



November 8, 2021

BY EMAIL

Michael Oberle, Environmental Planning
Technician
Saugeen Valley Conservation Authority
1078 Bruce Rd. 12, Box 150,
Formosa, ON N0G 1W0
Email: a.gowing@svca.on.ca

Dear Mr. Oberle:

**Re: Flood Assessment in Support of Farm Lane at
712457 71st Sideroad, Southgate Township
Jones File: MAR-21058**

The Jones Consulting Group Ltd. (TJCG) has been retained by Israel Bowman on behalf of the property owner Ian Martin to assess the requirements for constructing of a laneway through a wetland area on his property. The subject land is municipally known as 712457 71st Sideroad, Southgate Township in Grey County. Mr. Bowman would like to sever the parcel into two parcels and the proposed laneway would provide access to the western parcel (the property). See **Figure 1 – Location Map**.

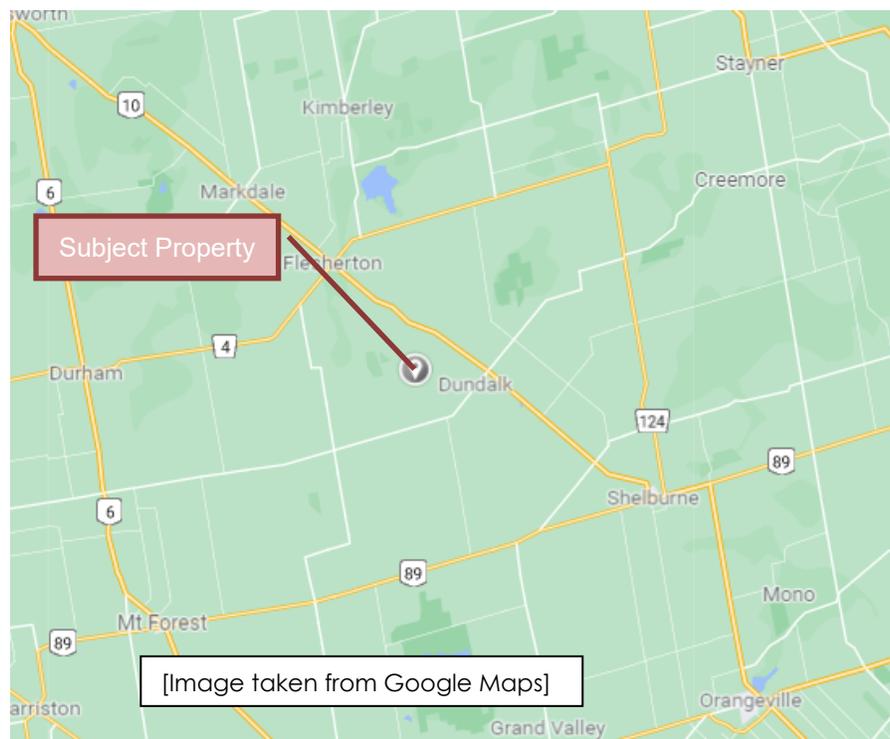


Figure 1 – Location Map

TJCG was established in 1988 to provide professional consulting services in the fields of planning, engineering, and surveying. Since our inception, we have provided consulting services to a broad spectrum of public and private sector clients. TJCG offers expertise and experience in all facets

of civil municipal engineering including: subdivision design, new and reconstruction road designs, site plan design and assessments, environmental reviews, hydrology/hydraulics, site servicing, grading and stormwater management.

A field review was completed on September 16th, 2021, to review the current condition of the property and to assess the downstream reaches.

The property contains an unevaluated wetland along the road frontage which continues back for 325m to 400m. This area drains to the southeast, crossing Southgate Sideroad 71 through two culverts to the southeast of the property. Beyond this wetland area is an upland area where the property owner plans on building a farmstead, including a house and farm-related outbuildings.



Figure 2 – Aerial Image of subject property showing both parcels

The wetland appears to be localized and only receives water from the immediately adjacent properties. Based on the Ontario Flow Assessment Tool (OFAT) prepared by the Ministry of Natural Resources and Forestry, the drainage area is approximately 1.1 km². Refer to **Figure 3**, below.

Utilizing the OFAT hydrology model [Flood Flow: Primary Multiple Regression (Moin and Shaw 1985)], the flow rates were calculated for the overall drainage area. Refer to supporting **OFAT tool outputs**, attached.

Since the OFAT tool calculates the drainage basin based on a mapped stream and the subject property is located within an unevaluated wetland, the nearest mapped stream location downstream of the subject site was used. As a result, not all of the flow calculated by the OFAT tool will flow through the proposed laneway.

The culvert crossing of Southgate Sideroad 71 is located to the east of the proposed laneway, so it is presumed water collected on the eastern side of the proposed laneway will flow directly to the road culvert and not through the laneway culverts. Desktop analysis was used to determine the percentage of the drainage area that would drain to the west side of the laneway and this drainage area is used as for the laneway calculations. This area would include the wetland area to the northwest and upland areas that drain towards it as well as all areas directly northwest of the laneway. This results in approximately 36% of the overall drainage area flowing through the

laneway culverts. **Table 1**, below, includes both the OFAT Tool Flood Flow values for the overall drainage area as well as the calculated flows expected at the laneway.

Storm Event	Flow Rate m ³ /s	
	OFAT Tool results, Downstream of site	Laneway flow, 36% of OFAT flow
2-year	0.38	0.14
5-year	0.67	0.24
10-year	0.92	0.33
20-year	1.18	0.42
25-year	1.48*	0.53*
50-year	1.88	0.68
100-year	2.27	0.82

* interpolated

Table 1: OFAT model Flood Flow downstream of subject site.

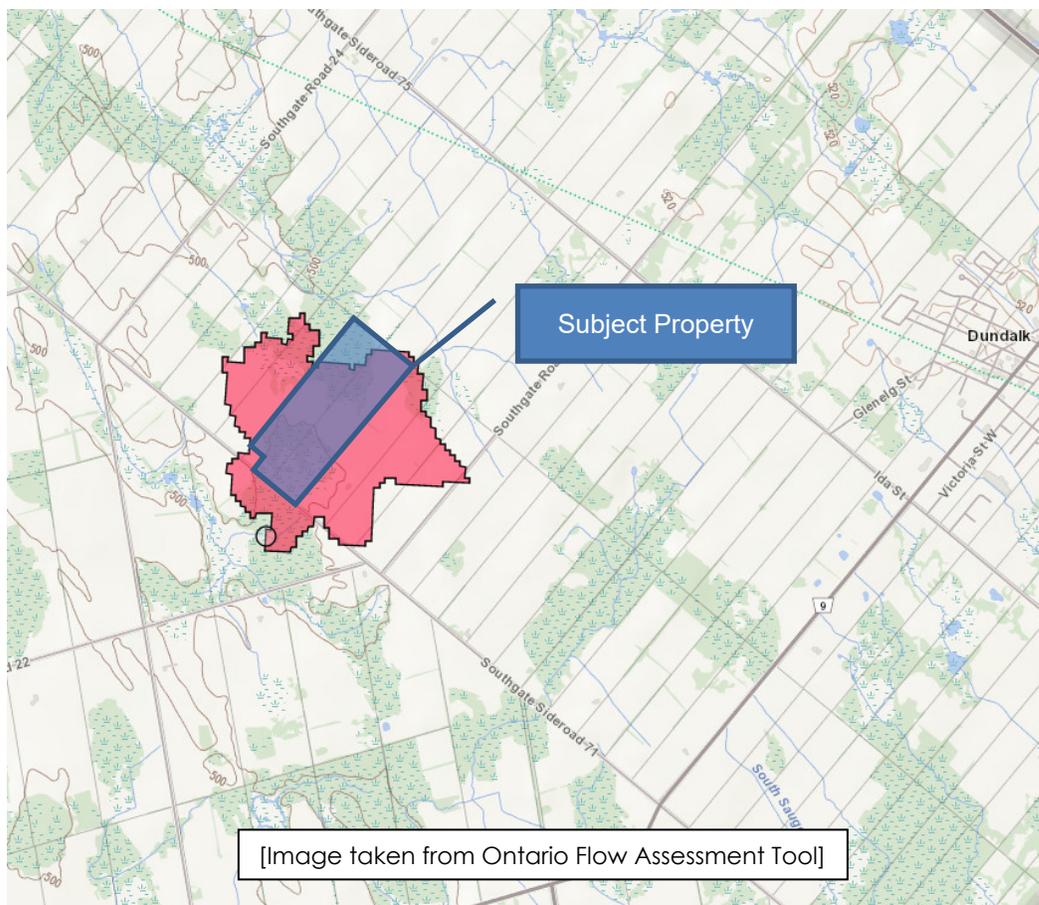


Figure 3: Drainage area associated with the subject property.

Proposed Laneway

We are proposing that a 6.0m by 350m laneway be constructed opposite the existing laneway on the southwest side of Sideroad 71. This location is the shortest distance through the wetland on the subject property, resulting in the lowest volume of imported material required. This material will total approximately 1500m³.

A series of four 300mm corrugated metal culverts are to be installed at the low points along the laneway to allow for equalization of the water levels. These should be spaced greater than 50m apart but take advantage of the natural lows in the wetland to allow for optimum drainage. This will allow the 20-year storm flow to pass through unimpeded and the 25 year storm to pass with a 0.175m high surcharge on the upstream side. Higher-order storms will increase the surcharge until overtopping of the laneway occurs. Culvert calculations can be found in the attached **Design Calculations**.

This volume of material will potentially impact the flood water levels in the wetland. This potential impact will be located on the northwest side of Sideroad 71 since the road will isolate the downstream areas. A conservative approach also assumes that the affected wetland does not have a direct connection to the wetland area to the northwest or the northeast, resulting in all the volume impact affecting the immediate area. Desktop analysis of the wetland areas show that the wetland in the subject area is approximately 34 % of the overall wetland areas within the Drainage Area provided by OFAT. See attached - **Area Delineation**. This produces in a wetland area of approximately 0.14km² impacted by the volume of imported material. That volume of material will result in a displacement of water that increases the water level by a maximum of 11.1mm if the entire laneway is under water. This impact will be isolated to the subject property and not affect flooding on adjacent properties.

If the wetlands to the north have a direct hydrological connection, the impact would be spread over a much larger area resulting in an overall maximum displacement of 5.2mm. See attached – **Design Calculations**. While this impact may affect the adjacent property to the northwest, this slight impact will only occur during major flooding events.

Concluding Remarks and Recommendations

In summary, based on the completed field review, the above and supporting documentation enclosed, we offer the following remarks and Professional opinions regarding the proposed laneway:

- The proposed laneway should align with the existing laneway across Southgate Sideroad 71, taking the shortest route through the wetland. This will be approximately parallel to the property boundaries;
- The proposed laneway will be approximately 350m long and 6.0m wide, with the depth an average of approximately 0.65m;
- A series of four, 300mm CSP culverts will allow continued equalization of water levels along the laneway;
- The proposed laneway will result in a maximum 11.1mm increase in flood elevation due to the volume of material;

It is recommended that the SVCA approve the proposed laneway, as it will allow access to a new farmstead which is consistent with the SVCA's Environmental Planning Regulations and Policies. Please do not hesitate to contact the undersigned should you have any questions or require anything further.

Yours truly,

THE JONES CONSULTING GROUP LTD.



Natasha Birch, P. Eng.
Project Engineer

c: Brad Baker, Birks

Encl.

1. OFAT Tool Output
2. Design Calculations
3. Area Delineation
4. Location Plans and sections

OFAT TOOL – Watershed Characterization

Watershed Characterization ×

Drainage Area (km ²)	1.092
Shape Factor (I)	4.551
Length of Main Channel (km)	2.229
Maximum Channel Elevation (m)	515.220
Minimum Channel Elevation (m)	497.630
Slope of Main Channel (m/km)	7.890
Slope of Main Channel (%)	0.789
Area Lakes/Wetlands (km ²)	0.401
Area - Lakes (km ²)	0.000
Area - Wetlands (km ²)	0.401
Mean Elevation (m)	502.853
Maximum Elevation (m)	515.220
Mean Slope (%)	1.717
Annual Mean Temperature (°C)	5.500
Annual Precipitation (mm)	1037.000

Calculate All

Watershed Name	On/Off	Delete
Watershed 3	<input checked="" type="checkbox"/>	✗

I want to...

OFAT TOOL – Hydrology Models (Moin and Shaw 1985)

Hydrology Models	
MoinShaw1985PrimaryMultipleRegression	
Flow	Results (m ³ /s)
RngQ2Q20	Parameters DA are outside of the range of parameters used to create this model.
RngQ50Q100	Parameters DA are outside of the range of parameters used to create this model.
Q ₂	0.380659
Q ₅	0.673462
Q ₁₀	0.916026
Q ₂₀	1.177433
Q ₅₀	1.875878
Q ₁₀₀	2.269177

712457 71 Sideroad, Southgate Township Design Calculations

CLIENT: Israel Bowman

DATE: Nov 2021

PROJECT: 712457 71 Sideroad

DESIGN: NWB

FILE: MAR-21058

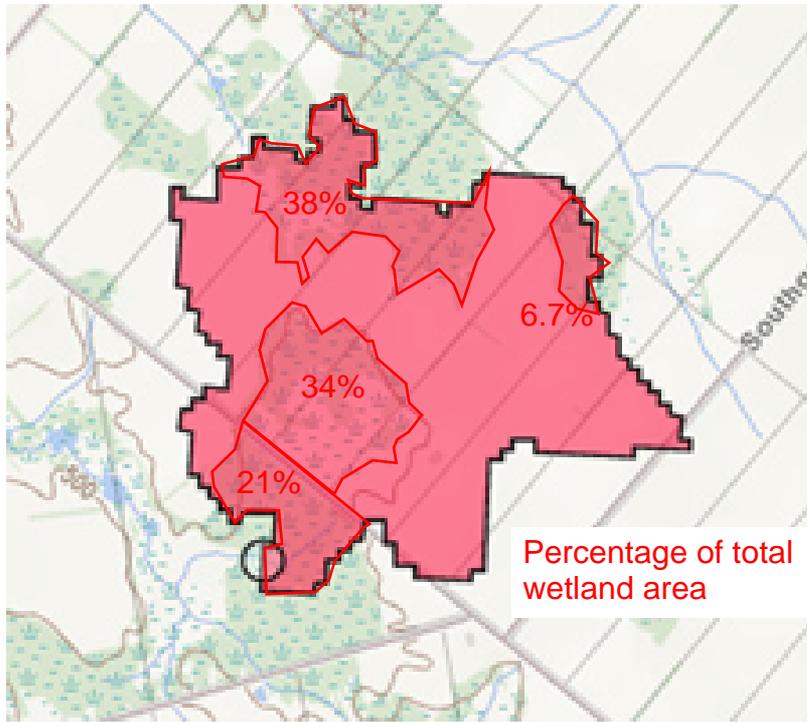


Culvert Flow (Swamee and Jain)		
Input:		
Length of Culvert	6.0	m
Diameter of Culvert	300	mm
Water Elev. U/S	499.84	m
Water Elev. D/S	499.54	m
Ks (see below)	0.046	mm
Kinematic Viscosity	0.00000114	m ² /s
Calculated:		
Flow/culvert	0.106	m ³ /s
Flow x 4 culverts	0.424	m ³ /s
Velocity	1.499	m/s
20-year Flow rate	0.42	m ³ /s
<u>Material</u>	<u>Ks</u>	
Plastic	1.5x10 ⁻³	mm
Steel	4.6x10 ⁻²	mm
Cast Iron	0.26	mm
Concrete	0.30	mm

Culvert Flow (Swamee and Jain)		
Input:		
Length of Culvert	6.0	m
Diameter of Culvert	300	mm
Water Elev. U/S	500.00	m
Water Elev. D/S	499.54	m
Ks (see below)	0.046	mm
Kinematic Viscosity	0.00000114	m ² /s
Calculated:		
Flow/culvert	0.131	m ³ /s
Flow x 4 culverts	0.525	m ³ /s
Velocity	1.856	m/s
25-year flow rate	0.53	m ³ /s
<u>Material</u>	<u>Ks</u>	
Plastic	1.5x10 ⁻³	mm
Steel	4.6x10 ⁻²	mm
Cast Iron	0.26	mm
Concrete	0.30	mm

Volume Displacement		
Laneway volume		
width	6.0	m
length	350	m
average depth	0.650	m
Volume	1513	m ³
Affected Wetland Area - Hydraulically Disconnected		
Total Wetland Area	0.401	km ²
% affected Area	34	%
Affected Area	0.136	km ²
Displacement	11.10	mm
Affected Wetland Area - Hydraulically connected		
Total Wetland Area	0.401	km ²
% affected Area	72	%
Affected Area	0.289	km ²
Displacement	5.24	mm

Area Delineation



Total drainage area:
1.092 km²

Area Wetlands:
0.401 km²

Approximate drainage
area flowing through
laneway culverts

