

MEMO

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Re: Douglas Landing Subdivision Aquatic Habitat Assessment

1. Introduction

GeoProcess Research Associates Inc. (GeoProcess) has been retained by Douglas Landing Developments and Z Developments to complete a survey of the aquatic habitat for the Douglas Landing Subdivision, located at 9243 McArton Road in Beckwith Township, Lanark County (Subject Property).

It is our understanding that the Subject Property is proposed to be developed into a rural residential community with associated amenities. Natural heritage features within and adjacent to the Subject Property include a watercourse, woodland, wetlands and headwater drainage features. In response to a Draft Plan of Subdivision and Official Plan Amendment (OPA) application for the proposed development, MVCA issued comments on April 24, 2025, and May 14, 2025. MVCA requested that the Fish Habitat Assessment completed for the Subject Property by Geofirma Engineering Ltd. (2017) be updated to establish existing conditions ahead of development.

GeoProcess completed a baseline inventory of the fish community and fish habitat present within the watercourse, and the potential effects to fish and fish habitat resulting from nearby development. The fish and fish habitat assessment included the following activities:

- Fish community inventory
- Habitat characterization
- Brief summary of potential impacts and general mitigation measures

These activities were completed through desktop and field assessments completed in July 2025, the findings of which are summarized within this report.

2. Background Review

The Subject Property is located within Beckwith Township, in Lanark County, approximately 10 km east of the town of Carleton Place. The area is a part of the Smith Falls Limestone Plain physiographic region and has organic and fine textured glaciomarine deposits atop Paleozoic bedrock as the surficial geology (Chapman and Putnam 1984, OGS 2010).

The watercourse assessed was the Munro Municipal Drain Branch 2 (MMD2), which is located along the southeast edge of the Subject Property. MMD2 and its tributaries are a part of the Mississippi River watershed and ultimately drains into the Mississippi River north of Glen Isle. Review of DFO species at risk screening tools indicate that no species at risk or their critical habitat are present in the subject watercourse or the connected section of the Mississippi River (DFO 2025). No fish community data was available specifically for MMD2, but since it is hydraulically connected to the larger Mississippi River there is the potential that forage and game species could migrate into MMD2 or use downstream habitat during periods of the year.

The main branch of MMD2 conveys flows from the agricultural and residential areas upstream of the Subject Property. The channel has been excavated to bedrock through most of its length, and the corridor has been naturalized into meadow and scrubland habitat. A previous study of the fish habitat in MMD2 was completed in 2017 by Geofirma Engineering Ltd. The report concluded that the watercourse did not bear fish and was not directly used as fish habitat but rather provided indirect benefits through baseflow to downstream habitats.

A tributary to MMD2 was also identified (MMD2-T1, Map 1) and described as an intermittent stream with a bed composed of organic material and dominated by dense vegetation (Pinchin 2025). It has been reported that the channel is wetted during other times of the year and conveys flow into MMD2 (Pinchin 2025; Geofirma 2017).

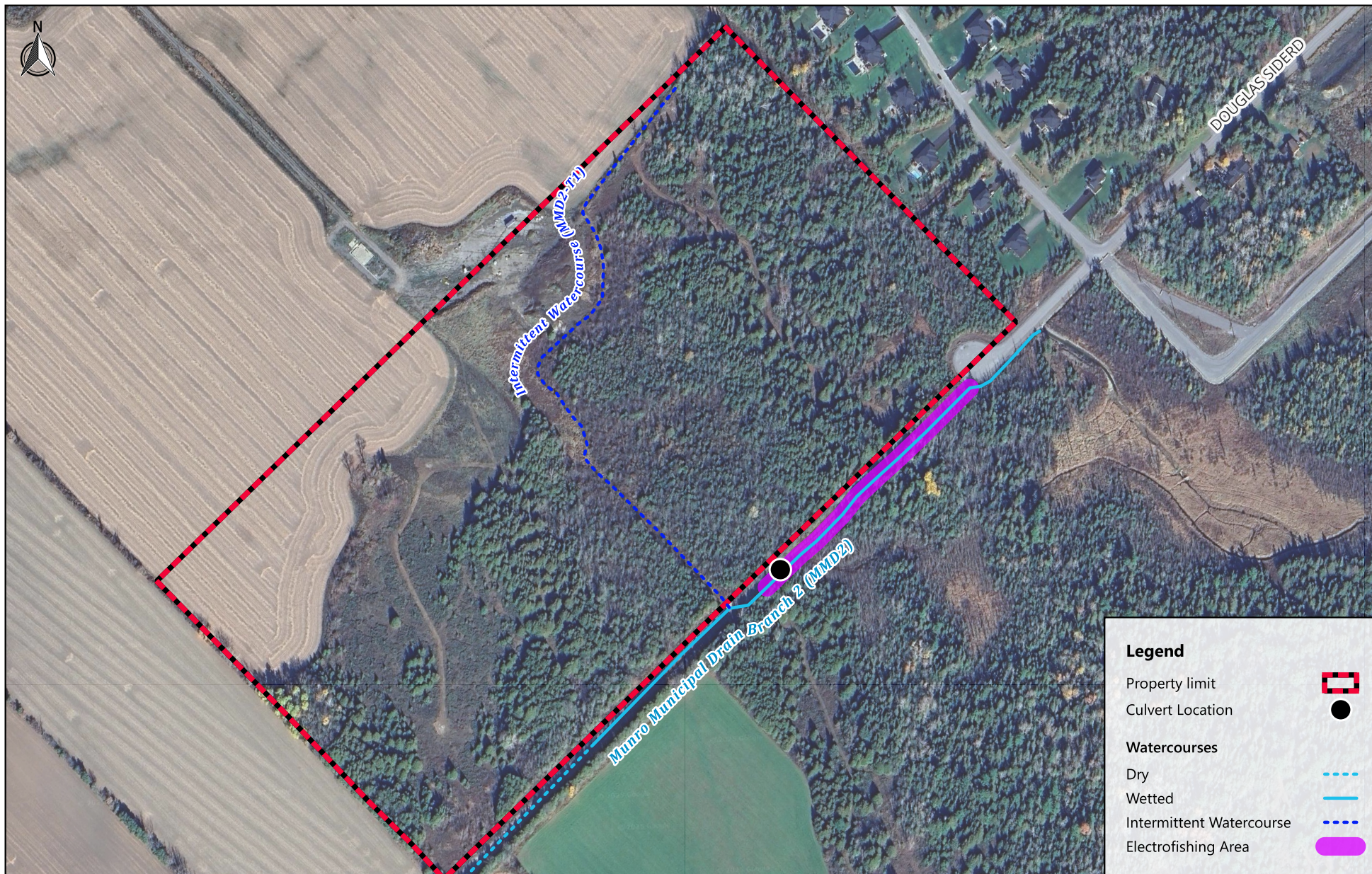
3. Methods

3.1. Fish Community Inventory

An electrofishing survey was completed to document the fish community on the Subject Property on July 17, 2025. The fish community assessment followed the OSAP Standard Single Pass Survey (MNRF 2017) methodology. Electrofishing was completed by two qualified staff members and followed all standard operating procedures outlined in the protocol (MNRF 2017). Crews fished upstream in habitat with adequate depth for approximately 230 m. The single pass, open station survey was completed with a Halltech HT-200 backpack electrofisher, set to 350v and 60hz. Care was taken to ensure sampling was representative of all microhabitats observed within the subject watercourse. Captured fish were identified and enumerated following the electrofishing survey. Total length and weight were recorded for each fish. Following the collection of meristics, all fish were released back into the channel.

3.2. Habitat Characterization

A watercourse characterization was completed for the Munro Municipal Drain Branch 2 (MMD2) adjacent to the Subject Property (Map 1), on July 17, 2025, following the Ontario Stream Assessment Protocol (OSAP) Rapid Assessment Methodology for Channel Structure (MNRF 2017). This method is the Ontario Provincial standard for executing a screening level characterization of watercourse. The characterization involves visually classifying habitat along transects. Transects were selected to be representative of the reach and ensured all mesohabitats were included. Data collected to inform the habitat characterization includes substrate, depth, morphology, and bank stability. Additional information on plant communities, available cover, instream barriers and bank condition has been added to the survey to support fish habitat characterization.



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CREATED BY: DH PROJECT NO.: P2025-1008
CHECKED BY: PA DATE: Aug 06, 2025

0 100 200 300 400 m

NAD83 / UTM zone 17N (EPSG:26917)

Notes:
[1] Imagery from Google Earth.
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Map 1.

Munro Municipal Drain Aquatic Habitat Assessment

Douglas Landing Subdivision Fish Habitat Assessment
Douglas Landing Developments

The intermittent watercourse (MMD2-T1) was dry at the time of assessment. The reach was walked to confirm no isolated areas remained that could provide direct fish habitat. Given the lack of water and the abundance of vegetation growing in the channel it was determined the channel is not appropriate for a fish habitat assessment and therefore no formal survey was completed, although notes were taken regarding its condition.

4. Results

4.1. Fish Community Inventory

Electrofishing resulted in three species being captured, totalling 25 fish. Two brook sticklebacks (*Culaea inconstans*), seven central mudminnows (*Umbra limi*), and sixteen creek chubs (*Semotilus atromaculatus*) were captured during 235 seconds of electrofishing effort, with a mean catch per unit effort of 0.04 fish caught / second of fishing effort (Photos 1 to 3, Table 1).

These species are typical of a cool water fish community in Eastern Ontario (Eakins 2025). Most captured species prefer shallow, slow moving creeks and ponds with sandy or muddy substrate and high vegetation (Scott and Crossman 1973; Eakin 2024). These species are tolerant of low dissolved oxygen levels, which is consistent with isolated pockets in the low flow conditions of the watercourse.

Table 1: Fish community inventory of MMD2, July 2025.

Common Name	n	Mean Weight (g)	Mean Total Length (mm)	CPUE (ind/s)
Brook Stickleback	2	0.09	19	0.008
Central Mudminnow	7	1.59	51	0.029
Creek Chub	16	4.75	64	0.068
<i>Total</i>	25	-	-	0.106

4.2. Habitat Characterization

4.2.1. MMD2

The channel conveys flow along a straightened municipal drain corridor in a southwesterly direction, originating in a wetland area to the east of the Subject Property (Map 1; Photo 4). Dry sections at the time of the assessment fragmented the watercourse, limiting opportunity for migration and access to refuge habitat. The MMD2's average bankfull width is 4.89 m, ranging from 3.5 m to 6.4 m, and the average wetted width is 1.02 m, ranging from 0.3 m to 1.9m. Maximum wetted depth was 0.25m, but most of the channel was less than 0.1 m deep. Bankfull depth ranges from 0.5 to 1.0m. The channel has a low gradient with areas of standing water.

The left bank is mostly stable, with 75% of the channel being protected from erosion, and the remaining 25% is considered vulnerable. The right bank is 50% protected and 50% vulnerable to erosion. Stability is provided by coarse rocky substrate and rooted vegetation growing along the banks. Instability occurred at areas with bare erodible soils and steep bank angles (Photo 5).

Instream cover was present at approximately 50% of the surveyed locations, with about half of the cover provided by rocks and half provided by aquatic macrophytes. The subpavement of the stream bed was predominately hardpan clay and bedrock with overlying gravel and cobbles and some interstitial fine sediment.

A single steel culvert with a diameter of 0.85 m and a length of 4.2 m is present (Photo 6). The culvert sits flush with the channel bed and is projecting from a gravel berm spanning the channel, providing access to a gate onto a neighbouring property.

Riparian vegetation was comprised of a mix of species that thrive in disturbed and open areas. The bank material is a mix of till and material excavated from the channel and appears to have suppressed the vegetation growth along the banks of the watercourse. As a result, a mixture of disturbance species are present. Cattail (*Typha sp.*), submerged Pondweed (*Potamogeton spp.*) and Muskgrass (*Chara spp.*), and common boneset (*Eupatorium perfoliatum*) were common in the wetted portions of the channel. The channel banks were interspersed with flowering and berry-producing plants such as red raspberry (*Rubus idaeus*), red-osier dogwood (*Cornus sericea*), purple-flowering raspberry (*Rubus odoratus*) and black-eyed Susan (*Rudbeckia hirta*). Poison ivy (*Toxicodendron radicans*) was also prominent at the top of the banks. Several invasive species were also present such as purple loosestrife (*Lythrum salicaria*), tufted vetch (*Vicia cracca*), and white sweetclover (*Melilotus albus*). Vegetation was relatively sparse when compared to the nearby natural areas such as the woodland and wetland to the north.

In the wetted channel, hardpan and bedrock sub-pavement provide limited media for rooted vegetation in the channel (Photo 7). Submerged and emergent macrophytes provide cover for the fish community present but are generally limited to the edges of the wetted channel.

Cover is provided by coarse rocky substrate and pockets of instream and overhanging riparian vegetation. At the time of survey, shallowed depths limited potential available cover. Increased water depth during the spring freshet or high precipitation events may improve the amount of available cover, however the straightened municipal drain likely has rapid flows at these times. Limited variation in the channel morphology and few refuges from the flow may limit the species present in the channel.

The channel runs dry approximately 160 m from the boundary of the property but is likely connected to downstream habitat during periods of high flow (Map 1; Photo 8). The wetted channel does not have any obvious barriers to fish passage at the time of survey. There are several natural log snags, but flow persists through and underneath these structures (Photo 9). Limited instream depth, sections of interstitial flow, and dry portions at the downstream extent limit upstream migration from during the summer months. Movement within the channel may be impacted by channel crossings (Photo 10). The culvert present in the channel is not perched and does not appear to pose a barrier to fish during the low water conditions observed.

4.2.2. MMD2-T1

MMD2-T1 (referred to as the intermittent watercourse within Pinchin reporting) roughly bisects the property, collecting overland flow from the agricultural fields to the northeast and confluences with MMD2 downstream of the culvert. MMD2-T1 was dry at the time of survey, with abundant vegetation growing within the bed and obscuring the banks (Photo 11)

5. Watercourse Classification

5.1.MMD2

MMD2 provides direct fish habitat for coolwater fish species during at least the spring and summer. The habitat is of low to moderate quality due to the limited water depth and flow during the rearing period. During high flow periods, when connectivity to other aquatic habitat is likely improved, there is the potential that the habitat would provide additional value to other species of fish that migrate upstream from the Mississippi River for seasonal life history stages.

5.2.MMD2-T1

MMD2-T1 did not provide direct fish habitat at the time of the survey. During wetted periods (i.e., during the Spring) it is possible that the channel provides direct fish habitat for small bodied species tolerant of low water and oxygen conditions (i.e., brook stickleback), although they would be at risk for mortality when flow recedes. Despite the potential for seasonal use by resilient species (which was not assessed in this Study), the channel is expected to primarily function as indirect fish habitat that provides allochthonous resource inputs to the direct habitat downstream.

6. Impact Mitigation Measures

6.1.Project Description

The Douglas Landing Subdivision intends to develop a severed rural agricultural property into multiple housing lots, parking areas and associated roads and services. Twenty-three lots have been proposed with plans for septic and well water systems for each. An access road wraps arounds the wetland and connects to Douglas Side Road at the eastern edge of the Subject Property. There are no anticipated direct impact to the MMD2 as no in water works are planned, and a riparian buffer of 15 m will be maintained. Indirect impacts to the channel due to changes to surface or groundwater quantity and quality are possible, but hydrogeological and stormwater management studies have been completed and determined that the development is at low risk to impact the surrounding environments (Pinchin 2025; Tatham 2025).

6.2.Avoidance Measures

In the hierarchy of preventing impacts, the first option is avoidance. In this case, avoidance is the principal option as the site plan is oriented to avoid the aquatic habitat of the Munro Municipal Drain.

By coordinating site access and construction sequencing, damage to the existing vegetation in the vicinity of the channel should be avoided to reduce impacts. Construction will only disturb or remove vegetation where required to complete the site work. The operation of construction vehicles will only occur within defined access points, and if required, will be managed using rig matting or similar equipment to avoid impacts to the watercourses or wetlands.

6.3. Mitigation Measures

Mitigation measures are meant to reduce or control adverse environmental effects because of the proposed construction. They include any restitution efforts required to offset unavoidable impacts and may involve replacement, restoration, or compensation of habitat that has undergone permanent impact from the works. In general, mitigation measures should be consistent with guidance provided within the DFO's interim codes of practice.

7. Conclusion

The Munro Municipal Drain Branch 2 provides aquatic habitat for a cool water fish community, comprised of small-bodied forage fish including brook stickleback, central mudminnow, and creek chub. The available habitat is low to moderate quality due to seasonal low flows. Impacts should be limited to indirect effects as the development has not proposed work below the high-water mark. Adherence to the avoidance and mitigation measures described above should minimize the risk of harm to the natural environment. Permanent changes to the watercourse are not expected as a result of the development of the Douglas Landing Subdivision, if standard guidance and mitigation measures to reduce harm to the aquatic environment can be adhered to.

If you have any questions regarding this report, please do not hesitate to contact us.

Regards,

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8. References

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PHOTOGRAPHIC RECORD

1. Douglas Landing Subdivision Aquatic Habitat Assessment



Photo 1: Brook Stickleback (*Culaea inconstans*), MMD2, July 2025

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Photo 2: Central Mudminnow (*Umbra limi*), MMD2, July 2025



Photo 3: Creek Chub (*Semotilus atromaculatus*), MMD2, July 2025



Photo 4: Munro Municipal Drain Branch 2, July 2025



Photo 5: Vegetated Banks with Coarse Rocky Material, MMD2, July 2025



Photo 6: Steel Culvert and Gravel Berm, MMD2, July 2025



Photo 7: Instream and Riparian Vegetation, MMD2, July 2025



Photo 8: Downstream Extent of Wetted Channel, MMD2, July 2025



Photo 9: Log Snag With Flow Underneath, MMD2, July 2025



Photo 10: Channel Crossing, MMD2, July 2025