FEBRUARY 4, 2019

PROJECT NO: 1535-4897

SENT VIA: EMAIL
JVELICK@COLLINGWOOD.CA

Town of Collingwood
545 Tenth Line North
Collingwood, ON, L9Y 3Z5

Attention: John Velick
Manager, Engineering Services

RE: TRAFFIC OPINION LETTER
WYLDEWOOD CREEK
TOWN OF COLLINGWOOD, COUNTY OF SIMCOE

Dear John,

Pursuant to the request for a transportation assessment to support the planning applications for the Wyldewood Creek development, this Traffic Opinion Letter has been prepared.

This study has been prepared to support the Site Plan Application. The main purpose of the study is to complete a signal warrant analysis at the intersection of Highway 26 and Vacation Inn Drive, to determine if signals are warranted under either existing conditions or future total conditions. In addition to the signal warrant analysis, this study also reviews the forecasted trip generation of the proposed development, as well as the operations at the intersection under existing and future total conditions.

The Terms of Reference for the study were confirmed with Town staff, with correspondence included in **Attachment A**.

Site Description and Background

The Subject Lands are approximately 2.56 hectares (6.33 acres) in area and are located on the south side of Highway 26 in the Town of Collingwood, County of Simcoe. The Subject Lands are bounded by the Georgian Bay Hotel and Highway 26 to the north, Cranberry Golf Course to the south and west, and Greentree Gardens and Emporium to the east. The lands currently contain a cell tower, maintenance buildings and an access road connecting to Vacation Inn Drive. The location of the property is illustrated in the Site Location Plan, included as **Figure 1**.

The Subject Lands are currently zoned "Resort Commercial – Exception 4 (C3-4)" in the Town of Collingwood Zoning By-law, and are designated "Resort Commercial", per the Town of Collingwood Official Plan. A Zoning By-law Amendment and Official Plan Amendment Application has been submitted to rezone the southern block as "Residential Fourth Density Exception (R4-E)", and designate the southern block as "High Density Residential Exception". Crozier prepared a high-level Traffic Opinion Letter in July 2018 in support of the Zoning By-law and Official Plan Amendment Application. Relevant excerpts from the Town of Collingwood Zoning By-law and Official Plan have been included as **Attachment B**.

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CROZIER
CONSULTING ENGINEERS

Development Proposal

The Site Plan, included as **Figure 2**, proposes six medium density residential buildings with 168 residential condominium units. The site includes 216 parking spaces and a recreational facility.

A private road is proposed through the site which will be an extension of Vacation Inn Drive. Access to the site would be provided through the Georgian Bay Hotel lands, by way of the existing intersection of Vacation Inn Drive and Highway 26. Paved sidewalks are proposed throughout the site connecting internally to the parking areas as well as the pool.

In addition to the residential development proposed on this portion of the lands, a new hotel building is envisioned in place of the existing mini-putt course located along the north-eastern limits of the property. The new hotel building would have approximately 100 additional rooms. The trips generated by the potential hotel expansion have been accounted for under future conditions to provide a conservative analysis.

Boundary Road Network

Highway 26 is an east-west arterial roadway under the jurisdiction of the Town of Collingwood. The Collingwood Connecting Link agreement for Highway 26 extends from Grey County Road 21 to Poplar Sideroad, spanning the entire length of Highway 26 through Collingwood. The roadway has a posted speed limit of 60 km/h and consists of two 3.7 metre travel and a 3.7 metre two-way centre left-turn lane. An approximate two metre paved shoulder exists on the north and south sides of the roadway. The Vacation Inn Trail exists on the south side of Highway 26, and the Collingwood Transit Crosstown Route has a stop at Vacation Inn Drive.

The internal road network consists of two private roadways, Vacation Inn Drive and Trafalgar Road. Vacation Inn Drive is approximately 7.5 metres wide near the intersection with Highway 26 and narrows to approximately 6.5 metres south through the middle sector of the property, where it services the low-rise condo units. Similarly, Trafalgar Road is approximately 6.5 metres wide, and services the multi-residential buildings along the eastern property line.

The existing intersection of Highway 26 and Vacation Inn Drive is a three-legged stop-controlled intersection, with Vacation Inn Drive forming the minor approach and there are no restrictions to free flow on Highway 26. The west approach consists of a two-way centre left-turn lane, a through lane and a 60-metre eastbound right-turn taper. The east approach consists of a through lane and a two-way centre left-turn lane.

The south approach consists of one shared right/left-turn lane and an entry feature with a 3-metre wide grassed median, containing part of the feature. The median is set-back 15 metres from the eastbound through-lane. North of the entry feature, the lane flares to approximately 9.5 metres, which permits right-turning vehicles to slip past any vehicles queued to make a left-turn. This was verified through video footage, which shows vehicles side-by-side waiting to make their respective right and left-turns.

Traffic Data

Turning movement counts for the intersection of Highway 26 and Vacation Inn Drive were undertaken by Spectrum Traffic Data Inc. from 7 a.m. to 7 p.m. on Friday, November 16, 2018. The traffic count data is summarized in **Attachment C**.

To adjust the traffic volumes for the peak summer driving season, winter average daily traffic (WADT) and summer average daily traffic (SADT) volumes from the MTO "Provincial Highways Traffic Volumes, 1988-2016" for the adjacent segment of Highway 26 were compared, and an average seasonal adjustment factor of 1.43 was calculated. **Attachment D** illustrates the seasonally adjusted volumes.

To complete the signal warrant, the peak eight hours were extracted from the 12-hour count. The eight peak hours identified were 8:00 a.m. to 9:00 a.m. and 11:00 a.m. to 6:00 p.m.

Signalization of Highway 26 and Vacation Inn Drive

Per the Terms of Reference established with Town staff, a signal warrant analysis should be undertaken based on existing traffic volumes to determine the need for traffic control signals. Accordingly, a signal warrant analysis was undertaken for the intersection of Highway 26 and Vacation Inn Drive under 2018 seasonally adjusted existing traffic volume conditions. The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justifications 1 (Minimum Vehicular Volume), 2 (Delay to Cross Traffic) and 3 (Combination of Justifications 1 and 2) were selected as the most appropriate warrants with which to assess the intersections.

The signal warrant utilized the peak eight-hour traffic (8:00 a.m. to 9:00 a.m. and 11:00 a.m. to 6:00 p.m.), as recorded by Spectrum Traffic Data Inc. video footage, with a seasonal factor applied.

This assessment determined that signals are not warranted under 2018 seasonally adjusted existing traffic conditions due to the minimal volumes on the south approach (Vacation Inn Drive). The signal warrant sheet has been included as **Attachment E**.

The requirement for signals under future traffic conditions is analyzed in subsequent sections.

Site Generated Traffic

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also result in additional turning movements at the intersection of Highway 26 and Vacation Inn Drive.

The trip generation for the proposed development was forecasted using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, Land Use Category 221: "Multifamily Housing (Mid-Rise)".

The trip generation for the proposed additional hotel rooms was forecasted using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, Land Use Category 310: "Hotel".

Table 1: Forecasted Trip Generation

Use	Roadway Peak Hour	Weekday Trips		
		Inbound	Outbound	Total
L.U. 221: Multifamily Housing (Mid-Rise) (168 units)	Weekday A.M.	15	45	60
	Weekday P.M.	45	29	74
L.U. 310: Hotel (100 Rooms)	Weekday A.M.	26	19	45
	Weekday P.M.	25	24	49
Total	**Weekday A.M.**	**41**	**64**	**105**
	Weekday P.M.	**70**	**53**	**123**

The trips generated by the proposed development were distributed to the boundary road network based on the travel patterns observed at the intersection of Highway 26 and Vacation Inn Drive over the 12-hour period surveyed. The distributions were similar in both the a.m. and p.m. peak hours, with approximately 70 percent arriving from and departing to the east, and 30 percent arriving from and departing to the west.

This distribution is consistent with the location of employment, retail and service destinations. The Town of Collingwood is a net importer of jobs, and is the site of regional "big box" stores, as well as the majority of services in the regional area. Therefore, the distribution was deemed to be representative of the future trip characteristics of the proposed development, and 70 percent of the trips were judged to arrive from/depart to the east towards Collingwood, and the remaining 30 percent of the trips were judged to arrive from/depart to the west towards the Town of Blue Mountains.

The trips generated by the proposed development were assigned to the boundary road network as per the distribution described above. The trip assignment and resulting peak 8-hour total volumes are tabulated in **Attachment D**.

Future Signal Warrant

The signal warrant analysis requires 8-hour traffic volumes. The trip generation calculations noted above are for the weekday a.m. and p.m. peak hours. Accordingly, each of the eight hours was analyzed to establish what percentage of the peak, within that time period, it represented. This percentage was then applied to the trip assignment.

Under existing conditions, the total volume on all three approaches exceeds the minimum volume requirements to meet Justification 1A, however the northbound volumes on Vacation Inn Drive are far less than the minimum threshold. Accordingly, growth rates were not applied to volumes, as increasing the east-west through traffic would not impact the results of the signal warrant.

Similar to the analysis under existing conditions, the analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justifications 1 (Minimum Vehicular Volume), 2 (Delay to Cross Traffic) and 3 (Combination of Justifications 1 and 2) were selected as the most appropriate warrants with which to assess the intersections.

This assessment determined that signals are not warranted under future traffic conditions due to the minimal volumes on the south approach (Vacation Inn Drive). The signal warrant sheet has been included as **Attachment F**.

It is noted that the minor street volumes only represent 36% of what is required to justify signals. Accordingly, any changes to the plan, including increasing the density in the South Block, would not result in signals being warranted.

Traffic Operations

While signals are not warranted at the study intersection, the operations of the study intersection were analyzed to confirm that the intersection is expected to operate acceptably in the future under stop-controlled conditions. The existing operations were compared with the future operations to establish the expected impact of the proposed development on the boundary road network.

The Level of Service definitions and detailed capacity analysis worksheets are included in **Attachment G**.

Table 2: Existing and Future Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	V/C Ratio
Highway 26 and Vacation Inn Drive	Stop	Existing AM	B	13.3 s	0.04 (NBR)
		Existing PM	B	14.9 s	0.09 (NBR)
		Future AM	B	14.3 s	0.16 (NBR)
		Future PM	C	16.5 s	0.18 (NBR)

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach. i.e. Vacation Inn Drive

As described above, the intersection of Highway 26 and Vacation Inn Drive is expected to operate with very good levels of service in the weekday a.m. and p.m. peak hours under both existing and future total traffic conditions. Accordingly, a traffic signal is not required to support the development from a traffic operations perspective.

Truck Turning Analysis

A truck turning analysis was completed to determine if trucks were able to enter and maneuver through the site without any conflicts to curbs or parking spaces. The analysis was completed for an Aerial Fire Truck and a WB17 Truck entering the site from the north. The analysis indicated that both vehicles could navigate the site without any internal conflicts and without the need to reverse within the site.

The analysis has been included as **Attachment H** for reference.

Conclusions

The analysis contained within this report indicates that signals are not warranted at the intersection of Highway 26 and Vacation Inn Drive. Under future conditions, the volumes on the minor approaches represent 35 percent of what is required to justify signals. Accordingly, any minor changes to the plan will not impact the requirement for signals.

Furthermore, the operations of the intersection of Highway 26 and Vacation Inn Drive under existing and future total conditions are very good. The additional site generated traffic is expected to have a negligible impact on the operations of the study intersection. Accordingly, a traffic signal is not required from a traffic operations perspective.

A truck turning analysis was prepared to demonstrate the vehicle manoeuvring paths of an Aerial Fire Truck and WB17 Truck navigating the site. This analysis demonstrated that both vehicle types can navigate the site without any internal conflicts and without the need to reverse within the site.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

Alexander J. W. Fleming, MBA, P.Eng.
Associate

C.F. CROZIER & ASSOCIATES INC.

M. Ferguson

Madeleine Ferguson, EIT
Transportation

/mf

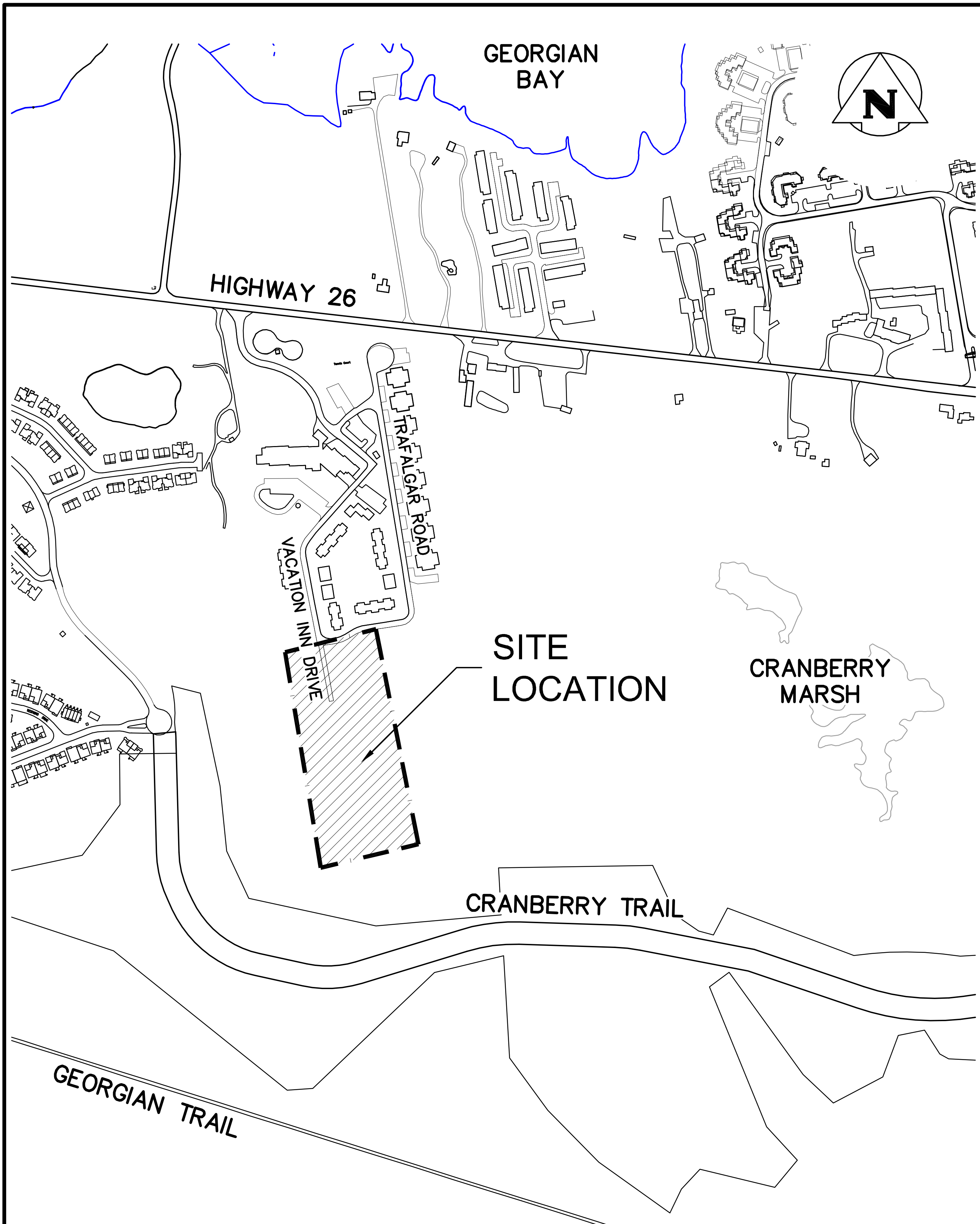
J:\1500\1535-Brandy Lane Corp\4897-Georgian Bay Hotel South Block\Letters\2019.02.04_Traffic Opinion Letter.docx

Encl.

Figure 1 – Site Location Plan
Figure 2 – Site Plan

Attachment A – Correspondence
Attachment B – Town of Collingwood Zoning By-law and Official Plan Excerpts
Attachment C – Turning Movement Counts
Attachment D – Traffic Volume Summary Tables
Attachment E – Existing Conditions Signal Warrant
Attachment F – Future Conditions Signal Warrant
Attachment G – Detailed Capacity Analysis Worksheets
Attachment H – Truck Turning Analysis

FIGURES



Legend	Project	
= SUBJECT LANDS	WYLDEWOOD CREEK TOWN OF COLLINGWOOD	CROZIER CONSULTING ENGINEERS THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA
	Drawing SITE LOCATION	Drawn By L.W. / Design By L.W. / Project 1519–4897 Scale N.T.S. / Date 01/29/2019 / Check By R.A. / Drawing FIG. 1

J:\1500\1535-Brandy Lane Corp\4897-Georgian Bay Hotel South Block\CAD\Civil_Sheets\4897_FIG.1.dwg, FIG. 1, 1/29/2019 12:03:43 PM, lwaters

ALL DRAWINGS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED ON REQUEST.

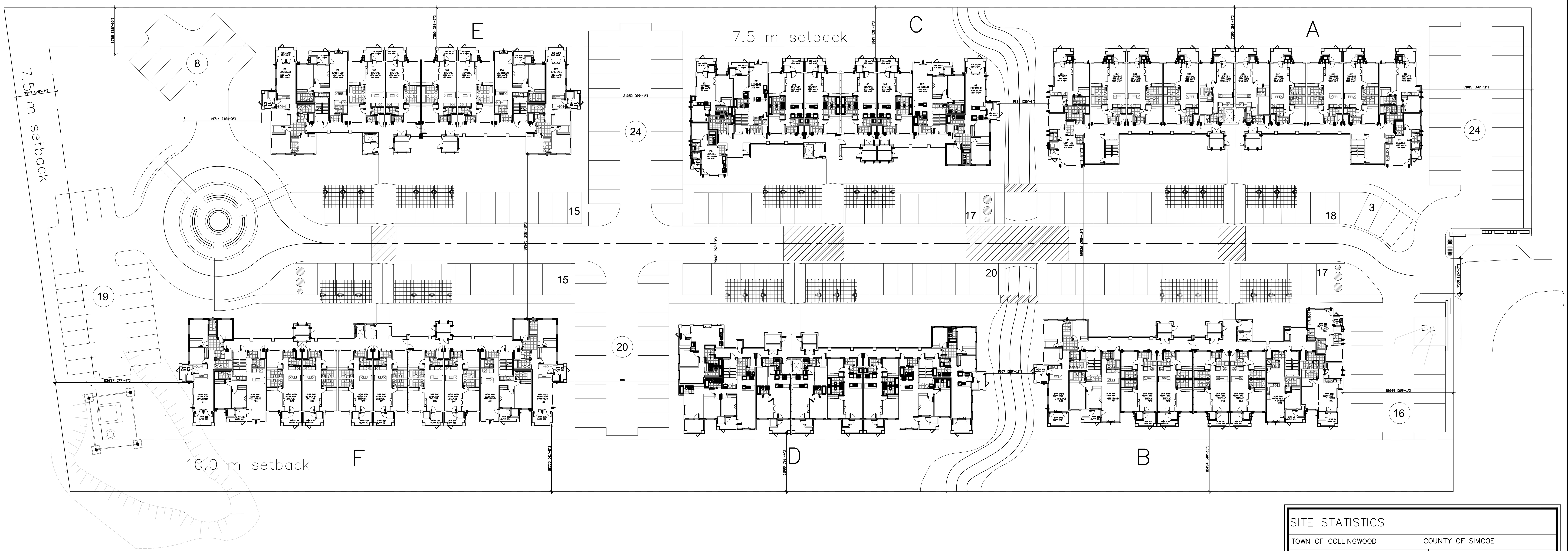
THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND REPORT DISCREPANCIES TO THE ARCHITECT.

ALL DIMENSIONS ARE GIVEN IN MILLIMETRES UNLESS OTHERWISE INDICATED.

DO NOT SCALE DRAWINGS.

REVISIONS AND DISTRIBUTION LOG

No.	Date	Note
1	2019/02/04	ISSUED FOR SITE PLAN APPROVAL
2		
3		
4		
5		
6		
7		
8		



SITE STATISTICS

TOWN OF COLLINGWOOD	COUNTY OF SIMCOE	
	HA	
TOTAL SITE AREA	±2.56 HA	
(NOTE: ALL CALCULATIONS ARE BASED ON TOTAL SITE AREA)		
BUILDING COVERAGE	6,648.54 M2	25.94%
LANDSCAPE AREA	11,402.61 M2	44.49%
PAVED AREA	7,579.15 M2	29.57%
BUILDING HEIGHT	13.18 M	
(FROM FINISHED FRONT GRADE TO HIGHEST ROOF RIDGE)		
NUMBER OF UNITS	168	
BUILDING CODE CLASSIFICATION	GROUP C RESIDENTIAL	
(3 STOREY BUILDING HEIGHT, BUILDING AREA NOT TO EXCEED 600 M2)		
RESIDENT PARKING REQUIRED (1.00 x 168 UNITS) = 168 SPACES		
VISITOR PARKING REQUIRED (0.25 x 168 UNITS) = 42 SPACES		
TOTAL PARKING PROVIDED = 216 SPACES		
MINIMUM PARKING STALL SIZE 2.75M X 6.00M = 16.5 M2		
BARRIER-FREE PARKING STALL SIZE 4.5M X 6.00M = 27 M2		
BICYCLE PARKING REQUIRED = 20 SPACES		
BICYCLE PARKING PROVIDED = 20 SPACES		

1 A100 SITE PLAN
SCALE: 1:300 REF DWG: N/A

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Toronto, Ontario
M5T 3A8
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T 416.506.1600 F 416.506.0956

Seal: ONTARIO ASSOCIATION OF ARCHITECTS
DANIEL L. COWLING
LICENCE
5403

Project:
WYLDEWOOD CREEEK
DESIGN DEVELOPMENT
WYLDEWOOD DEVELOPMENT CORPORATION

COLLINGWOOD ONTARIO

Drawing Title:
SITE PLAN

Drawn By:	Checked By:	Date Checked:	Project No.
	CMV		18A143

Date Plotted:	Scale:
Feb 04, 2019 - 1:15pm	AS NOTED

Drawing No.:	Revision No.:
A100	0

ATTACHMENT A
Correspondence

Madeleine Ferguson

From:	John Velick <jvelick@collingwood.ca>
Sent:	Thursday, November 8, 2018 3:35 PM
To:	Madeleine Ferguson
Cc:	Rebecca Alexander; Alex Fleming; Stuart West
Subject:	RE: Brandy Lane - Signal Warrant (CFC#1535-4897)

Hi Madeleine,

I am ok with the fall count and adding a seasonal adjustment. We do not require anything further from a transportation perspective.

Thank you,

John

John Velick P.Eng.
Manager, Engineering Services

Town of Collingwood
P.O. Box 157, 545 Tenth Line North
Collingwood, ON L9Y 3Z5
705-445-1292 Ext. 4209
jvelick@collingwood.ca | www.collingwood.ca

From: Madeleine Ferguson [mailto:mferguson@cfcrozier.ca]
Sent: Thursday, November 08, 2018 3:10 PM
To: John Velick
Cc: Rebecca Alexander; Alex Fleming
Subject: Brandy Lane - Signal Warrant (CFC#1535-4897)

Hi John,

Thanks for passing on the Highway 26 daily traffic volumes on Tuesday.

I just spoke with Rebecca about Brandy Lane and she mentioned that you said that a signal warrant at the intersection of Highway 26 and Vacation Inn Drive would be acceptable to support the submission. We can complete that analysis and summarize our results in a letter for your review. We're proposing to complete our turning movement counts on a Friday, and then apply a seasonal factor since we're in late autumn/winter now.

I wanted to confirm that this is acceptable, and there wasn't anything else you needed from us from a transportation perspective.

If you wish to discuss further I would be happy to chat over the phone.

Have a good evening,

| **MADELEINE FERGUSON** E.I.T. | C.F. CROZIER & ASSOCIATES
| 40 Huron Street, Suite 301 | Collingwood, ON L9Y 4R3
| cfcrozier.ca | mferguson@cfcrozier.ca | tel 705 446 3510

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&ASSOCIATES
Consulting Engineers

Land development engineering, from the ground up.

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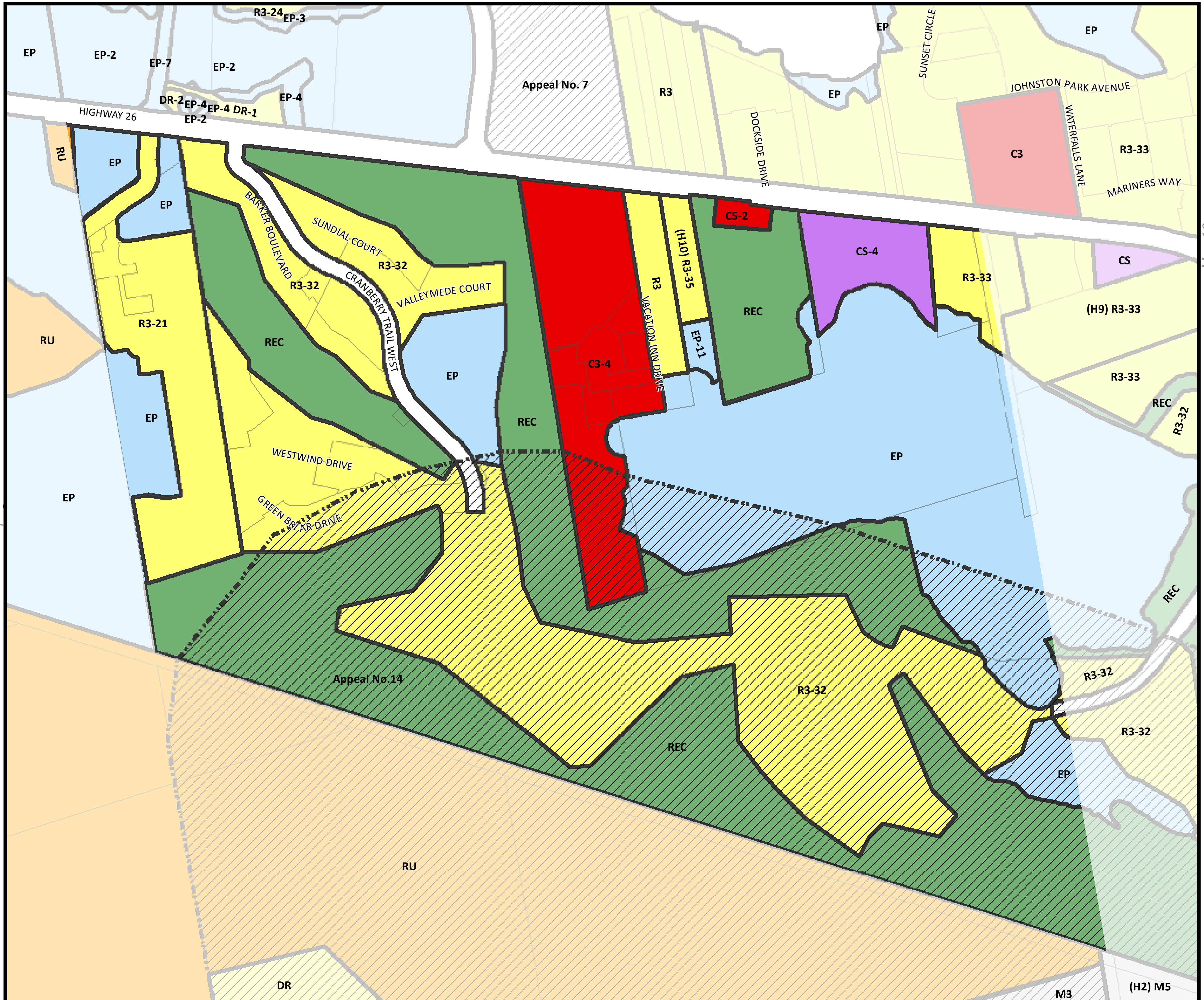
ATTACHMENT B

Town of Collingwood Zoning By-law and Official Plan Amendments

Map 6



Map 2

Map 10

Map 8

Collingwood Zoning By-Law Schedule 'A' - Map 7

REVISIONS

No.	Date	By-law
1	April 8, 2011	OMB Decision- Appeal No.9
2		
3		
4		
5		
6		
7		
8		
9		
10		

1:6000

Metres 0 25 50 100 150 200 250

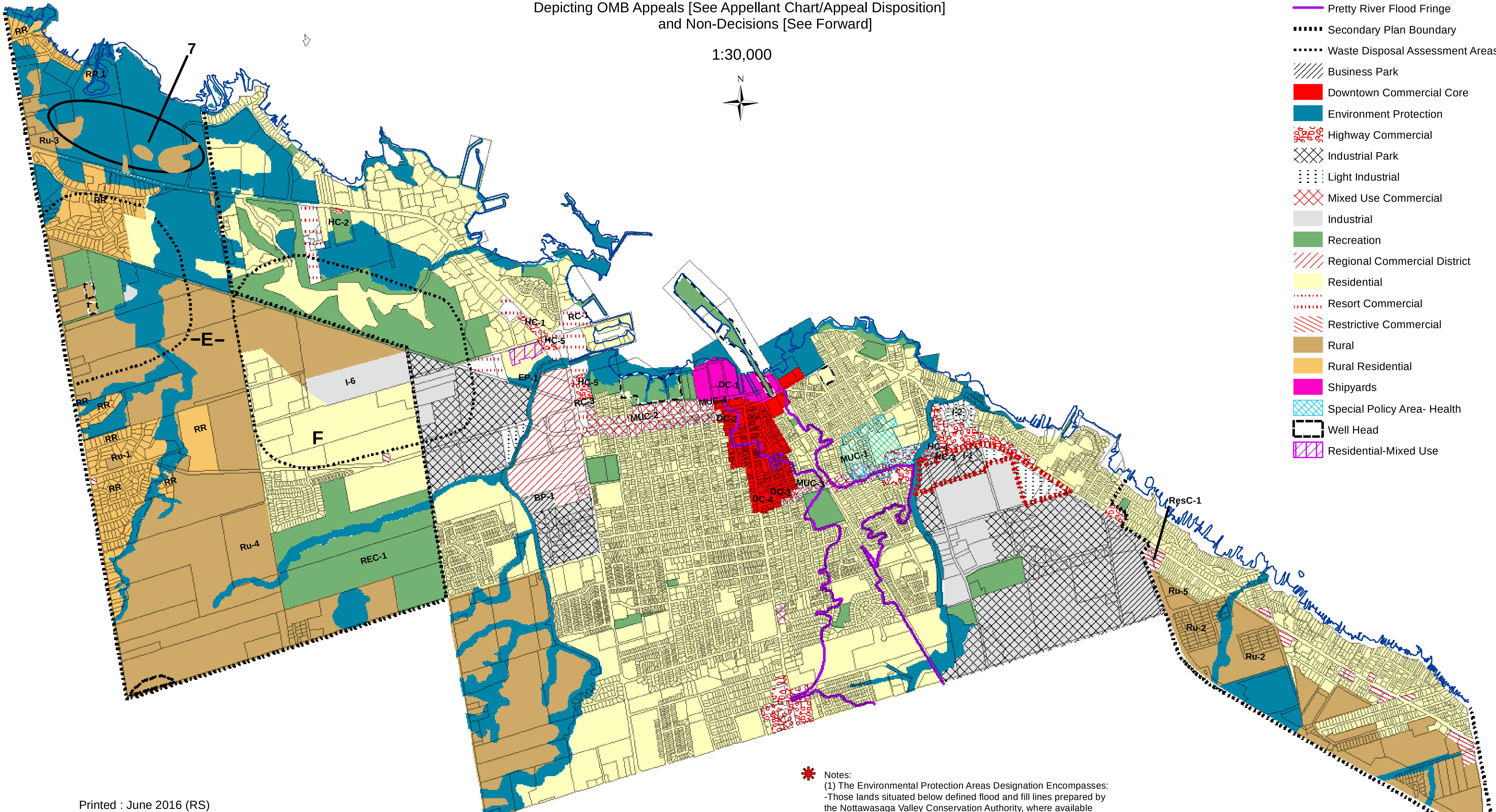
Revised by: RS

Produced by the Town of Collingwood, Planning Services. The information contained herein is believed to be correct, however, the Town assumes no liability for negligence, inaccuracies or omissions. This drawing is not a legal survey.

Official Plan of the Town of Collingwood
SCHEDULE 'A' - Land Use Plan

Depicting OMB Appeals [See Appellant Chart/Appeal Disposition]
and Non-Decisions [See Forward]

1:30,000



Legend

- Industrial Fringe
- Inactive Private Landfill
- Pretty River Flood Fringe
- Secondary Plan Boundary
- Waste Disposal Assessment Areas
- Business Park
- Downtown Commercial Core
- Environment Protection
- Highway Commercial
- Industrial Park
- Light Industrial
- Mixed Use Commercial
- Industrial
- Recreation
- Regional Commercial District
- Residential
- Resort Commercial
- Restrictive Commercial
- Rural
- Rural Residential
- Shipyards
- Special Policy Area- Health
- Well Head
- Residential-Mixed Use

Notes:
(1) The Environmental Protection Areas Designation Encompasses:
-Those lands situated below defined flood and fill lines prepared by the Nottawasaga Valley Conservation Authority, where available
-Category 1 - Natural Heritage Resource Areas as identified on Schedule 'B' to the Official Plan
-Areas derived using a "Top of Bank" approach along certain water courses where flood and/or fill lines are not available
(2) Environmental Protection areas along the Nottawasaga Bay shoreline are shown conceptually
(3) The precise location of the Environmental Protection areas designation shall, in all cases, be determined as development proceeds in consultation with The County of Simcoe (Nottawasaga Valley Conservation Authority) and the Town of Collingwood.

Printed : June 2016 (RS)

ATTACHMENT C

Turning Movement Counts

Turning Movement Count (1 . HWY 26 & VACATION INN DR)

Start Time	E Approach HWY 26					S Approach VACATION INN DR					W Approach HWY 26					Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total		
07:00:00	42	1	0	0	43	4	1	0	0	5	0	66	0	0	66	114	
07:15:00	56	1	0	0	57	1	0	0	0	1	0	63	0	0	63	121	
07:30:00	72	0	0	0	72	5	1	0	0	6	1	80	0	0	81	159	
07:45:00	87	2	0	0	89	6	1	0	0	7	1	99	0	0	100	196	590
08:00:00	72	1	0	0	73	3	0	0	0	3	1	78	0	0	79	155	631
08:15:00	86	2	0	0	88	3	1	0	0	4	2	105	0	0	107	199	709
08:30:00	85	5	0	0	90	2	4	0	0	6	1	86	0	0	87	183	733
08:45:00	88	4	0	0	92	4	2	0	0	6	2	135	0	0	137	235	772
09:00:00	60	4	0	0	64	4	1	0	0	5	1	90	0	0	91	160	777
09:15:00	69	2	0	0	71	5	2	0	0	7	0	86	0	0	86	164	742
09:30:00	64	0	0	0	64	0	0	0	0	0	2	86	0	0	88	152	711
09:45:00	60	4	0	0	64	2	2	0	0	4	0	84	0	0	84	152	628
10:00:00	68	4	0	0	72	1	0	0	0	1	0	84	0	0	84	157	625
10:15:00	62	3	0	0	65	4	0	0	0	4	4	102	0	0	106	175	636
10:30:00	79	1	0	0	80	7	1	0	0	8	3	115	0	0	118	206	690
10:45:00	78	2	0	0	80	3	1	0	0	4	0	108	0	0	108	192	730
11:00:00	69	0	0	0	69	3	0	0	0	3	1	113	0	0	114	186	759
11:15:00	75	4	0	0	79	2	1	0	0	3	1	84	0	0	85	167	751
11:30:00	82	4	0	0	86	6	0	0	0	6	1	116	0	0	117	209	754
11:45:00	94	10	0	0	104	5	4	0	0	9	3	109	0	0	112	225	787
12:00:00	85	5	2	0	92	3	2	0	0	5	2	112	0	0	114	211	812
12:15:00	87	2	0	0	89	2	3	0	0	5	1	101	0	0	102	196	841
12:30:00	99	1	0	0	100	5	2	0	2	7	1	91	0	0	92	199	831

12:45:00	101	6	0	0	107	6	2	0	0	8	0	111	0	0	111	226	832
13:00:00	104	2	0	0	106	1	1	0	0	2	1	119	0	0	120	228	849
13:15:00	104	6	0	0	110	5	2	0	0	7	1	118	0	0	119	236	889
13:30:00	102	4	0	0	106	5	1	0	0	6	2	79	0	0	81	193	883
13:45:00	109	3	0	0	112	2	2	0	0	4	4	98	0	0	102	218	875
14:00:00	104	2	0	0	106	9	4	0	0	13	2	74	0	0	76	195	842
14:15:00	91	5	0	0	96	6	0	0	0	6	5	119	0	0	124	226	832
14:30:00	99	4	0	0	103	5	1	0	0	6	2	127	0	0	129	238	877
14:45:00	95	5	0	0	100	3	2	0	0	5	0	103	0	0	103	208	867
15:00:00	112	5	0	0	117	3	0	0	0	3	0	100	0	0	100	220	892
15:15:00	113	12	0	0	125	2	2	0	0	4	1	114	0	0	115	244	910
15:30:00	132	7	0	0	139	2	3	0	0	5	3	112	0	0	115	259	931
15:45:00	156	7	0	0	163	6	2	1	0	9	3	107	0	0	110	282	1005
16:00:00	151	2	1	0	154	4	1	0	1	5	2	97	0	0	99	258	1043
16:15:00	133	8	0	0	141	9	4	0	1	13	3	96	0	0	99	253	1052
16:30:00	142	3	0	0	145	10	1	0	0	11	4	125	0	0	129	285	1078
16:45:00	148	8	0	0	156	3	6	0	0	9	4	118	0	0	122	287	1083
17:00:00	127	11	0	0	138	3	1	0	0	4	5	118	0	0	123	265	1090
17:15:00	123	10	0	0	133	6	2	0	0	8	8	113	0	0	121	262	1099
17:30:00	118	8	0	0	126	8	1	0	0	9	5	89	0	0	94	229	1043
17:45:00	115	7	0	0	122	3	2	0	0	5	4	103	0	0	107	234	990
18:00:00	104	10	0	0	114	8	1	0	0	9	2	93	0	0	95	218	943
18:15:00	94	12	0	0	106	2	1	0	0	3	3	50	0	0	53	162	843
18:30:00	82	12	0	0	94	0	4	0	0	4	3	52	0	0	55	153	767
18:45:00	75	6	0	0	81	6	0	0	0	6	2	56	0	0	58	145	678
Grand Total	4553	227	3	0	4783	197	75	1	4	273	97	4684	0	0	4781	**9837**	-
Approach%	95.2%	4.7%	0.1%		-	72.2%	27.5%	0.4%		-	2%	98%	0%		-	**-**	-
Totals %	46.3%	2.3%	0%		48.6%	2%	0.8%	0%		2.8%	1%	47.6%	0%		48.6%	**-**	-

Crozier & Associates

, ,

Heavy	181	3	0	-	3	2	0	-	2	163	0	-	-	-
Heavy %	4%	1.3%	0%	-	1.5%	2.7%	0%	-	2.1%	3.5%	0%	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Peak Hour: 04:30 PM - 05:30 PM Weather: Snow (0.1 °C)

Start Time	E Approach HWY 26					S Approach VACATION INN DR					W Approach HWY 26					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	142	3	0	0	145	10	1	0	0	11	4	125	0	0	129	285
16:45:00	148	8	0	0	156	3	6	0	0	9	4	118	0	0	122	287
17:00:00	127	11	0	0	138	3	1	0	0	4	5	118	0	0	123	265
17:15:00	123	10	0	0	133	6	2	0	0	8	8	113	0	0	121	262
Grand Total	540	32	0	0	572	22	10	0	0	32	21	474	0	0	495	**1099**
Approach%	94.4%	5.6%	0%		-	68.8%	31.3%	0%		-	4.2%	95.8%	0%		-	-
Totals %	49.1%	2.9%	0%		52%	2%	0.9%	0%		2.9%	1.9%	43.1%	0%		45%	-
PHF	0.91	0.73	0		0.92	0.55	0.42	0		0.73	0.66	0.95	0		0.96	-
Heavy	3	0	0		3	0	0	0		0	0	9	0		9	-
Heavy %	0.6%	0%	0%		0.5%	0%	0%	0%		0%	0%	1.9%	0%		1.8%	-
Lights	537	32	0		569	22	10	0		32	21	465	0		486	-
Lights %	99.4%	100%	0%		99.5%	100%	100%	0%		100%	100%	98.1%	0%		98.2%	-
Single-Unit Trucks	1	0	0		1	0	0	0		0	0	7	0		7	-
Single-Unit Trucks %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	1.5%	0%		1.4%	-
Buses	1	0	0		1	0	0	0		0	0	1	0		1	-
Buses %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0.2%	0%		0.2%	-
Articulated Trucks	1	0	0		1	0	0	0		0	0	1	0		1	-
Articulated Trucks %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0.2%	0%		0.2%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

ATTACHMENT D
Traffic Volume Summary Tables

Vacation Inn Drive and Highway 26
Traffic Volume Summary Tables

Existing Conditions								
Hour Ending	Eastbound		Northbound		Westbound		Total	% of Peak
	Th	RT	LT	RT	LT	Th		
8:00	440	3	4	23	6	368	844	75%
9:00	578	9	10	17	17	473	1104	98%
10:00	495	4	7	16	14	362	898	80%
11:00	585	10	3	21	14	410	1044	93%
12:00	603	9	7	23	26	458	1125	100%
13:00	593	6	13	23	20	532	1187	77%
14:00	592	11	9	19	21	599	1251	81%
15:00	605	13	10	33	23	556	1240	80%
16:00	619	10	10	19	44	734	1436	93%
17:00	623	19	17	37	30	821	1547	100%
18:00	605	31	9	29	51	691	1416	91%
19:00	359	14	9	23	57	508	970	63%

Trip Assignment						
Hour Ending	Eastbound		Northbound		Westbound	
	Th	RT	LT	RT	LT	Th
8:00	0	9	15	34	22	0
9:00	0	12	19	45	29	0
10:00	0	10	16	36	24	0
11:00	0	12	18	42	27	0
12:00	0	12	19	45	29	0
13:00	0	17	13	29	38	0
14:00	0	17	13	30	40	0
15:00	0	17	13	30	40	0
16:00	0	20	15	35	46	0
17:00	0	21	16	37	49	0
18:00	0	20	15	34	45	0
19:00	0	14	11	24	31	0

Future Conditions							
Hour Ending	Eastbound		Northbound		Westbound		Total
	Th	RT	LT	RT	LT	Th	
8:00	440	12	19	57	28	368	924
9:00	578	21	29	62	46	473	1209
10:00	495	14	23	52	38	362	984
11:00	585	22	21	63	41	410	1143
12:00	603	21	26	68	55	458	1230
13:00	593	23	26	52	58	532	1284
14:00	592	28	22	49	61	599	1351
15:00	605	30	23	63	63	556	1340
16:00	619	30	25	54	90	734	1552
17:00	623	40	33	74	79	821	1670
18:00	605	51	24	63	96	691	1530
19:00	359	28	20	47	88	508	1050

ATTACHMENT E

Existing Conditions Signal Warrant

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Highway 26 and Vacation Inn Drive

What is the direction of the Main Road street? East-West

When was the data collected? 2018

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban   **Population >= 10,000   AND   Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
9:00	0	578	9	10	0	17	17	473	0	0	0	0	0
12:00	0	603	9	7	0	23	26	458	0	0	0	0	0
13:00	0	593	6	13	0	23	20	532	0	0	0	0	0
14:00	0	592	11	9	0	19	21	599	0	0	0	0	0
15:00	0	605	13	10	0	33	23	556	0	0	0	0	0
16:00	0	619	10	10	0	19	44	734	0	0	0	0	0
17:00	0	623	19	17	0	37	30	821	0	0	0	0	0
18:00	0	605	31	9	0	29	51	691	0	0	0	0	0
Total	**0**	**4,819**	**107**	**84**	**0**	**199**	**233**	**4,863**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

***** Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									0

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Highway 26 and Vacation Inn Drive

Count Date: 2018

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	9:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00		
1A	480	720	600	900	1,104	1,125	1,187	1,251	1,240	1,436	1,547	1,416		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	180	255	180	255	27	30	36	27	43	29	54	37		
	COMPLIANCE %				11	12	14	11	17	11	21	15	111	14

Restricted Flow Signal Justification 1:			
	Both 1A and 1B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
	Lesser of 1A or 1B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	9:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00		
2A	480	720	600	900	1,077	1,095	1,151	1,224	1,197	1,407	1,493	1,379		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
2B	50	75	50	75	10	7	13	9	10	10	17	9		
	COMPLIANCE %				13	10	17	11	13	13	23	11	112	14

Restricted Flow Signal Justification 2:			
	Both 2A and 2B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
	Lesser of 2A or 2B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	14:00	1,224	27	80	34 %	46 %
	16:00	1,407	29	80	36 %	
	17:00	1,493	54	80	68 %	
	18:00	1,379	37	80	46 %	

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

Intersection: Highway 26 and Vacation Inn Drive

Count Date: 2018

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	14	%		
2. Delay to Cross Traffic	A	Main Road	100	%	☐	☑
	B	Crossing Road	14	%		
3. Combination	A	Justificaton 1	14	%	☐	☑
	B	Justification 2	14	%		
4. 4-Hr Volume			46	%	☐	☑

5. Collision Experience			0	%	☐	☑

6. Pedestrians	A	Volume	Justification met	☐	☑
	B	Delay	Justification not met		

ATTACHMENT F

Future Conditions Signal Warrant

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Highway 26 and Vacation Inn Drive

What is the direction of the Main Road street? East-West

When was the data collected? Future Warrant

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
9:00	0	578	21	29	0	62	46	473	0	0	0	0	0
12:00	0	603	21	26	0	68	55	458	0	0	0	0	0
13:00	0	593	23	26	0	52	58	532	0	0	0	0	0
14:00	0	592	28	22	0	49	61	599	0	0	0	0	0
15:00	0	605	30	23	0	63	63	556	0	0	0	0	0
16:00	0	619	30	25	0	54	90	734	0	0	0	0	0
17:00	0	623	40	33	0	74	79	821	0	0	0	0	0
18:00	0	605	51	24	0	63	96	691	0	0	0	0	0
Total	**0**	**4,819**	**243**	**207**	**0**	**484**	**549**	**4,863**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

***** Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									0

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 26 and Vacation Inn Drive

Count Date: Future Warrant

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	9:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00		
1A	480	720	600	900	1,209	1,230	1,284	1,351	1,340	1,552	1,670	1,530		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	180	255	180	255	91	94	78	70	86	79	107	86		
	COMPLIANCE %				36	37	30	28	34	31	42	34	271	34

Restricted Flow Signal Justification 1:			
	Both 1A and 1B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
	Lesser of 1A or 1B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	9:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00		
2A	480	720	600	900	1,118	1,136	1,206	1,281	1,254	1,473	1,563	1,444		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
2B	50	75	50	75	29	26	26	22	23	25	33	24		
	COMPLIANCE %				39	35	34	29	31	33	44	31	276	35

Restricted Flow Signal Justification 2:			
	Both 2A and 2B 100% Fullfilled each of 8 hours	Yes ☐	No ☑
	Lesser of 2A or 2B at least 80% fulfilled each of 8 hours	Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	14:00	1,281	70	80	88 %	96 %
	16:00	1,473	79	80	98 %	
	17:00	1,563	107	80	100 %	
	18:00	1,444	86	80	100 %	

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

Intersection: Highway 26 and Vacation Inn Drive   Count Date: Future Warrant

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	34	%		
2. Delay to Cross Traffic	A	Main Road	100	%	☐	☑
	B	Crossing Road	35	%		
3. Combination	A	Justificaton 1	34	%	☐	☑
	B	Justification 2	35	%		
4. 4-Hr Volume			96	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

ATTACHMENT G
Detailed Capacity Analysis Worksheets

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	603	9	17	473	10	17
Future Volume (Veh/h)	603	9	17	473	10	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	655	10	18	514	11	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			665		1205	655
vC1, stage 1 conf vol					655	
vC2, stage 2 conf vol					550	
vCu, unblocked vol			665		1205	655
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		97	96
cM capacity (veh/h)			934		419	470

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	655	10	18	514	11	18
Volume Left	0	0	18	0	11	0
Volume Right	0	10	0	0	0	18
cSH	1700	1700	934	1700	419	470
Volume to Capacity	0.39	0.01	0.02	0.30	0.03	0.04
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.6	0.9
Control Delay (s)	0.0	0.0	8.9	0.0	13.8	13.0
Lane LOS			A		B	B
Approach Delay (s)	0.0		0.3		13.3	
Approach LOS					B	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	623	19	30	821	17	37
Future Volume (Veh/h)	623	19	30	821	17	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	677	21	33	892	18	40
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			698		1635	677
vC1, stage 1 conf vol					677	
vC2, stage 2 conf vol					958	
vCu, unblocked vol			698		1635	677
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		94	91
cM capacity (veh/h)			908		304	456

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	677	21	33	892	18	40
Volume Left	0	0	33	0	18	0
Volume Right	0	21	0	0	0	40
cSH	1700	1700	908	1700	304	456
Volume to Capacity	0.40	0.01	0.04	0.52	0.06	0.09
Queue Length 95th (m)	0.0	0.0	0.9	0.0	1.4	2.2
Control Delay (s)	0.0	0.0	9.1	0.0	17.6	13.6
Lane LOS			A		C	B
Approach Delay (s)	0.0		0.3		14.9	
Approach LOS					B	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	603	21	55	458	26	68
Future Volume (Veh/h)	603	21	55	458	26	68
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	655	23	60	498	28	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			678		1273	655
vC1, stage 1 conf vol					655	
vC2, stage 2 conf vol					618	
vCu, unblocked vol			678		1273	655
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			94		93	84
cM capacity (veh/h)			923		391	470

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	655	23	60	498	28	74
Volume Left	0	0	60	0	28	0
Volume Right	0	23	0	0	0	74
cSH	1700	1700	923	1700	391	470
Volume to Capacity	0.39	0.01	0.06	0.29	0.07	0.16
Queue Length 95th (m)	0.0	0.0	1.6	0.0	1.8	4.2
Control Delay (s)	0.0	0.0	9.2	0.0	14.9	14.1
Lane LOS			A		B	B
Approach Delay (s)	0.0		1.0		14.3	
Approach LOS					B	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	623	40	79	821	33	74
Future Volume (Veh/h)	623	40	79	821	33	74
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	677	43	86	892	36	80
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			720		1741	677
vC1, stage 1 conf vol					677	
vC2, stage 2 conf vol					1064	
vCu, unblocked vol			720		1741	677
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			90		86	82
cM capacity (veh/h)			891		264	456

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	677	43	86	892	36	80
Volume Left	0	0	86	0	36	0
Volume Right	0	43	0	0	0	80
cSH	1700	1700	891	1700	264	456
Volume to Capacity	0.40	0.03	0.10	0.52	0.14	0.18
Queue Length 95th (m)	0.0	0.0	2.4	0.0	3.5	4.8
Control Delay (s)	0.0	0.0	9.5	0.0	20.8	14.6
Lane LOS			A		C	B
Approach Delay (s)	0.0		0.8		16.5	
Approach LOS					C	

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

ATTACHMENT H

Truck Turning Analysis

AERIAL FIRE TRUCK MOVEMENT

WB-17 TRACTOR TRAILER MOVEMENT

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4. DO NOT SCALE THE DRAWINGS.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

BENCHMARKS

ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE RELATED TO TOWN OF COLLINGWOOD BENCH MARK NO. 00172U311 HAVING AN ELEVATION OF 181.032 METRES.

TOPOGRAPHIC SURVEY COMPLETED BY KRCMAR SURVEYORS LTD., DATED AUGUST 25, 2018.

Town

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR 1st ENGINEERING SUBMISSION	02/04/2019

Engineer

Engineer

DRAFT
FOR DISCUSSION PURPOSES ONLY

Project
WYLDEWOOD CREEK
TOWN OF COLLINGWOOD

Drawing
TURNING MOVEMENT PLAN

CROZIER
CONSULTING ENGINEERS

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