes number of pages _____

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

Cty Rd 46
Crossing No 7.

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
1	Bluegill - Lepomis gibbosus	- No	No	50 mm	YOY
	~~unknown darter/minnow sp.~~ killifish			54 mm	YOY
19	Banded killifish			84/94 mm	Adult
1	Bluegill			43 mm	YOY
11	Crayfish				

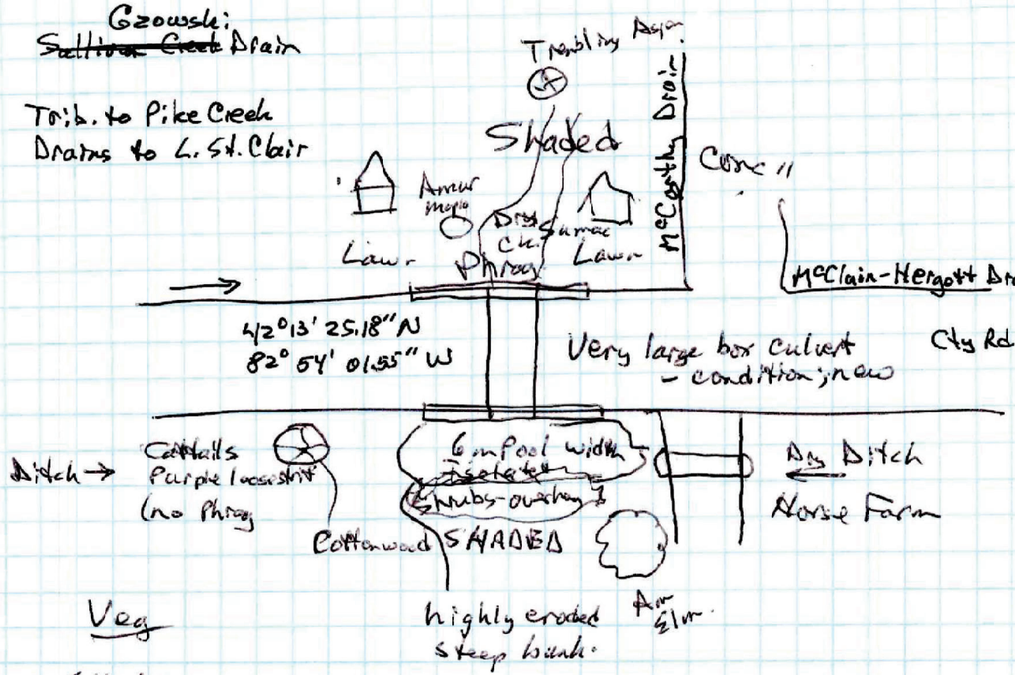
Note: Circle number if a sample was kept

Crossing #7
Cty Rd 46
23-041

Sept 11/25
Shaun Taylor

Czowski
~~Sullivan Creek~~ Drain

Trib. to Pike Creek
Drains to L. St. Clair



Veg

- Elderberry
- Phragmites
- Cattail
- Purple loosestrife
- Goldenrod
- Trembling Aspen
- Am Elm
- Cottonwood
- Ragweed
- Scotch Thistle
- Tartarian Honeysuckle

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing #8
Cty Rd 46

GENERAL INFORMATION		
Project # 23-041 Cty Rd. 46	Project Description: Road Improvements	Date: Sept 11/25

Collectors:	Time Started:	Time Finished:
S. Taylor B. Finlay H. Kansa	3:20	4:10

Weather Conditions:	Surface Conditions (If Applicable):			
	Calm	Rippled	Wavy	Rough
Clear, no clouds, warm ~ 25°C	⊙	○	○	○

LOCATION		
Name of Waterbody: Pike Creek Pike Creek / ~~Brzoski~~ Drain	Crossing #: 8	Station #: 1

Location Of Crossing/Station:
Midway btwn Conc 11 & 12 - near house at No. 11595 Rd 46.

GPS Coordinates:	~~MTO Chainage~~: DFO SAR map check
42° 13' 16.07" N / 82° 53' 24.00" W	No SAR mapped
Township: ~~Tecumseth~~ Sandwich	MNRF District: ERCA

SAMPLING LOCATIONS AND WATER CHEMISTRY

Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						

Water Colour:

Colourless	Yellow/Brown	Blue/Green	Turbid	Other
○	○	○	○	○ _____

GEAR

Electrofisher: Halltech HT2000 B

Length (m):	Settings:	Seconds:
50 m upstream a S. side	150 Watt 80 Hz	450s

Nets and Traps:

Minnow Trap: O #	Dip Net O #	Trap Net O #
Seine: O	Gill O	Other O Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:

Size of Net:

Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION

Fish Kept?	Number of Bags	Preservative:			
		Formalin	Frozen	Alcohol	Other (specify)
O Yes ⊘ No		O	O	O	O

ADDITIONAL COMMENTS

Additional Notes Appended? ☐ No ☑ Yes number of pages 1

CAPTURE INFORMATION

Project #:	Crossing/Station #:

No.	Scientific Name /	Physical Condition	Top Predator

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
2	Banded killifish	No		L 45/L50	YOY
38	Silver Shiner			L 35	YOY
1	Banded killifish			L 47	YOY
1	Channel Darter			L 29	YOY

Note: Circle number if a sample was kept

Cty Rd 46
Crossing # 8

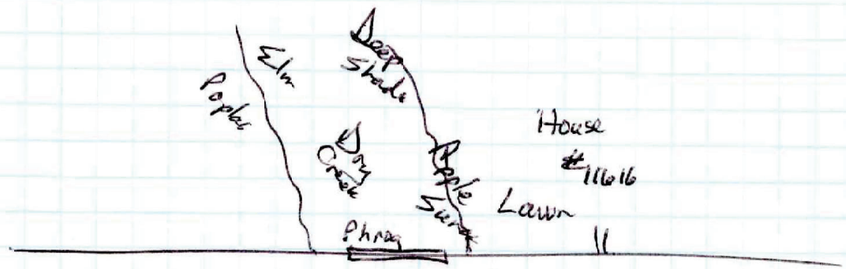
	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
2	Banded killifish	N/o		L 45/L 50	YOY
38	~~Silver Shiner~~ Fathead Minnow			L 35	YOY
1	Banded killifish			L 47	YOY
1	Channel Darter			L 29	YOY
	Photos sents to DFO for confirmation				
	Technician Robin Gaspardy corrected the ID.				
	on Oct 1/2025 - see file FishID request - Amy Boyko				

Note: Circle number if a sample was kept

Crossing #8
Cty Rd 46.
23-041

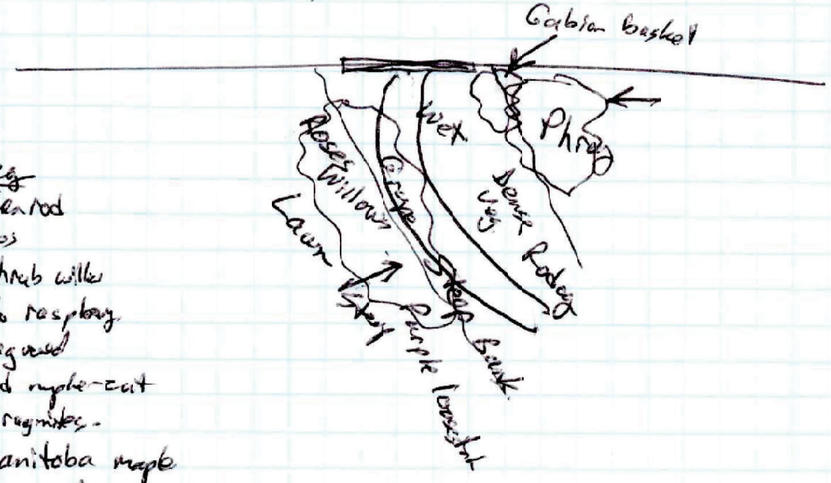
Sept 11/25
Shaun Taylor

Pike Creek
~~Creek~~ Drain - Trib to Pike Creek



42° 13' 16.07" N
85° 53' 24.00" W

Cty Rd 46



Veg
- Goldenrod
- roses
- shrub willow
- Red raspberry
- ragweed
- red maple-ash
- Phragmites.
- Manitoba maple
- Boneset
- Marsh marigold
- Red Osier Dogwood

APPENDIX C3: FISH COMMUNITY INVENTORY FORM

Crossing # 9
Cty Rd 46

GENERAL INFORMATION						
Project # 23-041 Cty Rd 46 Middle Road	Project Description: Road Improvements	Date: Sept 11/25				
Collectors: S. Taylor, B. Finlay, H. Kalsa		Time Started: 3:55	Time Finished: 4:35			
Weather Conditions: Clear, Cloudless		Surface Conditions (If Applicable):				
		Calm ⊗	Rippled ○	Wavy ○	Rough ○	
LOCATION						
Name of Waterbody: Mooney Creek / Pike Creek Tributary (Mooney Ck) West Townline Dr.		Crossing #: 9	Station #: 1			
Location Of Crossing/Station: Corner of Essex Cty Rd 46 & Cty Rd 19 - along W. side of Cty Rd 19						
GPS Coordinates: 42° 13' 09.93" N / 82° 52' 30.29" W		~~MTO Chainage~~: DFO SAR map check. No SAR - not shown as watercourse here				
Township: ~~Tecumseh~~ Sandwich		MNRF District: ERCA				
SAMPLING LOCATIONS AND WATER CHEMISTRY						
Location:	Length (m)	Air Temp. (°C)	pH	Dissolved Oxygen (mg/L)	Water Temp (°C)	Conductivity (µS/cm)
Upstream						
Downstream						
Culvert/Hwy ROW						
Water Colour:						
Colourless ○	Yellow/Brown ⊗	Blue/Green ○	Turbid ○	Other ○ _____		
GEAR						
Electrofisher: Halltech HT2000B						

Length (m): 20-25 m	Settings: 150 watt 80 Hz	Seconds: 425
Nets and Traps:		
Minnow Trap: ○ #	Dip Net ○ #	Trap Net ○ #
Seine: ○	Gill ○	Other ○ Specify:
Hauls (#):	Period of Time (24 Hour Clock):	
	Set Time:	Clear Time:
Size of Net:		
Length (m):	Mesh Size:	Depth of Capture:
	Smallest (cm):	Minimum (m):
	Largest (cm):	Maximum (m):

SAMPLE COLLECTION					
Fish Kept? ○ Yes ⊗ No	Number of Bags	Preservative:			
		Formalin ○	Frozen ○	Alcohol ○	Other (specify) ○

ADDITIONAL COMMENTS

- almost all ~~Emerald Shiner~~ Creek Chub
- severe barrier of rock at the culvert under Cty Rd 46
- ponded upstream - not fished

Additional Notes Appended? ☐ No ☒ Yes number of pages 1

CAPTURE INFORMATION

Project #:	Crossing/Station #:

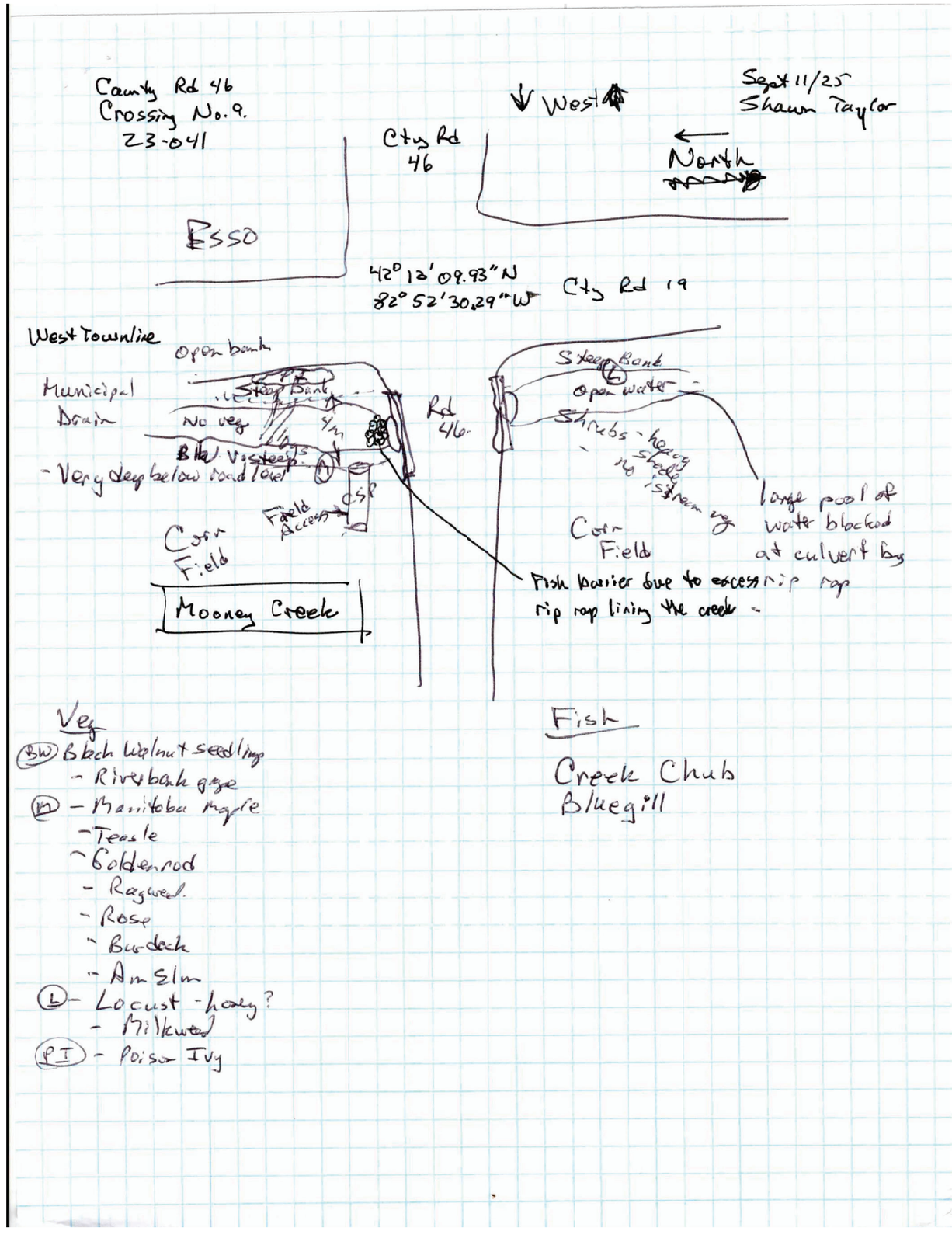
No.	Scientific Name /	Physical Condition	Top Predator

Cty Rd 46

Crossing # 9

	Common Name	# Fish with Blackspot	# Fish with Lesions, Tumours, Maturity etc.	Length (mm) F=Total Fork or L=Total Length	Age Class YOY/Adult
i	Bluegill			F 70mm	YOY
iii	~~Emerald Shiner~~ Creek Chub			L 85 mm	Adult
1	" "			F 120 mm	A
1	" "			F 95	A
2	" "	1	~~Blackspot~~	F 40	YOY
1	" "	1	Blackspot	F 50	YOY
1	" "			F 95	A
1	" "			F 114	A
1	" "			F 70	A
1	" "			F 70	A
1	" "			F 80	A
	ID of Creek Chub confirmed Oct 1 by DFO Technician			F 78	A

Note: Circle number if a sample was kept



Attachment 2

Site Photos – Ecology Field Work

Crossing 1 – West limits of Study Area east of 401 overpass

Photo 1: Crossing 1 south of the shoulder of Country Road 46 (facing south).

Photo 2 : Facing north of twin concrete culverts at Crossing 1.

Photo 4: One Crayfish was caught at Crossing 1. Channel consisted of a soft muck bottom (facing south).

Photo 3: Facing west towards 401 overpass at Crossing 1.

Photo 5: East channel of Crossing 1 – phragmites present (facing east).

BT ENGINEERING
BTE

Crossing 2– Ditch north of County Road 46, west side of Concession Road 8

Photo 6: Linear ditch along the west side of Concession Road 8 (facing north).

Photo 7: Linear ditch along the west side of Concession Road 8 (facing south).

Crossing 3– 560 m east of Concession Road 8

Photo 8: Facing west at Crossing 3, from the north side of County Road 46.

Photo 9 : Facing north at Crossing 3, from the north side of County Road 46.

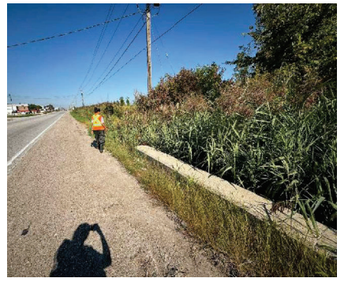


Photo 11: Facing northwest at Crossing 3, from the north side of County Road 46.

Photo 10: Crossing 3 was not fished due to minimal flow and densely populated invasive phragmites.

Photo 12: Facing northeast at Crossing 3, from the north side of County Road 46.

Crossing 3– 560 m east of Concession Road 8

Photo 13: Facing Southeast at Crossing 3, from the south side of County Road 46. Too many Phragmites to fish the watercourse.

Photo 14: Facing southwest at Crossing 3, from the south side of County Road 46.

Photo 15: Facing south at Crossing 3, from the south side of County Road 46.

Photo16: Facing south at Crossing 3, from the south side of County Road 46.

Crossing 4 – West of Intersection of County Road 46 and Concession Road 9

Photo 17: Pooled water at culvert outlet of Crossing 4, north side of County Road 46.

Photo 18: Facing west at Crossing 4, from north side of County Road 46.

Photo 19: Facing east at Crossing 4, from the north side of County Road 46.

Photo 20: Culvert inlet at Crossing 4, south side of County Road 46.

Photo 21: Facing west at Crossing 4, south side of County Road 46. Red Mulberry, centre mid-ground.

Photo 22: Facing east at Crossing 4, south side of County Road 46.

Crossing 5 – Intersection of County Road 46 and Concession Road 9

Photo 23: Facing northeast at Crossing 5, north side of County Road 46. Dry channel.

Photo 24: Facing west at Crossing 5, north side of County Road 46. Dry Channel.

Photo 25: Facing north at Crossing 5, north side of County Road 46.

Photo 26: No defined channel present at Crossing 5.

Photo 27: Facing east from north side of County Road 46, at Crossing 5.

Photo 28: Culvert inlet at Crossing 5, south side of County Road 46.

Crossing 6 – West of County Road 46 and County Road 17

Photo 29: Culvert outlet of Crossing 6, north side of County Road 46.

Photo 30: Culvert outlet at Crossing 6, south side of County Road 46.

Photo 31: Facing southwest, at outlet of twin-barrel concrete pipe culvert at Crossing 6.

Photo 33: Birds eye view of channel south side of County Road 46.

Photo 33: Animal tracks present in bottom of east barrel of concrete pipe culvert at Crossing 6 (facing south).

Photo 34: West barrel of concrete pipe culvert at Crossing 6 (facing south).

Crossing 7 – West of Intersection of County Road 46 and County Road 43

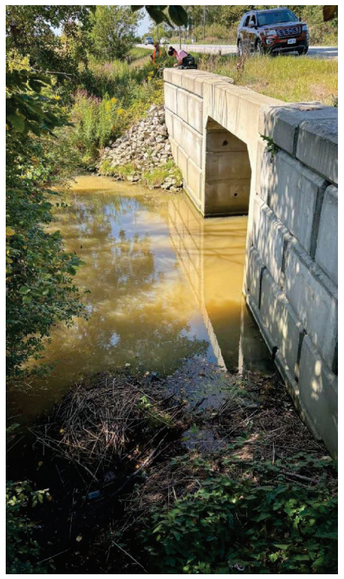


Photo 35: Inlet of concrete box culvert, facing west from south side of County Road 46.

Photo 36: Pooled water at culvert inlet at Crossing 7, south side of County Road 46.

Photo 38: Ditch on south side of County Road 46, east of Crossing 7, confluences with the channel through the culvert pictured on far right.

Photo 37: Facing east at Crossing 7, from the south side of County Road 46.

Photo 39: Habitat structure and Muskrat observed within concrete culvert at Crossing 7.

Crossing 8 – East 770 m from Intersection of County Road 46 and County Road 12

Photo 40: Facing south at Crossing 8, from south side of County Road 46.

Photo 41: Facing southwest at Crossing 8, from south side of County Road 46.

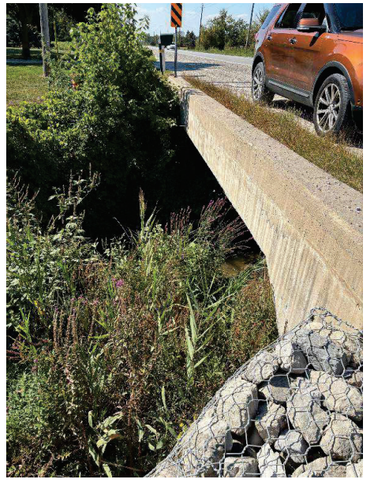


Photo 42: Culvert inlet at Crossing 8, south side of County Road 46.

Crossing 9 – West of Intersection of County Road 46 and County Road 19

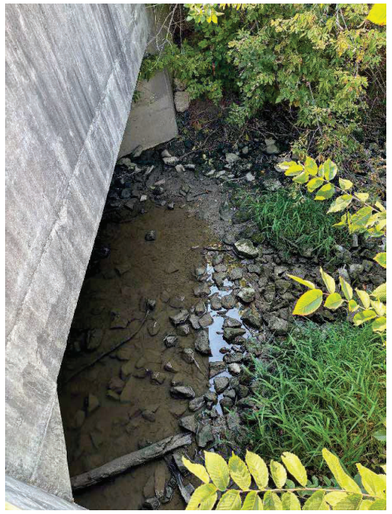


Photo 43: Outlet of Crossing 9, north side of County Road 46, facing west.

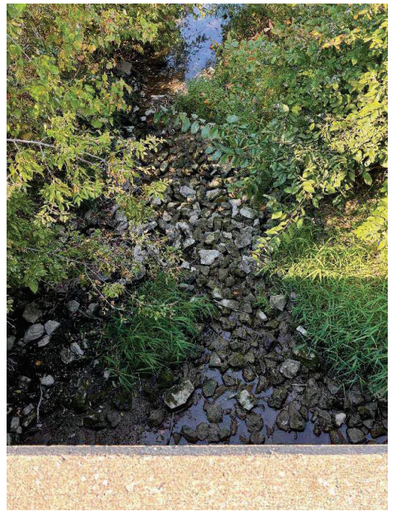


Photo 44: Channel of Crossing 9, north of County Road 46. Significant barrier to upstream fish movements.

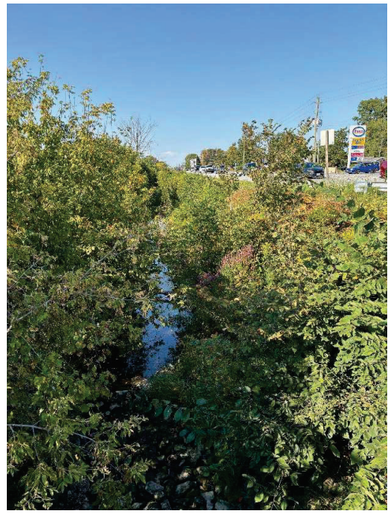


Photo 45: Facing north along County Road 19, at Crossing 9, north side of County Road 46. Right hand slope is extremely steep and unstable due to erosion and loss of protective stone lining.

Woodlot A – East of 11th Concession Road

Photo 46 – Woodlot A on south side of County Road 46

Photo 47 - Cavity tree within Woodlot A that may provide roosting habitat for SAR bat species.

Woodlot B – East of the 8th Concession Road

Photo 48 - Woodlot B in background at watercourse crossing #3.

Photo – 49 Typical hedgerow windbreak plantings along County Road 46