APPENDIX K

Intersection Assessment

Memo

To: Don Kudo, Wellington County

From: Maria King, Dillon Consulting Limited

cc: Dennis Kar, Paul Bumstead, Dillon Consulting Limited

Date: August 3, 2021

Subject: Wellington County Road Master Action Plan - Intersection Assessment

Our File: 20-3297

As a component of the Wellington County Road Master Action Plan (RMAP), Dillon Consulting Limited (Dillon) was retained by the County to review a total of 22 intersections to determine potential solutions to identified safety and operational issues. The intersection locations were selected based on input from County staff, councillors and through public consultation from the initial RMAP engagement exercise. The locations of these intersections are identified in Figure 1.

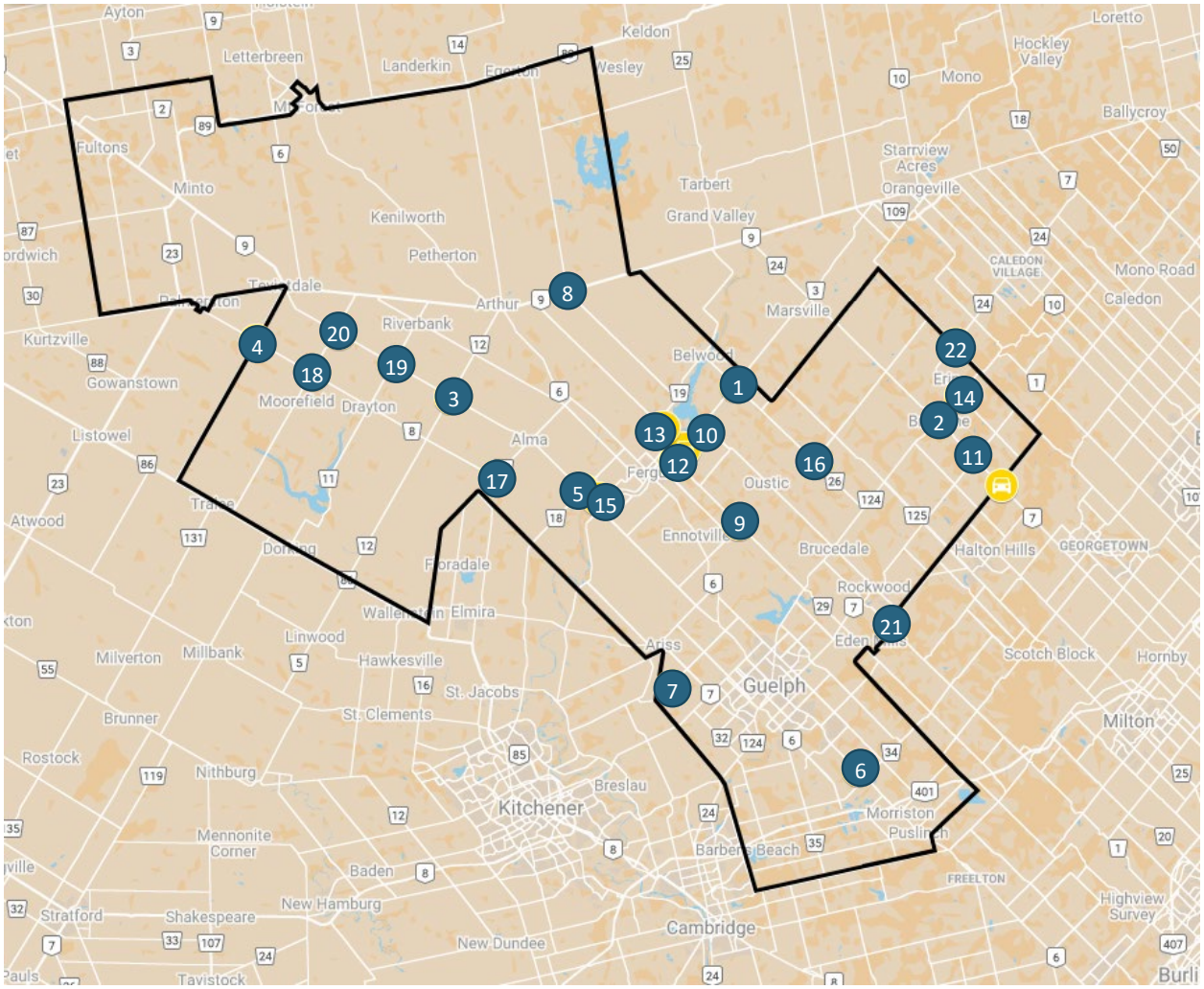

Figure 1: Locations of assessed intersections.

The review followed the process and methodology outlined in County's Data Driven Safety Strategy, which is aligned with Transportation Association of Canada's (TAC*) Guide to In-Service Road Safety Reviews* (2004). This included a review of the geometric, operational and collision records at each of the 22 locations. Where operational and/or safety issues could not readily be identified for a particular intersection based on available data, then a site visit was conducted to observe site conditions and operations. Table 1 provides an overview of the studied intersections, the identified safety and operational concerns, alternative solutions that were considered, and the preliminary preferred solution for each location. For intersections where traffic operational issues were identified, the study team considered implementation of either traffic signals or a roundabout, with the preferred solution taking into consideration factors such as construction cost, property impacts and ability to address other safety issues. For locations where alignment or sight distances were the predominant issues, considered solutions included addition of traffic control, roundabouts and realignment of the intersection approaches. More detailed information regarding the identified issues and the evaluation processes is provided for each intersection in **Appendix A**.

The total estimated capital cost associated with the recommended solutions is $19,160,000, not including costs associated with design, property acquisition, operations and/or maintenance. During a subsequent portion of the RMAP study, the recommended solutions will be prioritized and aligned with available funding in order to develop a financially feasible strategy to complete the recommended improvements.

Table 1: Overview of Intersection Assessments.

Location Description			Identified Concerns					Solutions Considered					Recommended Solution	Rationale for Recommendations[1]
#	Major Road	Minor Road	Traffic Ops	Upward Trend in Collisions	Speed	Geo-metry	Sight Distance	All-Way Stop Control	Traffic Signals	Round-about	Realign - ment	Other		
1	WR18	WR26	X		X				X	X			• Install single lane roundabout • Estimated value of $1,640,000 + property acquisition	• A roundabout has already been proposed by the County
2	WR124	WR24		X	X		X					X	• Conduct movement study • Adjust traffic signal timing • Review snow clearing operations	• Adjusting signal timing could potentially improve traffic operations (queues observed)
3	WR7	WR12	X	X					X	X			• Install single lane roundabout • Estimated value of $1,640,000 + property acquisition	• A roundabout has already been proposed by the County
4	WR8	WR9		X		X				X	X		• Install single lane roundabout • Estimated value of $1,640,000 + property acquisition	• The cost associated with the alternative solutions (realignment of approximately 500 m of WR8) was significantly higher than installing a roundabout
5	WR7	WR18	X						X	X			• Install single lane roundabout • Estimated value of $1,640,000 + property acquisition	• A roundabout has already been proposed by the County
6	WR46	Fox Run Bridle Path							X	X		X	• No data to warrant improvements	• N/A

[1] Refer to the appropriate document in Appendix A for more detailed information pertaining to the evaluation process.

Location Description			Identified Concerns					Solutions Considered					Recommended Solution	Rationale for Recommendations[1]
#	Major Road	Minor Road	Traffic Ops	Upward Trend in Collisions	Speed	Geo-metry	Sight Distance	All-Way Stop Control	Traffic Signals	Round-about	Realign - ment	Other		
7	WR30	Township Road 3		X	X	X		X		X			• Install single lane roundabout • Installation of guiderail to also be considered • Estimated value of $1,640,000	• Roundabout would address visibility, speeding and left turn capacity issues
8	WR16	WR109		X	X	X		X		X	X		• Realign approximately 400 m of WR16 in proximity to the intersection • Estimated value of $1,680,000 + property acquisition	• In the absence of more detailed traffic modelling, imbalanced traffic volumes at the intersection have been assumed to make a roundabout an infeasible solution for this location • As such, realignment has been recommended
9	WR22	WR29		X	X	X	X	X		X	X		• Adjust vertical profile WR22 or realign WR29 • Estimated value of $1,680,000 + property acquisition • In the interim, install all-way stop control and advanced signage to address sight distance issues	• Recommended solution will address sight distance issues • Due to close proximity of adjacent buildings, a roundabout was not considered to be a feasible solution
10	WR18	WR29	X				X		X	X			• Install traffic signals • Add left turn lane along WR18 • Install guiderail • Estimated value of $385,000	• Due to physical constraints imposed by the proximity of the Eramosa River, installation of a roundabout is not considered a feasible solution

Location Description			Identified Concerns					Solutions Considered					Recommended Solution	Rationale for Recommendations[1]
#	Major Road	Minor Road	Traffic Ops	Upward Trend in Collisions	Speed	Geo-metry	Sight Distance	All-Way Stop Control	Traffic Signals	Round-about	Realign - ment	Other		
11	WR24	WR42	X				X		X	X			• Install traffic signals • Add left turn lanes along WR24 • Estimated value of $540,000	• Installation of traffic signals and left turn lanes would address traffic operations and sight distances issues • Installation of roundabout is not feasible due to heritage property adjacent to the intersection
12	WR18	2 Line		X		X	X	X	X	X	X		• Install single lane roundabout • Estimated value of $1,640,000 + property acquisition	• Installation of roundabout would address operating speeds and sight distances issues • Realignment is not feasible due to close proximity of residential properties
13	WR19	2 Line		X			X	X		X			• Install single lane roundabout • Installation of guiderail to also be considered • Estimated value of $1,640,000 + property acquisition	• A roundabout could be used to address the alignment issue • Realignment is not feasible due to close proximity of residential properties
14	WR52	Ninth Line				X	X	X					• Remove right turn channel and painted island • Convert to all-way stop control • Estimated value of $40,000	• Current right turn channel design allows vehicles to approach adjacent intersections with limited visibility
15	WR18 (Geddes Street)	David Street		X			X	X					• Convert intersection to all-way stop control • Estimated value of $5,000	• All-way stop control could address the sight distances issue associated with existing vegetation without impacting the character of the area

Location Description			Identified Concerns					Solutions Considered					Recommended Solution	Rationale for Recommendations[1]
#	Major Road	Minor Road	Traffic Ops	Upward Trend in Collisions	Speed	Geo-metry	Sight Distance	All-Way Stop Control	Traffic Signals	Round-about	Realign - ment	Other		
16	WR22 (East)	WR26		X	X			X		X		X	• Add northbound right and southbound left auxiliary lanes • Estimated value of $330,000 + property acquisition	• Auxiliary lane installation to address the collision trend is less than the cost of installing a roundabout
17	WR8	WR17	X	X	X		X		X	X	X		• Install traffic signals • Add an eastbound left turn lane and westbound right turn lane along WR8 • Estimated value of $700,000	• Installation of traffic signals and turn lanes would provide additional traffic control and speed management • A roundabout was not considered due to the steep profile of the intersection
18	WR8	WR10		X		X	X	X			X		• In the interim, convert intersection to all-way stop control with advanced signage and an overhead beacon • Ultimate correction of vertical profile • Interim measures estimated at $8,000, ultimate solution estimated value of $1,268,000	• All-way stop control will alleviate issues associated with sight distances until budget is available to correct the profile
19	WR7	WR11	X	X	X	X			X	X			• Install traffic signals • Estimated cost of $210,000 (not including auxiliary lanes)	• Installation of traffic signals would address the need for additional traffic control and speed management • A roundabout was not considered due to the impacts on adjacent residential properties

Location Description			Identified Concerns					Solutions Considered					Recommended Solution	Rationale for Recommendations[1]
#	Major Road	Minor Road	Traffic Ops	Upward Trend in Collisions	Speed	Geo-metry	Sight Distance	All-Way Stop Control	Traffic Signals	Round-about	Realign - ment	Other		
20	WR7	WR10				X	X	X				X	• Convert intersection to all-way stop control with advanced signage • Increase curb radii and replace pedestrian pads in each quadrant • Estimated value of $20,000	• All-way stop control is considered an acceptable solution to address the lack of adequate sight distances in this low speed environment and is significantly cheaper than road realignment
21	WR44	Eramosa-Milton Townline		X			X			X		X	• Add enhanced pavement markings and signage on approach to the intersection. • Add left turn lanes • Install guiderail • Estimated value of $280,000	• Installation of left turn lanes would address lane warrant and partially mitigate collision trends • A roundabout is not recommended due to the proximity of existing residential properties
22	WR25	WR124	X		X				X	X			• Install traffic signals • Add left turn lanes along WR124 • Regrade ditches • Estimated value of $540,000	• Installation of traffic signals and left turn lanes would provide additional traffic control • A roundabout is not recommended due adjacent natural heritage constraints.

APPENDIX K-1

DETAILED INTERSECTION EVALUATION PACKAGES

Intersection Assessment

Intersection Location:	Wellington County Road 18 & Wellington Road 26 (Intersection 1)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area dated January 2021 were downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on September 29, 2020; and
- As-built drawing produced by Duncan Hopper & Associates Ltd.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 18

Detail	Existing Condition
Primary Direction	East - West
County Road #	Wellington County Road 18
Local Name	N/A
Jurisdiction	Centre Wellington
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington County Road 26

Detail	Existing Condition
Primary Direction	North - South
County Road #	Wellington Road 26
Local Name	N/A
Jurisdiction	Centre Wellington
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway using stop signs with flashing beacons. 4-way flashing beacon over intersection.
Existing Auxiliary Lanes	Right turn lanes along WR#18
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 1&3)
Left Turn Lane Warrant	Northbound	No
	Southbound	No
	Eastbound	Yes – 15 m Storage
	Westbound	Yes – 15 m Storage

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. As indicated in **Figure 1**, the junction of WR 26 and WR 18 is a four-way intersection with perpendicular alignments. The horizontal alignments of both roadways are linear within several hundred meters of the intersection, and therefore no horizontal alignment issues were identified.

The provided as-built drawing for the northbound approach of WR 26 was reviewed to determine if it would be indicative of any potential issues with the vertical design of the intersection. No issues were identified based on the as-builts. However, due to grade changes in WR 26 either side of WR 18, there are unclear sightlines across the intersection as drivers approach from the north. This is not considered an issue due to stop control on both WR 26 approaches; however, this should be investigated further if signals are to be installed at this intersection.

There are no apparent vertical design issues on WR 18.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Figures 2** and **3** in **Appendix A1**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3** and illustrated in **Figure 5**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Rd 18	2,392	80	8.0-9.0
Wellington Rd 26	5,155	80	8.0-9.0

Identified Hazards

No hazards were identified within the clear zone.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are four intersection related collisions per year at this location. Collisions during the analysis period remain relatively stable. The primary cause(s) of collisions at this location are "Failure to Yield" (T-bone) at 54% of

the collisions, followed by "Following Too Closely" and "Other Causes" at 11% each. There were no fatal collisions at this intersection during the period; however analysis reveals 29% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit sites S2603 (WR 26 a Sideroad 10) indicate an 85th percentile operating speed on WR 26 of 96 km/h, which exceeds the posted speed limit on that corridor by more than 15 km/h. Similar data was not available for WR 18.

PUBLIC CONCERNS

"Difficult intersection. It needs more than a flashing red light. People get impatient."

"This intersection has been a problem for years. As the owner of the land on the northwest corner of this intersection for over 60 years we welcome the proposed roundabout. However the painted passing lane lines on CR 18 all the way through the intersection should have been changed years ago."

"Several accidents at this corner. Would benefit from a roundabout to allow for a better flow of traffic."

"Too many accidents at this intersection."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Traffic operations;
- Majority of collisions are related to "Failure to Yield"; and
- Operating speeds.

In order to address the need for additional traffic control and speed management, implementation of either a roundabout or traffic signals with left turn lanes on WR18 was considered for this intersection.

Estimated construction costs are as follows:

- Single lane roundabout - $1,640,000[1]; and
- Traffic signals plus widening for auxiliary lanes - $540,000[2].

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.
[2] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency.

Both solutions would function equally well at this location. In this case, a roundabout has already been proposed by the County. As such, a recommendation is being made to proceed with the proposed roundabout.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Install single lane roundabout at this intersection.

Estimated construction cost of $1,640,000.

ADDITIONAL NOTES:

Potentially designated heritage building in the southwest quadrant of the intersection.

Intersection Assessment

Intersection Location:	Wellington Road 24 & Wellington Road 124 (Intersection 2)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- As-built drawings (plan only) by Reid and Associated Limited, March 1991; and
- An on-site review of the intersection took place on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 124

Detail	Existing Condition
Primary Direction	East-West
County Road #	124
Local Name	County Road 124
Jurisdiction	Erin
Posted Speed (km/h)	60
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Curb and Gutter with Inlets to Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	1.8 m asphalt sidewalk at NW quadrant with concrete sidewalk ramps at all corners

Minor Roadway: Wellington Road 24 (Trafalgar Road)

Detail	Existing Condition
Primary Direction	North-South
County Road #	24
Local Name	Trafalgar Road
Jurisdiction	Erin
Posted Speed (km/h)	60
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Curb and Gutter with Inlets to Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	1.8 m gravel path at SE quadrant with concrete sidewalk ramps at all corners

Intersection Design

Detail	Condition
Existing Traffic Control Type	4-way intersection with traffic signals
Existing Auxiliary Lanes	WR#24 contains right turn lanes, and WR#124 contains both right and left turn lanes
Intersection Lighting	Yes

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic data was not available for this intersection; however, there are existing traffic signals at this location.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Both roadways are linear within several hundred meters of the intersection, and intersect at approximately 90 degrees. There are no concerns in terms of the horizontal

design of the intersection. There are impact markings on face of curb returns and major concrete cracking on northwest sidewalk ramp. The markings on the curbs may indicate that the intersection was not adequately designed to accommodate large design vehicles.

No as-built information was made available that included vertical alignment information. However, all approaches are fairly flat with no anticipated impacts to sight distances.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A2**.

Table 1: Outcome of Sight Distance Review

	Sight Distance Criteria	Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	130	No
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	145	Potential Issues Depending on Snow Clearing
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	125	No
Minor Road	Minimum Stopping Sight Distance	130	No
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	145	No
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	125	No

No major deficiencies were identified based on the sight distance analysis completed as a component of this study. Depending on snow accumulations along the shoulder, however, there could be sight distance issues for vehicles turning “Right on Red” from WR124.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, stand-alone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the ‘clear zone’, and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Rd 24	7,076	60	6.0 – 6.5
Wellington Rd 124	Assumed 1,500 – 6,000	60	5.0 – 5.5

Identified Hazards

No hazards were identified.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are "Inattentive Driver" at 30% of the collisions followed by "Fail to Yield" and "Follow Too Closely" at 20% each. There were no fatal collisions at this intersection during the period though analysis reveals 30% of collisions at this location result in personal injury.

Operating Speeds

The Wellington Road 124 corridor was assessed within the speed management portion of the Road Master Action Plan. As part of that review, it was recommended that the posted speed limit on Wellington Road 124 to the east and west of Wellington Road 24 would be increased from 60 km/h to 70 km/h.

PUBLIC CONCERNS

"There is a need for a smart stop sign and a red light camera."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Collision history.

There is no evident data to quantify the anticipated cause of the upward trend in the number of collisions at this intersection. As a result, a sight visit was conducted to this location to determine if there were issues that would not be apparent based on available data. During this sight visit, it was identified that vehicles were often queued for a significant time at red lights when there was little to no traffic in the perpendicular direction. Based on collision records and observed behaviours, it has been inferred that the issues at this intersection are likely the result of drivers speeding on approach to the intersection

(impacting safety of making left turns or ability to stop if coming up behind a stopped vehicle) or drivers becoming impatient due to improperly timed signals. As vehicle detection loops have already been installed at this intersection, the County should consider signal timing adjustments. The County should continue to monitor the situation at this location and collect additional data to either provide warrant for additional modifications, or confirm that the issues have been addressed through the recommended changes.

Additionally, the County may wish to consider access management to the adjacent Petro-Canada Gas Station along the north leg of the intersection.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Conduct a movement study;
- Adjust signal timing on County Road 124; and
- Review snow clear operations.

The County should continue to monitor the situation at this location and collect additional data to either provide warrant for additional modifications, or confirm that the issues have been addressed through the recommended changes. Additional consideration should be given to closing or restricting (right-in/right-out only) access to the Petro Canada Gas Bar entrance located immediately north of the intersection.

ADDITIONAL NOTES:

There is an animal shelter in the southeast quadrant of the intersection and a commercial plaza in the northeast quadrant.

Intersection Assessment

Intersection Location:	Wellington Road 7 & Wellington Road 12 (Intersection 3)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019; and
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on September 24, 2020.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 7

Detail	Existing Condition
Primary Direction	East-West
County Road #	7
Local Name	Wellington Road 7
Jurisdiction	Mapleton
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 12

Detail	Existing Condition
Primary Direction	North-South
County Road #	12
Local Name	Wellington Road 12
Jurisdiction	Mapleton
Posted Speed (km/h)	80

Detail	Existing Condition
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway by stop sign with flashing beacon with additional 4-way flashers over the intersection
Existing Auxiliary Lanes	Unsigned right turn lanes off major roadway, with paved shoulders on receiving end of minor roadway
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1.**

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 1&3)
Left Turn Lane Warrant	Northbound	No
	Southbound	No
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. As indicated in **Figure 1**, the junction of WR 12 and WR 7 is a four-way intersection with perpendicular alignments. The horizontal alignments of both roadways are linear within several hundred meters of the intersection, and therefore no horizontal alignment issues were identified. Design of the right turn lanes on WR 12 do not, however, do not appear to meet TAC standards in terms of length.

Specific vertical alignment data was not available for the site; however, based on site observation it does not appear to be an issue.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A3**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Rd 7	5,230	80	8.0-9.0
Wellington Rd 12	3,669	80	8.0-9.0

Identified Hazards

Two utility poles with non-frangible bases were identified within the clear zone in the southeast quadrant of the intersection along WR 12. There are also trees within the clear zone on the east side of WR7 south of the intersection.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are four intersection related collision per year at this location. Collisions at this location are trending higher over the period reviewed. The primary cause(s) of collisions at this location are "Fail to Yield" at 68% of the collisions, followed by "Improper Turn / Movement" at 13%, and "Inattentive Driver" at 10%. There were no fatal collisions at this intersection during the period; however, analysis reveals 50% of collisions at this location result in personal injury.

Operating Speeds

This intersection was not captured within the speed study completed by the County in 2019.

PUBLIC CONCERNS

"The main issue here are vehicles travelling north and south on 140 are not always stopping and waiting for traffic to clear."

"Frequent area of high severity injury collisions. Most common causation is fail to yield/fail to stop at stop signs."

"Dangerous intersection. Need some lights or a roundabout"

"Many drivers try to ignore the stop sign. Please consider a roundabout, traffic lights, or a 4-way stop."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Traffic operations, and
- Upward trend in collisions, primarily "Failure to Yield".

In order to address the need for additional traffic control and the collision trends at this location, the following solutions were considered:

- Implement a single lane roundabout (estimated value of $1,640,000[1], not including property), or
- Install traffic signals and improve lighting at the adjacent commercial site (estimated value of $230,000[2], not including property).

The Township had previously completed a roundabout design study at this location and has identified it as a feasible solution. As such, a roundabout is recommended for implementation at this location. The functional design provided by the Township has been attached to this memo.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Install a single lane roundabout

The estimated cost for installation of single lane roundabout is $1,640,000.

ADDITIONAL NOTES:

None.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.
[2] Cost of signalization includes an estimated $150,000 of infrastructure plus a 40% contingency. Cost of additional streetlights estimated at $5,000 each plus 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 8 & Wellington County Road 9 (Intersection 4)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019; and
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on September 23, 2020.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 8

Detail	Existing Condition
Primary Direction	East-West
County Road #	8
Local Name	Wellington Road 8
Jurisdiction	Mapleton/Town of North Perth
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington County Road 9

Detail	Existing Condition
Primary Direction	North-South
County Road #	9
Local Name	Wellington County Road 9
Jurisdiction	Mapleton
Posted Speed (km/h)	80

Detail	Existing Condition
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway with stop sign with flashing beacon. Intersection also has 4-way flasher
Existing Auxiliary Lanes	Northbound and southbound right turn lanes
Intersection Lighting	Yes (1 Light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	No
	Southbound	No
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric design standards. WR9 is completely linear within several hundred meters of the study intersection, with no issued identified. WR8 includes a significant "S" curve at the intersection which appears to have been constructed to address a prior offset between the two WR8 approaches to WR9. The curve north of the intersection has a radius of approximately 350 m, while the curve south of the intersection has a radius of approximately 500 m. Assuming a design speed of 90 km/h, these two curves meet TAC standards with appropriate super-elevation. Based on measurements taken using existing centerline pavement markings, the approximate angle of intersection of between the two roadways is 68 degrees, which is just below the lower limit of what is considered acceptable per TAC standards.

No as-built drawings were made available to check the vertical alignment; however, the roads appear to be fairly flat on all approaches to the intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2** . Sight distance diagrams are provided in **Appendix A4**.

Table 2: Outcome of Sight Distance Review

	Sight Distance Criteria	Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Potentially not in winter
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Potentially not in winter
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Potentially not in winter
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Potentially not in winter
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Potentially not in winter

As identified within the sight distance diagrams, drivers advancing from stopped off of WR9, or making a left turn onto WR9, need to be able to see beyond the limits of the curves on WR8. In the summer months, sightlines south along WR8 are expected to be partially obscured by a tree line on the east side of the roadway. During winter months, snow banks may significantly impact a driver's ability to see far enough along WR8 in either direction to safely cross or turn onto that roadway.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Rd 8	2,744	80	8.0-9.0
Wellington Rd 9	2,349	80	8.0-9.0

Identified Hazards

No hazards were identified within the limits of the clear zone.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are two intersection related collision per year at this location. Collisions at this location are trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are "Fail to Yield" at 73% of collisions followed by "Inattentive Driver" at 9%. There was one fatal collision at this intersection during the period and the analysis reveals 41% of collisions at this location result in personal injury. Available collision data did not indicate that more collisions have occurred during a particular season.

Operating Speeds

Speed audits were completed by Wellington County in 2019 at audit sites S902 (WR9 north of WR8) and S801 (WR8 east of WR9). This data was not provided for review.

PUBLIC CONCERNS

"This intersection continues to be a huge hazard to motorists. There have been numerous collisions and fatalities. A roundabout would be beneficial here."

"I know the County is well aware of this problematic intersection and there are other

outside factors involved but it's disappointing how there's not enough collective will across government bodies to make this a roundabout."

"Unsafe intersection with several accidents annually, some fatal. People blow through the stop sign constantly! Roundabout is needed!"

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Inadequate sight lines along WR8

In order to address the identified safety concerns, the following alternative solutions were considered:

- Implementation of a roundabout at the junction of WR8 and WR9 (refer to appended Figure 5); or
- Realignment of approximately 500 m of WR8 to increase the curve radii on approach to WR9 in order to extend sight distances along WR8 (refer to appended **Figure 6**).

High level concept drawings for these two alternatives are provided as **Figures 5** and **6** in **Appendix A**. Based on approximate unit costs for construction of single lane roundabouts and two lane road reconstruction, the estimated construction costs for these two options are as follows:

- Single lane roundabout: $1,640,000[1], not including property; and
- Road realignment: $2,100,000[2], not including property.

Based on anticipated construction costs and property impacts, installation of a single lane roundabout is the preferred solution for this location.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Install single lane roundabout.

The estimated cost of this solution is $1,640,000.

ADDITIONAL NOTES:

None.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.
[2] Realignment costs based on the need to construct approximately 500 m of two lane rural roadway at an estimated cost of $1,500/m/lane, plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 7 & Wellington Road 18 (Intersection 5)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019; and
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on August 20, 2019.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 7

Detail	Existing Condition
Primary Direction	East-West
County Road #	7
Local Name	Wellington County Road 7
Jurisdiction	Centre Wellington
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Curb and Gutter with Inlets to Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	Urban shoulders east of WR18

Minor Roadway: Wellington Road 18 (Woolwich Street)

Detail	Existing Condition
Primary Direction	North-South
County Road #	18
Local Name	Woolwich Street
Jurisdiction	Centre Wellington
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Curb and Gutter with Inlets to Ditches
Shoulder Width & Material	~ 2 m asphalt shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Traffic signals, including pedestrian signal heads
Existing Auxiliary Lanes	Northbound and southbound left turn lanes
Intersection Lighting	Yes (2 Lights)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1.**

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 1)
Left Turn Lane Warrant	Northbound	N/A – No Data
	Southbound	No
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric design standards. Based on available data, it appears that the two roadways are linear within several hundred meters of the intersection, intersecting at 90 degrees to each other. There is a hatched pavement marking lane along south approach as a buffer lane, impact markings on east curb face, and a tight curb return along west corner.

Terrain around this intersection is rolling, with evident vertical curves on WR7 on approach to WR18. These vertical curves could impact sight distances at the intersection, depending on operating speeds.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A5**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	105	Yes, if driving at/below posted speed
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	130	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	110	Yes, if driving at/below posted speed
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	130	Yes, if driving at/below posted speed
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	110	Yes

If vehicles are travelling through this intersection at, or below, the posted speed, then sight distances are not expected to be an issue at this intersection.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed	TAC Clear Zone
Wellington Rd 7	3,339	50	3.5-4.5
Wellington Rd 18	9,199	50	5.0-5.5

Identified Hazards

Utility poles were located within the southwest quadrant of the intersection along Wellington Road 18 within the clear zone.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location. Collisions at this location are trending lower over the review period. The primary cause(s) of collisions at this location are "Fail to Yield", "Improper Turn / Movement" as well as "Speed Related" collisions at 25% each. There were no fatal collisions at this intersection during the period and analysis reveals 17% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit sites S711 and S702 located west and east of WR18, respectively. Unfortunately, that data was not made available as part of this study. Speed data was not collected for WR 18 in proximity to this intersection.

PUBLIC CONCERNS

"Some new turning lanes at this intersection would help the flow of traffic."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Traffic operations.

In order to address the need for additional traffic control and speed management, implementation of either a roundabout or traffic signals with left turn lanes on WR18 was considered for this intersection.

Estimated construction costs are as follows:

- Single lane roundabout - $1,640,000[1]; and
- Traffic signals plus widening for auxiliary lanes - $540,000[2].

Additionally, if speed is an issue on WR18, then the vertical profile of that roadway is anticipated to be an issue for vehicles making left turns on WR18 or turning 'right on red' off of WR7. If this is the case, the following additional solutions may be considered:

- Consider urbanizing the cross-section west of the intersection (curb and gutter, sidewalks, etc.) to provide a visual queue to drivers that they are entering a lower speed area;
- Consider narrowing the lanes (pavement markings);
- Restrict right on red from WR18; and/or
- Correct profile of WR18 in proximity to the intersection.

The County has identified their preference to have a roundabout installed at this location. A copy of one of the sheets from the roundabout design package has been included in the Appendix to this memo.

RECOMMENDED SOLUTION

Wellington County has proposed a single lane roundabout for this location. Estimated construction cost is $1,640,000 plus property acquisition.

ADDITIONAL NOTES:

None.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

[2] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 46 & Fox Run Drive (Intersection 6.1)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- As-built drawings produced by Gamsby & Mannerow Ltd. (1989); and
- An on-site review at this intersection occurred on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 46

Detail	Existing Condition
Primary Direction	North-South
County Road #	46
Local Name	Brock Road
Jurisdiction	Puslinch
Posted Speed (km/h)	70
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m asphalt shoulder
Active Transportation Accommodation	None

Minor Roadway: Fox Run Drive

Detail	Existing Condition
Primary Direction	East
County Road #	
Local Name	Fox Run Drive
Jurisdiction	Puslinch
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	divided
Drainage Type	Curb and Gutter with Catch Basins
Shoulder Width & Material	N/A
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Northbound and southbound left & right turn lanes
Intersection Lighting	Yes (minor lighting on Fox Run Drive median)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

No traffic data was available for the subject intersection; however, high volumes of vehicles were observed on WR46 during the sight visit.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. WR46 is linear within several hundred meters of the intersection, while Fox Run Drive has several winding curves on approach to the intersection. Horizontal design of both roadways meet TAC standards.

In terms of vertical design, the profile of WR46 slopes down towards the south at ~4%. Fox Run Drive slopes down towards WR46 at approximately 5%. Both profiles meet TAC standards.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A6**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	160	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	140	Yes
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	231 (-4% Slope)	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	167 (4% Slope)	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	204	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 46	19,381	70	6.5-7.5
Fox Run Drive	Assumed <750	50	2.0 - 3.0

Identified Hazards

No hazards were identified within the clear zones associated with this intersection.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. Only two collisions occurred at this location over the period reviewed. Both collision were personal injury collision and both appear to be the result of Failing to Yield. Given the location of these intersections there may have been further collisions reported to the Guelph Police.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S4601 located in close proximity to the study intersection. Unfortunately, this information was not available for review.

PUBLIC CONCERNS

No information regarding public concerns was provided for this intersection.

ALTERNATIVE SOLUTIONS

No issues were made evident based on available data; however, it is anticipated that making a left turn off of either Fox Run Drive or Bridle Path onto WR46 would be difficult due to the volumes and operating speeds on WR46. Additionally, due to the close proximity (100 m) of the intersections of Fox Run and Bridle Path, there is inadequate distance to identify a centre merge lane if it is to be used for both roadways.

Potential solutions to address difficulty with making left turns off of Fox Run and Bridle Path include the following solutions:

- Install two single lane roundabouts in series (estimated value of $3,2800,000[1], not including property); or
- Install coordinated signals at the intersections (estimated value of $420,000[2]);

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency, for a total estimated cost of $1,640,000 per roundabout.

[2] Cost of signalization includes an estimated $150,000 of infrastructure plus a 40% contingency per location.

- Install a traffic signal at Bridle Path and limit Fox Run to right-in/right-out with traffic turning left off Fox Run redirected to Hamersley Road (estimated value of $240,000[3]); or
- Construct turnarounds sufficiently far beyond either intersection to allow drivers to safely cross lanes and turn to face their preferred travel direction. This concept would allow drivers to enter WR46 by turning right off of Fox Run and then turn around within a protected laneway (see concept below, estimated value of $200,000 plus property per turnaround). Traffic volume, speed and sight distance studies would need to be reviewed to determine if making a left off of WR46 into the turnaround would be desirable from a safety perspective.

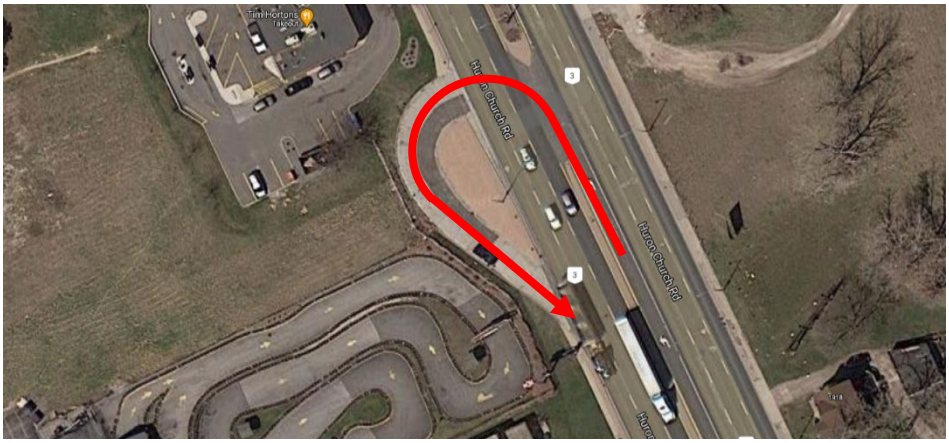

Figure 1: Turnaround example from Heron-Church Road in Windsor, ON

RECOMMENDED SOLUTION

Due to lack of data to provide warrant for improvements, no solution has been recommended.

ADDITIONAL NOTES:

An EA has been completed for WR46 that has identified the need for widening to four lanes and implementing intersection improvements.

[3] Cost of signalization includes an estimated $150,000 of infrastructure plus a 40% contingency. Additional cost associated with construction of a raised median to limit movements to right-in/right-out at Fox Run.

Intersection Assessment

Intersection Location:	Wellington Road 46 & Bridle Path (Intersection 6.2)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- As-built drawings produced by Gamsby & Mannerow Ltd. (1989); and
- An on-site review at this intersection occurred on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 46

Detail	Existing Condition
Primary Direction	North-South
County Road #	46
Local Name	Brock Road
Jurisdiction	Puslinch
Posted Speed (km/h)	70
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m asphalt shoulder
Active Transportation Accommodation	None

Minor Roadway: Fox Run Drive

Detail	Existing Condition
Primary Direction	East-West
County Road #	N/A
Local Name	Bridle Path
Jurisdiction	Puslinch
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	divided
Drainage Type	Curb and Gutter with Catch Basins
Shoulder Width & Material	N/A
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Northbound and southbound left & right turn lanes
Intersection Lighting	None

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

No traffic data was available for the subject intersection; however, high volumes of vehicles were observed on WR46 during the sight visit.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Based on available data, it appears that the intersection is an offset approach with Fox Run Drive, private driveway entrance east of intersection, major roadway is sloped at a

~4% slope, a right turn storage lane begins across from minor roadway, and large median dividing minor roadway.

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Both WR46 and Bridle Path are linear within several hundred meters of the intersection. The two roadways intersect at approximately 90 degrees. No deficiencies were identified in terms of horizontal alignment.

In terms of vertical design, the profile of WR46 slopes down towards the south at ~4%. Bridle Path slopes down towards WR46 at approximately 3%. Both profiles meet TAC standards.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A6**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	160	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	140	Yes
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	167 (~4% Slope)	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	231 (-4% Slope)	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	204	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 46	19,381	70	6.5-7.5
Bridle Path	Assumed < 750	50	2.0-3.0

Identified Hazards

No hazards were identified within the clear zone.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. Only two collisions have been report at this location over the 10 year review period. Both collision were personal injury collision and both appear to be the result of Failing to Yield. Given the location of these intersections there may have been further collisions reported to the Guelph Police.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S4601 located in close proximity to the study intersection. Unfortunately, this information was not available for review.

PUBLIC CONCERNS

No information regarding public concerns was provided for this intersection.

ALTERNATIVE SOLUTIONS

No issues were made evident based on available data; however, it is anticipated that making a left turn off of either Fox Run Drive or Bridle Path onto WR46 would be difficult due to the volumes and operating speeds on WR46. Additionally, due to the close proximity (100 m) of the intersections of Fox Run and Bridle Path, there is inadequate distance to identify a centre merge lane if it is to be used for both roadways.

Potential solutions to address difficulty with making left turns off of Fox Run and Bridle Path include the following solutions:

- Install two single lane roundabouts in series (estimated value of $3,2800,000[1], not including property); or

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency, for a total estimated cost of $1,640,000 per roundabout.

- Install coordinated signals at the intersections (estimated value of $420,000[2]);
- Install a traffic signal at Bridle Path and limit Fox Run to right-in/right-out with traffic turning left off Fox Run redirected to Hamersley Road (estimated value of $240,000[3]); or
- Construct turnarounds sufficiently far beyond either intersection to allow drivers to safely cross lanes and turn to face their preferred travel direction. This concept would allow drivers to enter WR46 by turning right off of Bridle Path and then turn around within a protected laneway (see concept below, estimated value of $200,000 plus property per turnaround). Traffic volume, speed and sight distance studies would need to be reviewed to determine if making a left off of WR46 into the turnaround would be desirable from a safety perspective.

Figure 1: Turnaround example from Heron-Church Road in Windsor, ON

RECOMMENDED SOLUTION

Due to lack of data to provide warrant for improvements, no solution has been recommended.

ADDITIONAL NOTES:

Four-lane segment is proposed for future development.

[2] Cost of signalization includes an estimated $150,000 of infrastructure plus a 40% contingency per location.

[3] Cost of signalization includes an estimated $150,000 of infrastructure plus a 40% contingency. Additional cost associated with construction of a raised median to limit movements to right-in/right-out at Fox Run.

Intersection Assessment

Intersection Location:	Wellington Road 30 & Township Road 3 (Intersection 7)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019; and
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on June 1, 2016.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 30

Detail	Existing Condition
Primary Direction	East-West
County Road #	30
Local Name	Marden Road
Jurisdiction	Guelph-Eramosa
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Township Road 3

Detail	Existing Condition
Primary Direction	North-South
County Road #	3
Local Name	N/A
Jurisdiction	Guelph-Eramosa

Detail	Existing Condition
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	North ~ 2 m gravel shoulder, South ~ 1m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Northbound and southbound right turn lanes
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	No
	Southbound	No
	Eastbound	No
	Westbound	Yes – 25m Storage, (AM hrs has Va=60%)

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Both roads intersect at 90 degrees and are linear within several hundred meters of the intersection. Based on shoulder wear, it appears that larger vehicles a driving on the shoulder to make right turns.

No as-built drawings were made available to check the vertical design of the intersection; however, there are sags (low points) within the limits of the sight distance triangles on all approaches which may impact visibility at the intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A7**.

Table 2: Outcome of Horizontal Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified in terms of horizontal sight distance; however, the intersection sits higher than the surrounding roadways and there are potential issues with the vertical sight distances.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 30	4,754	80	8.0-9.0
Township Road 3	Assumed 1,500 – 6,000	80	8.0-9.0

Identified Hazards

Utility poles and steep embankments appear to be within close proximity to the clear zone limits. There are also mature trees located along the clear zone limits. More detailed investigation should be completed ahead of detailed design.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are two intersection related collisions per year at this location. Collisions at this location appear to be trending higher over the review period. The primary cause(s) of collisions at this location are "Fail to Yield" at 41% of the collisions followed by "Inattentive Driver" at 18%. Moreover, 9% of collisions were caused by "Following too closely". There were no fatal collisions at this intersection during the period, though analysis reveals 36% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit sites S3002 (WR 30 north of Township Road 3) indicate an 85th percentile operating speed on WR 30 of 101 km/h, which exceeds the posted speed limit on that corridor by more than 20 km/h. Similar data was not available for Township Road 3.

PUBLIC CONCERNS

No information regarding public concerns was provided for this intersection.

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Visibility at intersection; and
- Operating speeds.

In order to address the need for improved visibility and speed management, the following alternative solutions are to be considered:

- Installation of a roundabout (estimated construction cost of $1,640,000[1], not including property);
- Installation of all-way stop control with overhead beacon (estimated cost of $8,000[2]) to mitigate sight distance issues; and
- Correct road profiles on approach to the intersection to address sight distances (estimated value of $1,680,000[3]), plus consider speed management strategies along the corridor.

All solutions should consider the need for guiderail due to steep embankments.

Installation of a roundabout at this location is the only solution that has the ability to address both visibility and speeding issues. This solution will also address the identified issue with left turn capacity in the westbound direction.

RECOMMENDED SOLUTION

The recommended solution for this intersection is installation of a single lane roundabout with high speed approaches. The need for guiderail or regrading of ditches should also be investigated for this intersection. The estimated cost of implementation is $1,640,000 plus property.

ADDITIONAL NOTES:

All-way stop control could be considered as a low cost, interim solution to address the sight distance limits imposed by the vertical alignments of roadways at this intersection.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

[2] Installation of All-Way Stop Control with an overhead beacon estimated at $5,600 for signs, posts and beacon, plus approximately 40% contingency.

[3] Cost for profile correction assumes reconstruction of two lanes of rural roadway within 200 m either side of the intersection, estimated at $1,500/m/lane for a total of $1.2M plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 16 & Wellington Road 109 (Intersection 8)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery; and
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington County Road 109

Detail	Existing Condition
Primary Direction	East-West
County Road #	109
Local Name	
Jurisdiction	Wellington North
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 16

Detail	Existing Condition
Primary Direction	North-South
County Road #	16
Local Name	
Jurisdiction	Wellington North
Posted Speed (km/h)	80
# of Lanes	2

Detail	Existing Condition
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Northbound and southbound right turn lanes
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

No traffic data was made available to determine warrant for traffic signals and/or auxiliary lanes.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. All approaches are linear within several hundred meters of the intersection. The southbound approach on WR16 intersects WR109 at approximately 83 degrees. However, the opposing approach of WR16 is slightly offset from the north approach (~ 3m) and has an angle of intersection of approximately 60 degrees with WR109. Based on TAC guidelines, roads should be designed to intersect at angles between 70 and 90 degrees, with perpendicular intersections being preferred. The fact that both the north and south segments of WR16 are stop controlled means that alignment of the roadway through the intersection is not a significant concern. However, in order for northbound drivers to view vehicles approaching from the east they do need to turn further than would be comfortable and potential even feasible for some drivers. Due to the skew, the southeast quadrant of

the intersection would also need to be designed with a larger radius than is typical to allow larger design vehicles to make the right hand turn. Right turn lanes are provided in both directions along WR 109.

No as-built drawings were available to check vertical alignment details. However, sight lines along WR109 extend a significant distance in both direction and are not anticipated to be an issue. The vertical alignment of WR16 is also fairly flat and not anticipated to be an issue.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A8**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 109	8,204	80	9.0-10.0
Wellington Road 16	1,377	80	6-7.5

Identified Hazards

No hazards were identified within the clear zones for WR16 and WR109.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are three intersection related collision per year at this location with collisions over the analysis period trending upward in recent years. The leading primary cause(s) of collisions at this location are "Fail to Yield" at 40% of the collisions followed by "Speed Related" at 27% and "Inattentive Driver" at 17%. There were no fatal collisions at this intersection during the period, however analysis reveals 37% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit sites S10904 (WR109 west of WR16) indicate an 85th percentile operating speed on WR 26 of 106 km/h, which exceeds the posted speed limit on that corridor by more than 25 km/h. Similar data was not available for WR 16 in proximity to the intersection.

PUBLIC CONCERNS

"Sightlines are a major issue at this intersection and make it very dangerous for travellers and prone to accidents. Consideration needs to be given to realigning the roads or perhaps even a roundabout."

"Wellington Road 109 and Wellington Road 16 is a very busy intersection. With traffic moving very fast on 109, it is challenging to turn off of 16. I've seen many near accidents. The layout of the intersection is dangerous as it's not aligned."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Intersection skew
- Collision trends
- Operating speeds

In order to address the identified design and speed issues, the following alternative solutions could be considered:

- Install a roundabout with high speed approaches north of the existing intersection (to avoid direct impacts to the residential property in the southwest quadrant). Estimated value of $1,640,000[1] not including property acquisition; or
- Realign approximately 400 m of WR16 in proximity to the intersection. This concept is illustrated in Figure 6, with an estimated value of $1,680,000[2] (not including property acquisition).

Among the above two solutions, realignment would address the geometric issues at the intersection, but would not mitigate speeding at this location. A roundabout could be considered for implementation at this location to address both alignment and speed. However, imbalanced traffic flows, which could be indicative of potential roundabout operational issues, have previously been flagged at this location. Prior to considering a roundabout at this location, the County should complete a traffic movement and modelling study to determine if there is an issue with peak period traffic movement conflicts and gaps.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following is recommended at the subject intersection:

- Complete a traffic movement study and modelling work to determine if a roundabout would be a feasible solution at this location;
- If a roundabout is deemed feasible, proceed with construction of a single lane roundabout;
- If a roundabout is deemed infeasible, realign approximately 400 m of WR16 in proximity to the intersection.

The estimated cost of these improvements is $1,680,000 plus property.

ADDITIONAL NOTES:

None.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

[2] Realignment costs for two lane rural roadway estimated at $1,500/m/lane plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 22 & Wellington Road 29 (Intersection 9)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on August 10, 2016;
- As-built drawings produced by Totten Sims Hubicki Associates (1994); and
- An on-site review was conducted at this intersection on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington County Road 29

Detail	Existing Condition
Primary Direction	East-West
County Road #	29
Local Name	
Jurisdiction	Centre Wellington
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 22

Detail	Existing Condition
Primary Direction	North-South
County Road #	22
Local Name	
Jurisdiction	Centre Wellington
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway by stop sign, with additional 3-way flashers.
Existing Auxiliary Lanes	No
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	N/A
	Southbound	Maybe
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. The horizontal alignment of both roadways is linear within at least 100 m of the t-intersection. There is a ~300 m radius horizontal curve on WR29 north of the intersection. This curve does not meet TAC standards for roadways with a design speed > 80 km/h which is assumed to be the case on WR29 where the road is posted at 80 km/h. There is a large radius return at the east corner of the intersection, right turn lane along the east approach, and a private driveway entrance immediately south of intersection.

Vertical alignment of WR 22 was reviewed using tender drawings provided for the intersection by the County. As is evident in the field, and confirmed through review of the tender drawings, there is significantly sub-standard[a] crest curve that starts approximately 40 m west of the intersection on WR22. This sub-standard vertical curve does not allow for adequate stopping or decision sight distances on approach to the intersection.

Horizontal Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2** . Sight distance diagrams are provided in **Appendix A9**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	105	No - Vertical
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	110	No - Vertical
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	No - Vertical

[a] Existing K value of 7.9. Recommended minimum K value of 52 for 100 km/h design speed per TAC Table 3.3.2.

Sight Distance Criteria		Distance (m)	Meets Standards
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	222 (10% slope)	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	

Deficiencies in terms of stopping and decision sight distances were identified.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed	TAC Clear Zone
Wellington Road 29	5,630	50	5.0 – 5.5
Wellington Road 22	1,301	80	6.0 - 7.5

Identified Hazards

No hazards were identified within the clear zone.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collisions per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading cause(s) of collisions at this location are "Speed Related" at 33% of the collisions followed by "Follow Too Closely" and "Other" causes at 22% each. There were no fatal nor personal injury collisions at this intersection during the period.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit sites located along the length of WR29. While site S2904 is identified as being located immediately east of the intersection, no speed data was provided for that site. Speed data collected east of the study area indicates that the 85th percentile

operating speed on WR 29 of 106 km/h, which exceeds the posted speed limit on that corridor by more than 25 km/h. Similar data was not available for WR 22.

PUBLIC CONCERNS

No information regarding public concerns was provided for this intersection.

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Vertical alignment west of the intersection; and
- Operating speeds.

In order to address the identified issues, the following alternative solutions could be considered:

- Install a roundabout at the intersection (estimated value of $1,640,000[b] plus property);
- Install all way stop control with advanced signage (intersection is not visible from eastbound approach). Estimated value of $8,000;
- Correct vertical profile west of the intersection (approximately 250 m), including lowering of entire intersection (estimated value of $1,050,000[c]); or
- Realign WR29 to the east such that sight distances are not impacted by the vertical alignment of WR22 (estimated value of $1,680,000 assuming approximately 400 m of new roadway, not including property).

Due to the close proximity of buildings to the limits of the intersection, a roundabout was not deemed to be a suitable solution for this location. Installation of all-way stop control would mitigate sight distance issues at the intersection; however, speeding at this location may result in increased collision risk due to non-compliance under all-way stop control. The ideal solution would be to either realign WR29 or correct the profile of WR22. Profile work on WR22 would be best to coordinate with future work at the creek crossing to the west of the intersection.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Reprofile WR22 or realign WR29 (assumed value of $1,680,000, plus property);
- Install all-way stop control with advanced signage as an interim solution; and
- Continue to monitor the intersection to determine if improvement is being realized.

Reconstruction is considered low priority as no fatal nor personal injury collisions have been reported at this intersection.

[b] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

[c] Roadway reconstruction estimated at $1,500/m/lane, plus 40% contingency.

ADDITIONAL NOTES:

With the all-way stop control, the posted speed limit on Wellington Road 29 could be increased back to 80 km/h, as traffic approaching the intersection would slow down significantly.

In the longer term, should the bridge on Wellington Road 29 across the creek need to be replaced, then the entire profile of Wellington Road 29 could be reconstructed to correct the current sight distance issues.

Intersection Assessment

Intersection Location:	Wellington Road 18 & Wellington Road 29 (Intersection 10)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on May 31, 2018; and
- As-built drawings produced by Keuffel & Esser Co. (January 1980).

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington County Road 18

Detail	Existing Condition
Primary Direction	East-West
County Road #	18
Local Name	
Jurisdiction	Centre Wellington
Posted Speed (km/h)	70
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 29

Detail	Existing Condition
Primary Direction	North-South
County Road #	29
Local Name	
Jurisdiction	Centre Wellington
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Eastbound right turn lane
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 2)
Left Turn Lane Warrant	Northbound	>50% Vehicle Advancing
	Southbound	N/A
	Eastbound	No
	Westbound	100% Vehicle Advancing

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. WR29 is fairly linear on approach to WR18 which has a large radius curve (R~800 m) at the location of the intersection. The horizontal curve on WR18 meets TAC standards.

In terms of vertical alignment, WR 18 has a subtle rolling topography in proximity to the intersection, with no issues identified. WR29 slopes down towards the intersection at ~7.5%, and has hatched pavement markings along the northbound paved shoulder. The grade on WR29 approaching the intersection is at the upper limit of what is considered acceptable per TAC standards for rural undivided collector or arterial roadways.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A10**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	160	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	126 (Looking upward to a ~7.5% slope approaching along WR29)	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	No
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Potential issues in winter

Issues were identified in terms of departure sight distances from WR29, particularly visibility to the east of the intersection. Visibility could be an issue in both directions in the winter months. Installation of the warranted traffic signals would address issues related to departure sight distance for left turns, but additional winter maintenance may be required to address departure sight distances for right turns.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 18	10,299	70	8.0-10.0
Wellington Road 29	Assumed >6,000	80	9.0-10.0

Identified Hazards

Given the steep grade on WR29 and the presence of what appear to be non-recoverable slopes within close proximity to the north shoulder of WR18, placement of guiderail across from WR29 is recommended, at a minimum. The need for guiderail along a longer segment of WR18 should be investigated further.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are three intersection related collisions per year at this location. Collisions at this location appear to be trending lower even though there was a spike in collisions in 2013. The leading cause(s) of collisions at this location are "Fail to Yield" at 36% of the collisions followed by speed related collisions at 20%. Important to note that 44% of all collisions occurred in winter (November to January). There were no fatal collisions at this intersection during the period and analysis reveals 28% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S2901 located along WR29 east of WR 18, and audit site S1802 located on WR18 north of WR29. No data was made available for either audit site, though collision records provided the MTO indicate that several collision were attributed to issues with speeding.

PUBLIC CONCERNS

"Add a traffic circle due to increased traffic and reduced visibility."

"Also a tricky left turn. Could there be a traffic signal sitting there?"

"Dangerous left turn. A 3-way stop, roundabout or traffic light would be beneficial."

"Very poor visibility and growing traffic volumes. Could a round-about be installed to balance traffic?"

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Lack of guiderail along north side of WR18;
- Traffic operations; and
- Operating speeds.

In order to address the need for additional traffic control and speed management, implementation of either a roundabout or traffic signals was evaluated for the intersection. Due to physical constraints imposed by the proximity of the Eramosa River, installation of a roundabout is not considered a feasible solution.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Install a traffic signal at the intersection of WR18 and WR29 with a potential westbound left turn lane on WR18;
- Install steel beam guiderail along the north side of WR18 across from WR29 and potentially along a longer stretch of this roadway;
- Address need for additional windrowing of snowbanks along the south side of WR18 to mitigate impacts that snow banks may have on sight distances; and
- Identify appropriate salting regimes for WR29 to reduce potential for drivers to slide into the intersection.

Estimated construction cost for recommended improvements (not including property) is $385,000[1].

[1] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate one 20 m parallel length and 115 m of taper ($1,500/m/lane), plus a 40% contingency. Additional amount added for guiderail.

ADDITIONAL NOTES:

None.

Intersection Assessment

Intersection Location:	Wellington Road 24 & Wellington Road 42 (Intersection 11)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on August 1, 2019; and
- An on-site review was conducted at this intersection on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 24

Detail	Existing Condition
Primary Direction	East-West
County Road #	24
Local Name	10 Line
Jurisdiction	Erin
Posted Speed	60
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 1m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 42

Detail	Existing Condition
Primary Direction	North-South
County Road #	42
Local Name	Erin Road
Jurisdiction	Erin
Posted Speed	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 1 m gravel shoulder
Active Transportation Accommodation	~ 2m Asphalt MUP

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	None
Intersection Lighting	No

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone;
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 1&2)
Left Turn Lane Warrant	Northbound	No
	Southbound	>70% Vehicle Advancing
	Eastbound	No
	Westbound	Yes – 15m Storage

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Both roadways are linear within several hundred meters of the intersection, and intersect at approximately 90 degrees. There are no concerns in terms of horizontal design of the intersection.

No as-built drawings were provided for this location; however the vertical alignment was reviewed as part of the site visit. There were no identified concerns in terms of profile on WR24. There is a sag south of the intersection on WR42 which is not a concern under current stop control conditions; however, this should be further reviewed if the intersection is signalized.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A11**.

Table 2: Outcome of Sight Distance Review.

Sight Distance Criteria		Distance	Meets Standards
Major Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	110	Yes
Minor Road	Minimum Stopping Sight Distance	130	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	150	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	130	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	130	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor.

Roadway	Estimated AADT	Posted Speed	TAC Clear Zone
Wellington Road 42	2,298	50	3.5 – 4.5
Wellington Road 24	8,388	60	6.0 - 6.5

Identified Hazards

There are a number of utility poles within the clear zone at this intersection. There are also, potentially, some mature trees within the clear zone to the south of the intersection.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. Only two collisions have been reported at this location over the 10 year review period. One collision was a personal injury collision and both appear to be the result of Failing to Yield. Given the location of this intersection there may have been further collisions reported to the Halton Regional Police.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S2404 located on WR24 west of WR42. This data was not made available for review.

PUBLIC CONCERNS

"We need the traffic lights that were promised to us two years ago. It is very difficult turning onto Trafalgar Rd with the increase in traffic. Proper crossing corners would be required as well for pedestrian safety when crossing Trafalgar Rd to go to the mail box or community centre park."

"Speeding issues identified here. Possible candidate for a roundabout to reduce the incident of collision."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Traffic operations
- Sight distances

In order to address the identified issues, the following alternative solutions should be investigated:

- Install a single lane roundabout (estimated value of $1,640,000[1] plus property); or
- Install traffic signals with left turn lanes on WR24 (estimated value of $540,000[2] plus property).

If the intersection is signalized, existing vegetation and signs should be removed from within sight triangles at the intersection.

In order to accommodate the high volume of trucks on WR24, a minimum 40 m diameter roundabout would be required at this location. Installation of this size of roundabout would require removal of two buildings immediately adjacent to the intersection – both of which appear to have heritage potential. For this reason, installation of a roundabout is not considered a feasible alternative for this location.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Install a traffic signal and left turn lanes on WR24; and
- Clear existing vegetation and signs from within sight triangles at the intersection.

The estimated value of this solution is $540,000 plus property acquisition.

ADDITIONAL NOTES:

None.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

[2] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 18 & 2 Line (Intersection 12)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019; and
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on July 26, 2016.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 18

Detail	Existing Condition
Primary Direction	North-South
County Road #	18
Local Name	
Jurisdiction	Centre Wellington
Posted Speed	70
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder, ~2m paved shoulder on NE shoulder
Active Transportation Accommodation	None

Minor Roadway: 2 Line

Detail	Existing Condition
Primary Direction	East-West
County Road #	
Local Name	2 Line
Jurisdiction	Centre Wellington

Detail	Existing Condition
Posted Speed	None (Assumed 50)
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	West of intersection has ~ 2 m gravel shoulder. East of intersection has ~1m gravel shoulder.
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Right turn lanes along major road.
Intersection Lighting	No, 1 LED street light above stop sign along minor road.

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone;
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	Yes – 15m Storage
	Southbound	No
	Eastbound	No
	Westbound	No - 55% Vehicle Approaching

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. The horizontal alignment of 2 Line is linear within several hundred meters of the intersections, while WR18 is winding with the intersection located in the middle of an approximately 520 m radius curve. The radius of this curve meets TAC standards based on an assumed design speed of 90 km/h. The angle of intersection between WR18 and 2 Line is skewed at just under 70 degrees, which is the lower limit of being acceptable by TAC standards. The visibility effects of this skew are made worse by the fact that the intersection occurs on a curve.

No as-built drawings were available to check vertical alignment data. However, based on observation it appears that WR18 is fairly flat in proximity to the intersection. 2 Line slopes down towards the intersection from both direction.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A12**.

Table 2: Outcome of Sight Distance Review.

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	160	No
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	140	No
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	190	No (Northbound)
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	165	No (Northbound)
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	165	No (Northbound)

Due to the intersection skew and location along a curve on WR18, there are anticipated issues with sight distances along both the major and minor roadways. Along WR18 a driver's ability to see far enough along the roadway to safely make a left turn could be impacted by the presence of other vehicles travelling in the same direction as the driver deciding to turn left. For northbound vehicles turning on WR18, visibility is expected to be impacted by snow banks as well as vehicles travelling away from the intersection.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor.

Roadway	Estimated AADT	Posted Speed	TAC Clear Zone
Wellington Road 18	9,117	70	6.5-7.5
2 Line	1,831	None (Assumed 50)	3.5 – 4.5

Identified Hazards

A utility pole was located at the southwest corner of the intersection within the clear zone.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location with collisions over the analysis period trending upward. The leading primary cause(s) of collisions at this location are "Following Too Closely" at 45% of the collisions followed by "Inattentive Driver" at 18% along with "Speed Related" and "Fail to Yield" at 9% of collisions each. There were no fatal collisions at this intersection during the period, however analysis reveals 36% of collisions at this location result in personal injury.

Operating Speeds

No operating speed audit information was made available for this intersection.

PUBLIC CONCERNS

"There are constant accidents and near misses at this spot. A round-about would help to slow and control the traffic."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Sight distances / geometric design
- Operating speeds

In order to address design and speeding issues at the intersection, the following alternative solutions were considered:

- Install a roundabout (estimated value of $1,640,000[1] plus property);
- Install traffic signals with dedicated left turn lanes and signal phase (estimated value of $540,000[2], plus property);
- Install all way stop control (estimated value of $5,000); and
- Realign approximately 500 m WR18 to address the alignment issue as illustrated in appended Figure 6. This alternative has an estimated value of $3,895,000[3] including three residential buildings, plus property.

Installation of either a roundabout or traffic signals are considered equally feasible options at this location, though the topography may be challenging to construct a roundabout and installation of signals would not address the sight distance issues identified at this location. If signalized, consideration should be given to providing a dedicated left turn phase on WR18 and removing "right on red" permissions for southbound 2 Line.

Realignment of either WR18 or 2 Line was not considered feasible due to the close proximity of existing residential properties to WR18 and the 2 Line crossing of the Grand River approximately 130 m north of the intersection. A potential realignment option is illustrated in appended Figure 6. Due to the significant traffic volumes on WR18, installation of all-way stop control was considered infeasible due to anticipated impacts on traffic operations at this intersection.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- In the interim, convert intersection to signalized control without implementing other permanent changes, and noting that this will not fully address site distance issues (estimated value of $200,000); and
- Ultimately, install a single lane roundabout at this intersection (offset to the northeast) with an estimated value of $1,640,000 plus property.

Prior to proceeding with design of the roundabout, the County should undertake a topographical survey of the study area and commission a functional design study to determine potential issues associated with

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.
[2] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency.
[3] Cost of 500 m of road realignment plus widening to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency. Residential property values estimated at $350,000 each.

constructing the roundabout in close proximity to the river valley. Should the roundabout be deemed infeasible, then the County should proceed with the following:

- Install traffic signals with dedicated left turn phases for WR18;
- Provide dedicated left turn lanes on WR18;
- Put “right on red” turn restrictions in place for northbound 2 Line; and
- Review the need for guiderail along the north side of WR18 (not included in estimated cost).

The estimated value of this alternative is $540,000 plus property.

ADDITIONAL NOTES:

Google earth shows high volumes of traffic on WR18.

Intersection Assessment

Intersection Location:	Wellington Road 19 & 2 Line (Intersection 13)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019; and
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on July 21, 2016.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 19

Detail	Existing Condition
Primary Direction	North-South
County Road #	19
Local Name	
Jurisdiction	Centre Wellington
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: 2 Line

Detail	Existing Condition
Primary Direction	East-West
County Road #	
Local Name	2 Line
Jurisdiction	Centre Wellington

Detail	Existing Condition
Posted Speed (km/h)	None (Assumed 50)
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 1m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	Northbound and southbound right turn lanes
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	>70% Vehicle Approaching
	Southbound	No
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. 2 Line in linear within several hundred meters of the intersection, whereas WR19 is curvilinear on approach to the intersection. There is a ~350 m radius curve immediately west of the intersection on WR19, and a ~450 m radius curve approximately 100 m to the east. Both curves meet TAC standards for design speeds of 90 km/h.

No drawings were made available to check vertical alignment; however, both roadways are fairly flat on approach to the intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A13**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	No (eastbound)
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	No (westbound)
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	No (northbound)
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	No (northbound)
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	No (northbound)

There are sightline issues associated with the alignment of the west approach to the intersection.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 19	5,547	80	8.0-9.0
2 Line	Assumed 1,500-6000	None (Assumed 50)	5.0-5.5

Identified Hazards

Trees along 2 Line were located within clear zone distance.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are "Fail to Yield" at 50% of the collisions followed by "Inattentive Driver" at 30%. There were no fatal collisions at this intersection during the period and analysis reveals 20% of collisions at this location result in personal injury.

Operating Speeds

No operating speed audit information was made available for this intersection.

PUBLIC CONCERNS

"Poor visibility at this intersection due to the house at the corner and the shape of County Rd 19."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Horizontal alignment on WR19 impacting sight distances to the west.

In order to address the identified issue at the intersection, the following alternative solutions could be considered:

- Install a roundabout, offset to the east (estimated value of $1,640,000[1] plus property);

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

- Realign the east-west road through the intersection (approximate length of 350 m, estimated value of $1,470,000[2] plus property); and

Due to the close proximity of residential properties within the southwest quadrant of the intersection, realignment of WR19 was not considered a feasible alternative. Yet, a roundabout could be used to address the alignment issue.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design change is recommended as the ultimate solution at the subject intersection:

- Install a single lane roundabout at this intersection.

The estimated cost of construction is $1,640,000 plus property.

ADDITIONAL NOTES:

None.

[2] Roadway realignment estimated at $1500/m/lane, plus 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 52 & Ninth Line (Intersection 14)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on May 14, 2013;
- As-built drawing produced in 1986; and
- An on-site review was conducted at this intersection on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 52

Detail	Existing Condition
Primary Direction	North and East legs of the intersection
County Road #	52
Local Name	
Jurisdiction	Erin
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Ninth Line

Detail	Existing Condition
Primary Direction	North-South (South leg of the intersection)
County Road #	
Local Name	Ninth Line
Jurisdiction	Erin
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 1 m gravel shoulder
Active Transportation Accommodation	~ 1.2m conc. sidewalk

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on Ninth Line (northbound only) and WR52 (left turn onto Ninth Line)
Existing Auxiliary Lanes	Westbound right turn channel
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	N/A
	Southbound	65% Vehicle Approaching
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometic standards. This is a three-leg intersection, with approximately 90 degrees between all three legs. The intersection includes a right turn by-pass lane for westbound WR52 to continue onto northbound WR42. Ninth Line slopes down at ~4% towards the intersection. There are two private driveways southwest of intersection and two additional T-intersection located approximately 10 m (Kenneth Avelue) and 60 m (McCullogh Drive) north of the end point of the right turn lane. There is inadequate distance between McCullogh Drive at the terminus of the right-turn lane off of WR52 for vehicles to safely turn off of McCollogh Drive. Additionally, if drivers using the right-turn lane off of WR52 are only checking to the south before proceeding past the yield, this would introduce additional safely concerns with the proximity of Kenneth Avenue. Based on the presence of steel beam guiderail on the painted island on WR52, it is also anticipated that drivers are experiencing confusion at this intersection.

As-built drawings were made available for WR52 at the study location. Based on information provided in the drawing, the profile of WR52 slopes down towards Ninth Line at approximately 8%. At the time that the drawing set was produced, the crest of the curve on WR52 was being flattened to provide a K value of 60 (previously did not meet TAC standards).

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A14**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	99 (3.75% Slope)	Yes
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance	150	Yes

Sight Distance Criteria		Distance (m)	Meets Standards
	(Left Turn from the Minor Road, Case B1)		
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	130	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	130	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study. However, sight distance issues are anticipated between the southbound right turn channel and adjacent local roads – particularly if drivers using the right turn channel do not yield before continuing onto WR52 west of the intersection.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 52	Assumed 1,500-6,000	50	3.5 – 4.5
Ninth Line	5,688	50	3.5 – 4.5

Identified Hazards

No hazards were identified.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. There have been three collisions at this location over the ten year review period. All three collisions were Property Damage Only collisions with two being the result of Inattentive Driving and one that was Speed Related.

Operating Speeds

No operating speed audit information was made available for this intersection.

PUBLIC CONCERNS

No information regarding public concerns was provided for this intersection.

RECOMMENDED SOLUTION

The following issues were identified at this intersection:

- Sight distances to adjacent intersections.

In order to address the identified issue, it is recommended that the right turn channel be replaced with either a Smart Channel or a right turn lane located immediately adjacent to the existing left turn lane and that the intersection be converted to all-way stop control. Given the lack of traffic data for this location, it is recommended that the County undertake additional counts prior to reconstructing this intersection to determine warrant for an eastbound left turn lane and the existing southbound right turn lane (appears to predate other network improvements).

Construction costs are associated with removal of the right turn channel and island, lane painting and addition of a stop sign on southbound WR52. Estimated cost of $40,000.

ADDITIONAL NOTES:

None.

Intersection Assessment

Intersection Location:	Wellington Road 18 & David Street (Intersection 15)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery; and
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 18

Detail	Existing Condition
Primary Direction	North-South
County Road #	18
Local Name	Geddes Street
Jurisdiction	Centre Wellington
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches and Curb & Gutter with Catch Basins
Shoulder Width & Material	Paved Shoulder
Active Transportation Accommodation	1.5 m asphalt sidewalks

Minor Roadway: David Street

Detail	Existing Condition
Primary Direction	East-West
County Road #	
Local Name	David Street
Jurisdiction	Centre Wellington
Posted Speed (km/h)	None (Assumed 50)
# of Lanes	2

Detail	Existing Condition
Divided / Undivided	Undivided
Drainage Type	Ditches and Curb & Gutter with Catch Basins
Shoulder Width & Material	Paved shoulder
Active Transportation Accommodation	1.5 m asphalt sidewalks

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway
Existing Auxiliary Lanes	None
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

No traffic data was available for this intersection in order to establish signal warrant.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. The intersection contains four legs at approximately 90 degrees to each other. WR18 is linear east of the intersection, and has a large radius curve (~2000 m) approximately 100 m to the west. David Street is linear north of the intersection, and has ~ 200 m curve approximately 75 m south of the intersection at Irvine Creek. Given the low operating speeds and urban context of the area, the small radius curve on David Street is not considered a concern.

No design drawings were made available to check the vertical alignment for adherence to TAC standards. Based on observation, there does not appear to be issues in terms of vertical design at this intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A15**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	110	Yes
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	150	No – Vegetation
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	130	No – Vegetation
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	130	No – Vegetation

There are sight distances issues identified with making turns off of David Street on WR18. The required sight distances are partially obscured by landscaping and mature trees.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 18	Assumed 1,500 - 6,000	50	3.5-4.5
David Street	Assumed 1,500 - 6,000	None (Assumed 50)	3.5-4.5

Identified Hazards

There are multiple hazards located within the TAC clear zone of both roadways. However, the existing curb and gutter is considered sufficient protection at the low posted speeds on these roadways.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collisions per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are Fail to Yield at 71% of the collisions followed by Speed Related collisions at 14%. There were no fatal collisions at this intersection during the period and analysis reveals 14% of collisions at this location result in personal injury.

Operating Speeds

No operating speed audit information was made available for this intersection.

PUBLIC CONCERNS

"The south corner is a busy corner and is very dark for pedestrians."

RECOMMENDED SOLUTION

Based on the review of the existing condition, the following issues are to be addressed:

- Sight distances are impacted by existing vegetation.

While issues associated with vegetation within sight triangles is generally addressed through removal of that vegetation, this would impact that character of the area. As a result, it is recommended that the intersection be converted to all-way stop control to mitigate the sight distance issue. The estimated cost for this solution is $5,000.

ADDITIONAL NOTES:

None.

Intersection Assessment

Intersection Location:	Wellington Road 22 (East) & Wellington Road 26 (Intersection 16)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Contract drawings by Duncan Hopper & Associates Limited dated July 2, 1968; and
- An on-site review was conducted at this intersection on Friday, January 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 26

Detail	Existing Condition
Primary Direction	North-South
County Road #	26
Local Name	
Jurisdiction	Guelph - Eramosa
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 22

Detail	Existing Condition
Primary Direction	East-West
County Road #	22
Local Name	
Jurisdiction	Guelph - Eramosa

Detail	Existing Condition
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway by stop sign with flashing beacon
Existing Auxiliary Lanes	Southbound right turn lane
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

No traffic data was made available for this intersection to establish TAC warrant for traffic signals.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. This intersections consists of a three-way intersection with stop control on WR22. Both roadways are linear within several hundred meters of the intersection, and intersect an approximately 90 degrees.

Available contract drawings for WR26 were reviewed to establish vertical alignment at the intersection. WR22 intersections WR26 at a point of inflection of a sag curve. To the west of the intersection, WR26 has a profile slope of 0.8%, while to the east of the intersection the profile is at 2.6%, sloping down towards WR22. A crest vertical curve starts approximately 300 m east of the intersection on WR26. The vertical alignment is not expected to impact sight lines at the intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A16**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 26	1,953	80	8.0-9.0
Wellington Road 22	1,800	80	8.0-9.0

Identified Hazards

No hazards were identified.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collisions per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are "Inattentive Driver" at 42% of the collisions followed by "Fail to Yield" at 17% and Speed Related at 25%. There were no fatal collisions at this intersection during the period and analysis reveals 8% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S2601, located west of Sideroad 20, indicating an 85th percentile operating speed on WR26 of 108 km/h, which exceeds the posted speed limit on that corridor by more than 30 km/h. Similar data was not available for WR22.

PUBLIC CONCERNS

No information regarding public concerns was provided for this intersection.

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Collision trends associated with "Inattentive Driver", and
- Operating speeds.

Alternatives there were considered include:

- Flatten crest curve east of the intersection and leave existing traffic control (estimated value of $1,260,000[1] plus property based on 300 m of road reconstruction;
- Addition of auxiliary lanes (northbound right and southbound left) to remove turning vehicles from the traffic stream on WR22 plus the addition of a flashing beacon (estimated cost of $330,000[2]); and
- Install a single lane roundabout (estimated cost of $1,640,000[3] plus property).

[1] Cost of road reconstruction assumes an average cost of $1,500/m/lane, plus a 40% contingency.
[2] Estimate based on the addition of an overhead beacon ($4,000) and two 20 m parallel lanes plus 115 m tapers at a cost of $1,500/m/lane, plus a 40% contingency.
[3] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

Due to differential in cost between the two alternatives, installation of auxiliary lanes to address the collision trend is recommended. This solution does not, however, address issues associated with speeding on WR22. Prior to making changes to the intersection, the County should conduct a traffic study to determine if additional traffic control is warranted as this may provide a stronger warrant for installation of signals or a roundabout.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Add northbound right and southbound left auxiliary lanes on WR 22 with an overhead flashing beacon.

Estimated cost of this alternative is $300,000 plus property.

ADDITIONAL NOTES:

None.

Intersection Assessment

Intersection Location:	Wellington Road 8 & Wellington Road 17 (Intersection 17)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on June 7, 2016; and
- As-built drawing produced by Automated Engineering Technologies Ltd. (2003).

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 17

Detail	Existing Condition
Primary Direction	North-South
County Road #	17
Local Name	
Jurisdiction	Centre Wellington
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 8

Detail	Existing Condition
Primary Direction	East-West
County Road #	8
Local Name	
Jurisdiction	Mapleton
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway, with 3-way flashing beacon yielding to major road.
Existing Auxiliary Lanes	Northbound left turn lane
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. At the time of data collection in 2016, Warrant 1 was satisfied to 80%. It has been assumed that the intersection would meet the full warrant at this point in time; however, this should be confirmed ahead of intersection modification through an updated traffic study.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. The alignment of WR17 is fairly straight adjacent to the intersection, while WR8 is curved immediately at the intersection to partially address a skew. In its present condition, WR8 intersects WR17 at approximately 84 degrees, which is within the range considered acceptable per TAC standards.

Contract drawings for WR17 at WR8 were reviewed to determine vertical alignment information for WR17. Based on the provided drawings, the intersection is located at the approximate high point of a crest curve, with a profile slope of 1.8% west of the intersection and a slope of 8.75% east of the intersection, both trending down away from WR8. There are potential sight distance issues associated with the east leg of the intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A17**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	No (westbound)
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	No (eastbound)
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	No
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	No

There are existing sight distance deficiencies associated with the east approach to the intersection due to the vertical alignment of WR8.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a

function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 17	5,076	80	8.0-9.0
Wellington Road 8	4,003	80	8.0-9.0

Identified Hazards

No hazards were identified.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are two intersection related collision per year at this location. Collisions at this location are trending lower over the period reviewed. The leading primary cause(s) of collisions at this location are "Speed Related" at 31 % of collisions followed by "Fail to Yield" as well as other collisions at 19% each. There were no fatal collisions at this intersection during the period and the analysis reveals 19% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S1702, located north of Third Line, indicating an 85th percentile operating speed on WR17 of 107 km/h, which exceeds the posted speed limit on that corridor by more than 25 km/h. Similar data was not available for WR8.

PUBLIC CONCERNS

"In the winter if the roads have not been heavily gritted the down slop from CR8 to the T joint with CR17 can be an ice rink."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Operating speeds; and
- Sight distances.

In order to address the need for additional traffic control and speed management, the following solutions were considered for this location:

- A single lane roundabout (estimated value of $1,640,000[1] plus property); or
- Traffic signals with a dedicated lane and signal phase (with detection) for eastbound left turns, a right turn lane for westbound traffic, "right on red" restrictions for southbound traffic on WR17 (estimated value of $700,000[2] plus property).

Due to the steep profile on the east leg of the intersection, installation of a roundabout was not considered feasible at this location. However, it would otherwise be a good solution for this intersection where the AADT values for each roadway are fairly balanced.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Traffic signals with a dedicated lane and signal phase (with detection) for eastbound left turns, a right turn lane for westbound traffic, "right on red" restrictions for southbound traffic on WR17 (estimated value of $700,000 plus property).

ADDITIONAL NOTES:

None.

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.
[2] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate three 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 8 & Wellington Road 10 (Intersection 18)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area downloaded from Bing Maps using the Autodesk mapping tool;
- Google Earth ground level imagery; and
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 8

Detail	Existing Condition
Primary Direction	East-West
County Road #	8
Local Name	
Jurisdiction	Mapleton
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 10

Detail	Existing Condition
Primary Direction	North-South
County Road #	10
Local Name	
Jurisdiction	Mapleton
Posted Speed (km/h)	80
# of Lanes	2

Detail	Existing Condition
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway, 4-way flashing beacon yielding to major roadway
Existing Auxiliary Lanes	Right turn lanes along major roadway
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

No traffic data was provided for this intersection in order to establish signal or auxiliary lane warrant.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. In terms of horizontal alignment, both roadways are linear within several hundred meters of the intersection and meet at approximately 90 degrees. There are no concerns in terms of the horizontal alignment at this intersection.

No drawings were made available to check the vertical alignment for the approaches to the intersection. Based on observation, WR10 is rolling on approach to the intersection but this does not obscure sight distances. West of the intersection, WR8 is similar to WR10 with a rolling profile that does not impact sightlines. To the east, there is a crest curve that peaks approximately 150 m from the intersection that drops sightlines below those required for stopping, decision or departure.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A18**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	No (eastbound)
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	No (eastbound)
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	No
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	No
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	No

There are sight distances issues associated with the vertical alignment of WR8 east of the intersection.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 8	2,744	80	8.0-9.0
Wellington Road 10	1,010	80	6.0-7.5

Identified Hazards

No hazards were identified.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location. Collisions at this location are trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are "Fail to Yield" at 83% followed by "Improper Turn / Movement" as well as Animal / Debris collisions at 8% each. There were no fatal collisions at this intersection during the period however the analysis reveals 50% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S1001 located north of the intersection. The speed audit indicated an 85th percentile operating speed on WR10 of 69 km/h, which is lower than posted. Similar data was not available for WR8.

PUBLIC CONCERNS

"The south corner should have rumble strips cut into pavement to make drivers more aware of stops signs."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Sight distances.

In order to address the identified safety issue, the following alternative solutions can be considered:

- Flatten crest curve east of the intersection and leave existing traffic control (estimated value of $1,260,000[1] plus property based on 300 m of road reconstruction; and
- Convert intersection to all-way stop control with "Stop Ahead" signage added on the east approach. Overhead flashers would also be beneficial to alert all directions to the presence of the intersection. Estimated value of this solution is $8,000[2].

Due to significant sight distance issues, installation of a traffic signal is not considered to be a viable solution. On the other hand, installation of all-way stop control will alleviate issues associated with sight distances, provided drivers obey this form of traffic control. This solution could be used to provide a temporary solution until such time as budget is available to correct the profile.

[1] Cost of road reconstruction assumes an average cost of $1,500/m/lane, plus a 40% contingency.
[2] Installation of All-Way Stop Control with an overhead beacon estimated at $5,600 for signs, posts and beacon, plus approximately 40% contingency.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- In the interim, convert intersection to all-way stop control with "Stop Ahead" signage added on the east approach. Overhead flashers would also be beneficial to alert all directions to the presence of the intersection.
- Ultimately, reconstruct the roadway east of the intersection to address the vertical alignment.

Total estimated cost of this solution is $8,000 (interim) plus $1,260,000 ultimate.

ADDITIONAL NOTES:

None.

Intersection Assessment

Intersection Location:	Wellington Road 7 & Wellington Road 11 (Intersection 19)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area dated January 2021 were downloaded from Bing maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on August 15, 2012; and
- Letters, emails and meeting minutes provided by the public to County staff.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 7

Detail	Existing Condition
Primary Direction	East-West
County Road #	7
Local Name	
Jurisdiction	Mapleton
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 11

Detail	Existing Condition
Primary Direction	North-South
County Road #	11
Local Name	
Jurisdiction	Mapleton
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway, with 4-way flashing beacon yielding to major roadway
Existing Auxiliary Lanes	Right turn lanes off major roadway
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 1&2)
Left Turn Lane Warrant	Northbound	No
	Southbound	No
	Eastbound	No
	Westbound	No

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Both roadways are linear within several hundred meters of the intersection with the approach interesting at approximately 90 degrees. There are no concerns with respect to horizontal alignment at this intersection.

No drawings were provided to formally check the vertical profiles adjacent to this intersection. However, there are observable crest curves on the east, west and south approaches to the intersection. These vertical curves may be an issue in terms of providing adequate sight distances.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A19**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 7	5,230	80	8.0-9.0
Wellington Road 11	2,215	80	8.0-9.0

Identified Hazards

No hazards were identified.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there are two intersection related collision per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are Fail to Yield at 44% of the collisions followed by Speed Related at 25%. There were no fatal collisions at this intersection during the period however analysis reveals 38% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S1101, located south of WR7, indicating an 85th percentile operating speed on WR11 of 108 km/h, which exceeds the posted speed limit on that corridor by more than 25 km/h. Similar data was not available for WR7.

PUBLIC CONCERNS

"Some people consistently speed from WR7 into and from Drayton along WR11. People take advantage of the hill in Bosworth to speed well above the posted limit. Never have I seen a police officer set a speed trap though this stretch."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Traffic operations; and
- Operating speeds.

In order to address the need for additional traffic control and speed management, implementation of either a roundabout or traffic signals was evaluated for the intersection. Installation of a 40-60 m roundabout at this location will have impacts on adjacent residential properties. For this reason, signalization of the intersection is preferred.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Complete additional traffic counts to determine warrant for auxiliary lanes (last count is nearly 10 years old);
- Review and amend corner radii as required; and
- Install traffic signals.

The estimated cost to signalize the intersection without the addition of auxiliary lanes is $210,000[1].

ADDITIONAL NOTES:

None.

[1] Cost of signalization includes an estimated $150,000 of infrastructure plus a 40% contingency.

Intersection Assessment

Intersection Location:	Wellington Road 7 & Wellington Road 10 (Intersection 20)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area dated January 2021 were downloaded from Bing maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on August 16, 2012; and
- Letters, emails and meeting minutes provided by the public to County staff.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 7

Detail	Existing Condition
Primary Direction	East-West
County Road #	7
Local Name	Elora Street
Jurisdiction	Mapleton
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Curb & Ditch Inlet
Shoulder Width & Material	~ 2 m paved & granular shoulder
Active Transportation Accommodation	1.2 m conc. sidewalk

Minor Roadway: Wellington Road 10

Detail	Existing Condition
Primary Direction	North-South
County Road #	10
Local Name	Catherine Street
Jurisdiction	Mapleton
Posted Speed (km/h)	50
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Curb & Dicth Inlet
Shoulder Width & Material	~ 1 m paved shoulder
Active Transportation Accommodation	1.2m conc. sidewalk

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway, 4-way flashing beacon indicating need to yield to major roadway
Existing Auxiliary Lanes	None
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff in 2012. At the time, traffic signals were not warranted at this location. It is recommended that updated counts be collected at this intersection.

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. This junction is a t-intersection, with both WR7 and WR10 having a

linear horizontal alignment within several hundred meters of the intersection. No concerns in terms of the horizontal alignment at this intersection.

No contract or as-built drawings were provided for this intersection to check the vertical profile. However, it is evident that WR7 has a steep slope down from east to west, with a vertical crest curve located approximately 70 m to the west of this intersection (half way to James Street North). WR 10 north of the intersection (known as Catherine Street) also slopes down towards the intersection, with a crest curve at Head Street, approximately 80 m north of the intersection. The alignment of both roadways has the potential to impact sight distances.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 1**. Sight distance diagrams are provided in **Appendix A20**.

Table 1: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	105	No (eastbound)
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	110	No (westbound)
Minor Road	Minimum Stopping Sight Distance	105	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	150	No (northbound)
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	130	No (northbound)
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	130	No

There are departure and stopping sight distance issues related to the crest curve immediately west of this intersection.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 2**.

Table 2: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 7	Assumed 1,500-6,000	50	3.5-4.5
Wellington Road 10	663	50	2.0-3.0

Identified Hazards

There are utility poles located within the clear zone within all quadrants of the intersection. Additionally, embankment slopes in the southeast quadrant of the intersection and along the south leg of WR10 may warrant guiderail.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. Only two collisions were recorded at this location over the review period. Both collisions were Property Damage Only collisions with one being the result of Failing to Yield and one that was Speed Related.

Operating Speeds

No operating speed audit information was made available for this intersection.

PUBLIC CONCERNS

"Poor visibility here, due to the hill, for vehicles coming off of the side street and either crossing County road 7, or turning on to it."

"People drive through Rothesay like it's a race track. Put in lights and make County Road 7 and Catherine to County Road 10 a four-way stop intersection."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Sight distances at the intersection.

In order to address the issue with sightlines at the intersection, the following alternative solutions were considered:

- Flatten the vertical profile of WR7 between James and Catherine Street; and
- Install four way stop control with advanced warning signs at the intersection of WR7 and Catherine Street/ WR10.

Given the posted speeds on the intersecting roadways, introduction of all-way stop control is considered an acceptable solution to address the lack of adequate sight distances. Should budgets permit, the ideal solution would be to address the crest curve on WR7 west of the intersection.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Install four way stop control with advanced warning signs at the intersection of WR7 and Catherine Street/ WR10; and
- Improve curb radii and existing sidewalks

The estimated cost of these improvements is $20,000.

ADDITIONAL NOTES:

- Parking lot entrance merged with curb return along east corner.
- Large turning radius along west corner.
- Wheel impact with face of curb along east corner.
- Significant cracking in concrete sidewalk ramp along north corner.
- Sidewalks are not wide enough and are in poor condition.
- A potential roundabout solution was considered for this location; however, it was screened out due to direct impacts to adjacent residential properties.

Intersection Assessment

Intersection Location:	Wellington Road 44 & Eramosa-Milton Townline (Intersection 21)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area dated January 2021 were downloaded from Bing maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on August 8, 2018; and
- Letters, emails and meeting minutes provided by the public to County staff.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 44

Detail	Existing Condition
Primary Direction	East-West
County Road #	44
Local Name	Guelph Line
Jurisdiction	Eramosa
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved/gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Halton Regional Road 32

Detail	Existing Condition
Primary Direction	North-South
County Road #	32
Local Name	Wilson Street / Eramosa – Milton Townline
Jurisdiction	Eramosa
Posted Speed (km/h)	Southbound 60 / Northbound 80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 1-2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	4-way stop controlled.
Existing Auxiliary Lanes	None
Intersection Lighting	Yes (1 light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		No
Left Turn Lane Warrant	Northbound	No
	Southbound	No
	Eastbound	Yes – 15 m Storage
	Westbound	Yes – 15 m Storage

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Eramosa-Milton Townline and the northbound approach of WR44 are linear within several hundred meters of the intersection. The southbound approach of WR44 is curvilinear on approach to the intersection, with an approximately 165 m radius curve immediately north of the intersection. This curve does not meet TAC standards for the posted speed limit. As this curve is on approach to a stop sign, it is not considered as issue as long as adequate stopping sight distances are provided.

No contract or as-built drawings were available to check the vertical profile for the approaches to this intersection. The intersection is located at a sag vertical curve on WR44, which is anticipated to limit visibility of the intersection – particularly from the northbound approach. Eramosa-Milton Townline is also rolling on approach to the intersection, though sightlines appear to be acceptable.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A21**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
Minor Road	Minimum Stopping Sight Distance	130 (north)/ 185 (south)	No

There are issues in terms of stopping sight distance on southbound Eramosa-Milton Townline caused by the horizontal alignment, and on northbound Eramosa-Milton Townline caused by the vertical alignment. As this intersection is four-way stop controlled, this issue can be at least partially mitigated through installation of advanced warning signs and an overhead flashing beacon.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 44	Assumed 1,500 – 6,000	80	8.0-9.0
Eramosa-Milton	Assumed 1,500 – 6,000	60 (North)/ 80 (South)	5.0-5.5 / 8.0-9.0

Identified Hazards

There are very narrow shoulders and fairly steep embankments on the Eramosa-Milton Townline in the northeast quadrant of the intersection, adjacent to the creek. It is recommended that guiderail be installed along the north shoulder.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location. Collisions at this location appear to be trending higher over the period reviewed. The leading primary cause(s) of collisions at this location are "Speed Related" at 43% of the collisions followed by "Fail to Yield" at 29%. There were no fatal collisions at this intersection during the period; however, analysis reveals 14% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S4401, located west of Indian Trail, indicating an 85th percentile operating speed on WR44 of 89 km/h, which exceeds the posted speed limit on that corridor by nearly 10 km/h. Similar data was not available for Eramosa-Milton Townline.

PUBLIC CONCERNS

"Wellington Rd 44 & Milton/ Eramosa Town Line. Significant number of vehicles run the stop sign daily."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Upward trend in collisions (primarily related to operating speeds);
- Warrant for left turn lanes on Guelph Line; and
- Roadside safety.

Alternative solutions to be considered to address collision trends related to speeding include the following:

- Installation of a roundabout (estimated construction cost of $1,640,000[1] not including property); and
- Install left turn lanes on Guelph Line plus add enhanced pavement markings and signage on approach to the intersection (estimated cost of $250,000[2], plus property).

In all instances, installation of guiderail should be considered adjacent to the creek.

Given the proximity of existing residential properties to this intersection, installation of a roundabout is not recommended.

RECOMMENDED SOLUTION

The following design changes are recommended at the subject intersection:

- Addition of guiderail along the northeast side of Eramosa-Milton Townline to address the lack of shoulders and steep embankments along the creek;
- Add left turn lanes for east and westbound traffic on Guelph Line;
- "Stop Ahead" signs added on approach to the intersection; and
- Consideration for transverse pavement markings on approach to the intersection to further alert drivers to the need to reduce speeds.

Estimated cost of the recommended improvements is $280,000 including guiderail, plus property.

The County should continue to monitor volumes at this intersection as signals may soon be warranted.

---

[1] Roundabout cost based on recent Wellington County tenders for roundabouts at WR109/WR5 and WR8/WR12 that were bid at an average of $1.45M and $0.89M, respectively, plus a 40% contingency.

[2] Cost of widening to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency. Enhanced pavement markings and signage valued at approximately $5,000.

ADDITIONAL NOTES:

Intersection to be maintained by Halton Region.

Intersection Assessment

Intersection Location:	Wellington Road 25 & Wellington Road 124 (Intersection 22)

The following report provides details related to operational and safety issues identified for the subject intersection. Note that this assessment and proposed solutions are not to be considered comprehensive. This evaluation was completed to assist with prioritization and identification of alternative solutions to address existing issues as identified by Wellington County staff.

DATA SOURCES

The following data sources were utilized during the review:

- Aerial photography for the study area dated January 2021 were downloaded from Bing maps using the Autodesk mapping tool;
- Google Earth ground level imagery;
- Collision records were provided by the Ontario Provincial Police for the period of 2009-2019;
- Traffic data collection and signal warrant analysis was completed by Wellington County staff on June 18, 2019;
- Contract drawings produced by Delcan for the Ministry of Transportation, 1997; and
- An on-site review was conducted at this intersection on Friday, November 8, 2021.

Note that topographical survey data was not available. Centerlines, edge of pavement, edge of shoulder, ditch lines and locations of existing utilities were all approximated from the aerial photography and confirmed on-site.

EXISTING CONDITIONS

Transportation Facilities

The following sections describe the existing transportation facilities at the subject intersection.

Major Roadway: Wellington Road 124

Detail	Existing Condition
Primary Direction	East-west
County Road #	124
Local Name	
Jurisdiction	Erin
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m paved/gravel shoulder
Active Transportation Accommodation	None

Minor Roadway: Wellington Road 25

Detail	Existing Condition
Primary Direction	North-South
County Road #	25
Local Name	Winston Churchill Boulevard
Jurisdiction	Erin
Posted Speed (km/h)	80
# of Lanes	2
Divided / Undivided	Undivided
Drainage Type	Ditches
Shoulder Width & Material	~ 2 m gravel shoulder
Active Transportation Accommodation	None

Intersection Design

Detail	Condition
Existing Traffic Control Type	Stop controlled on minor roadway, flashing beacons on stop signs.
Existing Auxiliary Lanes	None
Intersection Lighting	Yes (1 Light)

OPERATIONAL AND SAFETY REVIEW OF EXISTING CONDITION

Existing conditions within the study area were examined for the following:

- Warrant for additional traffic control based on volumes and/or collision frequency;
- General adherence of the geometric design to applicable standards;
- Adequacy of sight distances at intersections and pedestrian crossings;
- Adequacy of streetlighting for the types of adjacent land uses;
- Roadside safety related to unprotected hazards located within the clear zone; and
- Trends in the location, frequency or type of collisions occurring within the study area.

Traffic Signal Warrant

Traffic counts were collected and traffic signal warrant was assessed by Wellington County staff. Traffic volumes were also used to determine warrant for left turn lanes using the nomographs provided in the MTO Supplement to the TAC Geometric Design Guide. For simplicity, all auxiliary lane analysis was completed assuming uncontrolled intersection design. The outcomes of this analysis are summarized in **Table 1**.

Table 1: Traffic Signal and Auxiliary Lane Warrant

Design Element		Warranted (Yes/No)
Traffic Control (Signal or Roundabout)		Yes (Warrant 1&2)
Left Turn Lane Warrant	Northbound	No
	Southbound	>50% Vehicle Approaching
	Eastbound	Yes – 15 m Storage
	Westbound	Yes – 15 m Storage

Geometric Design

The general horizontal design of the intersection and its immediate approaches were checked based on current TAC geometric standards. Both WR25 and WR124 are linear for several hundred meters on approach to the intersection. The two roads intersect at nearly 90 degrees. There are no concerns in terms of the horizontal alignments at this intersection.

Contract drawings were provided by Wellington County and were reviewed to establish vertical alignment characteristics for the intersection. The intersection is located on a 3.8% slope (trends down to the east) along WR25, approximately 300 m east of a crest curve. WR124 has a slope of 3% through the intersection, trending down towards the south. There are no identified concerns in terms of vertical alignment at this intersection.

Sight Distances

Stopping and decision sight distances were checked for each of the intersections in accordance with the TAC Geometric Design Guide for Canadian Roads, Chapter 9. Providing adequate sight distances at intersections allows drivers to see approaching vehicles or upcoming hazards with sufficient time to react accordingly – provided road users are operating acceptably considering posted speeds and weather conditions. Recommended minimum stopping and decision sight distances for each of the road corridors are identified in **Table 2**. Sight distance diagrams are provided in **Appendix A22**.

Table 2: Outcome of Sight Distance Review

Sight Distance Criteria		Distance (m)	Meets Standards
Major Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Decision Sight Distance (Left Turn on Major Road, Case F)	155	Yes
Minor Road	Minimum Stopping Sight Distance	185	Yes
	Minimum Departure Sight Distance (Left Turn from the Minor Road, Case B1)	210	Yes
	Minimum Departure Sight Distance (Right Turn from Minor Road, Case B2)	185	Yes
	Minimum Departure Sight Distance (Crossing Major Road, Case B3)	185	Yes

No deficiencies were identified based on the sight distance analysis completed as a component of this study.

Roadside Safety

A review of roadside safety considers the potential for vehicles to encounter hazards within proximity to the roadway that could cause significant harm to vehicles and passengers. These hazards include steep embankments, standalone mature trees, and non-breakaway poles that are located close enough to the travel lanes that drivers leaving the road do not have time to stop before encountering them. The distance from the roadway within which hazards are considered is known as the 'clear zone', and is a function of both traffic volumes and operating speeds. Hazards can generally be addressed through removal, protection using guiderail, or reducing travel speeds.

Clear Zone

The clear zones for each of the study corridors are summarized in **Table 3**.

Table 3: Clear Zone Distances for Each Study Corridor.

Roadway	Estimated AADT	Posted Speed (km/h)	TAC Clear Zone
Wellington Road 124	7,068	80	9.0-10.0
Wellington Road 25	2,866	80	8.0-10.0

Identified Hazards

A utility pole was located at the west of the intersection along Wellington Road 25 within clear zone distance. Additionally, a number of the ditches have what appear to be non-recoverable slopes in close proximity to the intersection. Regrading is recommended.

Collision Records

Collision records were provided by the OPP. This data was reviewed to determine if there were specific locations associated with significantly more collisions, as well as to whether a particular type of collision has occurred more frequently within a specific location within the study area. On average there is one intersection related collision per year at this location. Collisions at this location appear to be trending lower over the period reviewed. The leading primary cause(s) of collisions at this location are "Fail to Yield" at 64% of the collisions followed by "Improper Turn / Movement" at 18%. There were no fatal collisions at this intersection during the period; however, analysis reveals 27% of collisions at this location result in personal injury.

Operating Speeds

Speed audits were completed by Wellington County in 2019, with audit site S2501, located west of the intersection, indicating an 85th percentile operating speed on WR25 of 99 km/h, which exceeds the posted speed limit on that corridor by approximately 20 km/h. Similar data was not available for WR124.

PUBLIC CONCERNS

"Bad accidents happen here. Large dumptrucks and long trucks on their way to Alliston. Could do with lights here."

"This is an ideal place for a roundabout which is safer and more efficient than traffic lights."

ALTERNATIVE SOLUTIONS

Based on the review of the existing condition, the following issues are to be addressed:

- Traffic operations; and
- Operating speeds.

In order to address the need for additional traffic control and speed management, implementation of either a roundabout or traffic signals with auxilarly lanes on WR124 were evaluated for the intersection. Due to the proximity of a pond in the northwest quadrant, a creek immediately to the east, and what appears to be dense forest in the southwest and northeast quadrants, a roundabout is not recommended at this location.

RECOMMENDED SOLUTION

Based on review of the existing operational and safety conditions, the following design changes are recommended at the subject intersection:

- Introduce traffic signals,
- Regrade ditches to a recommended 3:1 slope within proximity to the intersection; and
- Add dedicated left turn lanes on both approaches of WR124.

The estimated cost of these improvements is $540,000[1].

ADDITIONAL NOTES:

- Non recoverable ditches along each corner of the intersection.
- Edge of pavement is indicated at these corners with a mountable concrete curb.
- Guiderails just north of intersection.
- Maintain intersection as stated in agreement with Peel region.
- Solmar (Erin) improvements should be included as a part of the Development Charges list.

[1] Cost of signalization plus widening to accommodate auxiliary lanes assumes an average cost of $150,000 for signal infrastructure, widening plus regrading to accommodate two 20 m parallel lengths and 115 m tapers ($1,500/m/lane), plus a 40% contingency.

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E.G.	M.K.
DATE	Jan. 2021
SCALE	1:500

WELLINGTON ROAD 18 & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 18 & WELLINGTON ROAD 26

SHEET NO. **01**

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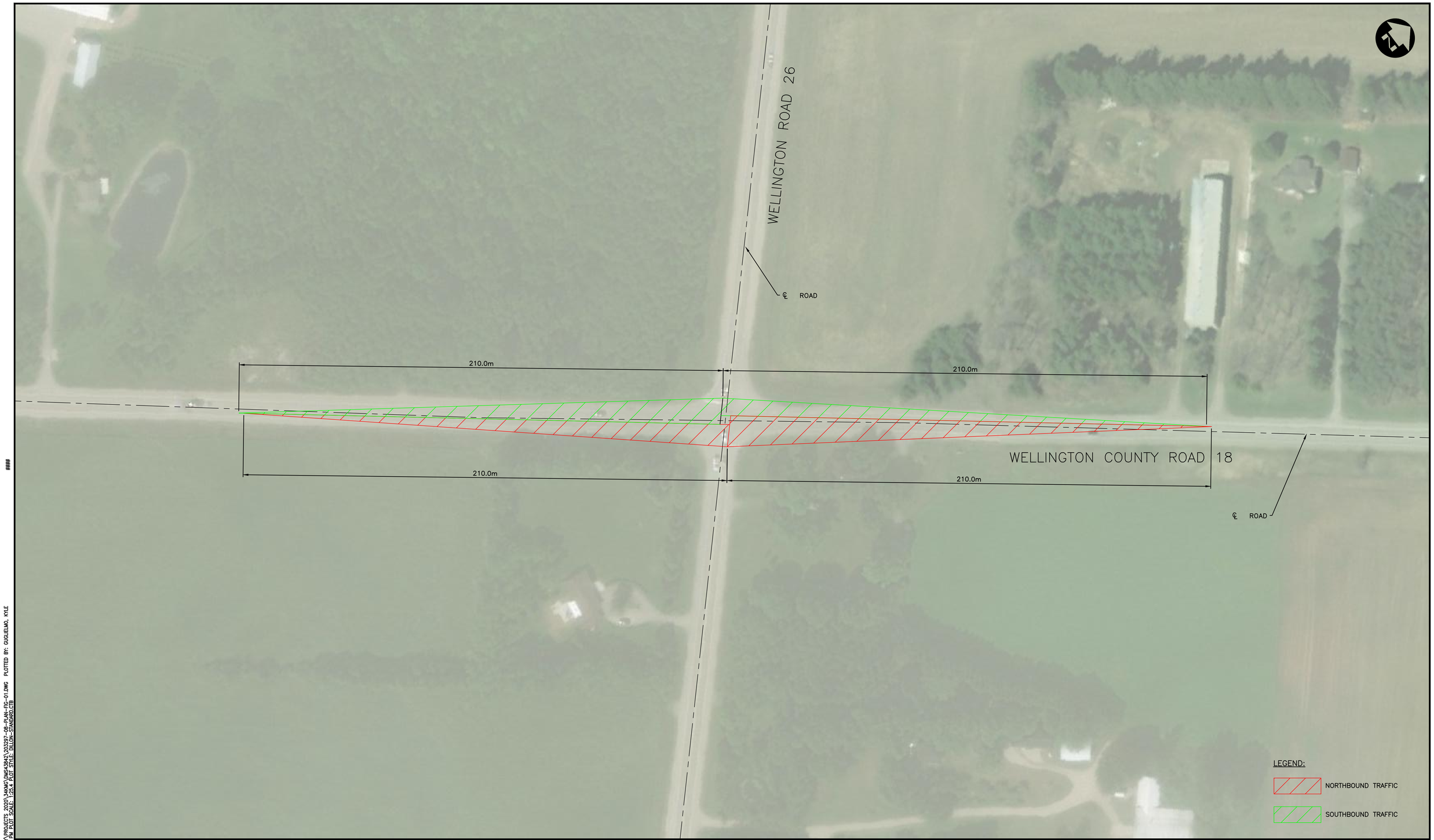
WELLINGTON ROAD 18 & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 18

SHEET NO. 02



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WELLINGTON ROAD 18 & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 26

SHEET NO. **03**

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WELLINGTON ROAD 18 & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 18 & WELLINGTON ROAD 26

SHEET NO. 04

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WELLINGTON ROAD 18 & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 18 & WELLINGTON ROAD 26

SHEET NO. 05

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PRELIMINARY
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U/G BELL
SIB
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CP
TCP
SN
GARDEN
PORCH
HOUSE
8703
DRIVEWAY
CHAIN LINK FENCE
GRASS COVERED GRAVEL ENTRY
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350ø
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WELLINGTON ROAD 24 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 24 & WELLINGTON ROAD 124

PROJECT NO.: 203297

SHEET NO.: 01

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WELLINGTON ROAD 24 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

MAJOR/MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 24 & WELLINGTON ROAD 124

PROJECT NO. 203297

SHEET NO. **02**

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WELLINGTON ROAD 24 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

MAJOR/MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 24 & WELLINGTON ROAD 124

PROJECT NO. 203297

SHEET NO. 03

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-02.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:49:46 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

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DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
SCALE: 1:200	

WELLINGTON ROAD 24 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 24 & WELLINGTON ROAD 124

SHEET NO. **04**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
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WELLINGTON ROAD 7 & WELLINGTON ROAD 12
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 12

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-03.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:51:11 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
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WELLINGTON ROAD 7 & WELLINGTON ROAD 12
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 12

PROJECT NO. 203297

SHEET NO. **02**

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-03.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:51:14 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-03.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:51:19 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
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WELLINGTON ROAD 7 & WELLINGTON ROAD 12
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 7

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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WELLINGTON ROAD 7 & WELLINGTON ROAD 12
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 12

PROJECT NO. **203297**

SHEET NO. **04**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DATE: Jan. 2021	
SCALE: 1:750	

WELLINGTON ROAD 7 & WELLINGTON ROAD 12
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT WELLINGTON ROAD 7 & WELLINGTON ROAD 12

PROJECT NO. 203297

SHEET NO. 05

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-03.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:51:29 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB


WELLINGTON ROAD 12
WELLINGTON ROAD 7
PRELIMINARY
SILO
FENCE
ARMOUR STONE
GARDEN
GRAVEL DRIVEWAY
EDGE OF PAVEMENT
BOTTOM OF DITCH
TOP OF BANK
EDGE OF SHOULDER
EX. ℄ OF ROAD
EDGE OF FIELD
U/G BELL
ASPHALT DRIVEWAY
GARAGE
WELL

Conditions of Use

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WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

EXISTING SITE PLAN
WELLINGTON ROAD 8 & WELLINGTON ROAD 9

SHEET NO. **01**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-04.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:51:52 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-04.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:51:55 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:1000

WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 8

SHEET NO. **02**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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K.G.	M.K.
DRAWN	**CHECKED BY**
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:100

WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 9

PROJECT NO. 203297

SHEET NO. 03

###

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-04.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:52:00 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

PERTH COUNTY ROAD 91

WELLINGTON COUNTY ROAD 9

WELLINGTON ROAD 8

8.0–9.0m

℄ ROAD

EDGE OF TRAVEL WAY

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
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DESIGN: K.G. | REVIEWED BY: M.K.
DRAWN: E.G. | CHECKED BY: M.K.
DATE: Jan. 2021
SCALE: 1:1000

WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

SHEET NO. 04

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 8 & WELLINGTON ROAD 9

FILENAME: C:\PW_WORKING_DIRECTORY\PROJECTS_2020\340A6\DMS4384\203297-09-PLAN-FIG-04.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:06 PM PLOT SCALE: 125.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.
DATE	
Jan. 2021	
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No.	ISSUED FOR	DATE	BY

WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 8 & WELLINGTON ROAD 9

PROJECT NO. 203297

SHEET NO. 05

Conditions of Use

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DRAWN: E.G. CHECKED BY: M.K.
DATE: Jan. 2021
SCALE: 1:1500

WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

PROPOSED ROAD REALIGNMENT
WELLINGTON ROAD 8 & WELLINGTON ROAD 9

PROJECT NO. 203297

SHEET NO. 06

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-04.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:52:15 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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WELLINGTON ROAD 9

PERTH ROAD 91

WELLINGTON ROAD 8

EDGE OF FIELD

FENCE

BOTTOM OF DITCH

BOTTOM OF BANK

TOP OF BANK

EDGE OF PAVEMENT

EX. E OF ROAD

EDGE OF SHOULDER

600 dia CSP

NOTE

Conditions of Use

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REVIEWED BY	M.K.
DRAWN	E.G.
CHECKED BY	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 7 & WELLINGTON ROAD 18
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 18

SHEET NO. 01

FILENAME: C:\PW_WORKING DIRECTORY\PROJECTS 2020\34KMO\DMS-3842\203297-08-PLAN-FIG-05.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-02-03 @ 2:53:53 PM PLOT SCALE: 125.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-05.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:53:36 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DRAWN	CHECKED BY
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 7 & WELLINGTON ROAD 18
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 7

PROJECT NO. 203297

SHEET NO. 02

Conditions of Use

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DRAWN E.G. | CHECKED BY M.K.
DATE Jan. 2021
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WELLINGTON ROAD 7 & WELLINGTON ROAD 18
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 18

PROJECT NO. 203297

SHEET NO. 03

FILENAME: C:\PW_WORKING DIRECTORY\PROJECTS 2020\JAKMO\DMS-SB42\203297-08-PLAN-FIG-05.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-02-03 @ 2:53:41 PM | PLOT STYLE: DILLON-STANDARD.CTB
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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-05.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:53:46 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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E.G.	M.K.
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WELLINGTON ROAD 7 & WELLINGTON ROAD 18
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 18

SHEET NO. 04

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-05.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:53:51 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DRAWN	CHECKED BY
E.G.	M.K.
DATE	
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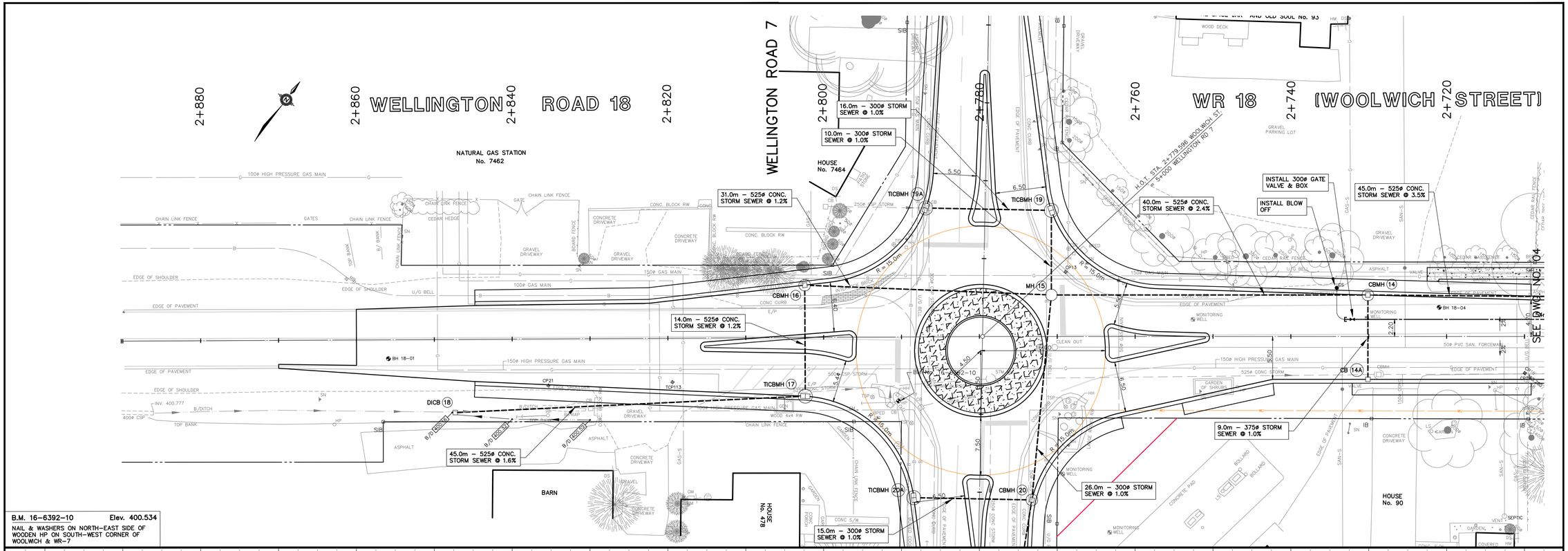
WELLINGTON ROAD 8 & WELLINGTON ROAD 9
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 7 & WELLINGTON ROAD 18

PROJECT NO.
203297

SHEET NO.
05



NOTES

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION AGAINST DAMAGE.

No	DATE	REVISION	INITIAL
1	NOV. 2018	ISSUED FOR M.O.E.C.C. APPROVAL	P.F.Z.

RECONSTRUCTION OF

WELLINGTON ROAD 18

(SALEM)

COUNTY OF WELLINGTON
74 WOOLWICH STREET
GUELPH, ON N1H 3T9

PLAN AND PROFILE

WOOLWICH STREET
STA. 2+710 TO WELLINGTON RD. 7

CONTRACT No	
PROJECT No	M6392
DRAWN BY:	A.S.B. (AutoCAD)
CHECKED BY:	D.P.S.
APPROVED BY:	P.F.Z.
DATE:	FEBRUARY 2017

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SCALES
1:250 HORIZONTAL
1:50 VERTICAL

DRAWING NUMBER 05

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-06.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:53:49 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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E.G.	M.K.
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WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH

PROJECT NO. 203297

SHEET NO. 01

Conditions of Use

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DATE Jan. 2021	
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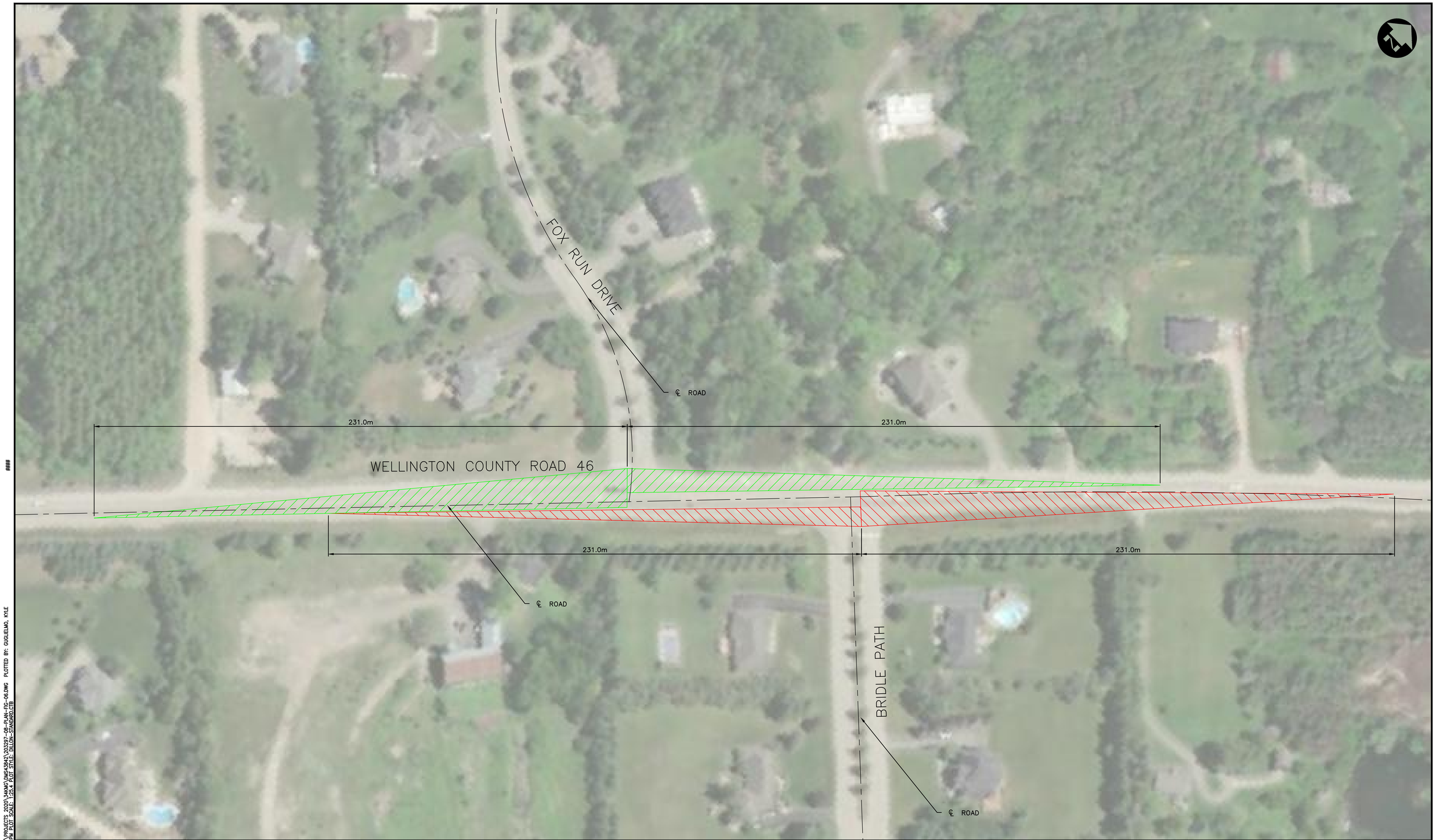
WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH ROAD MASTER ACTION PLAN

PROJECT NO. 203297

MAJOR ROADWAY SIGHT LINES PLAN WELLINGTON ROAD 46

SHEET NO. **02**



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DESIGN	K.G.
REVIEWED BY	M.K.
DRAWN	E.G.
CHECKED BY	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

SHEET NO. **03**

MINOR ROADWAY SIGHT LINES PLAN
FOX RUN DRIVE/BRIDLE PATH

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-06.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:54:02 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
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WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH

PROJECT NO. 203297

SHEET NO. 04

Conditions of Use

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K.G.	M.K.
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E.G.	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 46 & FOX RUN DRIVE/BRIDLE PATH

SHEET NO. **05**

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-06.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:54:07 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE Jan. 2021

SCALE 1:750

WELLINGTON ROAD 30 & GUELPH ROAD 3
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 30 & GUELPH ROAD 3

PROJECT NO. 203297

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-07.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:55:08 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-07.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:55:11 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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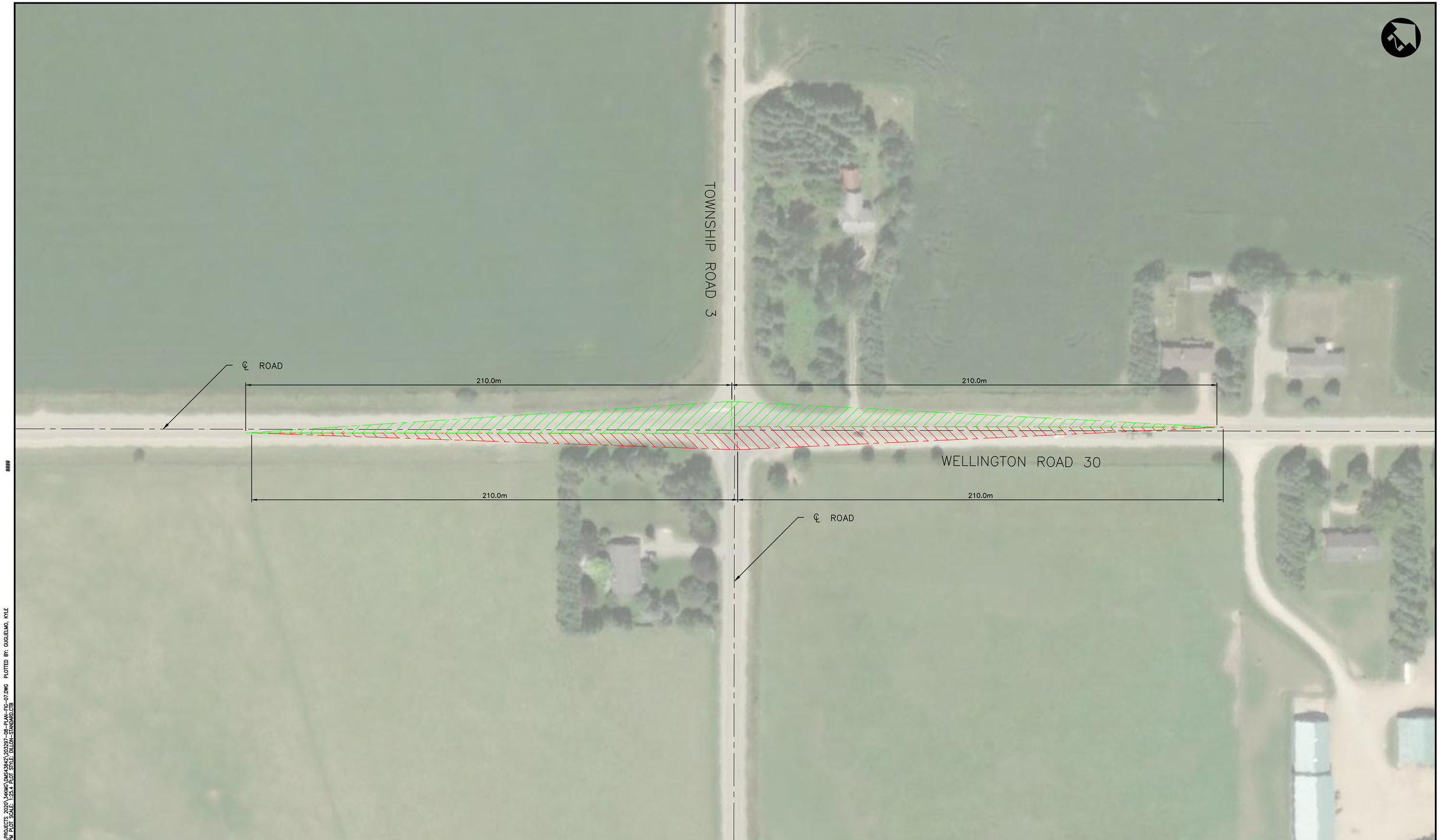
WELLINGTON ROAD 30 & GUELPH ROAD 3
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 30

PROJECT NO. 203297

SHEET NO. **02**



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DESIGN	K.G.
REVIEWED BY	M.K.
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DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 30 & GUELPH ROAD 3
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
TOWNSHIP ROAD 3

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

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WELLINGTON ROAD 30 & GUELPH ROAD 3
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 30 & GUELPH ROAD 3

PROJECT NO. 203297

SHEET NO. 04

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-07.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:55:21 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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WELLINGTON ROAD 30 & GUELPH ROAD 3
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 30 & GUELPH ROAD 3

SHEET NO. 05

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-07.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:55:26 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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DESIGN K.G.	REVIEWED BY M.K.
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DATE Jan. 2021	
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WELLINGTON ROAD 16 & WELLINGTON ROAD 109
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 16 & WELLINGTON ROAD 109

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-08.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:55:52 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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WELLINGTON ROAD 16 & WELLINGTON ROAD 109
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGH LINES PLAN
WELLINGTON COUNTY ROAD 109

PROJECT NO. 203297

SHEET NO. 02

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-08.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:56:00 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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WELLINGTON ROAD 16 & WELLINGTON ROAD 109
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 16

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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WELLINGTON ROAD 16 & WELLINGTON ROAD 109
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 16 & WELLINGTON ROAD 109

PROJECT NO. 203297

SHEET NO. 04

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020_34KMO DMS43842\203297-08-PLAN-FIG-08.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:56:05 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DATE Jan. 2021
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WELLINGTON ROAD 16 & WELLINGTON ROAD 109
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 16 & WELLINGTON ROAD 109

SHEET NO. 05

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-08.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:56:15 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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WELLINGTON ROAD 16 & WELLINGTON ROAD 109
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

PROPOSED ROAD REALIGNMENT
WELLINGTON ROAD 16 & WELLINGTON ROAD 109

SHEET NO. **06**

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-09.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:56:56 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 29

SHEET NO. **01**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGH LINES PLAN
WELLINGTON COUNTY ROAD 22

PROJECT NO. 203297

SHEET NO. 02

PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:58 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB
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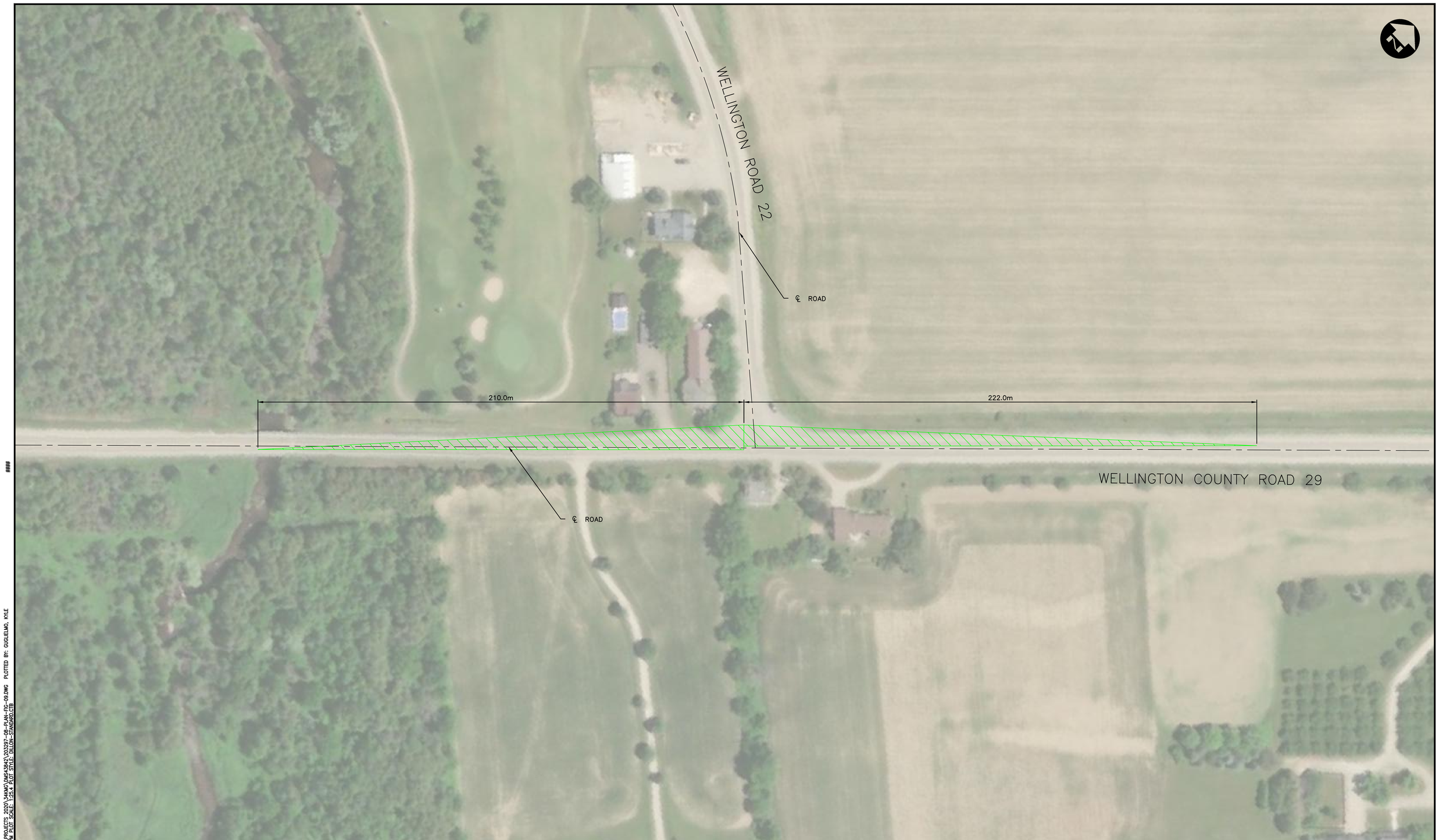

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DATE	Jan. 2021
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WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 29

PROJECT NO. 203297

SHEET NO. 03

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-09.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:57:09 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DILLON CONSULTING

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K.G.	M.K.
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E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 29

PROJECT NO. 203297

SHEET NO. 04

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-10.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:57:52 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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DATE: Jan. 2021	
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WELLINGTON ROAD 18 & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 18 & WELLINGTON ROAD 29

PROJECT NO. 203297

SHEET NO. 01

Conditions of Use

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DILLON CONSULTING

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DESIGN: K.G.	REVIEWED BY: M.K.
DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
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WELLINGTON ROAD 18 & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGH LINES PLAN
WELLINGTON COUNTY ROAD 18

PROJECT NO. 203297

SHEET NO. **02**

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-10.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:57:55 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-10.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:00 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 18 & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 29

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

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DILLON CONSULTING

DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.
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Jan. 2021	
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WELLINGTON ROAD 18 & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 18 & WELLINGTON ROAD 29

PROJECT NO. 203297

SHEET NO. 04

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
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WELLINGTON ROAD 18 & WELLINGTON ROAD 29
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 18 & WELLINGTON ROAD 29

SHEET NO. 05

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-10.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:10 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
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DATE Jan. 2021	
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WELLINGTON ROAD 24 & WELLINGTON ROAD 42
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

EXISTING SITE PLAN
WELLINGTON ROAD 24 & WELLINGTON ROAD 42

SHEET NO. **01**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN	REVIEWED BY
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DRAWN	CHECKED BY
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 24 & WELLINGTON ROAD 42
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 24

PROJECT NO. 203297

SHEET NO. 02

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-11.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:31 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-11.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:36 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 24 & WELLINGTON ROAD 42
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 42

PROJECT NO. 203297

SHEET NO. **03**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\KMG\DMS43842\203297-08-PLAN-FIG-11.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:41 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN: K.G. REVIEWED BY: M.K.
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WELLINGTON ROAD 24 & WELLINGTON ROAD 42
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 24 & WELLINGTON ROAD 42

PROJECT NO. 203297

SHEET NO. 04

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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WELLINGTON ROAD 24 & WELLINGTON ROAD 42
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 24 & WELLINGTON ROAD 42

PROJECT NO. 203297

SHEET NO. 05

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-11.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:58:46 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DRAWN E.G. | CHECKED BY M.K.
DATE Jan. 2021
SCALE 1:750

WELLINGTON ROAD 18 & 2ND LINE
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

SHEET NO. 01

EXISTING SITE PLAN
WELLINGTON ROAD 18 & 2ND LINE

FILENAME: C:\PW_WORKING_DIRECTORY\PROJECTS_2020\JAKAR\DMS-3842\203297-08-PLAN-FIG-12.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-02-03 @ 2:58:38 PM PLOT SCALE: 125.6 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-12.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:59:41 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DATE: Jan. 2021	
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WELLINGTON ROAD 18 & 2ND LINE
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 18

PROJECT NO. 203297

SHEET NO. 02

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-12.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:59:46 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
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DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 18 & 2ND LINE
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
2ND LINE

PROJECT NO. 203297

SHEET NO. 03

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020_3MMO DMS43842\203297-08-PLAN-FIG-12.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 2:59:51 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN K.G.	REVIEWED BY M.K.
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DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 18 & 2ND LINE
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 18 & 2ND LINE

SHEET NO. **04**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DILLON CONSULTING

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DESIGN K.G. | REVIEWED BY M.K.
DRAWN E.G. | CHECKED BY M.K.
DATE Jan. 2021
SCALE 1:750

WELLINGTON ROAD 18 & 2ND LINE
ROAD MASTER ACTION PLAN

REALIGNMENT EXISTING SITE PLAN
WELLINGTON ROAD 18 & 2ND LINE

PROJECT NO. 203297

SHEET NO. **06**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-12.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-04 @ 11:57:30 AM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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E.G.	M.K.
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WELLINGTON ROAD 18 & 2ND LINE
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 18 & 2ND LINE

PROJECT NO.
203297

SHEET NO.
05

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 19 & 2ND LINE
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 19 & 2ND LINE

PROJECT NO. 203297

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-13.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:00:18 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DWG\43842\203297-08-PLAN-FIG-13.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:00:20 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DILLON CONSULTING

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DESIGN: K.G.	REVIEWED BY: M.K.
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DATE: Jan. 2021	
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WELLINGTON ROAD 19 & 2ND LINE
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 19

PROJECT NO. 203297

SHEET NO. 02

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-13.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:00:25 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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DILLON CONSULTING

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E.G.	M.K.
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WELLINGTON ROAD 19 & 2ND LINE
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGHT LINES PLAN
SECOND LINE

PROJECT NO. **203297**

SHEET NO. **03**

Conditions of Use

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DATE: Jan. 2021	
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WELLINGTON ROAD 19 & 2ND LINE
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 19 & 2ND LINE

PROJECT NO. 203297

SHEET NO. **04**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-13.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:00:30 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-13.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:00:36 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DESIGN K.G.	REVIEWED BY M.K.
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DATE Jan. 2021	
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WELLINGTON ROAD 19 & 2ND LINE
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 19 & 2ND LINE

PROJECT NO. **203297**

SHEET NO. **05**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-13.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:00:41 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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WELLINGTON ROAD 19 & 2ND LINE
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROAD REALIGNMENT
WELLINGTON ROAD 19 & 2ND LINE

SHEET NO. 06

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN K.G. | REVIEWED BY M.K.
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DATE Jan. 2021
SCALE 1:500

WELLINGTON ROAD 52 & 9TH LINE
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

SHEET NO. **01**

EXISTING SITE PLAN
WELLINGTON ROAD 52 & 9TH LINE

FILENAME: C:\PW_WORKING_DIRECTORY\PROJECTS_2020_JAKMG\DMS\3845\203297-08-PLAN-FIG-14.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-02-03 @ 8:01:28 AM PLOT SCALE: 125.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN K.G. REVIEWED BY M.K.
DRAWN E.G. CHECKED BY M.K.
DATE Jan. 2021
SCALE 1:500

WELLINGTON ROAD 52 & 9TH LINE
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 52

PROJECT NO. 203297

SHEET NO. 02

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-14.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:01:40 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN: K.G.	REVIEWED BY: M.K.
DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
SCALE: 1:500	

WELLINGTON ROAD 52 & 9TH LINE
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
9TH LINE

PROJECT NO. 203297

SHEET NO. **03**

Conditions of Use

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DESIGN K.G. | REVIEWED BY M.K.
DRAWN E.G. | CHECKED BY M.K.
DATE Jan. 2021
SCALE 1:500

WELLINGTON ROAD 52 & 9TH LINE
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 52 & 9TH LINE

SHEET NO. 04

FILENAME: C:\DW WORKING DIRECTORY\PROJECTS 2020\34KMS\DWGS+SHPS\203297-08-PLAN-FIG-14.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-05-04 @ 3:01:45 PM | PLOT SCALE: 1:250.4 | PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE Jan. 2021

SCALE 1:750

WELLINGTON ROAD 18 & DAVID STREET
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 18 & DAVID STREET

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-15.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:01:59 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 18 & DAVID STREET
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 18

PROJECT NO. 203297

SHEET NO. 02

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-15.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:02:01 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-15.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:02:06 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 18 & DAVID STREET
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
DAVID STREET

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN	REVIEWED BY
K.G.	M.K.
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E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 18 & DAVID STREET
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 18 & DAVID STREET

SHEET NO. 04

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-15.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:02:11 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-16.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:03:00 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26

SHEET NO. 01

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN K.G. | REVIEWED BY M.K.
DRAWN E.G. | CHECKED BY M.K.
DATE Jan. 2021
SCALE 1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 22(EAST)

PROJECT NO. 203297

SHEET NO. 02

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-16.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:03:03 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN	K.G.
REVIEWED BY	M.K.
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CHECKED BY	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 26

PROJECT NO. 203297

SHEET NO. 03

FILENAME: C:\PW_WORKING_DIRECTORY\PROJECTS_2020\34MKO_UMS-SB42\203297-SB-PLAN-FIG-16.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-02-01 @ 3:03:08 PM PLOT SCALE: 125.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

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DESIGN: K.G. | REVIEWED BY: M.K.
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DATE: Jan. 2021
SCALE: 1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26

SHEET NO. **04**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 22(EAST) & WELLINGTON ROAD 26

SHEET NO. **05**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-16.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-04 @ 12:00:37 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-17.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:03:36 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 8 & WELLINGTON ROAD 17
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 8 & WELLINGTON ROAD 17

PROJECT NO. 203297

SHEET NO. 01

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 8 & WELLINGTON ROAD 17
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 8

PROJECT NO. 203297

SHEET NO. **02**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-17.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:03:39 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-17.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:03:44 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 8 & WELLINGTON ROAD 17
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

MINOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 17

SHEET NO. 03

####

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-17.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:03:49 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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DESIGN: K.G.	REVIEWED BY: M.K.
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DATE: Jan. 2021	
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WELLINGTON ROAD 8 & WELLINGTON ROAD 17
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 8 & WELLINGTON ROAD 17

PROJECT NO. **203297**

SHEET NO. **04**

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN: K.G.	REVIEWED BY: M.K.
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DATE: Jan. 2021	
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WELLINGTON ROAD 8 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 8 & WELLINGTON ROAD 10

PROJECT NO. 203297

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-18.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:04:28 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DILLON CONSULTING

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 8 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 8

PROJECT NO. 203297

SHEET NO. 02

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-18.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:04:31 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-18.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:04:36 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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DESIGN	REVIEWED BY
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WELLINGTON ROAD 8 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 10

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN K.G.	REVIEWED BY M.K.
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DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 8 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 8 & WELLINGTON ROAD 10

PROJECT NO. 203297

SHEET NO. 04

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

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DESIGN: K.G.	REVIEWED BY: M.K.
DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
SCALE: 1:750	

WELLINGTON ROAD 7 & WELLINGTON ROAD 11
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 11

PROJECT NO. 203297

SHEET NO. 01

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-19.DWG PLOTTED BY: GUGLIELMO, KYLE ####
PLOT DATE: 2021-03-01 @ 3:05:40 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-19.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:05:43 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DILLON CONSULTING

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DESIGN K.G. | REVIEWED BY M.K.
DRAWN E.G. | CHECKED BY M.K.
DATE Jan. 2021
SCALE 1:750

WELLINGTON ROAD 7 & WELLINGTON ROAD 11
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGH LINES PLAN
WELLINGTON COUNTY ROAD 7

PROJECT NO. 203297

SHEET NO. 02

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DILLON CONSULTING

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DESIGN: K.G.	REVIEWED BY: M.K.
DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
SCALE: 1:750	

WELLINGTON ROAD 7 & WELLINGTON ROAD 11
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 11

PROJECT NO. **203297**

SHEET NO. **03**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-19.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:05:48 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-19.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:05:53 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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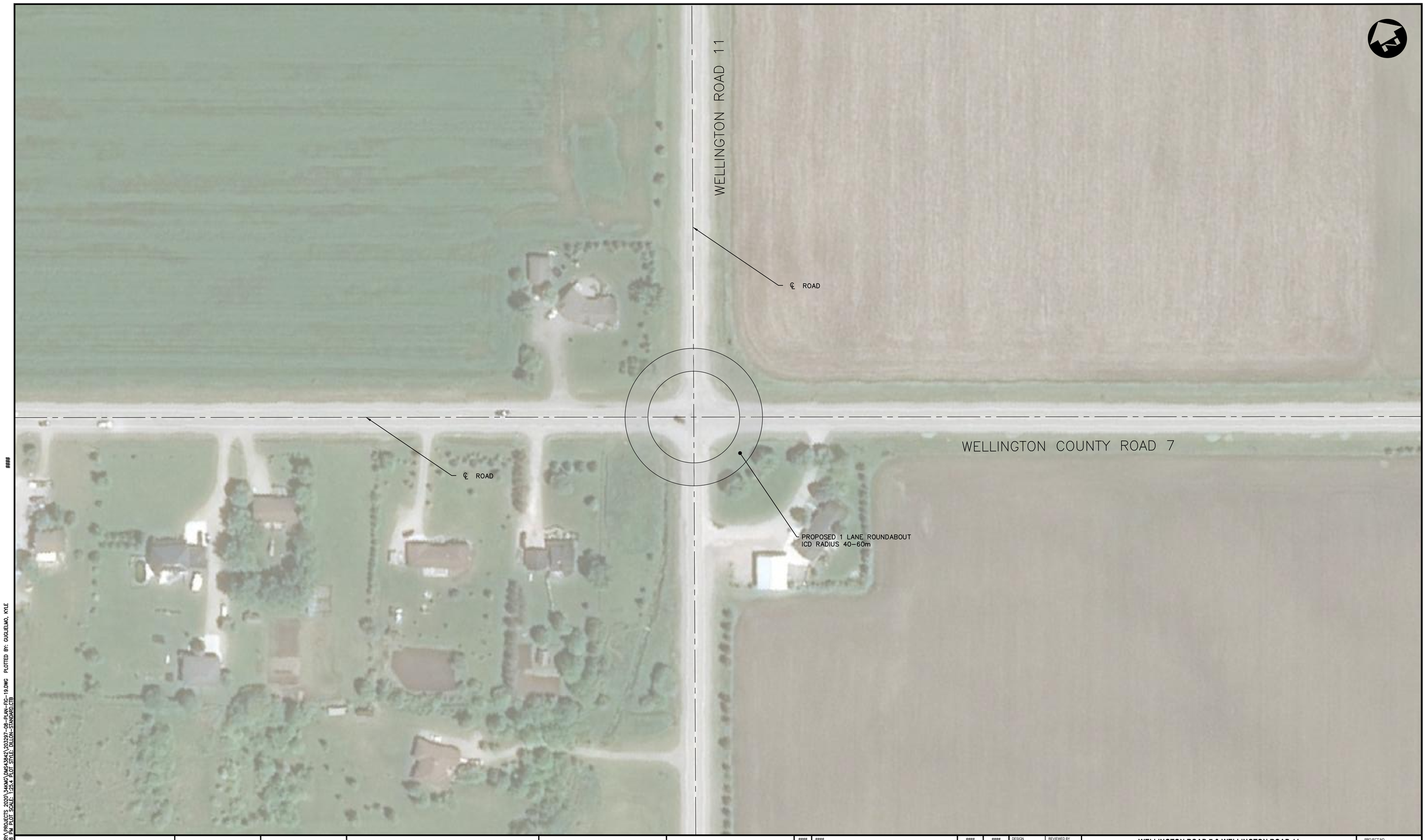
DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 7 & WELLINGTON ROAD 11
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 11

PROJECT NO. **203297**

SHEET NO. **04**



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DILLON CONSULTING

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DESIGN	K.G.
REVIEWED BY	M.K.
DRAWN	E.G.
CHECKED BY	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 7 & WELLINGTON ROAD 11
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

SHEET NO. 05

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 7 & WELLINGTON ROAD 11

FILENAME: C:\PW_WORKING_DIRECTORY\PROJECTS_2020\JAKAR\DMS4384\203297-09-PLAN-FIG-19.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 8:58:58 AM PLOT SCALE: 125.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	CHECKED BY
E.G.	M.K.

DATE Jan. 2021

SCALE 1:750

WELLINGTON ROAD 7 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

EXISTING SITE PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 10

PROJECT NO. **203297**

SHEET NO. **01**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-20.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:05:55 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

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DESIGN	REVIEWED BY
K.G.	M.K.
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E.G.	M.K.

DATE Jan. 2021

SCALE 1:750

WELLINGTON ROAD 7 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN WELLINGTON ROAD 7

PROJECT NO. 203297

SHEET NO. **02**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-20.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-04 @ 1:22:26 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-20.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-04 @ 1:22:39 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
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WELLINGTON ROAD 7 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 10

PROJECT NO. 203297

SHEET NO. 03

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-20.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-04 @ 1:56:06 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN: K.G.	REVIEWED BY: M.K.
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DATE: Jan. 2021	
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WELLINGTON ROAD 7 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 7 & WELLINGTON ROAD 10

PROJECT NO. 203297

SHEET NO. 04

Conditions of Use

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN: E.G.	CHECKED BY: M.K.
DATE: Jan. 2021	
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WELLINGTON ROAD 7 & WELLINGTON ROAD 10
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 7 & WELLINGTON ROAD 10

PROJECT NO. 203297

SHEET NO. 05

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\40MM\DMS43842\203297-08-PLAN-FIG-20.DWG PLOTTED BY: MA, MATTHEW
PLOT DATE: 2021-04-21 @ 4:47:45 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

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DESIGN	K.G.
REVIEWED BY	M.K.
DRAWN	E.G.
CHECKED BY	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE
ROAD MASTER ACTION PLAN

PROJECT NO. **203297**

SHEET NO. **01**

EXISTING SITE PLAN
WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE

FILENAME: C:\DW WORKING DIRECTORY\PROJECTS 2020\34KMS\DWGS\203297-08-PLAN-FIG-21.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-05-28 @ 3:07PM PLOT SCALE: 1:250.4 PLOT STYLE: FULL24-STANDARD.CTB

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DESIGN	K.G.
REVIEWED BY	M.K.
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CHECKED BY	M.K.
DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE ROAD MASTER ACTION PLAN

MAJOR/MINOR ROADWAY SIGHT LINES PLAN WELLINGTON ROAD 44

PROJECT NO. **203297**

SHEET NO. **02**

Conditions of Use

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DESIGN	REVIEWED BY
K.G.	M.K.
DRAWN	**CHECKED BY**
E.G.	M.K.

DATE: Jan. 2021

SCALE: 1:750

WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE
ROAD MASTER ACTION PLAN

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE

PROJECT NO. 203297

SHEET NO. 03

Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

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DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 44 & ERAMOSA-MILTON TOWNLINE

SHEET NO. 04

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-22.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:07:43 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB
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Conditions of Use

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DESIGN K.G.	REVIEWED BY M.K.
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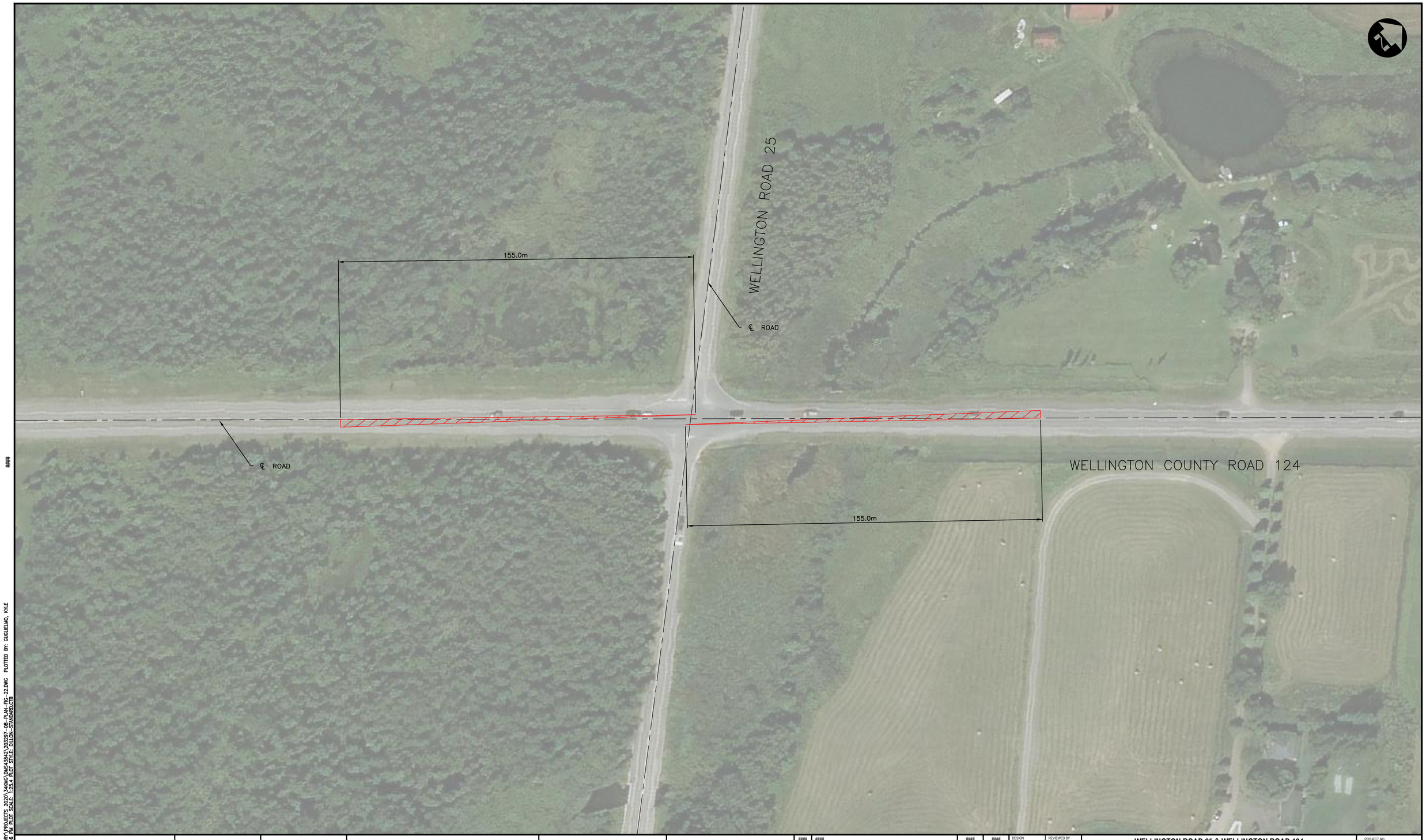
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 25 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

EXISTING SITE PLAN
WELLINGTON ROAD 25 & WELLINGTON ROAD 124

SHEET NO. 01



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DATE	Jan. 2021
SCALE	1:750

WELLINGTON ROAD 25 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

MAJOR ROADWAY SIGHT LINES PLAN
WELLINGTON ROAD 25

PROJECT NO. **203297**

SHEET NO. **02**

Conditions of Use

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DESIGN: K.G.	REVIEWED BY: M.K.
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WELLINGTON ROAD 25 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

MINOR ROADWAY SIGH LINES PLAN
WELLINGTON ROAD 124

PROJECT NO. 203297

SHEET NO. 03

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FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-22.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:07:51 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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DATE: Jan. 2021	
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WELLINGTON ROAD 25 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

PROJECT NO. 203297

TAC CLEAR ZONES PLAN
WELLINGTON ROAD 25 & WELLINGTON ROAD 124

SHEET NO. 04

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-22.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:07:56 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

Conditions of Use

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DESIGN K.G.	REVIEWED BY M.K.
DRAWN E.G.	CHECKED BY M.K.
DATE Jan. 2021	
SCALE 1:750	

WELLINGTON ROAD 25 & WELLINGTON ROAD 124
ROAD MASTER ACTION PLAN

PROPOSED ROUNDABOUT LAYOUT
WELLINGTON ROAD 25 & WELLINGTON ROAD 124

PROJECT NO. 203297

SHEET NO. **05**

FILENAME: C:\PW WORKING DIRECTORY\PROJECTS 2020\34KMG\DMS43842\203297-08-PLAN-FIG-22.DWG PLOTTED BY: GUGLIELMO, KYLE
PLOT DATE: 2021-03-01 @ 3:08:01 PM PLOT SCALE: 1:25.4 PLOT STYLE: DILLON-STANDARD.CTB

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