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Schedule 'B' Environmental
Assessment for Intersection of
Derry Road and Argentia Road
Transportation Report

Regional Municipality of Peel

February 2015

EXECUTIVE SUMMARY

The Regional Municipality of Peel is undertaking a Schedule 'B' Class Environmental Assessment for the intersection of Derry Road and Argentia Road in the City of Mississauga. The purpose of this environmental assessment study is to:

- Identify short and long term improvements for the horizon years of 2021 and 2031 at the intersection of Derry Road and Argentia Road
- Complete Phases 1 through 4 of the Class EA Process
- Prepare 30% Detail Design for the Preferred Alternative, including recommending mitigation measures for the Final Recommended Design
- Prepare a Class EA Schedule 'B' Project File Report

A review of existing and projected future transportation conditions identified the following needs and opportunities within the study:

- Opportunities to improve traffic operations and reduce delays at the intersection of Derry Road and Argentia Road; as a result of increasing traffic volumes, operations at the intersection of Derry Road and Argentia Road will deteriorate without any improvements by 2021 and 2031
- Opportunities to improve the safety performance of the intersection of Derry Road and Argentia Road.
- Opportunities to improve the transportation environment for multiple modes (i.e. pedestrians, cyclists, transit users, good movement and drivers)
- Capacity constraints under the existing and future conditions at other intersections within the study area

Multiple alternative designs to improve multi-modal traffic operations at the intersection of Derry Road and Argentia Road were developed and evaluated. The preferred alternative design includes the following improvements:

- Addition of one northbound through lane at the south leg of the intersection and on the receiving north leg of the intersection
- Addition of one southbound through lane at the north leg of the intersection
- Addition of a westbound dual left-turn lane
- Geometric improvements at existing channelized right-turn lanes to improve the safety performance of the intersection
- Accommodation of multi-use trail along both sides of Derry Road
- Improvements to the existing sidewalk network

The existing and proposed configurations are illustrated in **Exhibit ES-1** and **Exhibit ES-2**, respectively.

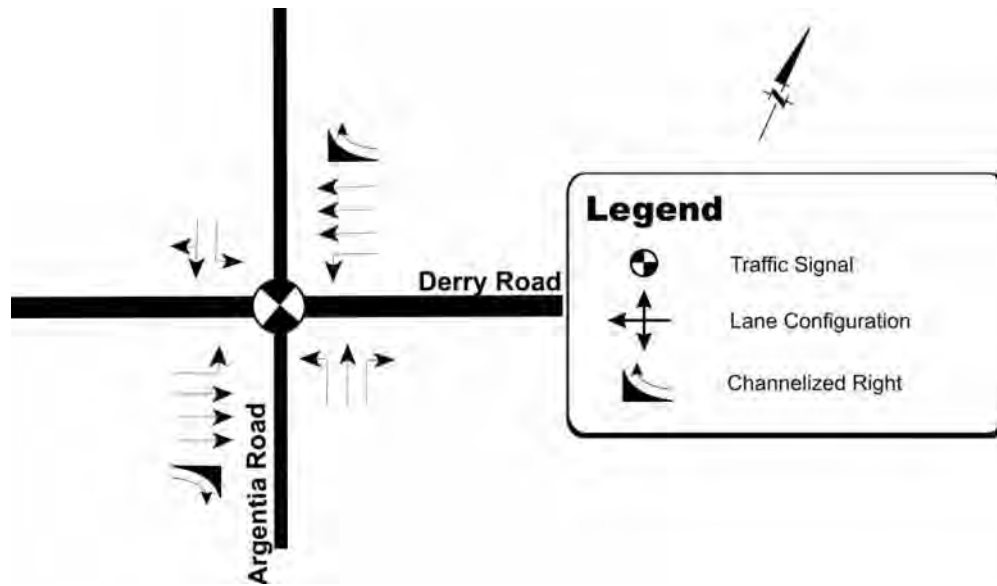


Exhibit ES-1: Derry Road and Argentia Road – Existing Configuration



Exhibit ES-2: Derry Road and Argentia Road – Recommended Configuration

Synchro modelling has verified that the proposed modifications to the intersection will improve operations at Derry Road and Argentia Road compared to a base case where no improvements are implemented.



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Appendix B: Existing Signal Timing Plans

Appendix C: Existing Turning Movement Counts

Appendix D: HCM Synchro Reports – Derry Road and Argentia Road

Appendix E: HCM Synchro Reports – Study Area Intersections

Appendix F: Northbound Right-Turn Assessment

Appendix G: Northbound Left-Turn Lane and Accesses

1 Study Area Profile

The Regional Municipality of Peel is undertaking a Schedule 'B' Class Environmental Assessment for the intersection of Derry Road and Argentia Road in the City of Mississauga. The purpose of this environmental assessment study is to:

- Identify short and long term improvements for the horizon years of 2021 and 2031 at the intersection of Derry Road and Argentia Road
- Complete Phases 1 through 4 of the Class EA Process
- Prepare 30% Detail Design for the Preferred Alternative, including recommending mitigation measures for the Final Recommended Design
- Prepare a Class EA Schedule 'B' Project File Report

The study intersection of Derry Road and Argentia Road and the surrounding study area is located in the southwest quadrant of the Region of Peel. The study intersection is illustrated in **Exhibit 1-1**. For the purposes of this study, Derry Road is considered to run east-west and Argentia Road is considered to run north-south.

The intersection is located in north Mississauga, south of Highway 401 and north of the Milton GO Train rail corridor. Derry Road is a regional arterial road that runs continuously across Mississauga from Halton Region in the west to the City of Toronto in the east. Derry Road also passes through Pearson Airport. Argentia Road is a Major Collector that begins at Creditview Road in the east and terminates at 10th Line Road in the west at the entrance to the Lisgar GO Station parking lot.

Based on the City of Mississauga Official Plan, the study area falls within the "Meadowvale Business Park Corporate Centre". The land use designation for the four corners of the intersection of Derry Road and Argentia Road is "Business Employment." The following properties are located within the vicinity of the intersection:

- A Four Points Sheraton hotel and a Bank of Montreal (BMO) office building are on the southeast corner of the intersection.
- A vacant office building is located at the southwest corner of the intersection; First Gulf has proposed the demolition of the existing building and the construction of a new office building with an approximate Gross Floor Area (GFA) of 11,430 square metres. The development plan proposes shifting the existing driveway 30 m south, so that it would be 80 m to the south of the study intersection.
- A Holiday Inn Express is located in the northeast corner of the intersection
- A low-rise office building named the "Pentagon Building" is located in the northwest corner of the intersection
- The Meadowvale GO Train station and parking lot is also located further to the southwest of the intersection. There is an access to one of the parking lots for this station on Argentia Road, south of the study intersection.

There are no direct easterly or westerly accesses to or from Derry Road, and therefore there are no specific businesses until Millcreek Drive or Syntex Drive. Approximately 300m west of the intersection is the GO Train overpass, and approximately 160m east of the intersection is the Highway 401 overpass.

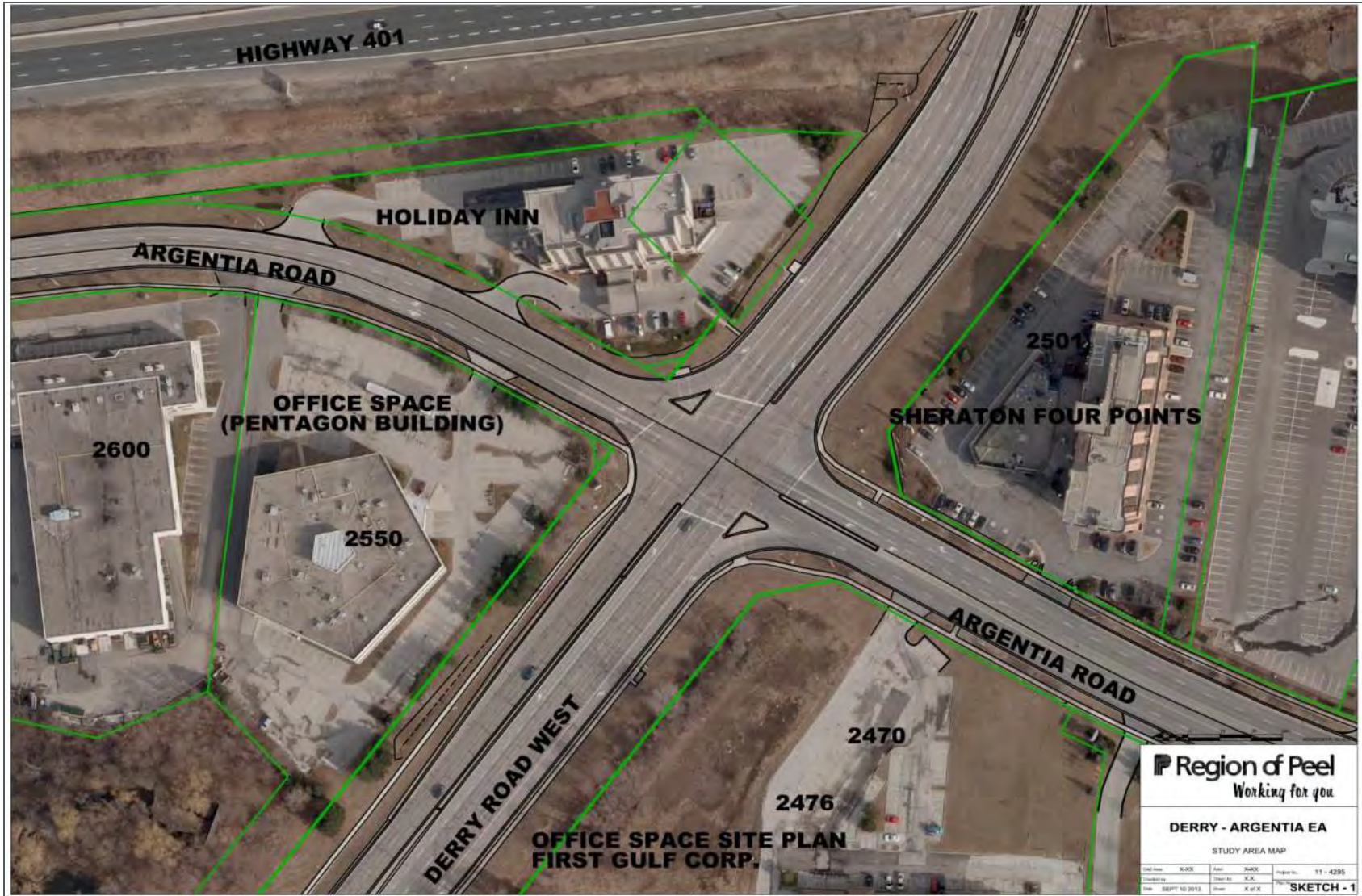


Exhibit 1-1: Intersection of Derry Road and Argentia Road



Peel Region has provided data on planned growth in the study area to 2031. The intersection is located within Traffic Superzone 24 (Meadowvale), and is adjacent to Superzone 23 (Streetsville). The population and employment within these zones are summarized in **Exhibit 1-2** and **Exhibit 1-3**. Population and employment in Meadowvale are projected to increase by 6% and 20%, respectively, between 2011 and 2031.

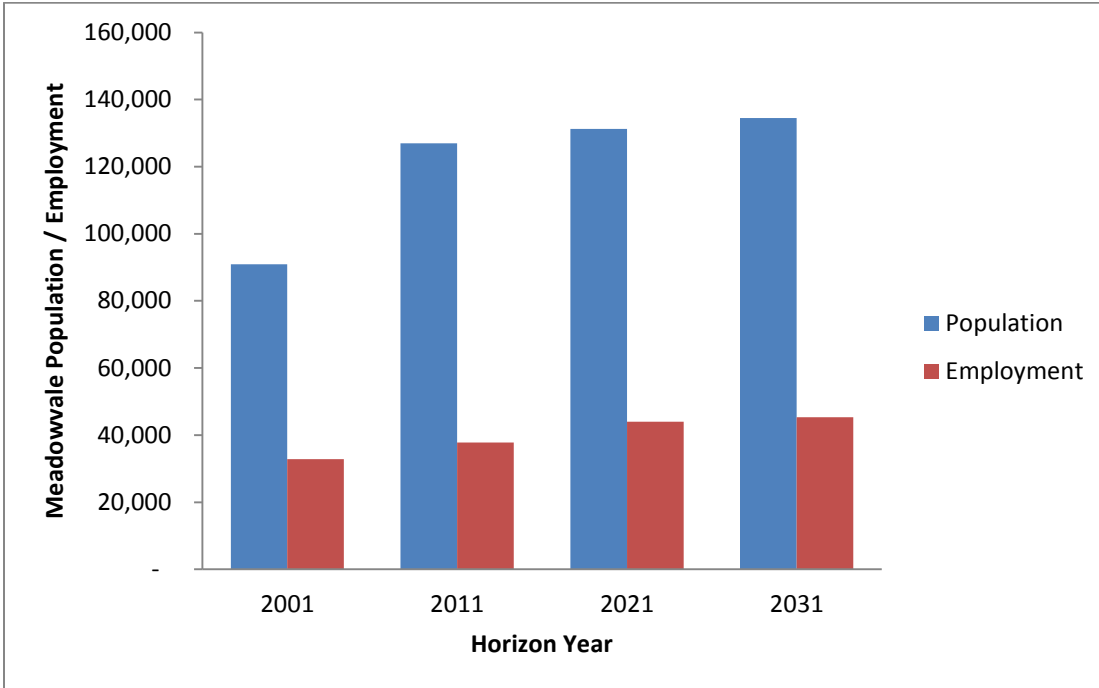


Exhibit 1-2: Population and Employment in Meadowvale

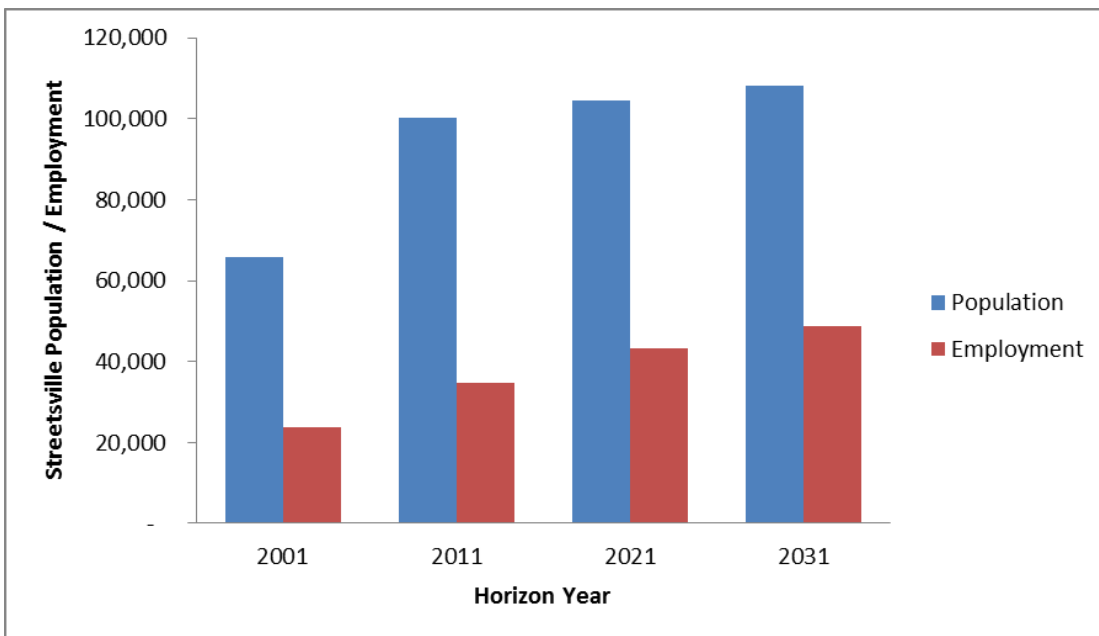


Exhibit 1-3: Population and Employment in Streetsville

2 Existing and Future Transportation Conditions

2.1 Existing Transportation Facilities

The existing intersection of Derry Road and Argentia Road serves pedestrians, cyclists, transit users, automobiles and trucks.

2.1.1 Vehicles

Derry Road is classified as a Regional Road, and it falls under the jurisdiction of the Regional Municipality of Peel. Its posted speed is 70 km/h and there are three through lanes in each direction east and west of Argentia Road.

Argentia Road is classified as a Major Collector and it falls under the jurisdiction of the City of Mississauga. Its posted speed is 60 km/h and there are two through lanes in each direction, north and south of Derry Road.

The lane configurations at the intersection are illustrated in **Exhibit 2-1**.



Exhibit 2-1: Derry and Argentia – Existing Configuration

The existing intersection includes:

- Channelized right-turns from Derry Road to Argentia Road in both the eastbound and westbound directions
- Single left-turn lanes for all approaches
- Three through-lanes on Derry Road in the eastbound and westbound directions
- One northbound through lane and one northbound right-turn lane
- One southbound shared through-right turn lane

2.1.2 Transit

Several Mississauga Transit bus routes serve the study area, as shown in **Exhibit 2-2** and summarized in **Table 2-1**.

Table 2-1: Transit Routes in Derry Road / Argentia Road Study Area

Route Number	Route Description	Study Area Stops
Route 38	Creditview: travels between Trillium Health Centre and Meadowvale Town Centre; full day route	-Stops on Argentia (NB and SB)
Route 42	Derry: travels in both directions between Meadowvale Mall and Westwood Mall; full day route	-Stops on Derry (EB and WB)
Route 43	Matheson-Argentia: connects Skymark Hub and Meadowvale Town Centre; NB in AM only and SB in PM only	-Stops on Argentia (NB and SB)
Route 57	Courtneypark: travels between Islington/Kipling subway stations and Meadowvale Town Centre; peak period service (runs in both directions during the AM Peak and the PM Peak only)	-Stops on Derry (EB and WB)
Route 108	Meadowvale Business Express: connects Islington and Kipling subway station to the Meadowvale Business Park area; peak period service (runs NB in the AM Peak and SB in the PM Peak)	-Stops on Argentia (NB and SB)

Mississauga Transit provided the study team with a presentation outlining plans for implementing transit priority features onto roads in Mississauga. Queue jump lanes and transit signal priority were shown along Derry Road at several intersections; however, no queue jump lanes or transit signal priority were shown at the intersection with Argentia Road.

Mississauga Transit has noted that it is planning to construct a bus garage near the intersection of Derry Road and Argentia Road.

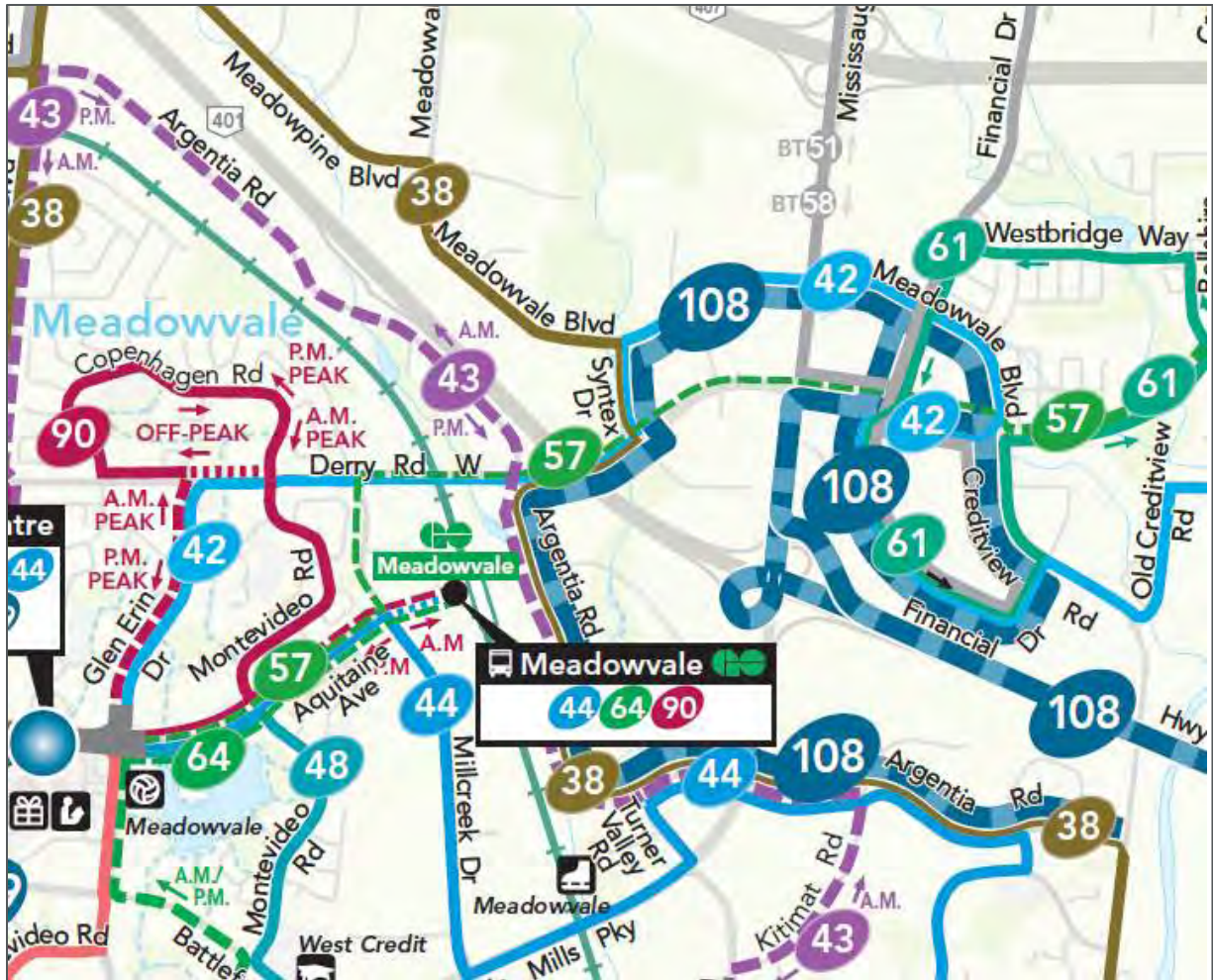


Exhibit 2-2: Transit Routes at the Intersection of Derry Road and Argentia Road

There are 4 transit stops within the study area, which are illustrated in **Exhibit 2-3**.

- West leg of Derry, eastbound lanes: full shelter
- East leg of Derry, westbound lanes: concrete pad
- South leg of Argentia, northbound lanes: full shelter (**Photo 2-1**)
- South leg of Argentia, southbound lanes: concrete pad



Photo 2-1: Transit Shelter at Southeast Corner of Intersection of Derry / Argentia

2.1.3 Pedestrians

Pedestrian activity within the study area is generated by the hotels, offices and transit stops (see **Photo 2-2**). There are crosswalks for pedestrians at all four legs of the intersection. The existing sidewalk network is illustrated in **Exhibit 2-3**. There are opportunities to extend the sidewalk network at the northeast corner of the intersection in order to provide more complete pedestrian linkages within the study intersection. The crosswalk pavement markings were noted to be faded during the site visit, so there are also opportunities to improve the pavement markings to increase visibility of pedestrians. There are pedestrian signal heads for all crosswalks, which were observed to be operational during a site visit in September 2013.



Exhibit 2-3: Existing Sidewalk Network and Transit Stops



Photo 2-2: Pedestrians at Derry Road and Argentia Road

2.1.5 Cyclists

A new multi-use trail for pedestrians and cyclists was constructed in 2013 within the study corridor on the south side of Derry Road to the west of the study intersection. The extension of this facility for cyclists will improve the comfort and safety of cyclists within the study area, and will be incorporated into the design of any improvements to the intersection of Derry Road and Argentia Road as part of this EA.

2.2 Travel Demand Management

There are opportunities to implement Travel Demand Management (TDM) measures in the study area. The purpose of TDM measures is to reduce vehicular demand for the roadway and use existing infrastructure more efficiently. Some TDM measures to better manage vehicular demand for the roadway include:

- Encouraging active transportation modes, such as walking and cycling
- Encourage transit use (i.e. better public transit service, employer financial contribution toward transit passes)
- Methods to increase vehicle occupancy, such as carpooling and a network of HOV lanes
- Employer support / subsidization of carpooling
- Employer support for tele-commuting (i.e. working from home)
- Flexible work hours (to allow commuters to travel before or after the peak periods)
- Parking fees or congestion pricing / road tolls

Further opportunities to implement TDM as a potential alternative solution will be described in **Phase 2** of the EA Study.

2.3 Traffic Safety Analysis

Existing safety performance has been evaluated at the intersection of Derry Road and Argentia Road. The safety analysis includes a review of the collision history at the intersection, a review of Peel Region's Safety Performance Function, the results from a field review and a list of potential countermeasures. Peel Region provided HDR with the following information:

- Collision records at the intersection of Derry Road and Argentia Road from 2008 to 2012
- Peel Region Safety Performance Functions

The five year period collision data was analyzed to review the safety conditions at the intersection. Collisions reported with classification of 'Other' and 'Non-reportable' are assumed to be 'Property Damage Only', as more severe collisions resulting in injury would be classified as such.

2.3.1 Collisions by Year, Month, Day and Hour

2.3.1.1 Collisions by Year

A total of 82 collisions were reported at the intersection of Derry Road and Argentia Road over the 5 year period from January 2008 to December 2012. Years 2010 and 2012 exhibited higher numbers of collisions than other years within the study period. No fatalities were reported at the intersection and injury collisions accounted for 15% (or 12 out of 82) of total collisions.

There is an average of 16.4 collisions per year at the intersection, although the number of collisions per year has fluctuated between 13 and 21. The number of collisions by year and severity is summarized in **Table 2-2** and **Exhibit 2-4**.

Table 2-2: Number of Collisions by Year

	2008	2009	2010	2011	2012	Average	Total	Percentage
PD	12	11	17	15	15	14	70	85%
Injury	1	2	4	0	5	2.4	12	15%
Fatal	0	0	0	0	0	0	0	0%
Total	13	13	21	15	20	16.4	82	100%

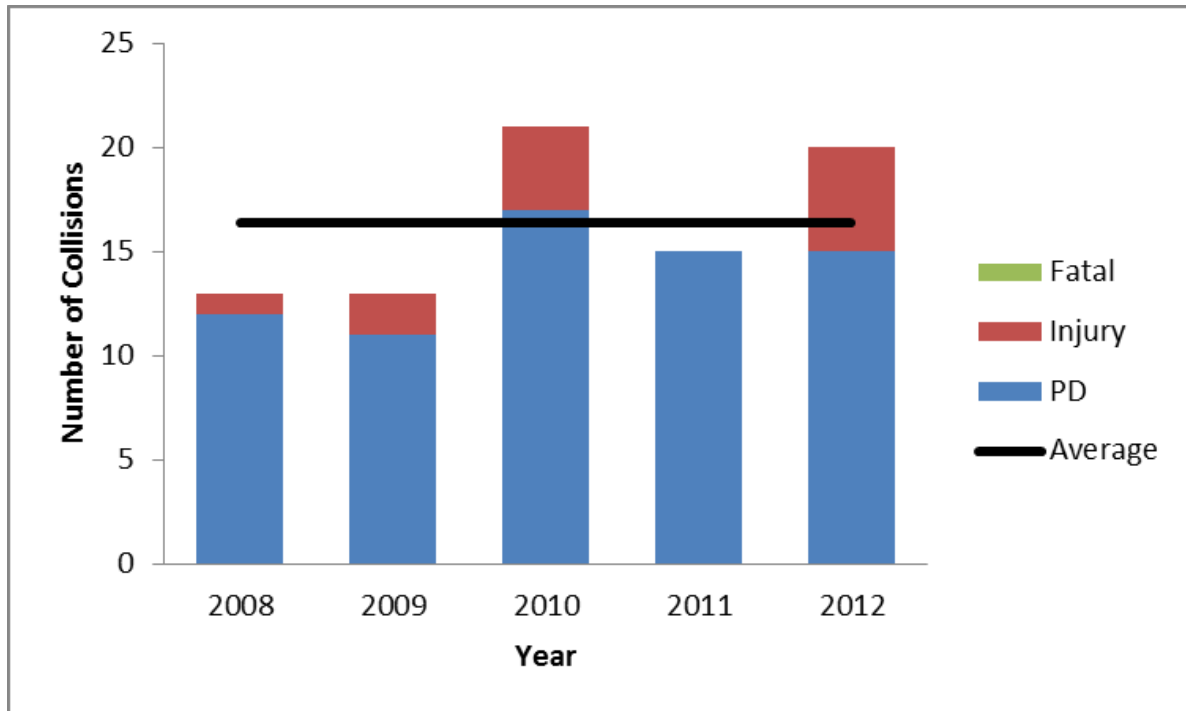


Exhibit 2-4: Collisions by Year at Derry Road / Argentia Road Intersection

2.3.1.1.1 Collisions by Month

The number of collisions also fluctuates depending on the month of the year; however, a seasonal trend relating to the number of collisions is not reflected in the data at this intersection. The number of collisions over the five year period by **month** is illustrated in **Exhibit 2-5**.

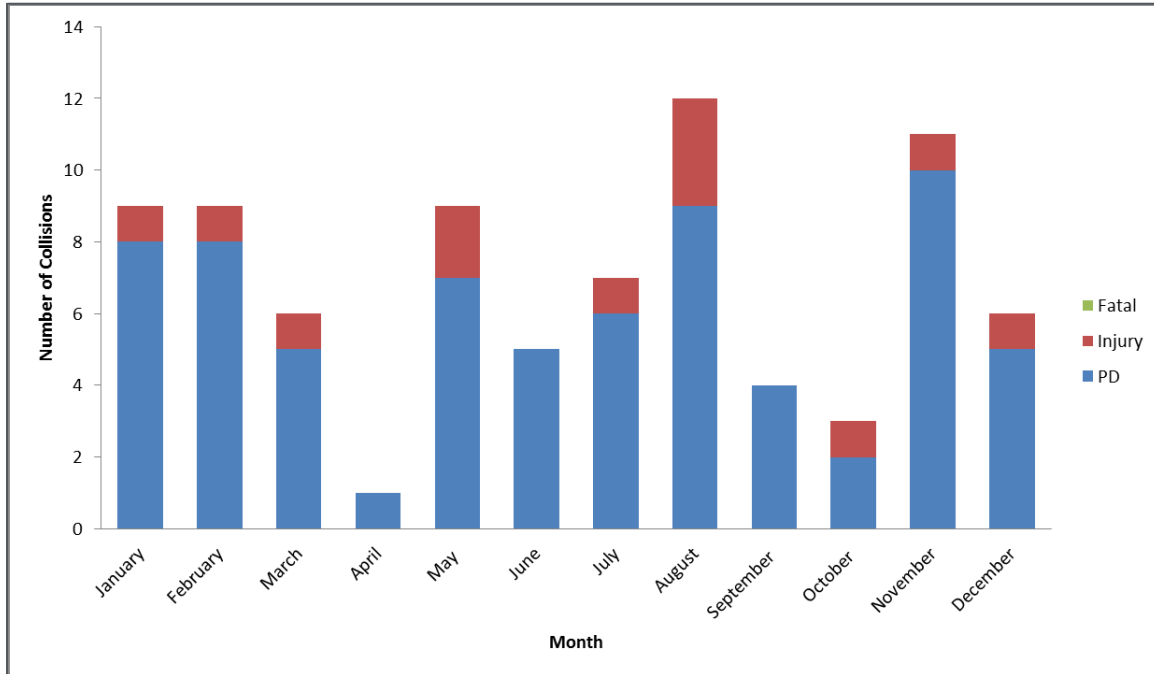


Exhibit 2-5: Collisions by Month at Derry Road / Argentia Road Intersection

2.3.1.2 Collisions by Day of the Week

The number of collisions over the 5 year period by **day of the week** is shown in **Exhibit 2-6**. Collisions are much more frequent on weekdays than they are on weekends. This is because traffic volumes at the intersection are much higher on weekdays than weekends, as this intersection is located in a commercial area where several people make commuting trips on weekdays. Collision rates are generally linked to traffic volumes: when traffic volumes are higher, collision rates are expected to be higher. Injury rates were highest on Fridays.

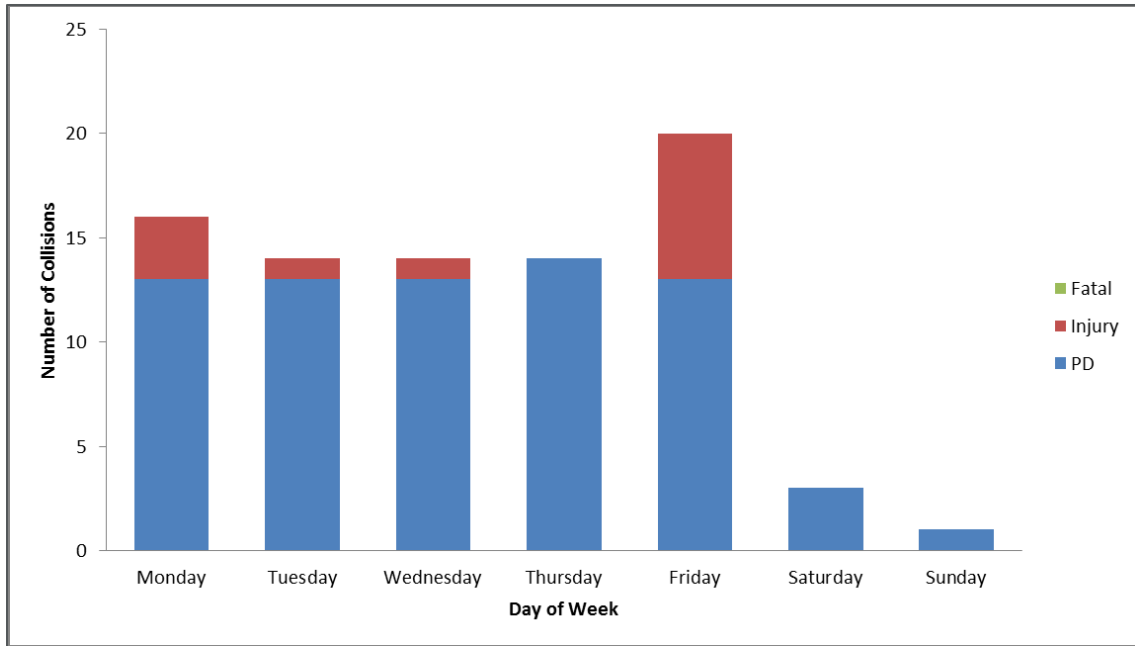


Exhibit 2-6: Collisions by Day of the Week at the Derry Road / Argentia Road Intersection

2.3.1.3 Collisions by Hour of the Day

The distribution of collisions by **hour of the day** is shown in **Exhibit 2-7**. The data indicates that collisions occur more frequently during the AM Peak (between 7:00 AM and 10:00 AM) and the PM Peak (between 3:00 PM and 7:00 PM) on weekdays, when traffic volumes are higher. Collisions occur less frequently during the off-peak hours and on weekends.

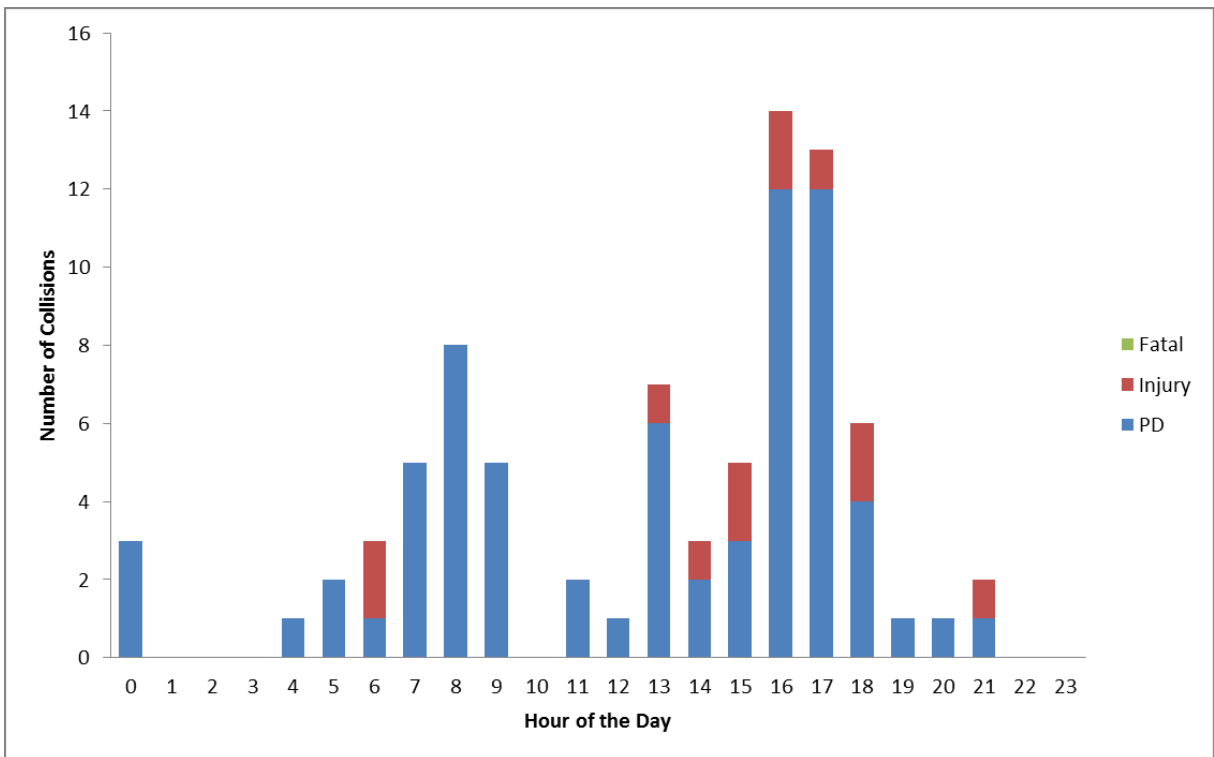


Exhibit 2-7: Collisions by Hour of the Day at Derry Road / Argentia Road Intersection

2.3.2 Collisions by Impact Type, Environment and Light Conditions

2.3.2.1 Impact Type

A plot of the average number of collisions per year by impact type is shown in **Table 2-3** and **Exhibit 2-8**. The predominant impact type is rear end collisions (50%), followed by turning movement collisions (23%) for all years. Sideswipe (8 collisions), single motor vehicle (7), angle (4) approaching/head-on (2), and pedestrian (1) collisions were also reported; however, these types of collisions occur less frequently.

Table 2-3 : Collisions by Impact Type and Year

	Rear End	Turning Movement	Side Swipe	Single Motor Vehicle	Angle	Approaching	Pedestrian	Total
PD	37	16	6	5	4	2	-	70
Injury	4	3	2	2	-	-	1	12
Fatal	-	-	-	-	-	-	-	-
Total	41	19	8	7	4	2	1	82
Percentage Injury/Fatal	10%	16%	25%	29%	0%	0%	100%	15%

Note: '-' indicates no collisions

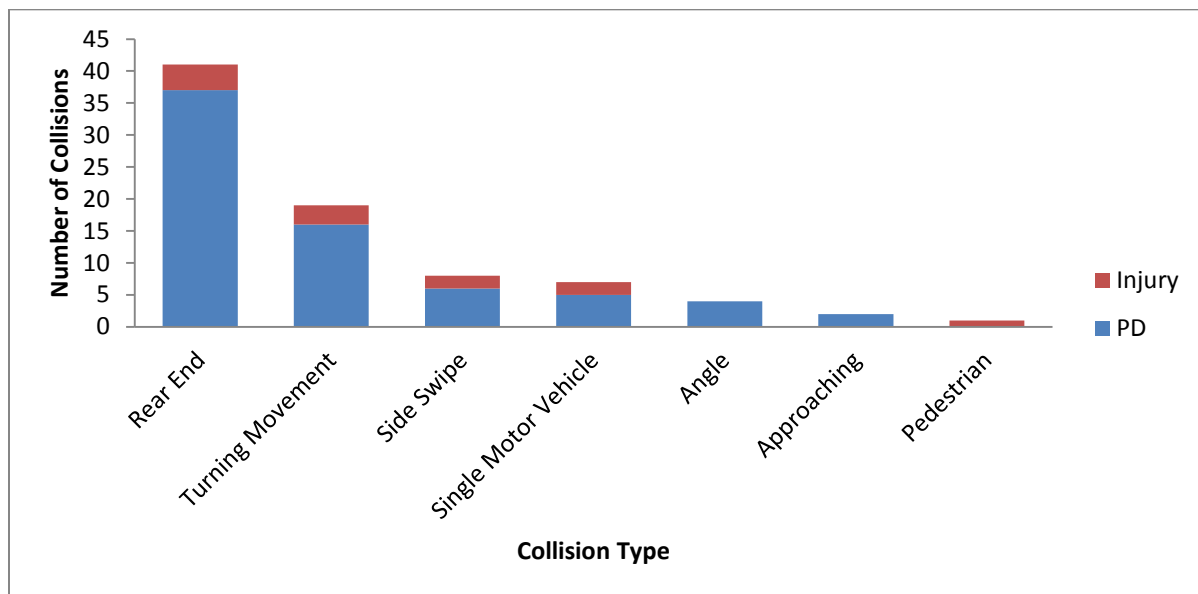


Exhibit 2-8: Collisions by Type and Severity at the Derry Road / Argentia Road Intersection

Single motor vehicle, sideswipe and angle collisions had a relatively higher proportion of injuries, (29%, 25% and 13%, respectively). Although rear-end collisions were the most frequent type of collision, only 10% of rear-end collisions resulted in injuries. No injuries were reported for the small number of approaching and angle collisions.

2.3.2.2 Light Condition

Since only a subset of collision records have data on the light condition, records with no light condition information have been filled in based on the time of day and time of year. The number of collisions by light condition is shown in **Exhibit 2-9**. Most collisions take place in daylight (72% or 59 collisions), as most traffic travels through the intersection under daylight conditions.

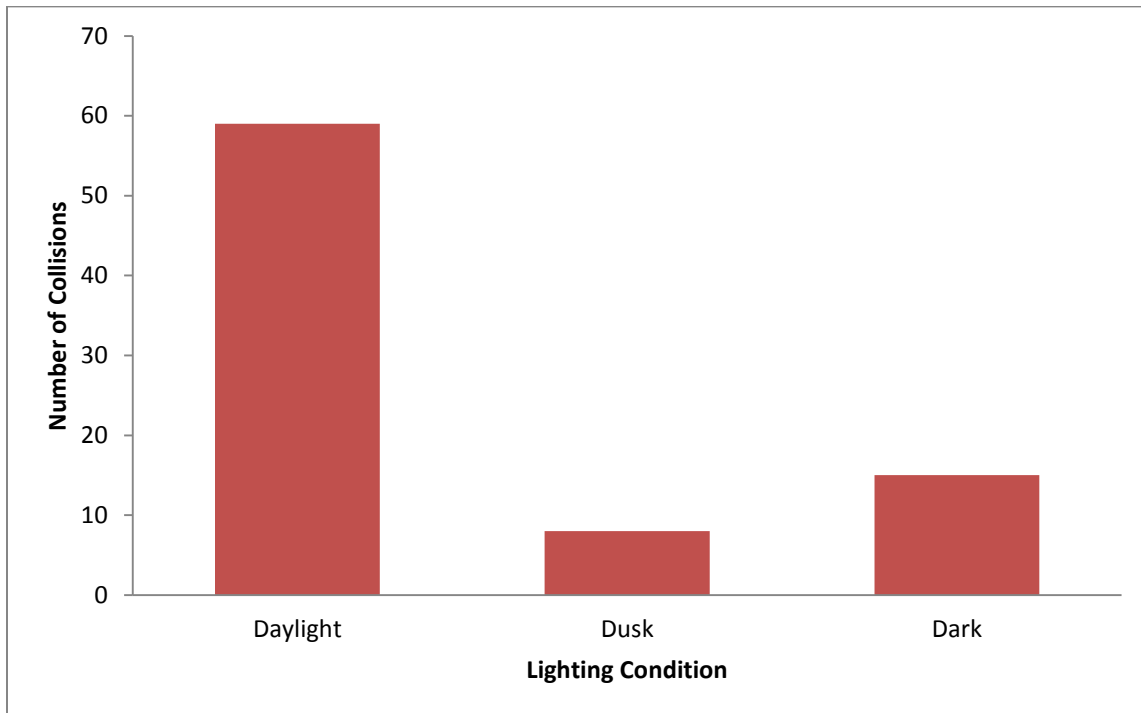


Exhibit 2-9: Collisions by Lighting Condition at the Derry Road / Argentia Road Intersection

2.3.2.3 Environmental Condition

The numbers of collisions by weather condition are shown in **Exhibit 2-10**. The majority of collisions (27) occurred during clear weather conditions. It is important to note that only a subset of the collision records (27 out of 82 records) contained information on the weather conditions. Additional data on the environmental condition is required to determine the overall pattern.

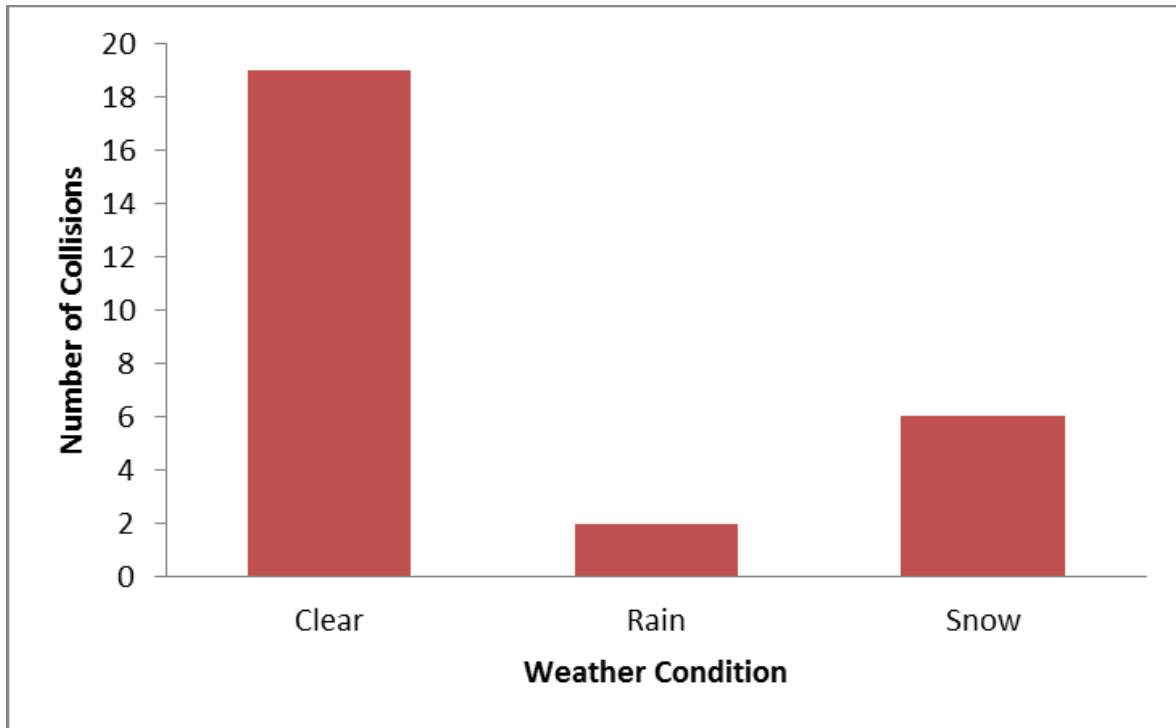


Exhibit 2-10: Collisions by Weather Condition at the Derry Road / Argentia Road Intersection

2.3.3 Collisions by Location

Collisions were also assessed with respect to the location within the intersection where they took place:

Intersection Location	Description
Within the intersection	Collisions that occur as a result of the intersection, such as rear-end collisions at the stop bar or a turning movement collision that takes place as a result of two conflicting vehicle movements
North leg of the intersection	On Argentia Road, north of the intersection
East leg of the intersection	On Derry Road, east of the intersection
South leg of the intersection	On Argentia Road, south of the intersection
West leg of the intersection	On Derry Road, west of the intersection
Sheraton driveway	Collisions that occur as a result of vehicles using the driveway to the Sheraton Hotel, to the south of the intersection
Vacant office driveway	Collisions that occur as a result of vehicles using the driveway to the vacant office at the southwest corner of the intersection

The distribution of collisions based on location is shown in **Exhibit 2-11**. The results show that a majority of the collisions (66% or 54 out of 82) take place at the intersection itself, either at the stop bars or when traveling through the intersection. Relatively fewer collisions take place when vehicles are traveling on the approach legs. However, a larger number of collisions take place on the north leg of the intersection (Argentia Road) and also at the Sheraton Driveway to the south of the intersection. Collisions are illustrated by both type and location within the intersection in **Exhibit 2-11**.

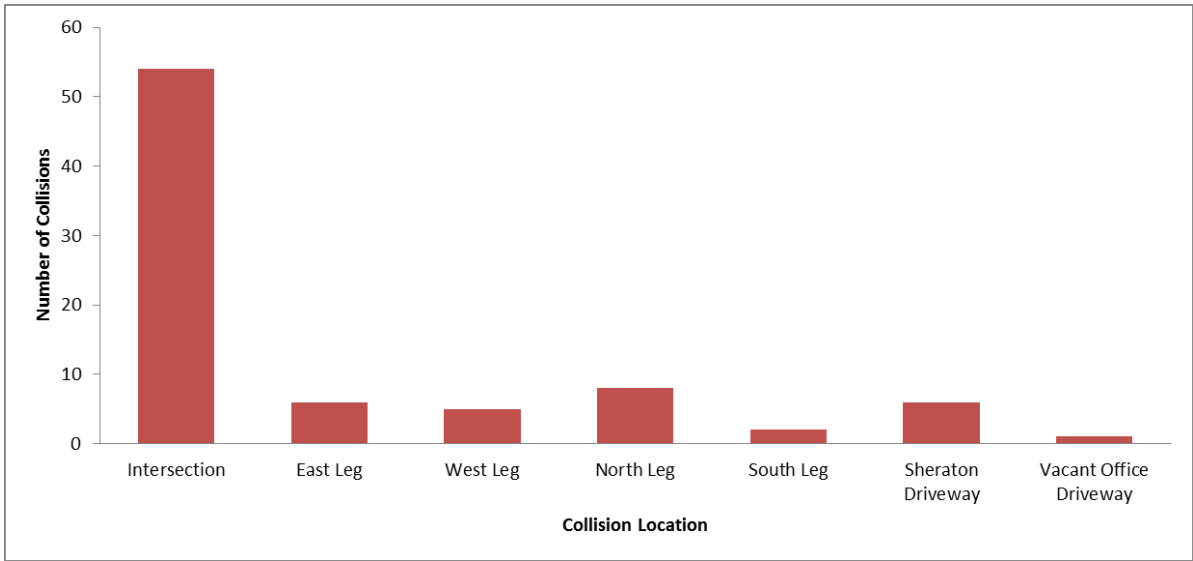


Exhibit 2-11: Collision Location within the Intersection of Derry Road / Argentia Road



Key to Symbols	
Vehicle Movement	Collision Type
<ul style="list-style-type: none"> ↶ Left → Straight ↷ Right ↔ Reversing 	<ul style="list-style-type: none"> ⊥ Rear-end ↘ Turning Movement ● Pedestrian ⚡ Run Off Road ↘ Angle ↔ Sideswipe (same direction) ↔ Sideswipe (opposite direction)
<p>Notes: Collision locations are approximate</p>	

Exhibit 2-12: Collision Locations within Intersection of Derry Road and Argentia Road

The review of collisions by location and type suggests the following trends:

- **Channelized Right-Turns:** A higher proportion of collisions take place at the channelized right turn lanes (eastbound right-turn and westbound right-turn)
- **Left-Turn Movements:** Turning movement collisions occur for all left-turn movements; when considering the volume of vehicles making each movement, the proportion of collisions occurring for eastbound left-turns and southbound left-turns is higher
- **Sheraton Driveway:** Six collisions take place at the driveway to the Sheraton, which is higher than the number of collisions at other study area driveways
- **North Leg of Intersection:** Proportionally more collisions have taken place on the north leg of the intersection (Argentia Road), including three run-off-road collisions, a head-on collision and a sideswipe collision. This may be a result of the alignment of the horizontal curve in Argentia Road.

2.3.4 Safety Performance Function

The expected number of collisions is a weighted average of the observed collisions and predicted collisions. It is a more accurate measure of collision frequency at a site than the observed number of collisions or collision rate mainly because it accounts for bias related to Regression to the Mean in collision datasets. Locations where the observed number of collisions is higher than expected number of collisions highlight a location which experiences more collisions than other sites with similar characteristics.

The expected number of collisions at the study intersection during the study period was calculated utilizing Safety Performance Functions (SPFs) developed by the Regional Municipality of Peel. Detailed calculations are provided in **Appendix A**.

A comparison of the observed collisions, predicted collisions and expected collisions during the study period is summarized in **Table 2-4**.

Table 2-4: Results of Safety Performance Function for Intersection of Derry Road and Argentia Road

	Observed Number of Collisions	Predicted Number of Collisions	Expected Number of Collisions
Severe	12	8.22	10.80
PDO	70	40.04	68.89
All Collisions	82	48.26	79.69

The results show that there are slightly more collisions taking place at the intersection than would be expected based upon the Region's SPFs. Overall the intersection recorded 2.31 (i.e. 82 – 79.69) more collisions than expected at other similar sites. It can be concluded that this intersection is performing as expected due to the small difference between observed and expected number of collisions.

2.3.5 Field Review

A field review was undertaken in September 2013 to assess the intersection.

2.3.5.1.1 Cross-Section

The receiving lane on Argentia Road for northbound traffic on the north side of Argentia Road is quite wide. The channelized eastbound right-turn lane also feeds into this lane. However, as this lane is quite wide and there are often right-turning vehicles merging into it, it may be confusing for northbound vehicles crossing through the intersection. This section of the intersection is wide enough to accommodate two lanes (**Photo 2-3**), but only one lane is marked: this may result in driver confusion or encourage drivers to drive two at a time in the lane.



Photo 2-3: Receiving Leg for Northbound Traffic, North Side of Intersection

2.3.5.2 Pavement Markings

The pavement markings for all legs of the intersection were clear and bright.

The crosswalks were observed to be faded during the site visit (**Photo 2-4**). This is less safe for pedestrians, as drivers cannot see the crosswalk as clearly and will be less aware of pedestrian crossings.



Photo 2-4: Faded Crosswalk Pavement Markings

2.3.5.2.1 Signage

A review of regulatory, warning and guide signs were conducted within the functional area of the intersection. Their placement and condition were reviewed and found to be in acceptable standard. Signage on the intersection approaches was visible and unobstructed by trees or other barriers.

2.3.5.2.2 Traffic Signal

On all approaches at the intersection pedestrian call buttons were present and operational (**Photo 2-5**).



Photo 2-5: Traffic Signals and Pedestrian Signal Heads

2.3.5.3 Sight Distance

The sight distances were observed for the accesses to private properties on Argentia Road. Based on the TAC Manual, for a design speed of 60 km/h (as along Argentia Road), the minimum stopping sight distance should be 85 m. A review of the sight distances at the accesses is provided in **Table 2-5**.

Table 2-5: Sight Distances at Study Area Accesses

Access	View to Right Side	View to Left Side
<i>Northeast corner of the intersection</i>		
Holiday Inn – North Entrance	-Can see greater than 85 m	-Can see as far as the channelized right-turn lane at the intersection; however, bushes obstruct the view of vehicles entering the channelized right-turn (Photo 2-6)
Holiday Inn – South Entrance	-Can see greater than 85 m (to as far as where Argentia Road curves)	-Can see clearly through the intersection of Derry / Argentia
<i>Northwest corner of the intersection</i>		
Pentagon Building	-Can see through to the south side of the intersection; however, southbound vehicle queues may block visibility of northbound traffic (Photo 2-7)	-Can see approximately 80 m to the left side; curvature of Argentia Road and bushes limit visibility
<i>Southwest corner of the intersection</i>		
Vacant Commercial Property	-Can see greater than 85 m	-Can see clearly through the intersection

Access	View to Right Side	View to Left Side
Safe Self Storage	-Can see greater than 85 m	-Can see greater than 85 m
GO Station parking lot entrance	-Can see greater than 85 m	-Can see greater than 85 m
<i>Southeast corner of the intersection</i>		
Sheraton Hotel	-Clear view to intersection of Derry and Argentia	-Can see greater than 85 m; however, there are some visual obstructions (trees, light poles) that limit visibility beyond this point (Photo 2-8).
BMO	-Clear view to nearest intersection	-Clear view to nearest intersection



Photo 2-6: View of Eastbound Channelized Right-Turn from North Holiday Inn Entrance



Photo 2-7: Southbound Vehicle Queues can Limit Visibility of Northbound Traffic

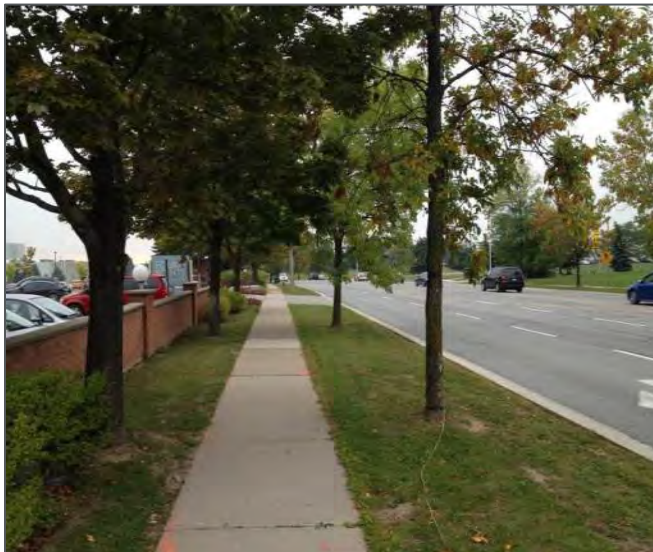


Photo 2-8: Visibility from Sheraton Hotel Driveway, looking Left

2.3.5.4 Operations

Some drivers approached the **channelized right-turn lanes** cautiously and would slow down / stop and wait until a very large gap was available (**Photo 2-9**). Other drivers would approach the channelized right-turns more aggressively. The varying driver behaviour could result in confusion if drivers do not know what to expect when driving behind another vehicle in a channelized right-turn lane.



Photo 2-9: Cautious Driver at Westbound Channelized Right-Turn Lane



Photo 2-10: Vehicles Turning out of Sheraton Driveway

At the **Sheraton Hotel driveway** at the southeast corner of the intersection (**Photo 2-10**), there is not a dedicated left-turn lane into the site and there is very little queuing space for vehicles. Although this was not observed during the field visit, it is possible that vehicles making left-turns into the site wait until there is gap in the traffic to enter the driveway; however, if their visibility is limited, they may not see a vehicle coming in the curb lane.

When vehicles make left turns out of the driveway, they are observed to use the median space between the yellow lanes in the centre of the road to accelerate and then merge into the southbound lanes on Argentia Road.

Driver workload is high for drivers making the eastbound left-turn, as there are several things the driver must process: 3 lanes of oncoming traffic, other left-turning vehicles in the intersection (westbound left-turns), pedestrians on the north leg of the intersection and vehicles making the channelized right-turn. Furthermore, the vertical curve of Derry Road to the east of the intersection reduces visibility of oncoming vehicles.

2.3.5.5 Pedestrian and Cyclist Realm

As discussed in **Section 2.1.3**, there are gaps in the sidewalk network at the intersection. There are some locations where there is no sidewalk, or where there is only a splash pad / kill strip adjacent to the roadway (**Photo 2-11**).



Photo 2-11: Splash Pad / Kill Strip on the North Side of Derry Road



Photo 2-12: Cyclist using Crosswalk

Pedestrians were observed to get off the bus on Argentia and jaywalk across Argentia Road to the Sheraton Hotel. As the bus stop location is to the south of the crosswalk, pedestrians jaywalk because this is the most direct route between the bus stop and the hotel

There are no dedicated facilities for cyclists. Some cyclists were observed using the intersection crosswalks (**Photo 2-12**).

2.3.5.6 Illumination

Streetlights are provided at the intersection to improve visibility at night.

2.3.5.7 Alignment

The horizontal alignment of Argentia Road curves to the north of the intersection. The intersection angle should be reviewed to assess if any skew can be reduced.

There is a vertical curve on Derry Road to the east of the intersection as the roadway goes down to pass beneath Highway 401.

2.3.5.8 Clear Zone

Infrastructure or objects at the side of the roadway can increase the severity of collisions when a vehicle departs the travelled right-of-way. If there are objects adjacent to the curb, then a vehicle can strike them if the driver loses control. For example, collisions with utility poles can result in significant injuries to drivers and passengers, depending on the vehicle speed and the characteristics of the collision. If the clear zone is free of any objects or infrastructure, then a driver will more easily be able to regain control and return to the travelled right-of-way.

Some trees, signs, fire hydrants and light poles are located to the side of the roadway within the clear zone. If any infrastructure is relocated as part of the project works, the new infrastructure should be placed to maximize the clear zone and vehicle recovery zone, particularly at locations where there is a higher risk of vehicle running off the road, such as where there are horizontal curves on Argentia Road.

2.3.6 Potential Countermeasures

As a result of the review of the collision records, safety performance function and field visit, the following potential countermeasures should be examined during the design of intersection improvements to be completed as part of this EA:

- **Channelized right-turn lanes:** based on the number of collisions that have occurred at the two channelized right-turn lanes, assess whether the channelized right-turn lanes can be eliminated or modified to improve safety performance. For example, consider the conversion of the existing channelized right-turn lanes to “Smart Channels” to reduce right-turning vehicle speeds. The Ontario Traffic Manual (OTM) Book 15 notes that smart channels are designed to increase the adjacent road entry angle; this results in a reduction of the turning speed and improved visibility of pedestrians.

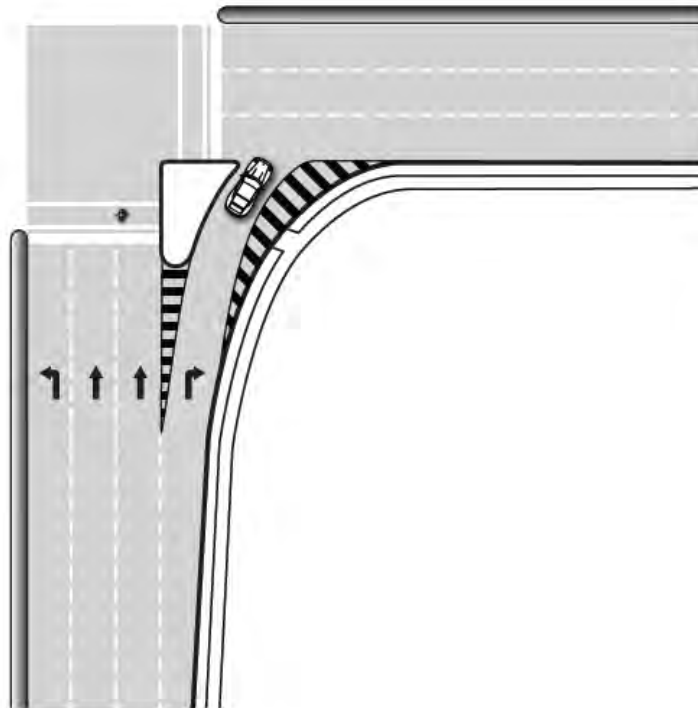


Diagram of Smart Channel; Figure 22 from OTM Book 15 – Pedestrian Crossing Facilities

- **North Leg of the Intersection:** Review alignment and pavement markings to assess if the northbound lane of the north leg of the intersection can be improved.
- **Crosswalks:** Improve the pavement markings of the intersection crosswalks, which were faded during the site visit.
- **Review Clear Zone:** Ensure that major obstructions are not placed within the clear zone.
- **Sheraton Hotel Driveway:** Review opportunities to improve the safety of the access to the Sheraton Hotel.
- **Utility Pole Placement:** If any light poles are relocated as part of the project works at the intersection, place the new light poles in locations that can maximize the clear zone / vehicle recovery area; avoid placing poles in locations where vehicles are more likely to run off the road (such as locations with horizontal curves)

2.5 Existing Accesses

There are no existing accesses to Derry Road within the study area.

There are approximately 9 driveways onto Argentia Road within the study area. A sightline analysis for these driveways was provided in **Section 2.3.5** of this report. Signalization is not recommended for any of these driveways, as they are too close to the existing intersection of Derry Road and Argentia Road. Considering the collision history at the Sheraton Driveway, measures to improve safety such as a left-turn lane should be considered during the design phase.

2.6 Derry / Argentia Traffic Operations

2.6.1 Existing Conditions

Existing traffic volumes were determined based on counts received from the Region of Peel. The counts were conducted during the AM Peak and PM Peak on February 15, 2011. The counts were reviewed and considered reasonable based upon a comparison with field visit observations and a 2012 traffic count that was included as part of the traffic study for the proposed First Gulf development at the southwest corner of the intersection. The turning movement counts used for all study area intersections are provided in **Appendix B**.

Existing (2011) traffic volumes are illustrated in **Exhibit 2-13**.

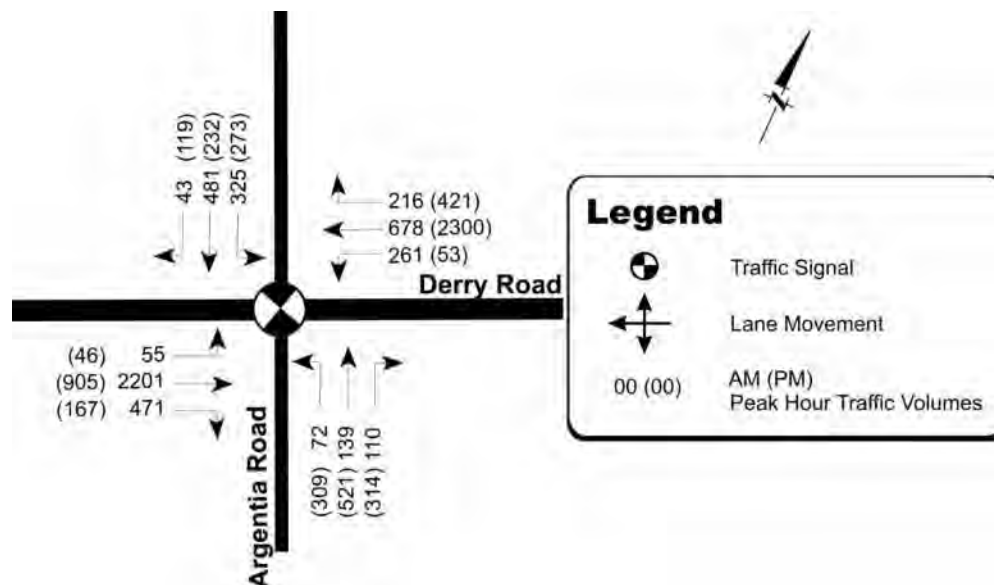


Exhibit 2-13: 2011 Traffic Volumes

The intersection was modelled in Synchro for the AM and PM Peak Periods for existing conditions. For all analyses, the existing AM Peak and PM Peak Period results are based upon the existing signal timings. The signal timings received from Peel Region and used in this analysis are provided in **Appendix C**.

HCM Reports were used, as per the Region of Peel's Synchro Guidelines. The HCM reports are provided for the intersection of Derry Road and Argentia Road in **Appendix D**. The assessment of traffic operations is based about the following two measures:

- Volume to Capacity Ratio (v/c ratio) for each movement and for the intersection as a whole
- Level of Service (LOS) for each movement and the intersection as a whole

Using the default saturation flows in Synchro resulted in several instances where the volume to capacity (v/c) ratios were higher than 1 for specific movements during both the AM and PM peak. As a result the model underestimated capacity during both AM and PM peaks. Through discussions with the staff at the Region, it was agreed that the model should be adjusted to reflect v/c ratios close to one to become more reliable when estimating traffic operations under 2021 and 2031 conditions. Therefore, the default saturation flow rates in Synchro were adjusted for all existing movements with v/c greater than 1. The modifications made to the specific movements during both AM and PM peaks are summarized in **Table 2-6**.

Table 2-6: Ideal Saturation Flow Adjustments

	AM	PM
Eastbound Through	Increased from 1900 to 2050	<i>No change</i>
Southbound Through/Right	Increased from 1900 to 1975	<i>No change</i>
Southbound Left	<i>No change</i>	Increased from 1900 to 2250

The results of the Synchro modelling of existing conditions at Derry Road and Argentia Road are summarized in **Table 2-7**.

Table 2-7: Updated Existing Operations at Derry Road and Argentia Road

Movement	AM		PM	
	Existing		Existing	
	v/c	LOS	v/c	LOS
Intersection Overall	0.94	D	0.91	D
Eastbound Left	0.20	C	0.85	F
Eastbound Through	0.98	E	0.43	C
Eastbound Right	0.31	A	0.11	A
Westbound Left	0.86	E	0.20	C
Westbound Through	0.24	B	0.91	D
Westbound Right	0.15	A	0.28	A
Northbound Left	0.60	D	0.79	D
Northbound Through	0.30	D	0.91	E
Northbound Right	0.08	D	0.43	D
Southbound Left	0.81	E	1.00	F
Southbound Through/Right	0.98	F	0.75	E

Note: v/c = Volume to Capacity , LOS = Level of Service

The HCM analysis indicates that demand is approaching capacity at specific movements at the intersection of Derry Road and Argentia Road during both the AM and PM Peak Periods under existing conditions. The results of this analysis are summarized in **Table 2-11**.

Table 2-8: Review of Operations at Derry Road and Argentia Road

AM Peak	PM Peak
<ul style="list-style-type: none"> • The intersection is approaching capacity during the AM Peak Period • Eastbound Through has v/c approaching 1 • Southbound Through/Right has v/c approaching 1 and LOS of F 	<ul style="list-style-type: none"> • The intersection is approaching capacity during the PM Peak Period • Eastbound Left-Turn has LOS F • Southbound Left-Turn has v/c approaching 1 and LOS of F

2.6.2 Development of Horizon Year Traffic Volumes

In order to model operations in 2021 and 2031, traffic volumes had to be developed for these horizon years. The following process was undertaken to develop horizon year traffic volumes for 2021 and 2031:

- Based upon co-ordination with the Region of Peel, a compound growth rate of 1% per annum was used on all approaches for the 2021 and 2031 horizon years.
- The growth rate was applied to the inbound volumes at each leg of the intersection
- The existing turning movement split for each intersection approach was applied to the future total inbound volume. This resulted in the future turning movement counts at the intersection
- HDR contacted the City of Mississauga Planning and Building Department to determine development applications within the study area that would result in additional traffic volumes or changes in traffic patterns. HDR was informed of a proposed development at the southwest corner of Derry Road and Argentia Road.
- HDR received the “First Meadowvale Phase 3 Traffic Impact Study, February 2013”, completed by BA Group on behalf of First Gulf Corporation regarding the proposed new office (with GFA of approximately 125,000) at the southwest corner of Derry Road and Argentia Road.
- HDR reviewed the study and found its methodology acceptable. The site traffic volumes resulting from this proposed development that would use the intersection of Derry Road and Argentia Road were added to the 2021 and 2031 traffic volumes. The growth factor was **not** applied to these background volumes.

Site volumes expected to be generated from the “First Meadowvale Phase 3” development are illustrated in **Exhibit 2-14** and total traffic volumes in 2021 and 2031 are illustrated in **Exhibit 2-15** and **Exhibit 2-16**.

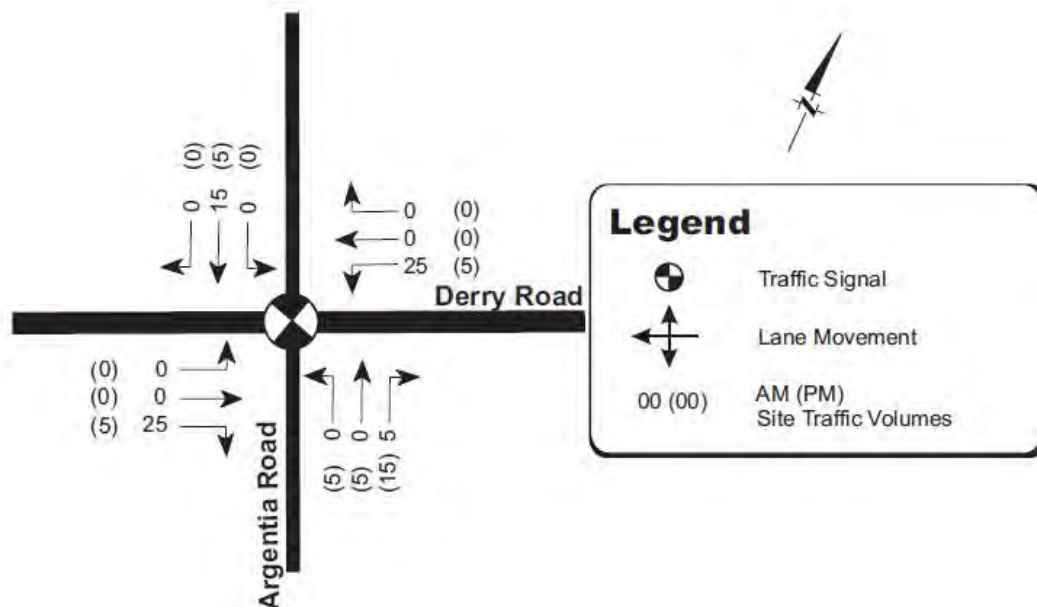


Exhibit 2-14: Site Traffic Volumes – First Meadowvale Phase 3

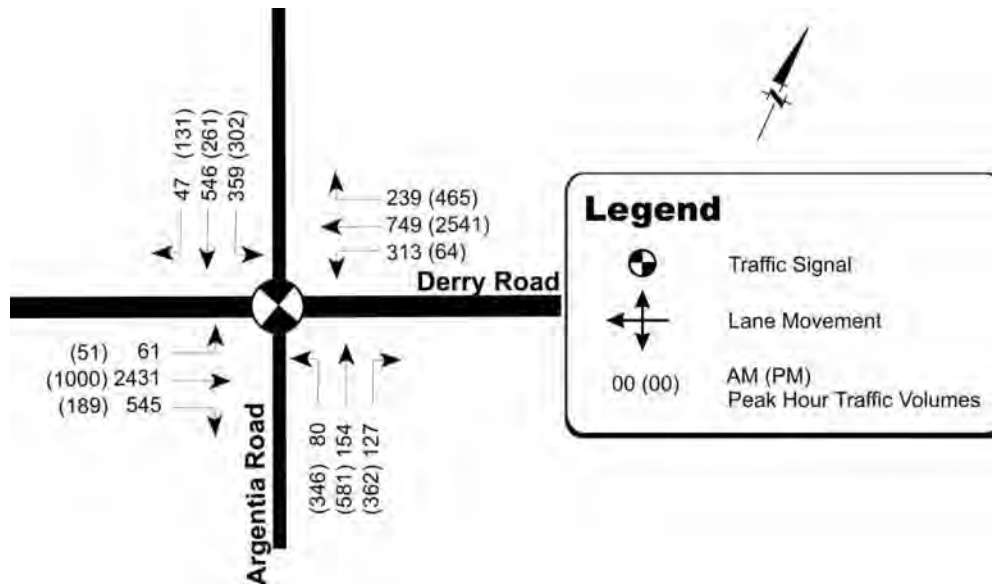


Exhibit 2-15: 2021 Traffic Volumes

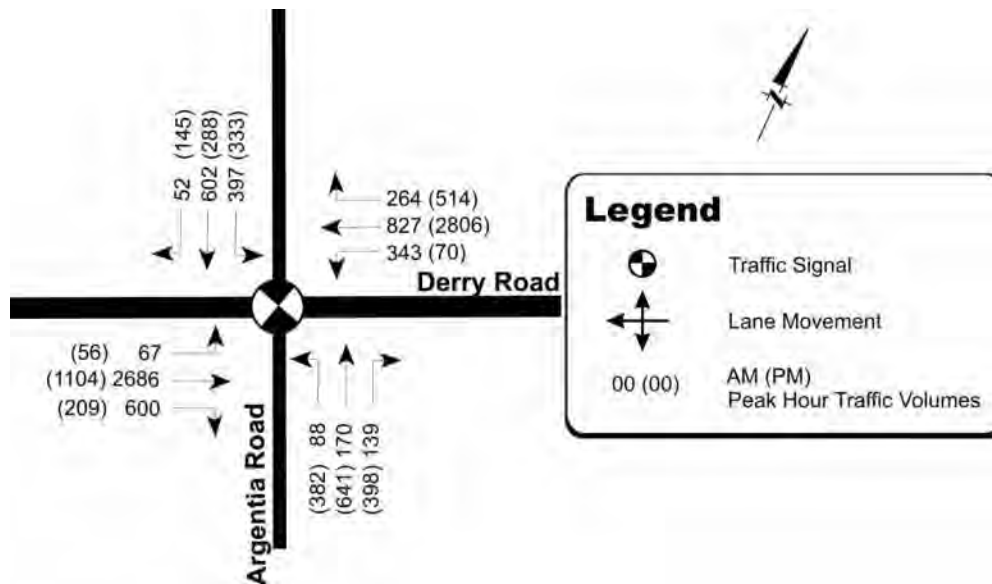


Exhibit 2-16: 2031 Traffic Volumes

HDR has also reviewed the traffic growth, population growth and employment growth in the traffic super-zone between 2001 and 2012 to better understand the demand profile expected to use the study intersection. The purpose of reviewing the traffic growth, population growth and employment growth over the past decade was to help predict the traffic growth up to the horizon years of 2021 and 2031. Population and employment growth in the “Meadowvale” traffic super-zone is summarized in **Table 2-9**.

Table 2-9: Population and Employment Growth in Meadowvale

Meadowvale	Population	Employment
2001	90,932	32,864
2011	126,991	37,813
Growth from 2001 to 2011(10 years)	39.7%	15.1%
Growth per annum	3.4%	1.4%
2021	131,256	44,023
2031	134,506	45,314
Growth from 2011 to 2031 (20 years)	5.9%	19.8%
Growth per annum	0.287%	0.9%

In summary:

- Population growth in the 10 year period between 2001 and 2011 is much greater than projected population growth between 2011 and 2031.
- Projected employment growth between 2011 and 2031 is somewhat greater than employment growth between 2001 and 2011.

Average Annual Daily Traffic (AADT) on Derry Road at locations to the east and west of the intersection of Derry Road and Argentia Road have been assessed for the period between 2001 and 2011/2012. The AADT volumes are illustrated in **Exhibit 2-17** and **Exhibit 2-18**. The purpose of reviewing the AADT over time is to assess how traffic volumes have changed in relation to the change in population and employment over this time-frame.

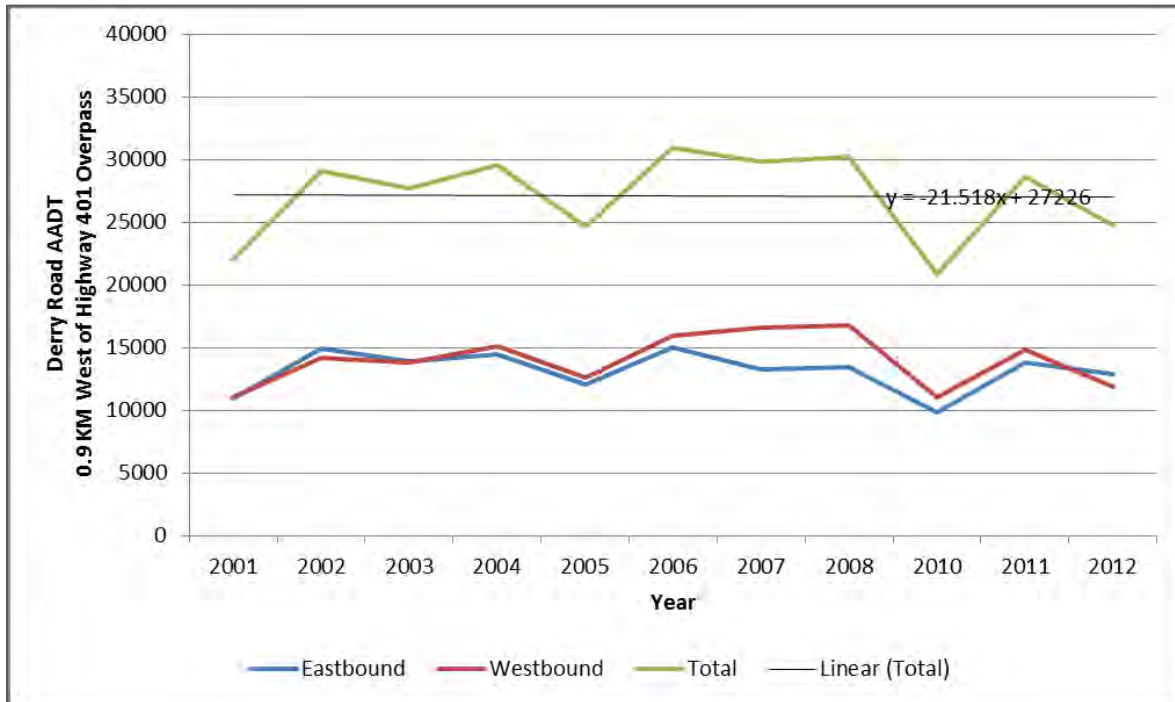


Exhibit 2-17: Derry Road AADT, 0.9 km West of Highway 401 Overpass

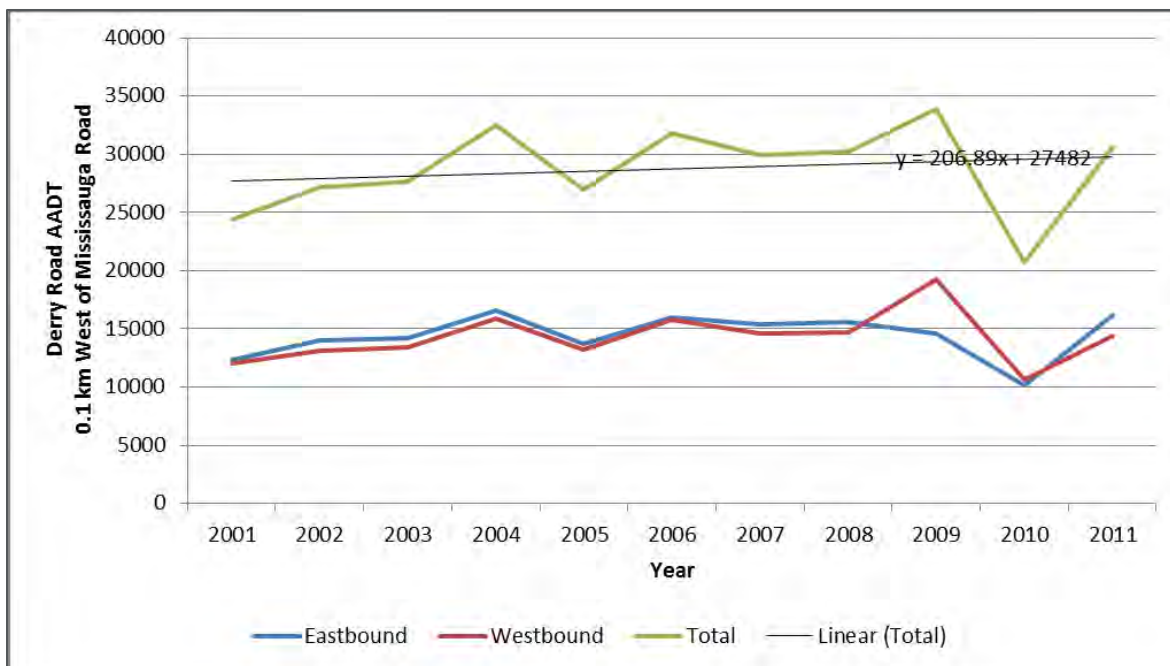


Exhibit 2-18: Derry Road AADT, 0.1 km West of Mississauga Road

At the location 0.9 km to the west of the Highway 401 overpass, total volumes have fluctuated over the years but the general trend has been of little overall growth, while at the other location (0.1 km west of Mississauga Road) the trendline has shown an increase over time, with a total growth rate of 7.5%.

The information in the preceding table and figures can be summarized as follows:

- During the 10 year time frame between 2001 and 2011, population and employment increased in the zone by 39.7% and 15.1%, respectively, and AADT volumes increased by 7.5% at most
- During the 20 year time frame between 2011 and 2031, population and employment are forecasted to increase by 5.9% and 19.8%, respectively. As the increase of jobs and population in the zone between 2011 and 2031 is less than the growth experienced between 2001 and 2011, the increase in AADT volumes between 2011 and 2031 would be expected to be equivalent to or less than the increase between 2001 and 2011.

Using the compounded 1% per annum growth rate between 2011 and 2031 results in a total increase of **22%**, which exceeds the growth in traffic that occurred between 2001 and 2011 when there was greater overall growth in population and employment. Further, these growth rates do not take into account potential modal shifts toward transit, active transportation and carpooling which may result from social policies or fuel prices. They also do not account for peak spreading (i.e. drivers shifting their trip times to avoid peak congestion) and route diversion (drivers shifting to different routes to avoid congestion at Derry Road and Argentia Road).

In conclusion, the **compounded 1% per annum** growth rate is expected to be conservative and represent a worst-case scenario. A **0.5% per annum** growth rate, which was used in the Traffic Impact Study for the "First Meadowvale Phase 3" development, is expected to be more reasonable. However, operations at the intersection in 2021 and 2031 were assessed based on the compounded 1% per annum growth rate.



2.6.3 Synchro Analysis – Do Nothing Scenario

The intersection was modelled in Synchro for the AM and PM Peak Periods in 2021 and 2031 assuming that no improvements are made to the intersection. The signal cycle length has been retained as 140 seconds, but the splits have been optimized. The adjustments to the saturation flows described in **Table 2-6** were carried forward to the assessment of operations in 2021 and 2031. Operations in the AM and PM Peak Period at the intersection of Derry Road and Argentia Road are summarized in **Table 2-10**.

Table 2-10: Peak Period Operations at Derry Road and Argentia Road – 2021 and 2031

Movement	AM				PM			
	2021		2031		2021		2031	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
Intersection Overall	1.06	E	1.22	F	1.01	E	1.13	F
Eastbound Left	0.23	C	0.27	C	0.96	F	1.04	F
Eastbound Through	1.01	E	1.12	F	0.48	C	0.52	C
Eastbound Right	0.35	A	0.39	A	0.13	A	0.14	A
Westbound Left	1.16	F	1.39	F	0.31	C	0.37	C
Westbound Through	0.27	B	0.30	B	1.05	E	1.13	F
Westbound Right	0.17	A	0.18	A	0.31	A	0.34	A
Northbound Left	0.69	E	0.76	E	0.90	D	1.06	F
Northbound Through	0.36	D	0.40	D	0.98	F	1.09	F
Northbound Right	0.09	D	0.10	D	0.59	D	0.69	D
Southbound Left	0.92	E	0.99	F	1.06	F	1.24	F
Southbound Through/Right	1.11	F	1.17	F	0.82	E	0.98	F

The 2021 and 2031 operations are expected to experience capacity issues at specific movements during both AM and PM peak as shown in **Table 2-10**. Without geometric improvements, by 2021 the intersection is expected to be heavily congested, with conditions to deteriorate further by 2031. The results of this analysis are summarized in **Table 2-11**.

Table 2-11: Review of Operations at Derry Road and Argentia Road

	AM Peak	PM Peak
Derry Road and Argentia Road		
2021	<ul style="list-style-type: none"> • Intersection v/c exceeds 1, with LOS of E • Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> • Eastbound through • Westbound left-turn • Southbound through-right 	<ul style="list-style-type: none"> • Intersection v/c exceeds 1, with LOS of E • Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> • Eastbound left-turn • Westbound through • Northbound through • Southbound left-turn
2031	<ul style="list-style-type: none"> • Intersection v/c exceeds 1, with LOS of F • Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> • Eastbound through • Westbound left-turn • Southbound left-turn • Southbound through-right 	<ul style="list-style-type: none"> • Intersection v/c exceeds 1, with LOS of F • Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> • Eastbound left-turn • Westbound through • Northbound left-turn • Northbound through • Southbound left-turn

The review of the 2021 and 2031 operations under the “Do Nothing” case highlighted specific deficiencies to address which was used to identify potential alternatives that were evaluated. The

alternatives are a combination of geometric improvements and signal timing updates and are discussed in **Section 4**.

2.6.4 Field Visit Observations

A field visit was undertaken during the **AM Peak Period** on Thursday, September 19th, 2013. The following observations were noted:

- Significant southbound queues (approximately 140-150 m) were observed, both for the left-turn and the through movement (**Photo 2-13**, **Photo 2-14** and **Photo 2-15**). Some vehicles had to wait more than one cycle to cross the intersection.
- For the westbound left-turn, some vehicles had to wait more than one cycle to complete the turn (**Photo 2-16**)
- Peak directions were southbound and eastbound; lower volumes observed in the westbound and northbound directions
- Lengthy eastbound queues were observed; however, they would clear within one cycle (**Photo 2-17**).

A field visit was undertaken during the **PM Peak Period** on Monday, May 6th, 2013. The following observations were noted:

- Westbound queues extended under the Highway 401 underpass; however, this may have been caused by construction taking place on Derry Road on the west side of the intersection
- Demand for the northbound left-turn exceeded the available storage and this queuing blocked some vehicles exiting the Sheraton and BMO driveways; congestion on Derry Road limited capacity of the northbound left-turn movement
- Low demand observed for the eastbound left-turn



Photo 2-13: Southbound Queues on Argentia Road during the AM Peak (1)



Photo 2-14: Southbound Queues on Argentia Road during the AM Peak (2)



Photo 2-15: Southbound Queues on Argentia Road during the AM Peak (3)



Photo 2-16: Westbound Left-Turning Vehicles



Photo 2-17: Eastbound Through Traffic on Derry Road

2.7 Study Area Traffic Operations

In addition to an assessment of operations at the intersection of Derry Road and Argentia Road, operations at the following intersections within the broader study area were also assessed:

- Argentia Road and Winston Churchill Boulevard
- Argentia Road and Mississauga Road
- Derry Road and Winston Churchill Boulevard
- Derry Road and Mississauga Road

For all analyses, the existing AM Peak and PM Peak Period results are based upon the existing signal timings. For 2021 and 2031, the cycle length has been retained but the splits have been optimized. The intent of this analysis is to assess future network operations without any major infrastructure improvements. The assessment of traffic operations is based about the following two measures:

- Volume to Capacity Ratio (v/c ratio) for each movement and the intersection as a whole
- Level of Service (LOS) for each movement and the intersection as a whole

As discussed previously in **Section 2.6.1**, adjustments to the ideal saturation flow in the Synchro model were made for certain movements based upon their performance under existing conditions. If a movement had a v/c ratio that exceeded 1 under existing conditions, the ideal saturation flow was adjusted so that the v/c ratio would be just under 1. The modifications made to the specific movements during both AM and PM peaks to study area intersections are summarized in **Table 2-12**.

Table 2-12: Ideal Saturation Flow Adjustments to Study Area Intersections

	AM	PM
Argentia Road and Winston Churchill Boulevard		
Eastbound Left	<i>No change</i>	Increased from 1900 to 2200
Argentia Road and Mississauga Road		
Northbound Through	Increased from 1900 to 2150	<i>No change</i>
Southbound Left	Increased from 1900 to 2100	<i>No change</i>
Westbound Left	<i>No change</i>	Increased from 1900 to 2050
Derry Road and Winston Churchill Boulevard		
Northbound Left	<i>No change</i>	Increased from 1900 to 2200
Derry Road and Mississauga Road		
Eastbound Left	Increased from 1900 to 2300	Increased from 1900 to 2300
Eastbound Through	Increased from 1900 to 2000	<i>No change</i>
Northbound Through	Increased from 1900 to 2000	Increased from 1900 to 2200

HCM Synchro Reports for study area intersection operations are provided in **Appendix E**.

Operations in the AM and PM Peak Period are summarized in **Table 2-13** for the other study area intersections:

- Argentia Road and Winston Churchill Boulevard
- Argentia Road and Mississauga Road
- Derry Road and Winston Churchill Boulevard
- Derry Road and Mississauga Road



Table 2-13: Peak Period Operations at Study Area Intersections

Argentia Road and Winston Churchill Boulevard												
Movement	AM						PM					
	Existing		2021		2031		Existing		2021		2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Intersection Overall	0.61	D	0.65	D	0.71	D	0.73	D	0.79	D	0.89	E
Eastbound Left	0.78	E	0.97	F	1.07	F	0.99	F	0.86	E	0.94	E
Eastbound Through	0.42	D	0.45	D	0.51	D	0.43	D	0.46	D	0.50	D
Eastbound Right	0.15	D	0.17	D	0.18	D	0.15	D	0.16	D	0.18	D
Westbound Left	0.45	D	0.64	E	0.62	E	0.63	D	0.63	D	0.70	D
Westbound Through	0.24	E	0.28	E	0.28	E	0.61	D	0.67	D	0.71	D
Westbound Right	0.49	E	0.30	E	0.47	E	0.74	E	0.82	E	0.91	E
Northbound Left	0.60	E	0.66	E	0.68	E	0.80	E	0.86	E	0.93	F
Northbound Through	0.57	D	0.52	D	0.66	D	0.53	D	0.65	D	0.77	D
Northbound Right	0.19	A	0.21	A	0.23	A	0.14	A	0.15	A	0.16	A
Southbound Left	0.62	D	0.77	E	0.74	D	0.75	E	0.80	E	0.86	E
Southbound Through	0.25	C	0.25	C	0.29	C	0.58	D	0.71	D	0.83	D
Southbound Right	0.11	C	0.12	C	0.13	C	0.20	C	0.22	D	0.30	D

Argentia Road and Mississauga Road												
Movement	AM						PM					
	Existing		2021		2031		Existing		2021		2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Intersection Overall	0.90	D	1.04	E	1.21	F	0.80	D	0.90	D	1.00	E
Eastbound Left	0.51	E	0.55	E	0.61	E	0.93	E	1.14	F	1.25	F
Eastbound Through	0.64	E	0.67	E	0.70	E	0.31	D	0.36	D	0.38	D
Eastbound Right	0.02	A	0.02	A	0.03	A	0.06	A	0.06	A	0.07	A
Westbound Left	0.80	E	1.11	F	1.28	F	0.99	F	1.06	F	1.14	F
Westbound Through	0.40	D	0.47	D	0.50	D	0.69	E	0.72	E	0.77	E
Westbound Right	0.19	A	0.21	A	0.23	A	0.74	A	0.82	A	0.91	A
Northbound Left	0.79	E	1.01	F	1.28	F	0.33	C	0.40	C	0.46	D
Northbound Through	0.99	E	1.10	F	1.19	F	0.84	D	0.87	D	0.99	E
Northbound Right	0.30	A	0.33	A	0.36	A	0.09	A	0.09	A	0.10	A
Southbound Left	0.98	F	1.03	F	1.22	F	0.62	E	0.79	E	0.90	F
Southbound Through	0.40	B	0.43	B	0.49	B	0.83	D	0.89	D	1.01	E
Southbound Right	0.32	A	0.36	A	0.39	A	0.04	A	0.05	A	0.05	A

Derry Road and Winston Churchill Boulevard												
Movement	AM						PM					
	Existing		2021		2031		Existing		2021		2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Intersection Overall	0.83	D	0.88	D	1.04	D	0.86	D	0.89	D	0.98	E
Eastbound Left	0.57	E	0.69	E	0.71	E	0.43	E	0.86	F	0.95	F
Eastbound Through	0.81	D	0.99	E	1.05	E	0.29	D	0.45	D	0.50	D
Eastbound Right	0.23	A	0.25	A	0.28	A	0.14	A	0.16	A	0.18	A
Westbound Left	0.94	F	0.98	F	1.16	F	0.80	D	0.92	D	1.02	F
Westbound Through	0.17	C	0.20	C	0.22	D	0.84	D	0.93	D	1.01	E
Westbound Right	0.10	A	0.11	A	0.12	A	0.10	A	0.12	A	0.13	A
Northbound Left	0.78	E	0.72	E	0.90	F	0.98	F	0.97	F	1.07	F
Northbound Through	0.51	D	0.45	D	0.51	D	0.56	D	0.54	D	0.62	D
Northbound Right	0.20	A	0.22	A	0.24	A	0.11	A	0.12	A	0.14	A
Southbound Left	0.47	E	1.03	F	1.00	F	0.61	E	0.66	E	0.69	E
Southbound Through	0.33	C	0.34	C	0.38	C	0.82	D	0.83	D	0.95	E
Southbound Right	0.05	A	0.05	A	0.06	A	0.21	A	0.23	A	0.26	A

Derry Road and Mississauga Road												
Movement	AM						PM					
	Existing		2021		2031		Existing		2021		2031	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Intersection Overall	0.91	E	0.94	E	1.07	F	1.03	E	1.01	E	1.16	F
Eastbound Left	1.00	E	1.04	E	1.21	F	1.45	F	1.26	F	1.50	F
Eastbound Through	0.97	E	1.03	E	1.12	F	0.63	D	0.73	D	0.75	D
Eastbound Right	0.09	A	0.10	A	0.11	A	0.15	A	0.17	A	0.18	A
Westbound Left	0.90	F	1.02	F	1.20	F	0.91	E	0.97	F	1.17	F
Westbound Through	0.38	D	0.48	D	0.52	D	0.83	D	1.10	F	1.15	F
Westbound Right	0.04	A	0.05	A	0.05	A	0.10	A	0.11	A	0.12	A
Northbound Left	0.95	F	1.03	F	1.20	F	0.71	E	0.98	F	1.08	F
Northbound Through	1.00	E	1.00	E	1.10	F	0.99	F	1.03	E	1.16	F
Northbound Right	0.36	A	0.40	A	0.44	A	0.19	A	0.21	A	0.23	A
Southbound Left	0.61	E	0.98	F	1.08	F	0.45	E	0.57	E	0.59	E
Southbound Through	0.85	D	0.98	E	1.04	F	0.92	E	0.93	E	1.02	E
Southbound Right	0.17	A	0.18	A	0.20	A	0.15	A	0.17	A	0.19	A

*V/C: volume to capacity ratio

**LOS: Level of Service

The key findings from this analysis are summarized in **Table 2-14**.

Table 2-14: Review of Traffic Operations for Study Area Intersections

	AM Peak	PM Peak
Argentia Road and Winston Churchill Boulevard		
Existing	-Intersection operating with reserve capacity	-Intersection operating with reserve capacity -Eastbound Left has LOS F and v/c ratio approaches 1
2021	-Intersection operating with reserve capacity -Eastbound Left has LOS F	-Intersection operating with reserve capacity



	AM Peak	PM Peak
2031	-Intersection operating with reserve capacity -Eastbound Left has LOS F and v/c ratio exceeds 1	-Intersection operating with reserve capacity -Northbound left-turn has LOS F
Argentia Road and Mississauga Road		
Existing	-Intersection approaching capacity	-Intersection operating with reserve capacity
2021	-Intersection v/c exceeds 1 and LOS is E -Multiple movements have LOS F: <ul style="list-style-type: none"> ▪ Westbound left-turn ▪ Northbound left-turn ▪ Northbound through ▪ Southbound left-turn 	-Intersection operating with reserve capacity -Westbound left-turn and eastbound left-turn have LOS F and V/C exceeds 1
2031	-Intersection v/c exceeds 1 and LOS is F -Multiple movements have v/c greater than 1 and LOS F: <ul style="list-style-type: none"> ▪ Westbound left-turn ▪ Northbound left-turn ▪ Northbound through ▪ Southbound left-turn 	-Intersection v/c equals 1 -Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Westbound left-turn ▪ Southbound left-turn ▪ Southbound through
Derry Road and Winston Churchill Boulevard		
Existing	-Intersection operating with reserve capacity -Westbound Left has LOS F	-Intersection operating with reserve capacity -Northbound Left has v/c approaching 1 and LOS F
2021	-Intersection operating with reserve capacity -Westbound Left has LOS F -Southbound Left has LOS F and v/c exceeds 1	-Intersection operating with reserve capacity -Eastbound Left and Northbound Left have LOS F
2031	-Intersection v/c exceeds 1 -Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Westbound left-turn ▪ Northbound left-turn ▪ Southbound left-turn 	-Intersection v/c approaches 1 -Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Westbound left-turn ▪ Westbound through ▪ Northbound left-turn

Derry Road and Mississauga Road		
Existing	-Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Westbound left-turn ▪ Northbound left-turn ▪ Northbound through 	-Intersection v/c exceeds 1 -Eastbound left-turn and northbound through have LOS of F
2021	-Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Eastbound through ▪ Westbound left-turn ▪ Northbound left-turn ▪ Northbound through ▪ Southbound left-turn 	-Intersection v/c exceeds 1 -Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Westbound left-turn ▪ Westbound through ▪ Northbound left-turn ▪ Northbound through
2031	-Intersection v/c exceeds 1 and LOS is F -Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Eastbound through ▪ Westbound left-turn ▪ Northbound left-turn ▪ Northbound through ▪ Southbound left-turn ▪ Southbound through 	-Intersection v/c exceeds 1 and LOS is F -Multiple movements have v/c greater than 1 and/or LOS F: <ul style="list-style-type: none"> ▪ Eastbound left-turn ▪ Westbound left-turn ▪ Westbound through ▪ Northbound left-turn ▪ Northbound through ▪ Southbound through

2.8 Summary of Traffic Operations

Traffic operations for each horizon period are summarized in **Exhibit 2-19** through **Exhibit 2-24**. The exhibits illustrate the overall Level of Service (LOS) and Volume to Capacity ratio (V/C ratio) for each study area intersection. By 2031, operations at study area intersections will deteriorate without any improvements.

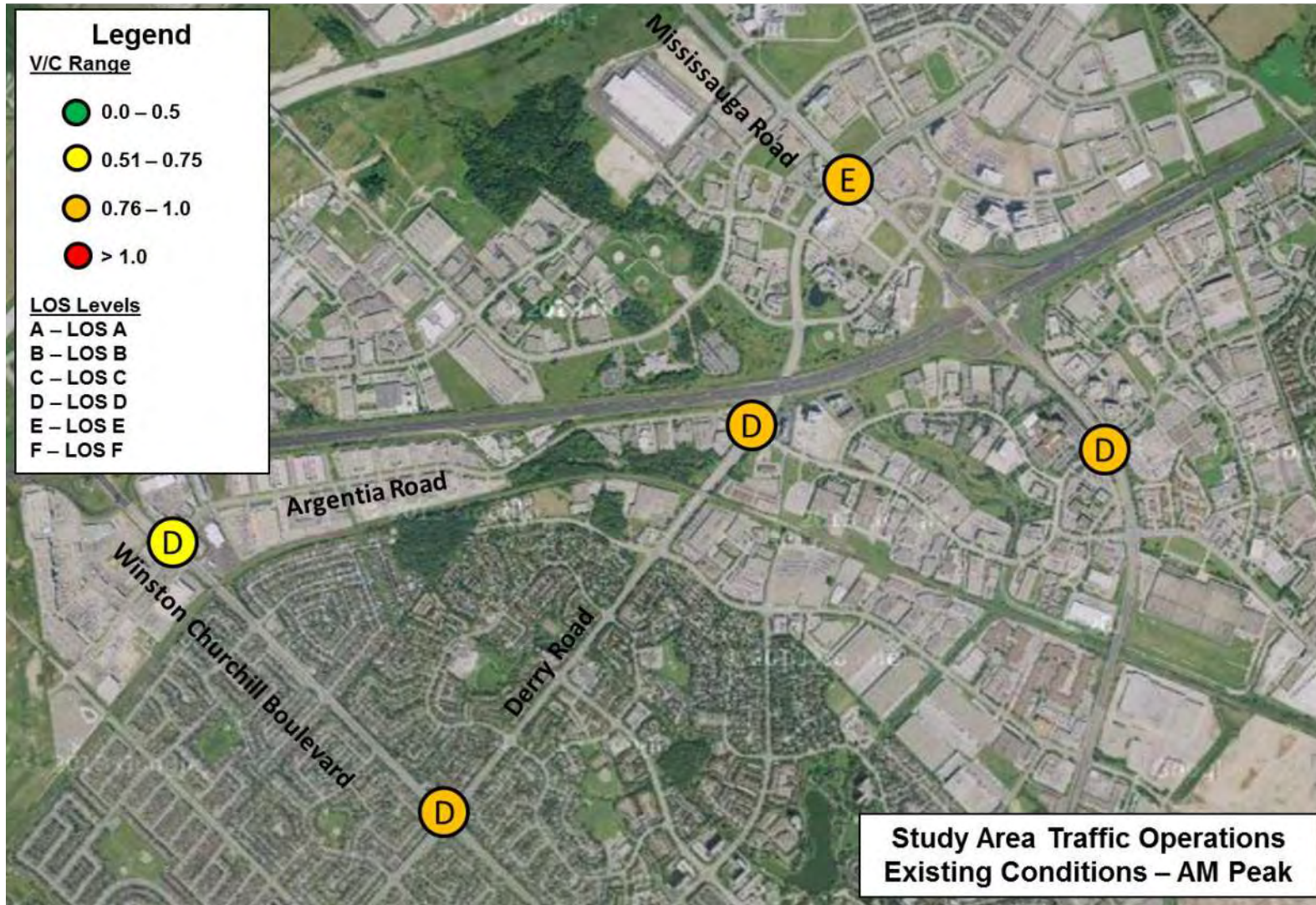


Exhibit 2-19: Study Area Operations – Existing AM Peak Period

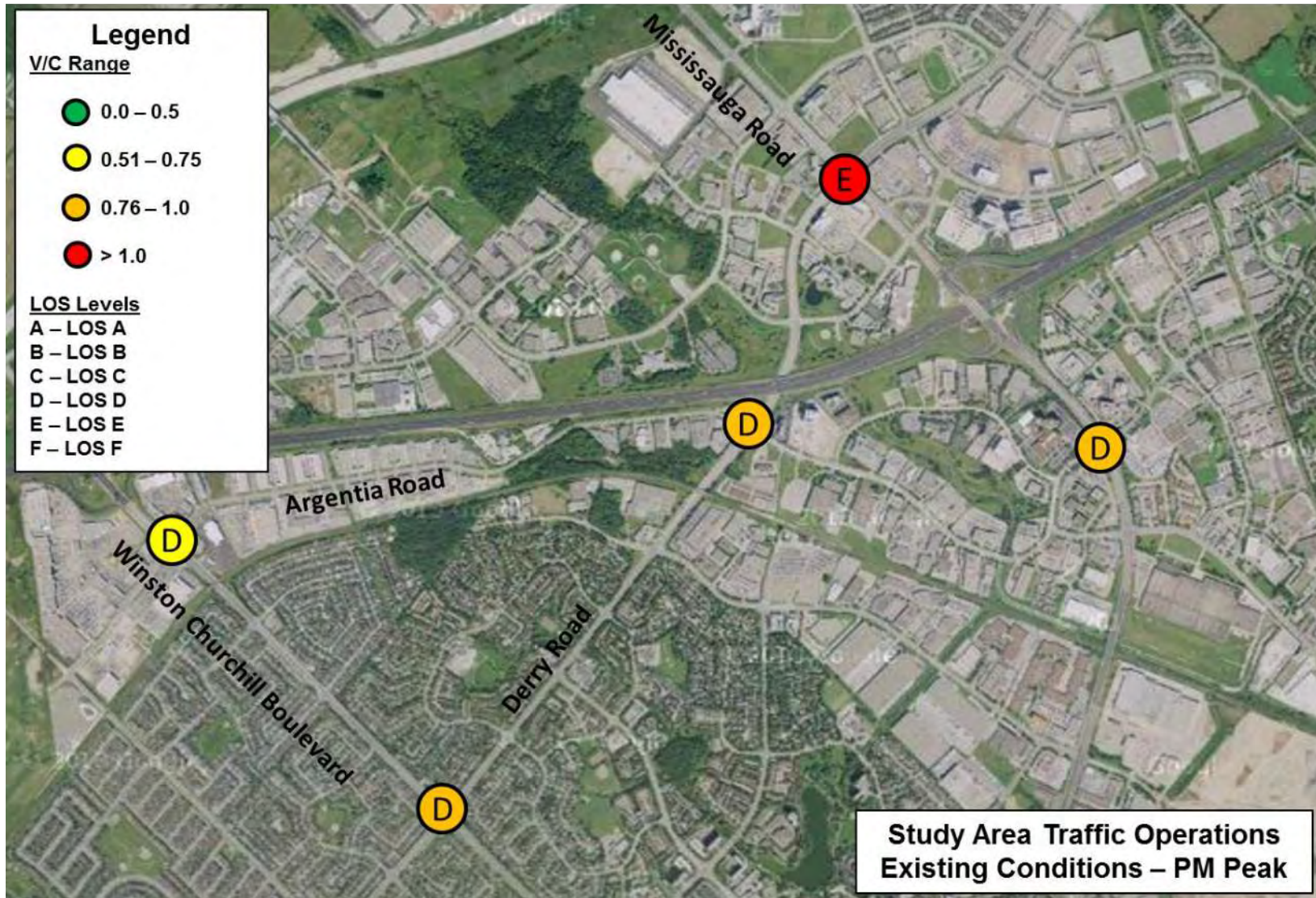


Exhibit 2-20: Study Area Operations – Existing PM Peak Period

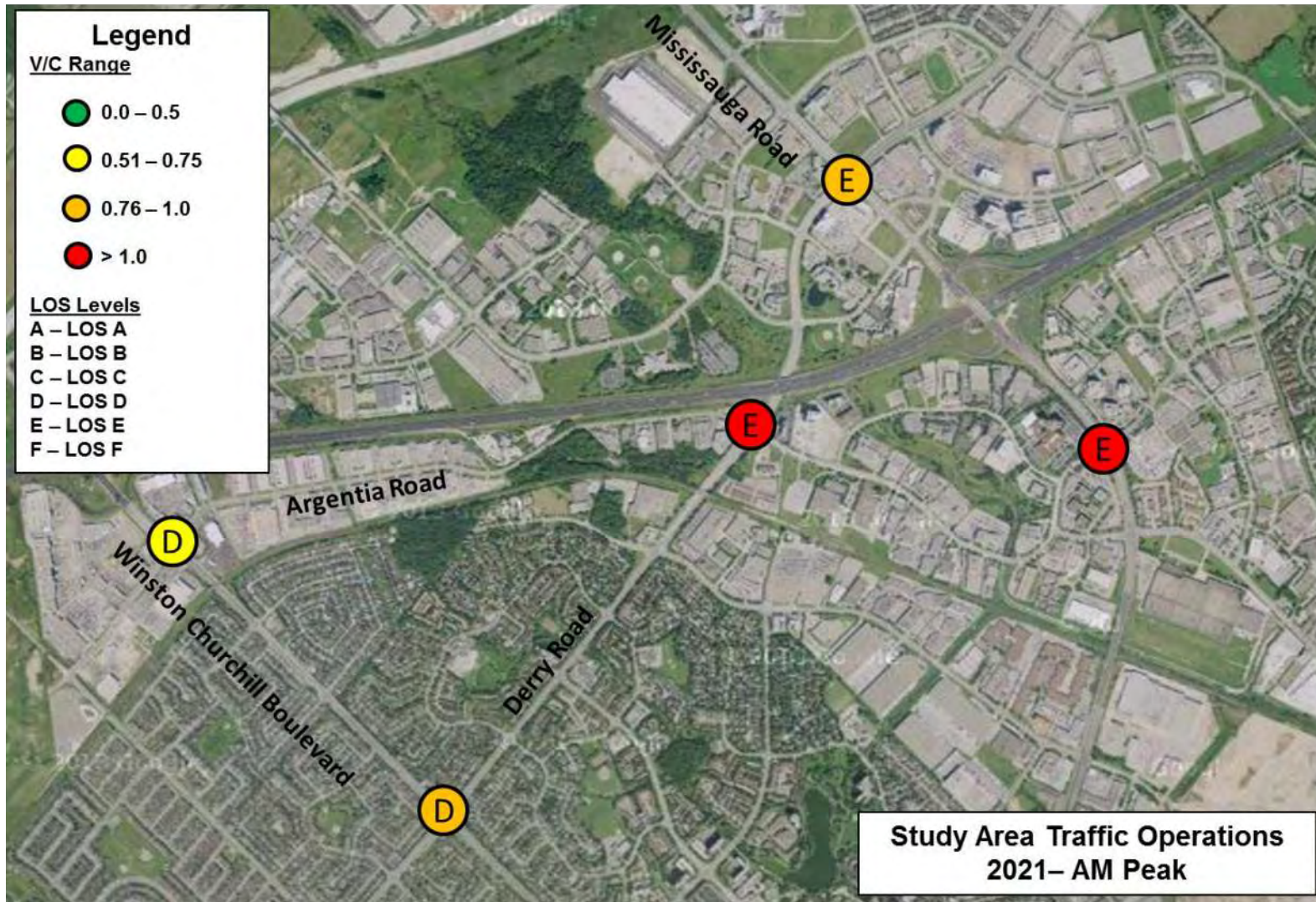


Exhibit 2-21: Study Area Operations – 2021 AM Peak Period

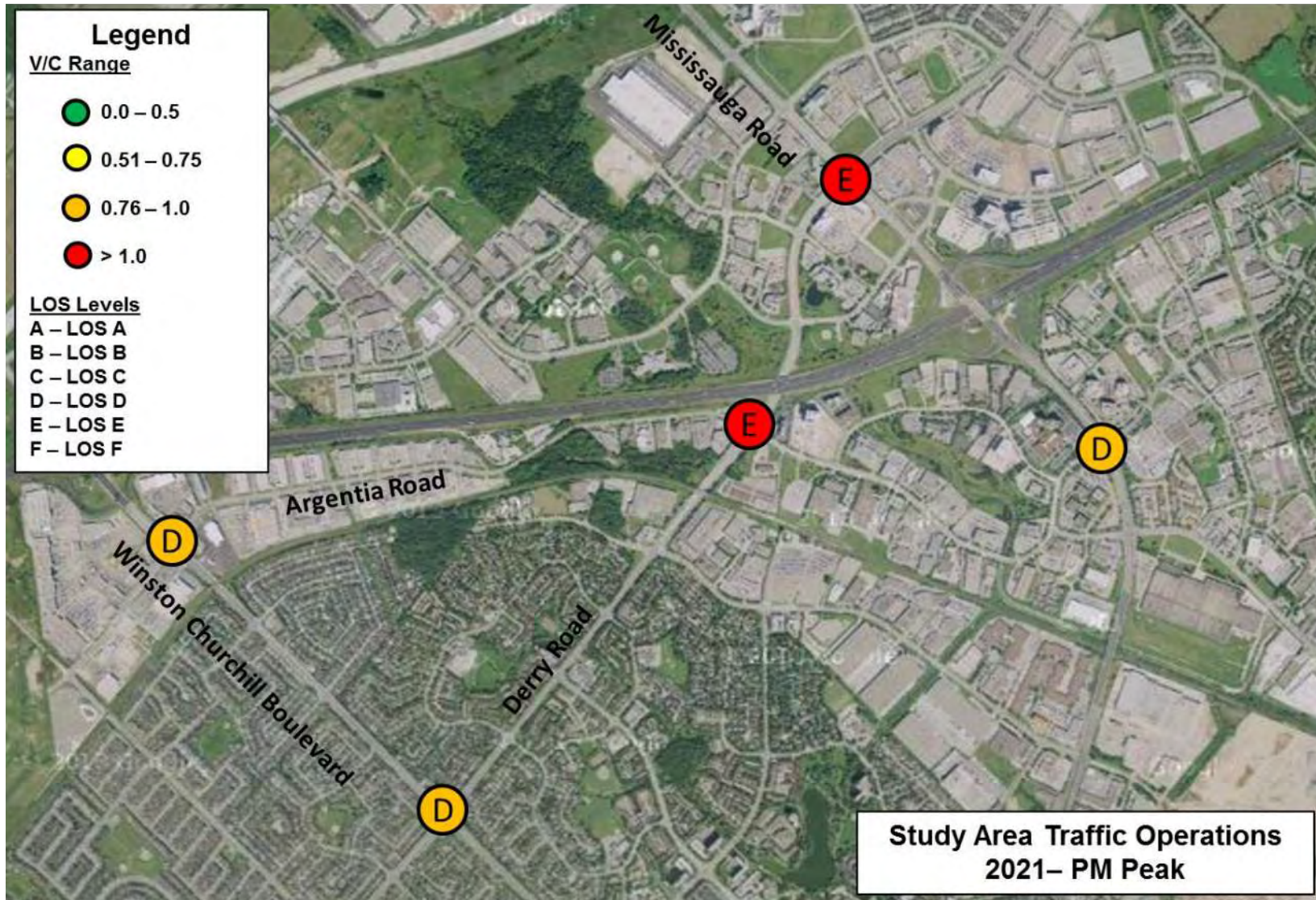


Exhibit 2-22: Study Area Operations – 2021 PM Peak Period

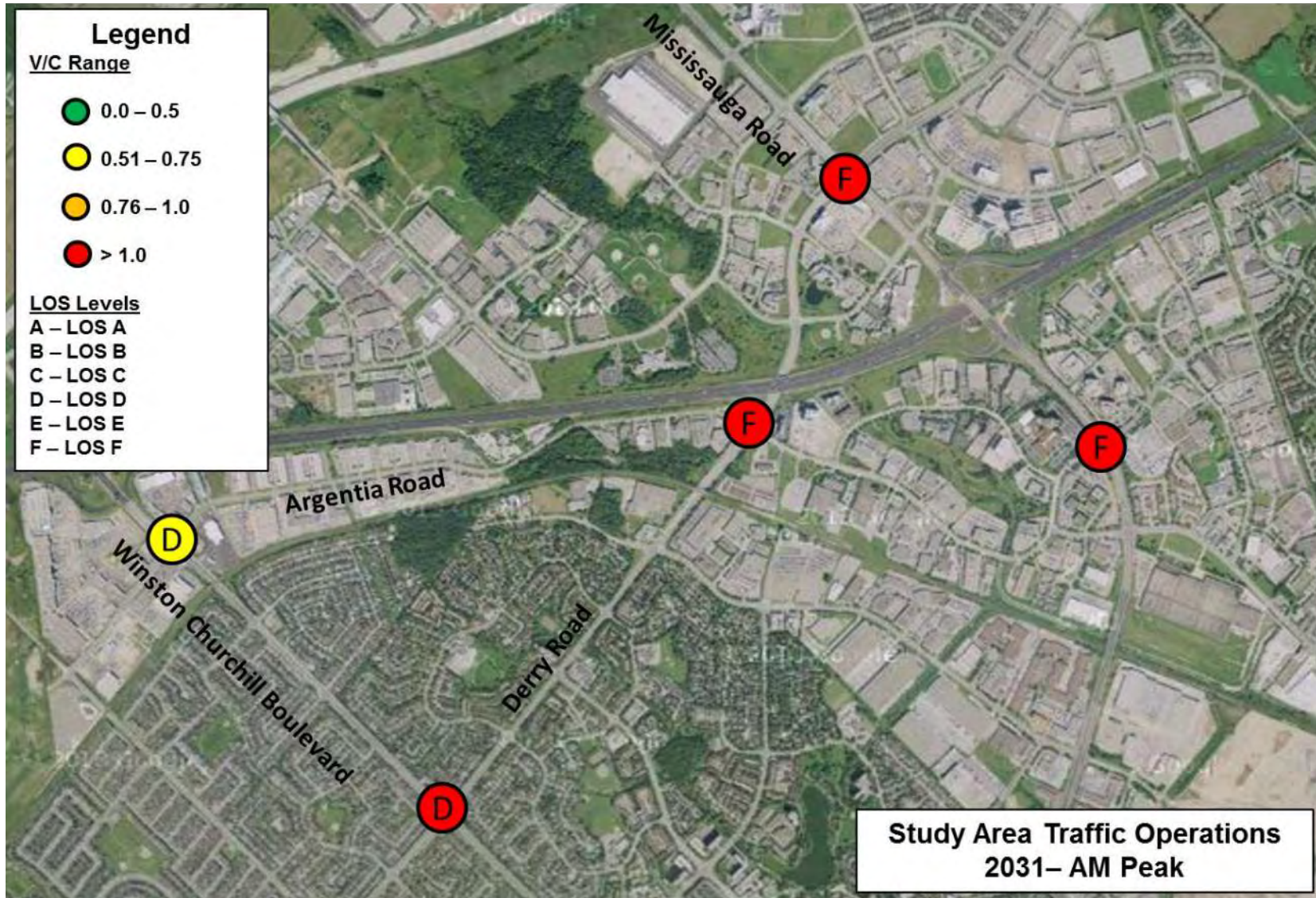


Exhibit 2-23: Study Area Operations – 2031 AM Peak Period

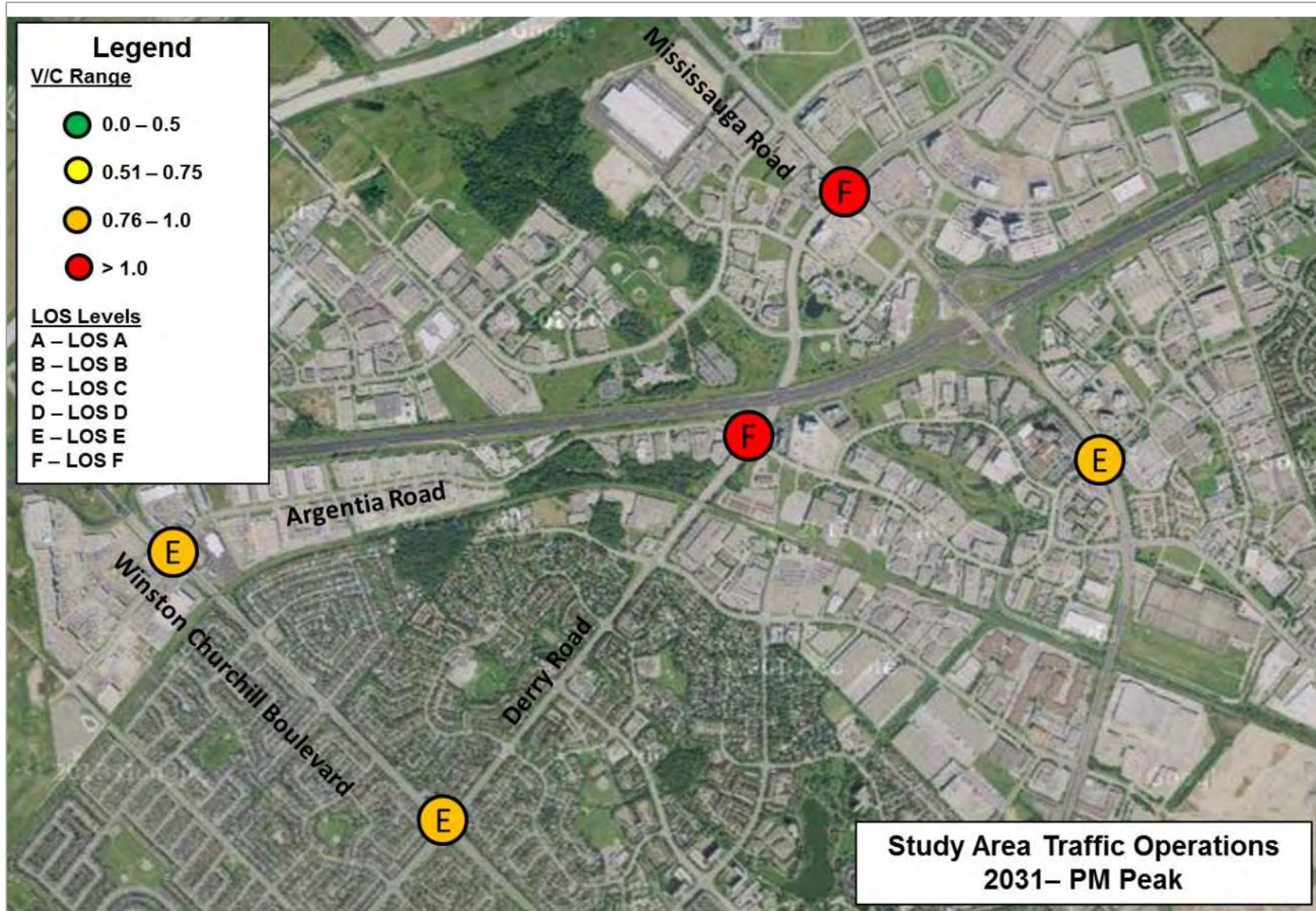


Exhibit 2-24: Study Area Operations – 2031 PM Peak Period

2.9 Conclusions

The transportation study has identified the following needs and opportunities within the study corridor:

- Opportunities to improve traffic operations and reduce delays at the intersection of Derry Road and Argentia Road; as a result of increasing traffic volumes, without any improvements, operations at the intersection of Derry Road and Argentia Road will deteriorate by 2021 and 2031
- Opportunities to improve the safety performance of the intersection of Derry Road and Argentia Road.
- Opportunities to improve the transportation environment for multiple modes (i.e. pedestrians, cyclists, transit users, good movement and drivers)
- Capacity constraints under the existing and future conditions at other intersections within the study area

To address these needs and opportunities, alternative solutions are developed and evaluated in **Section 4** of this report.

3 Problem and Opportunity Statement

Based upon the findings of the transportation study, improvements are necessary to accommodate existing and long-term travel demands which are projected to exceed the current capacity of the intersection of Derry Road and Argentia Road. At the same time, improvements should minimize impacts to existing features at the intersection.

In particular the study will focus on addressing the following problems and opportunities:

- Supporting the movement of people and goods through the intersection by facilitating more efficient vehicle movement (automobiles, transit vehicles, trucks)
- Improving safety for all corridor users
- Protecting vulnerable road users
- Improving facilities for pedestrians and cyclists
- Improving access to transit service
- Supporting economic growth and planned development within the study area
- Preserving and enhancing existing natural features

4 Evaluation of Alternative Designs and Selection of Preferred Design

4.1 Alternative Identification Process

Several alternatives were developed to address the expected future capacity deficiencies identified in **Section 2.6.3**. The alternatives were focused at the following lane movements with consideration for the available right-of-way on all approaches to the intersection:

- **Westbound dual-left turn lane** to address high demand for westbound left turn movements
- **Northbound and southbound dual-left turn lanes** to address high demand for northbound and southbound movements
- **Additional northbound and southbound through lanes** to address high demand for northbound and southbound through movements

The alternatives were evaluated based on the expected 2021 and 2031 level of service (LOS) and v/c ratio for the study intersection.

The screening analyses highlighted the following findings:

- The intersection is expected to operate close to or at capacity in 2031 during both AM and PM peak. However, as discussed in **Section 2.6.2**, these growth rates are expected to be conservative.
- Providing additional northbound and southbound capacity on Argentia Road improves overall intersection level of service and capacity.
- A dual left turn lane is not warranted in the eastbound direction as a result of low volumes
- As a result of the high eastbound through movement volumes, it is challenging to serve the westbound left-turn with a single protected phase
- Adding northbound and southbound dual left turn phases increase the “all-red” time in the cycle and further reduces capacity.

Based on the results of the analysis and focused areas, three (3) alternatives were identified and further screened from the perspective of traffic operations, safety, available right-of-way and pedestrian accessibility.

4.2 Short-List of Alternatives

The three short-listed alternatives and the “Do Nothing” alternative are described as follows:

- **Alternative 0**
 - Do Nothing
- **Alternative 1**
 - Argentia NB: add through lane
 - Argentia SB: add dual-left and through lane
 - Derry WB: add dual-left turn
- **Alternative 2**
 - Argentia NB: add dual left-turn
 - Argentia SB: add dual left-turn
- **Alternative 3**
 - Argentia NB: add one through lane
 - Argentia SB: add one through lane
 - Derry WB: add dual-left turn

In order to complete the evaluation of alternatives each of the short listed alternatives was given a rating, from most preferred to least preferred, in order to determine if the alternative is considered reasonable. The rating scale criteria used in the assessment are described below in Exhibit 4-1.

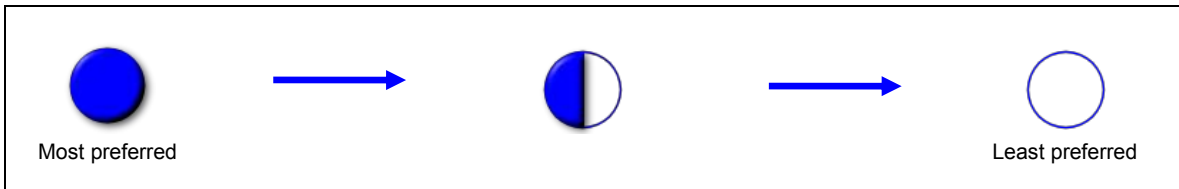


Exhibit 4-1: Pre-Screening Rating Scale

The evaluation of short-listed alternatives is shown in **Table 4-1**. Synchro output of the peak period traffic operations for each of the short listed alternatives are shown in **Table 4-2** and **Table 4-3** for the 2021 and 2031 horizon years, respectively. Full Synchro reports are provided in **Appendix D** of this report.

Table 4-1: Evaluation of Short-Listed Alternatives

Alt	Description	Advantages	Disadvantages	Rating
0	<ul style="list-style-type: none"> Do Nothing 	<ul style="list-style-type: none"> Pedestrian crossing distance of Derry Road does not increase No property requirements or utility impacts 	<ul style="list-style-type: none"> No improvement to traffic operations Volume exceeds capacity in the AM Peak and PM Peak under both the 2021 and 2031 horizon years 	
1	<ul style="list-style-type: none"> Argentia NB: add through lane Argentia SB: add dual-left and through lane Derry WB: add dual-left turn 	<ul style="list-style-type: none"> Additional through lanes on Argentia Road provide additional capacity for northbound and southbound movements Additional capacity provided for the westbound left-turn movement during the critical AM peak period 	<ul style="list-style-type: none"> Two sets of dual-left turn lanes increase the “all-red” time during the cycle when all vehicles are stopped More significant property impacts on Argentia Road (widening north leg from 3 lane to 5 lane cross-section) Longer crossing distance for pedestrians on both Derry Road and Argentia Road Longer delays for southbound and westbound left-turn vehicles during the off-peak; they must wait for the protected dedicated phase before turning 	
2	<ul style="list-style-type: none"> Argentia NB: add dual left-turn Argentia SB: add dual left-turn 	<ul style="list-style-type: none"> Pedestrian crossing distance of Derry Road does not increase Fewer property requirements on Argentia Road (widening from 3 lane to 4 lane cross-section) 	<ul style="list-style-type: none"> Poor operations for westbound left-turn movement during the AM, when there is a high number of conflicting eastbound through vehicles Poor operations for southbound left turn; vehicles can only turn left during the protected phase. As there are low northbound through volumes during the AM Peak, vehicles are unable to turn left when there are gaps in northbound traffic Longer delays for northbound and southbound left-turn vehicles during the off-peak; they must wait for the protected dedicated phase before turning All southbound through/right-turn movements must use one lane only 	
3	<ul style="list-style-type: none"> Argentia NB: add one through lane Argentia SB: add one through lane Derry WB: add dual-left turn 	<ul style="list-style-type: none"> Additional through lanes on Argentia Road provide additional capacity for northbound and southbound vehicle movements Additional capacity for westbound-left turns Shorter crossing distance for pedestrians across Argentia Road compared to Alternative 1 Fewer property requirements on Argentia Road compared to Alternative 1 	<ul style="list-style-type: none"> Longer delays for westbound left-turns during the off-peak when vehicles must wait for the protected dedicated phase to turn left Longer crossing distance for pedestrians across Derry Road 	

Table 4-2: 2021 Traffic Operations – Alternative Solutions

Movement	Do Nothing				Alternative 1				Alternative 2				Alternative 3			
	AM		PM		AM		PM		AM		PM		AM		PM	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
Intersection Overall	1.06	E	1.01	E	0.86	D	0.97	D	1.13	F	0.95	D	0.91	D	0.90	D
Eastbound Left	0.23	C	0.96	F	0.23	C	0.98	F	0.25	C	0.98	F	0.22	C	0.94	F
Eastbound Through	1.01	E	0.48	C	1.02	E	0.43	C	1.10	F	0.45	C	0.97	D	0.44	C
Eastbound Right	0.35	A	0.13	A	0.35	A	0.13	A	0.35	A	0.13	A	0.35	A	0.13	A
Westbound Left	1.16	F	0.31	C	0.61	E	0.45	E	1.32	F	0.30	C	0.70	E	0.51	E
Westbound Through	0.27	B	1.05	E	0.25	B	0.91	D	0.29	B	0.98	D	0.25	B	0.92	D
Westbound Right	0.17	A	0.31	A	0.17	A	0.31	A	0.17	A	0.31	A	0.17	A	0.31	A
Northbound Left	0.69	E	0.90	D	0.48	D	0.91	E	0.68	F	0.85	E	0.44	D	0.90	E
Northbound Through	0.36	D	0.98	F	0.27	D	0.64	D	0.22	D	0.88	E	0.22	D	0.64	D
Northbound Right	0.09	D	0.59	D	0.09	D	0.76	E	n/a	n/a	n/a	n/a	0.09	D	0.72	E
Southbound Left	0.92	E	1.06	F	1.17	F	0.92	F	1.26	F	0.92	F	0.98	F	0.88	E
Southbound Through/Right	1.11	F	0.82	E	0.70	D	0.46	D	0.97	E	0.84	E	0.74	E	0.46	D



Table 4-3: 2031 Traffic Operations – Alternative Solutions

Movement	Do Nothing				Alternative 1				Alternative 2				Alternative 3			
	AM		PM		AM		PM		AM		PM		AM		PM	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
Intersection Overall	1.22	F	1.13	F	0.95	F	1.00	D	1.24	F	1.11	E	1.02	E	1.01	D
Eastbound Left	0.27	C	1.04	F	0.29	C	1.04	F	0.30	C	1.12	F	0.26	C	1.04	F
Eastbound Through	1.12	F	0.52	C	1.20	F	0.48	C	1.22	F	0.47	C	1.07	E	0.50	C
Eastbound Right	0.39	A	0.14	A	0.39	A	0.14	A	0.39	A	0.14	A	0.39	A	0.14	A
Westbound Left	1.39	F	0.37	C	0.63	E	0.62	F	1.45	F	0.31	C	0.85	E	0.60	E
Westbound Through	0.30	B	1.13	F	0.28	B	1.02	E	0.32	C	1.02	E	0.28	B	1.06	E
Westbound Right	0.18	A	0.34	A	0.18	A	0.34	A	0.18	A	0.34	A	0.18	A	0.34	A
Northbound Left	0.76	E	1.06	F	0.56	D	1.07	F	0.75	F	1.18	F	0.56	D	0.97	E
Northbound Through	0.40	D	1.09	F	0.27	D	0.70	D	0.24	D	1.08	F	0.22	D	0.71	D
Northbound Right	0.10	D	0.69	D	0.10	D	0.83	E	n/a	n/a	n/a	n/a	0.10	D	0.81	E
Southbound Left	0.99	F	1.24	F	1.29	F	0.98	F	1.40	F	1.02	F	1.10	F	0.91	E
Southbound Through/Right	1.17	F	0.98	F	0.72	D	0.47	D	1.07	F	0.94	F	0.76	E	0.47	D

Based on the screening of the short listed alternatives, Alternative 3 is the most preferred alternative because it provides improved operations at the intersection while minimizing property impacts compared to Alternative 1. This alternative includes the following improvements:

- Addition of one northbound through lane at the south leg of the intersection and on the receiving north leg of the intersection
- Addition of one southbound through lane at the north leg of the intersection
- Addition of a westbound dual left-turn lane
- Geometric improvements at existing channelized right-turn lanes to improve the safety performance of the intersection
- Accommodation of multi-use trail along south side of Derry Road
- Improvements to the existing sidewalk network

The existing intersection configuration is illustrated in **Exhibit 4-2** and the proposed intersection configuration is illustrated in **Exhibit 4-3**.



Exhibit 4-2: Derry and Argentia – Existing Configuration



Exhibit 4-3: Derry and Argentia – Recommended Configuration

The following are key findings from the Synchro model for both time periods (2021 and 2031) under alternative 3:

- Under the 2021 traffic demand, all movements are expected to operate with v/c less than 1 implying reserve capacity.
- Under 2031 traffic demand, all movements are expected to operate with v/c less than 1.0 except for the following movements:
 - AM Peak: Eastbound Through and Southbound Left
 - PM Peak: Eastbound Left and Westbound Through

As discussed in **Section 2.6.2**, the 1% compound per annum growth rate for all approaches represents a conservative, worst-case scenario for 2031 which may not materialize.

4.3 Queuing and Storage Lengths

Queue lengths at the intersection of Derry Road and Argentia Road during the AM Peak and PM Peak are shown in **Table 4-4**. These queue lengths are based on Synchro output, and are compared to the existing distance available for vehicles to queue at the intersection (measured as the length within the turning lanes where vehicles can queue without blocking the through lanes).

Table 4-4: Queue Lengths for Recommended Configuration

Movement	Existing Distance Available for Queuing (m)	2011 – 95 th Percentile Queue (m)		2021 – 95 th Percentile Queue (m)		2031 – 95 th Percentile Queue (m)	
		AM	PM	AM	PM	AM	PM
EBL	110	20	35	20	40*	20	45*
EBT	550	205	70	275*	80	310*	90
EBR	145	0	0	0	0	0	0
WBL	105	60*	15	75*	20*	85*	20
WBT	400	40	210	45	280*	50	320*
WBR	100	0	0	0	0	0	0
NBL	60	20	75	25	80*	25	115*
NBT	75	20	75	25	80	25	95
NBR	75	15	65	15	90	15	110*
SBL	45	90	65	105*	70*	140*	90*
SBT	45	75	45	95	50	100	60

*Synchro output for queues is based upon a probability distribution; there is a small probability that queues will slightly exceed this length in some instances

The queue length outputs from Synchro were used to develop the storage lengths at the intersection. The Synchro output was considered in conjunction with existing conditions, in order to determine the ideal design lengths. Some major design considerations are listed below:

- To reduce social, environmental, cost and constructability impacts, the length of the Northbound Right-Turn lane was reduced to a length less than the ideal based upon Synchro output; please refer to **Appendix F** for additional detail.
- To improve safety and operations, the length of the left-turn lane was extended past the existing Sheraton driveway and the proposed First Gulf driveway. The existing Sheraton driveway is to be converted to a “right-in/right-out” and the proposed First Gulf driveway will be shifted to the southern-most edge of their property, with a restriction on “left-out”

movements during the PM Peak. Please refer to **Appendix G** of the Transportation Report for additional detail.

The design storage lengths are summarized in **Table 4-5**.

Table 4-5: Design Storage Lengths

Turning Lane	Lengths (m)	Notes
Eastbound Left-Turn	<ul style="list-style-type: none"> ▪ 40 m storage ▪ 108 m parallel ▪ 80 m taper 	Total length comparable to the existing condition
Eastbound Right-Turn	<ul style="list-style-type: none"> ▪ 85 m storage/parallel ▪ 95 m taper 	Total length comparable to the existing condition
Westbound Left-Turn	<p><u>Lane 1 (Inside)</u></p> <ul style="list-style-type: none"> ▪ 40 m storage/parallel ▪ 58 m taper <p><u>Lane 2 (Outside)</u></p> <ul style="list-style-type: none"> ▪ 67 m storage/parallel ▪ 70 m taper 	Length of left-turn lanes maximized such that there is no impact to the Highway 401 overpass (to the east of the intersection)
Westbound Right-Turn	<ul style="list-style-type: none"> ▪ 60 m storage/parallel ▪ 65 m taper 	Match existing condition
Northbound Left-Turn	<ul style="list-style-type: none"> ▪ 100 m storage/parallel ▪ 20 m taper 	Length of lane maximized to distance before Self Storage site driveway and proposed new Sheraton access
Northbound Right-Turn	<ul style="list-style-type: none"> ▪ 28 m storage/parallel ▪ 40 m taper 	To minimize social, environmental and cost impacts, storage length reduced to less than "ideal" length based on Synchro output
Southbound Left-Turn	<ul style="list-style-type: none"> ▪ 120 m storage/parallel ▪ 53 m taper 	Storage length based on Synchro queuing output Minor reduction to storage length applied in order to reduce impacts
Southbound Right-Turn	Shared with through lane	

5 Active Transportation

In addition to the improvements recommended to the lane configurations at the intersection, recommendations have been made to improve conditions for active transportation at the intersection of Derry Road and Argentia Road.

5.1 Existing Conditions

As discussed in **Section 2.1.4**, at present there are no dedicated facilities for cyclists within the study area. The existing sidewalk network in the study area is illustrated in **Exhibit 5-1**.

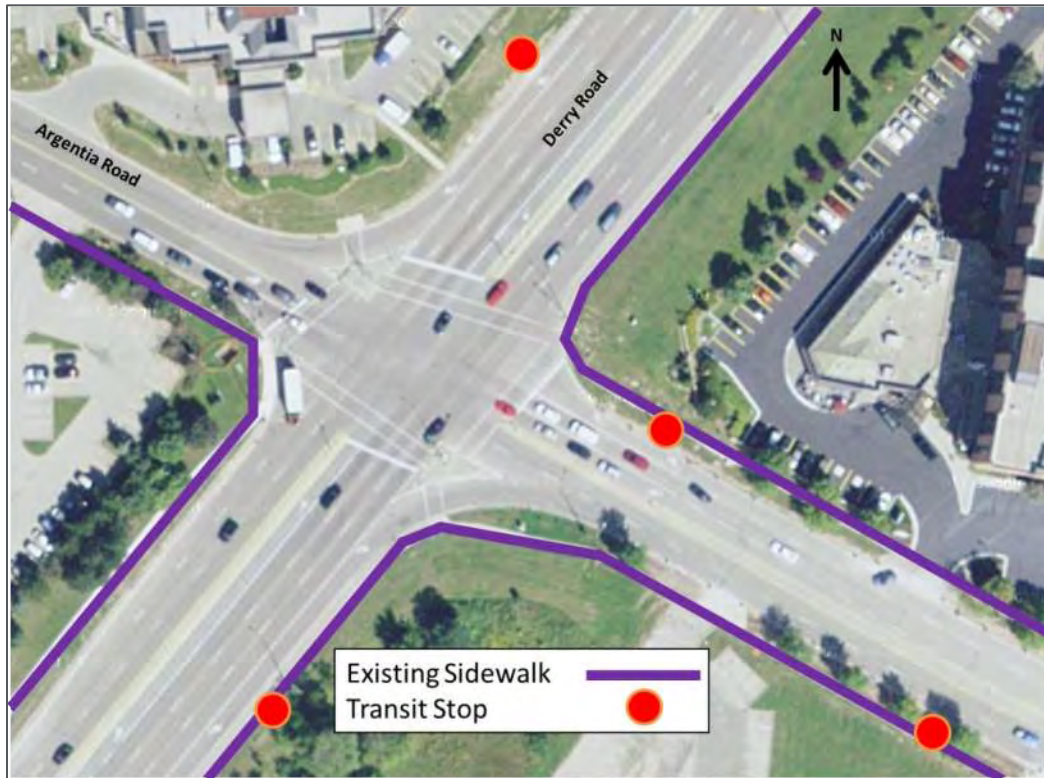


Exhibit 5-1: Existing Sidewalks within the Study Area

5.2 Plans and Policies

The following plans and policies were reviewed:

- Region of Peel's Road Characterization Study, May 2013
- The Region of Peel's Active Transportation Study, November 2011
- Mississauga Cycling Master Plan, September 2010

5.2.1 Region of Peel's Road Characterization Study

The Region of Peel's Road Characterization Study (RCS) identifies this portion of Derry Road as a "Commercial Connector". The illustrative cross-section for the "Commercial Connector" is shown in Exhibit 5-2.



Exhibit 5-2: RCS Illustrative Cross-Section for Commercial Connector

5.2.2 Region of Peel's Active Transportation Study

The Derry / Argentia study area is excerpted from "Map 9C: Proposed Long Term Regional Pedestrian Network – Mississauga" as **Exhibit 5-3**

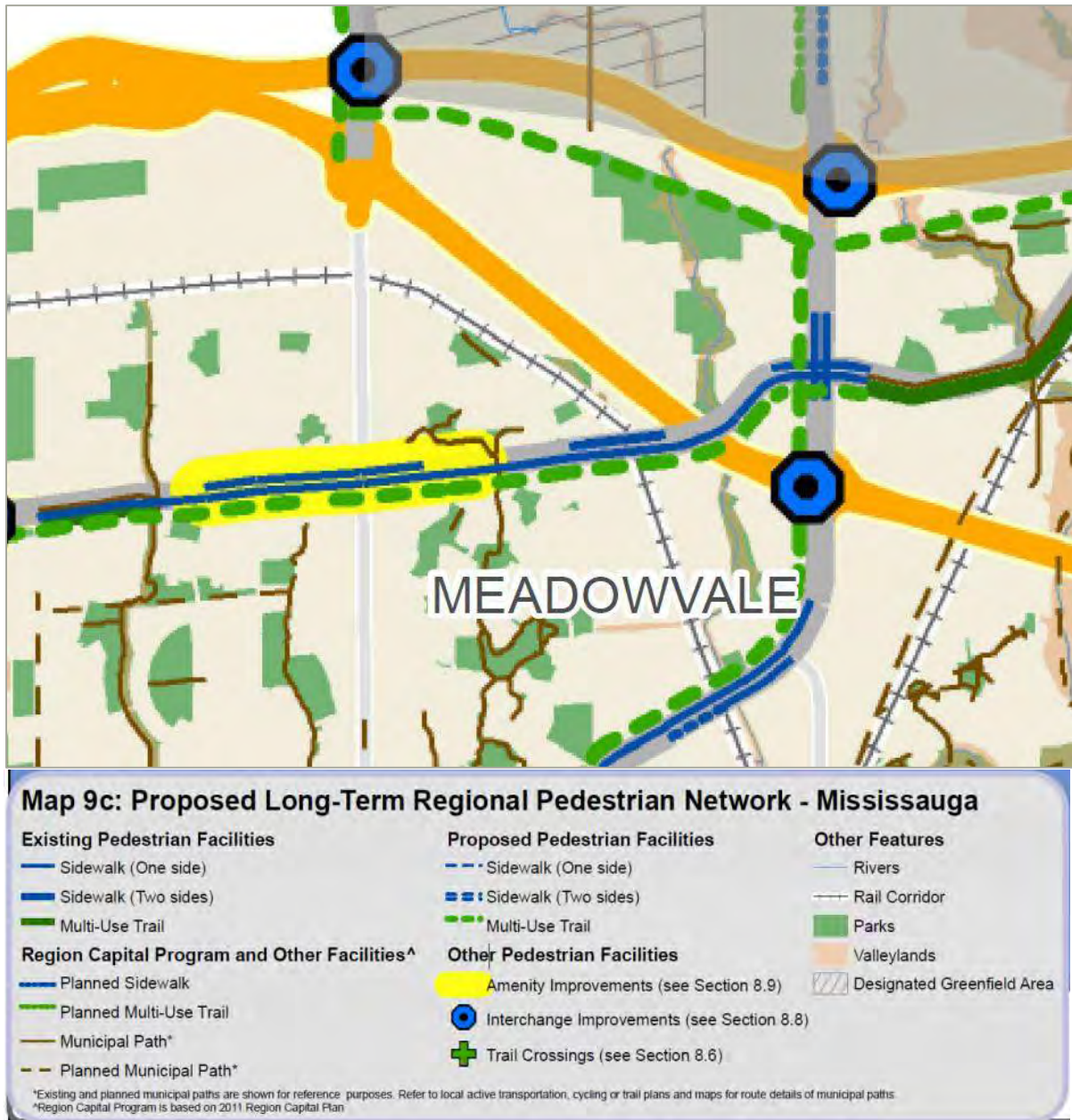


Exhibit 5-3: Region of Peel Long-Term Regional Pedestrian Network

The Derry / Argentia study area is excerpted from "Map 10C: Proposed Regional Cycling Network – Mississauga" in **Exhibit 5-4**.

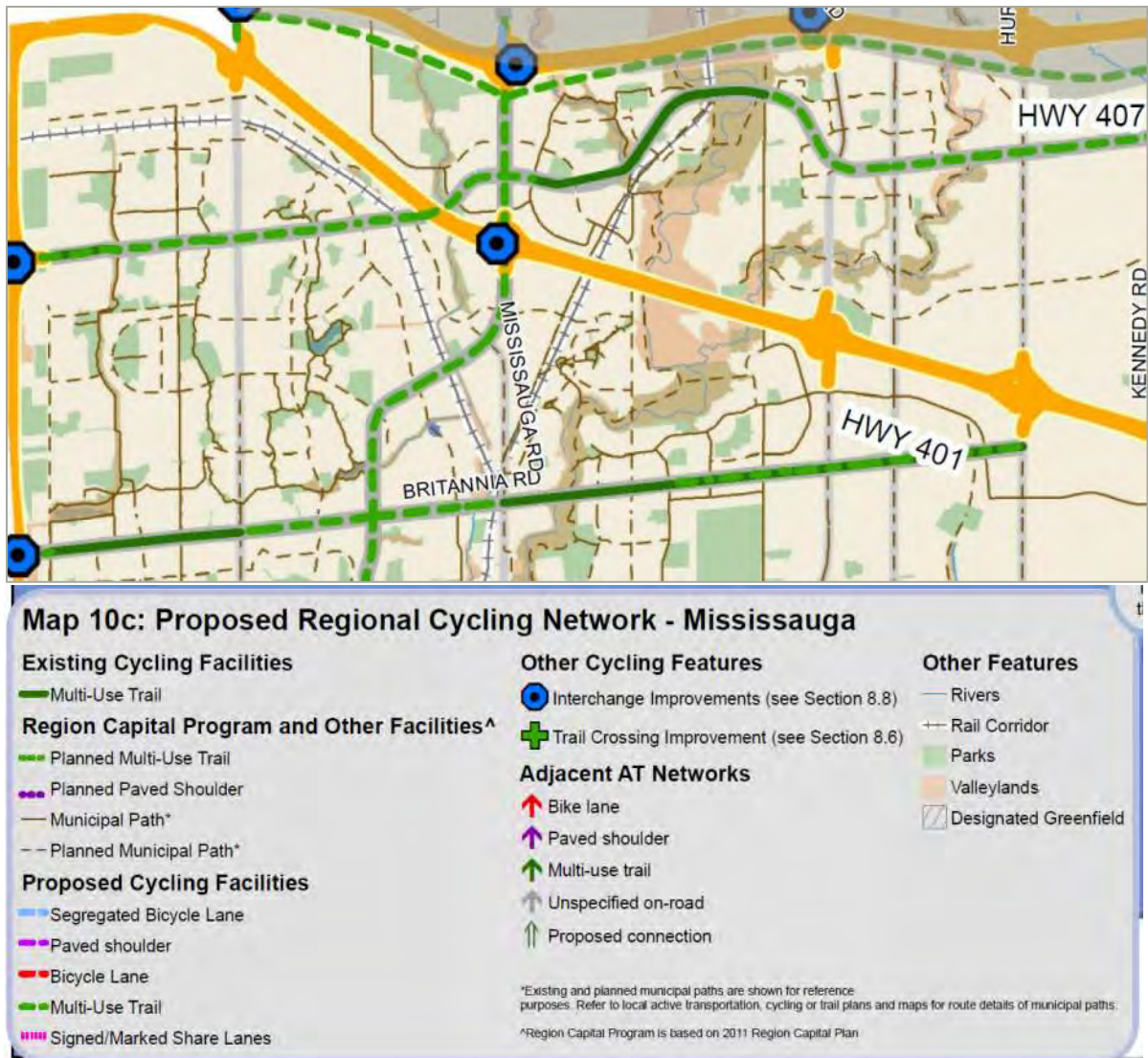


Exhibit 5-4: Region of Peel Regional Cycling Network

5.2.3 City of Mississauga Cycling Plan

The Derry / Argentia study area is excerpted from “Map 5-2: Proposed Mississauga Cycling Route Network” in **Exhibit 5-5**.

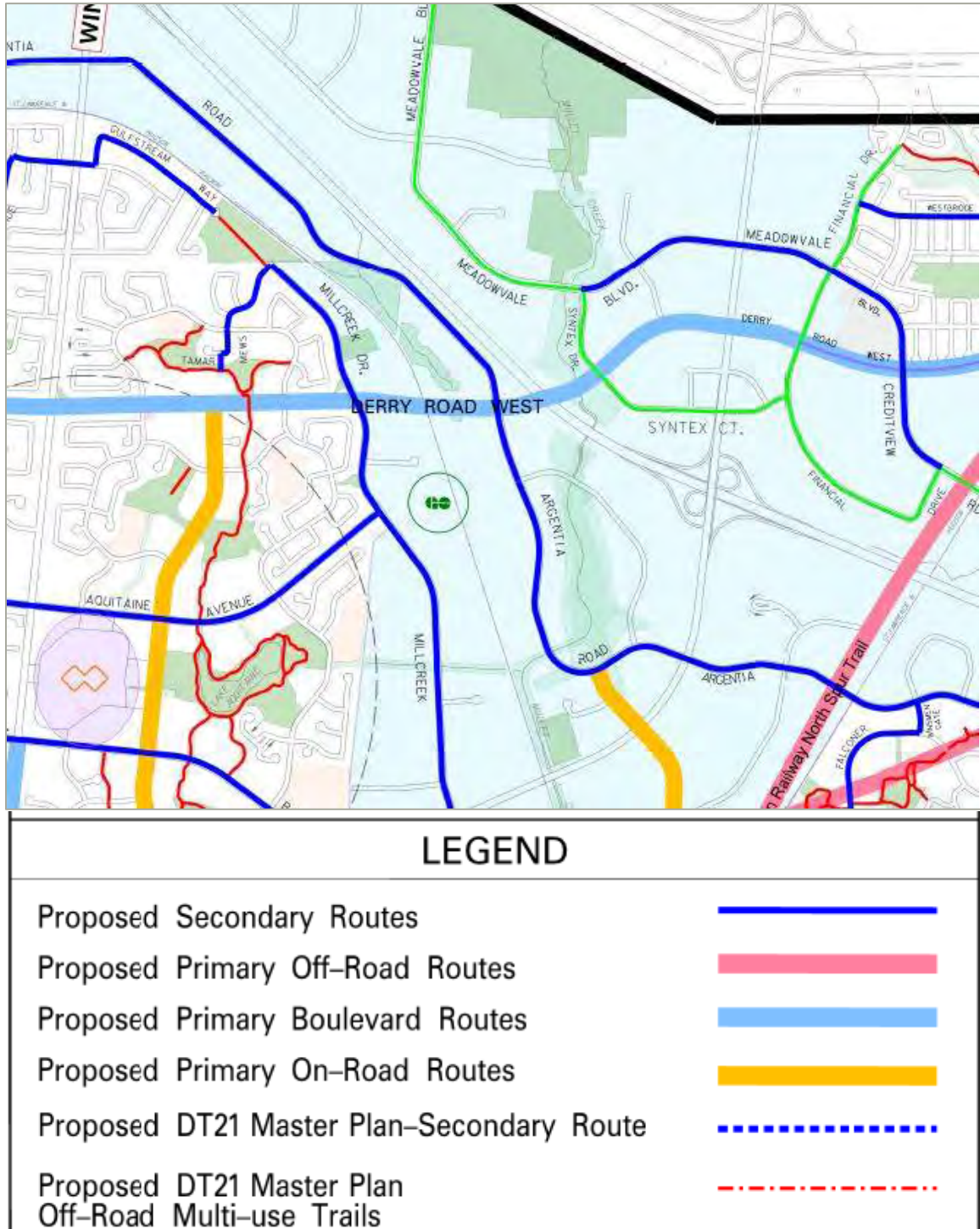


Exhibit 5-5: Proposed Mississauga Cycling Route Network

A summary of the recommendations from each plan are provided in **Table 5-1**.

Table 5-1: Summary of Active Transportation Recommendations

Plan / Policy	Recommendation
Peel Region RCS	<ul style="list-style-type: none"> ▪ Multi-use path on both sides of “Commercial Connectors” ▪ No sidewalks shown
Peel Region Active Transportation Plan	<ul style="list-style-type: none"> ▪ Existing continuous sidewalk on south side of Derry Road ▪ Existing sidewalk on north side of Derry Road that ends to the west of Highway 401 ▪ Planned multi-use trail on both sides, where feasible to provide access to developments on both sides of the road where on-road bikeway are not present/planned
City of Mississauga Cycling Plan	<ul style="list-style-type: none"> ▪ Argentia Road as a “Proposed Secondary Route”, which can include the following types of accommodation for cyclists: <ul style="list-style-type: none"> ○ Bicycle Lanes ○ Shared Use Lanes – sharrows ○ Signed Routes

5.3 Recommended Design Elements

As part of the Environmental Assessment process, information from existing plans and policies, existing conditions and technical aspects are synthesized to produce context-sensitive recommendations for the particular study area. The recommended design elements to support active transportation at the intersection of Derry Road and Argentia Road are summarized in **Table 5-2**.

Table 5-2: Recommended Design Elements for Active Transportation

Recommended Design Element	Rationale
<ul style="list-style-type: none"> ▪ Retain all existing sidewalks on Derry Road and Argentia Road within the study area 	<ul style="list-style-type: none"> ▪ Existing sidewalk network provides connectivity to transit stops and other destinations within the study area
<ul style="list-style-type: none"> ▪ New section of sidewalk to connect the bus stop outside of the Holiday Inn to the intersection 	<ul style="list-style-type: none"> ▪ This short distance of new sidewalk will improve connectivity to the Holiday Inn and the transit stop on Derry Road ▪ Providing this additional sidewalk on the north side fills in the gap and improves the connectivity in the pedestrian network and connections to destinations
<ul style="list-style-type: none"> ▪ Planned multi-use trail on the south side of Derry Road only 	<ul style="list-style-type: none"> ▪ Co-ordinate EA recommendations with the multi-use trail which was recently constructed on the south side of Derry Road, west of Argentia Road. Extending this multi-use trail through the study area will fill in a gap in the network and improve network connectivity and connections to destinations. ▪ Multi-use path on south side of Derry Road and crosswalk / proposed sharrows on Argentia Road provide connectivity for active transportation users on south side of the road to facilities on the north side of the road ▪ Steep embankment grade would necessitate earth retaining structures to accommodate multi-use trail on north side of Derry Road east of Argentia Road, leading to increased costs and aesthetic impacts
<ul style="list-style-type: none"> ▪ Shared use lanes, including sharrows, along Argentia Road 	<ul style="list-style-type: none"> ▪ Provide accommodation for cyclists (in keeping with City of Mississauga Cycling Plan) within the limited Right-of-Way for Argentia Road north and south of Derry Road

The recommended design elements are shown in **Exhibit 5-6**.

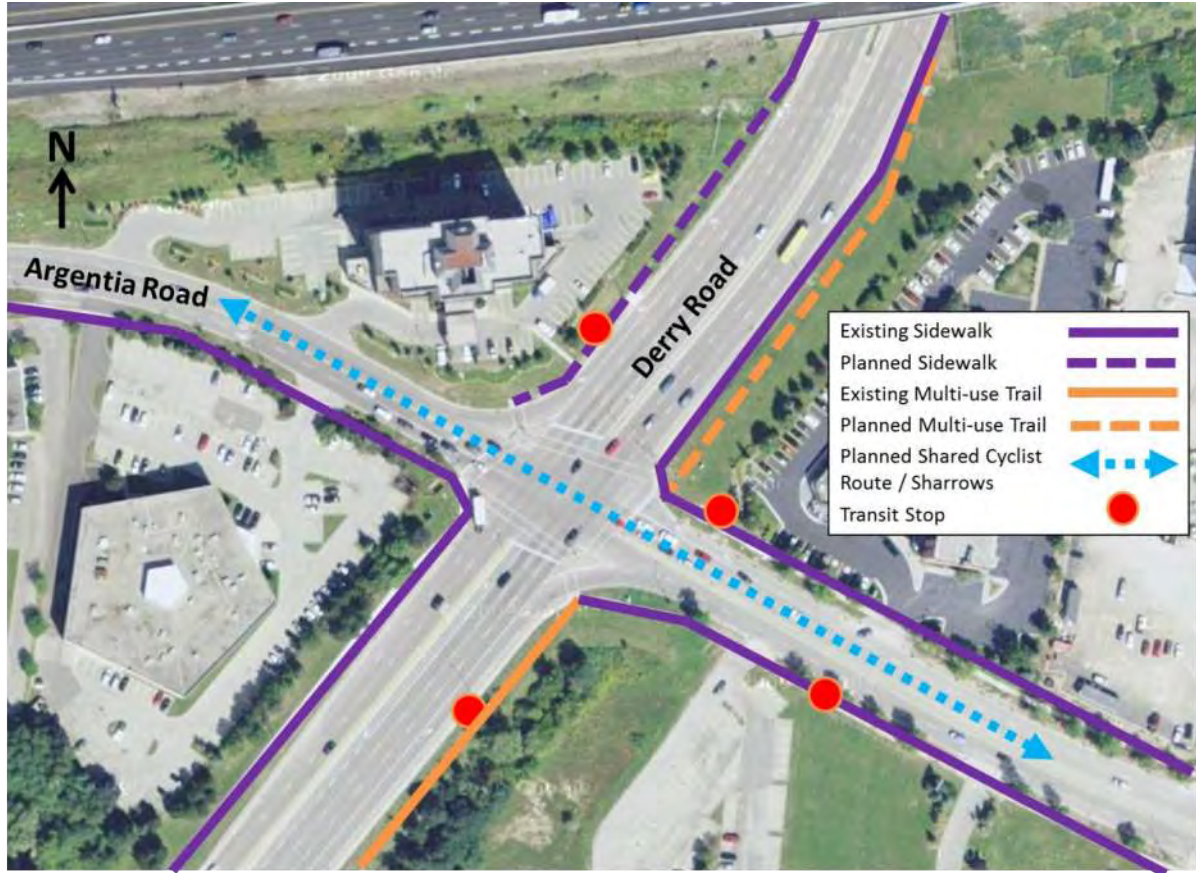


Exhibit 5-6: Recommended Active Transportation Facilities at Intersection of Derry Road and Argentia Road

6 Conclusions

The recommended configuration for the intersection of Derry Road and Argentia Road is:

- Addition of one northbound through lane at the south leg of the intersection and on the receiving north leg of the intersection
- Addition of one southbound through lane at the north leg of the intersection
- Addition of a westbound dual left-turn lane
- Introduction of "Smart Channels" at the existing channelized right-turn lanes to improve the safety performance of the intersection.
- Extension of the existing multi-use trail along the south side of the intersection
- New sidewalk to connect transit stop on northeast corner of the intersection to the crosswalk

It is recommended that all improvements be implemented for the 2021 horizon year. As the northbound, southbound and westbound left-turn movements are all expected to experience capacity deficiencies by 2021, it is recommended that all recommended infrastructure upgrades be implemented at once.