Attention: Karl Shipprack, CBO

Re: WO #9955
Lot 4 and Part Lot 5 Adam Street Plan 164
Geo. Township of Normanby
Municipality of West Grey

1 Objective

to prepare a Site Servicing Report regarding the engineering viability of developing an undeveloped Parcel of land, described as 357 David Winkler Parkway within the Village of Neustadt as requested by the Municipality of West Grey.

1.1 In brief

the Subject Parcel is illustrated in Figure 1 below shown in a dark blue hatched area and designated as PIN 37303-0467 (LT) with an approximate area of 0.33 acres. It is bounded by David Winkler Parkway to the west, and existing residential development to the north, east and south.

Figure 1 – a portion of the Block Map (courtesy of the Land Registry Office)

The Subject Parcel is a currently empty, or undeveloped residential lot comprised of a grass surface with a knoll in the most rear sloping toward the David Winkler Parkway.

2 Storm water management Criteria

Based on comments from a pre-consultation meeting with the Municipality of West Grey (November 21, 2023) a stormwater management (swm) plan was to be generated. It was inferred from this comment that the post-development drainage discharge was not to exceed pre-development drainage discharge.

3 Project Summary

In brief, the applicants are proposing to build a new two-storey apartment building, approximately 207.7 sq m of building area, along with a hard surface driveway and parking lot.

The Subject Parcel is approximately 0.134 ha (0.33 ac) in area composed of the following catchment areas:

	Grass (sq m)	Runoff factor Cn	Building/hard/surface (sq m)	Runoff factor Cn	Total area (sq m)
Pre-development	1336.5	61	0	0	1336.5
Post-development	610.6	79	725.90	98	1336.5

Table 1 - swm criteria

4 Design Criteria

Rainfall data used in the design was obtained from the Ministry of Transportation (MTO) IDF statistical data for the site in Neustadt, or approximately 44.079 deg North, -81.004 deg West if referring to latitude and longitude. In other words, we attempted to get the most relevant data for the site.

Based on this specific location the following rainfall intensity figures were generated:

Duration	**5 min**	**10 min**	**15 min**	**30 min**	**1 hr**	**2 hr**	**6 hr**	**12 hr**	**24 hr**
2-year	128.4	79.1	59.6	36.7	22.6	13.9	6.5	4.0	2.5
5-year	170.4	105.0	79.1	48.7	30.0	18.5	8.6	5.3	3.3
10-year	198.2	122.1	92.0	56.7	34.9	21.5	10.0	6.1	3.8
25-year	233.4	143.8	108.3	66.7	41.1	25.3	11.7	7.2	4.5
50-year	259.6	159.9	120.4	74.2	45.7	28.2	13.1	8.0	5.0
100-year	285.1	175.6	132.3	81.5	50.2	30.9	14.3	8.8	5.4

Table 2 - rainfall intensity (mm/hr)

5 Pre-Development Conditions

The area of the Subject Parcel and overall catchment area were considered one and the same, and due to the relatively small size was modelled as one catchment area. As shown in Table 1 above the entire site, or 100 % of the site is considered as landscaped area with a runoff curve number of 61, resulting in an overall weighted runoff coefficient of 61, all with an estimated hydrologic soil group value of ‘B’.

5.1 Pre-Development Runoff Rate Modelling

Modelling through computer software determined the following runoff rates:

	Return Storm Frequency (year)					
Catchment area	2	5	10	25	50	100
cu m/sec	0.0003	0.0024	0.0045	0.0083	0.0113	0.0141
Runoff volume (cu m)	4.1	11.5	17.5	27.4	35.4	42.3

Table 3 - pre-dev runoff rates

6 Post-Development Conditions

The area of the Subject Parcel and overall catchment area were considered one and the same, and due to the relatively small size was modelled as one catchment area. As shown in Table 1 above approximately 46 % of the site is considered as landscaped area with a runoff curve number of 79, and 54 % considered a hard surface/impermeable area with a runoff coefficient of 98, resulting in an overall weighted runoff coefficient of 89 all based on an estimated background hydrologic soil value of 'B'.

6.1 Post-Development Runoff Rate Modelling

Modelling through computer software determined the following runoff rates:

	Return Storm Frequency (year)					
Catchment area	2	5	10	25	50	100
cu m/sec	0.0184	0.0274	0.0334	0.0412	0.0470	0.0524
Runoff volume (cu m)	47.0	69.9	84.6	105.6	120.9	133.1

Table 4 – post-dev runoff rates

7 Storm water Management facility: Dry Pond

As requested by the Municipality, *a swm Report was to be provided*, which was interpreted as reviewing both the post-development runoff and the pre-development runoff, presumably at all rain events from a 2-year frequency to a 100-year frequency, which was what was calculated.

Due to both the size of the site being fairly small (0.33 acres), and that it was an infill densification of an existing residential lot, a dry pond was selected as a solution. In brief, the function of the dry pond is to remain in essence dry except in a rain event when its storage volume is equivalent to the difference between pre and post development runoff volumes.

Form a review of Tables 3 and 4 the difference in said runoff volumes increases from 42.9 cu m (2-year frequency) to 90.8 cu m (100-year frequency). A simple dry pond based on a trapezoidal prism with side slopes at 1:1 both at the ends and at the sides with a depth of 0.6 m (24 inches) will have sufficient capacity to store the generated runoff onsite as requested with an outlet.

The base of the pond is designed to be 2.5 m in width x 13.5 m in length with side slopes set at 1:1. An outlet, or more specifically a culvert, 110 mm in dia and a slope of 9 % (estimated) will allow the pond to empty after the rain event has passed, while restricting post-development runoff discharge to pre-development rates.

8 Sanitary Design

As requested by the Municipality, *a Servicing Report was to be provided*, which was interpreted as both storm and sanitary sewage design. Based on design drawings prepared by Joshua Van Muyen dated December 18, 2023, which illustrates 6 suites spread over two storeys, the following hydraulic load was calculated:

	Fixture Units
Suite 1	11
Suite 2	11
Suite 3	11
Suite 4	11
Suite 5	11
Suite 6	11
Total FU	**66**

Table 4 - fixture units

From a review of the Ontario Building Code, and more specifically Table 7.4.10.5, a Hydraulic Load of 66 FU corresponds to a maximum probable drainage rate of 45.8 gal/min, or 3.5 L/sec.

A sanitary building sewer of 100 mm dia at a slope of 1.0 % has sufficient capacity to discharge the necessary sewage into the local sanitary sewer.

9 Sediment and Erosion Control Measures

The following sediment and erosion control measures are anticipated for the development noted above and illustrated on the Site Plan:

- Install silt fencing around the applicable areas to minimise transference of debris onto neighbouring properties and streets, and
- Seed or sod exposed soils as soon as possible after construction is complete.

10 Summary:

A request was made by the Municipality of West Grey for a Servicing Report to allow construction of a new two-storey apartment building on an existing infill lot, approximately 0.33 acres in area, in Neustadt.

The sanitary sewer and storm water management proposed solution herein controls post-development runoff for rainfall events with storm frequencies between 2-years and 100-years using MTO IDF data and a synthetic rainfall distribution.

Respectfully submitted February 16, 2024
Wilson-Ford Surveying & Engineering Ltd.

per Greg Ford, P. Eng. (civil), OLS