355 Franktown Road

Transportation Impact Study

Prepared for:

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Executive Summary

The following summarizes the analysis and results presented in this TIA report:

Study Area

- The subject site is greenfield, and the surrounding area is developing
- Highway 7 and Highway 15 are provincially owned freeways, McNeely Avenue is a county arterial, Franktown Road is a town arterial, and Coleman Street and Park Avenue are town collectors in the study area
- Sidewalks are provided along both sides of Franktown Road north of Alexander Street, and on Coleman Street west of Franktown Road and along one side of Franktown Road between Alexander Street and Findlay Avenue, on Coleman Street between Christie Street and McNeely Avenue, on Park Avenue, Findlay Avenue, McGregor Street, and Christie Street
- Asphalt pathways are located on one side of Coleman Street east of Franktown Road, and on McNeely Avenue north of Coleman Street, gravel pathways are located on both sides of McNeely Avenue south of Coleman Street, and a cycletrack is located on the north side of Coleman Street west of Franktown Road.
- Typically, commuter bus service between Carleton Place and Ottawa/Gatineau during AM and PM weekday peak periods comprising the OC Transpo rural partner route #538 is provided by Classic Alliance Motorcoach
- A TESR was completed for Highway 7 and Highway 15 within the study area, including new intersection geometry and active connections at these two highways and a new east-west arterial connection between Franktown Road (at Findlay Avenue) and McNeely Avenue
- Two developments are within the study area that will contribute traffic to the future conditions, being the Coleman Subdivision and the 347 Franktown Road development
- The TESR includes volumes from other developments outside of the study area that will be considered within the subject report

Site Plan Review

- The proposed development consists of a residential subdivision with six townhouses and two condominium buildings of 48 units each, for a total of 102 dwelling units
- An extension of two planned public roads is proposed as part of the development forming a connection between each adjacent property and to the wider transportation network via Nelson Street East
- This new extension of the adjacent planned public roads is proposed as having a 20-metre right of way with a sidewalk along both sides of the road
- Vehicle access to the townhouses is proposed via private driveways to each accessing proposed public road extension
- Vehicle access for the condominium residents is proposed via a driveway to the proposed public road on the north side of the site to underground parking, and for condominium visitors via a driveway to the proposed public road on south the south end of the site to a surface lot
- All site accesses are proposed as having minor stop control an each meets the minimum widths from The Town of Carleton Place Development Permit By-Law
- Garbage collection for the condominium units is proposed as taking place on the new public roadway at the proposed underground garage access and garbage collection for the townhomes is proposed via residential collection

- A temporary emergency access route is to be provided from south and east of the adjacent retail plaza on Franktown Road with a permanent fire access lane connecting to a hard surface amenity area and the visitor parking lot
- No concerns were noted for car or truck access to the site driveways or for emergency vehicle access to the fire access lane
- A 2.0-metre-wide sidewalk with boulevard is located along both sides of the new public road's north-south alignment, and along the east-west alignment, a 2.0-metre-wide sidewalk with boulevard is located on the north side and a 1.5-metre-wide sidewalk abutting the roadway is located on the south side of the road
- A walkway is proposed from each main building entrance to the sidewalk where the three easterly walkways include stairs, and the westerly walkway includes a ramped connection with a 2% grade
- A fully accessible building entrance is provided on the east side of the east condominium building
- Condominium resident parking is proposed as 130 vehicle spaces below ground, and condominium visitor parking is proposed as 18 vehicle spaces within a surface lot
- Bicycle parking for the condominium units is proposed as comprising 54 spaces with 15 exterior spaces via surface racks, and the remaining 39 spaces in the underground parking garage
- Resident vehicle and bicycle parking rates meet minimum values from the Development Permit by-law, but visitor vehicle parking is under the minimum value by six spaces, all barrier-free vehicle parking spaces required are proposed as being provided

Study Area and Development Traffic

- The anticipated build-out year is 2024 and the study horizons will be 2024, 2029, and 2034, where the AM and PM peak hours will be examined
- Traffic volumes were collected from the adjacent development traffic studies and from the Highway 7 and Highway 15 Intersection Improvements TESR
- The improvements recommended within the TESR were included at the 2029 horizon, and the new east-west arterial road was included at the 2034 horizon
- Growth rates identified in the Highway 7 and Highway 15 Intersection Improvements TESR were applied and the volumes from the two study area developments and from the TESR background developments were included to obtain background volumes at the future horizons
- Consistent with area traffic studies, ITE Trip Generation Manual vehicle trip rates were used to forecast development traffic
- The development is anticipated to generate 48 new AM and 58 new PM peak hour two-way vehicle trips, and 25% of site traffic is anticipated to travel to/from the north, 10% to/from the south, 45% to/from the east and 20% to/from the west

Traffic Impacts

- Synchro Version 11 was used to model traffic conditions and analyze operations and HCM 6th Edition methodology was used to calculate level of service and delay for individual movements and the overall intersections
- The study area intersections operate well in the existing conditions with the exception of the intersection of Franktown Road/Highway 15 at Highway 7 during the PM peak hour where the westbound left experiences capacity and delay issues, and extended queueing is generally noted at this intersection during both peak hours

- The study area intersections at the 2024 background horizon operate similarly to the existing conditions
- The study area intersections at the 2029 background horizon with the planned geometric changes at the intersection of Franktown Road/Highway 15 at Highway 7 and with proposed signal timing for the new geometry generally operate satisfactorily
- At this horizon, the minor approaches at the intersection of Franktown Road at Nelson Street West/Nelson Street East are forecasted to experience high delays during the PM peak hour with increasing mainline volumes on Franktown Road
- The study area intersections at the 2034 background horizon operate similarly to the 2029 future background conditions, with the exception of the intersection of Franktown Road at Findlay Avenue with the proposed arterial east leg of the intersection, where queuing on the northbound approach may spill back to the intersection of Franktown Road/Highway 15 at Highway 7
- The study area intersections for all three future total horizons operate similarly to the background horizons, with the additional through volumes from site traffic at the intersection of Franktown Road at Findlay Avenue increasing delay on the eastbound approach during the PM peak hour by approximately 3.2 seconds, scoring the movement a LOS F at the 2029 future total horizon
- At the 2034 future total horizon, similarly to in the background conditions, potential for queuing on the northbound approach spilling back to the intersection of Franktown Road/Highway 15 at Highway 7 may be possible
- While it is noted that the growth scenario employed in the TESR and this report are conservative, the trend of delay increasing on minor stop-controlled side streets intersecting Franktown Road as mainline arterial volumes increase into the future has been identified and signalization may be a potential strategy employed by the Town to mitigate these effects if desired
- Performing a SimTraffic analysis, the potential spillback reported previously on the northbound approach is not present when examined using this alternative methodology, and furthermore, signal timing optimization to reduce queues may be employed should this potential remain a concern

Conclusion and Recommendations

- The proposed development is anticipated to produce negligible transportation impacts
- It is recommended that the Town of Carleton Place monitor the future volumes along Franktown Road to assess intersection operations and queuing along Franktown Road
- From a transportation perspective, the proposed development is recommended to proceed

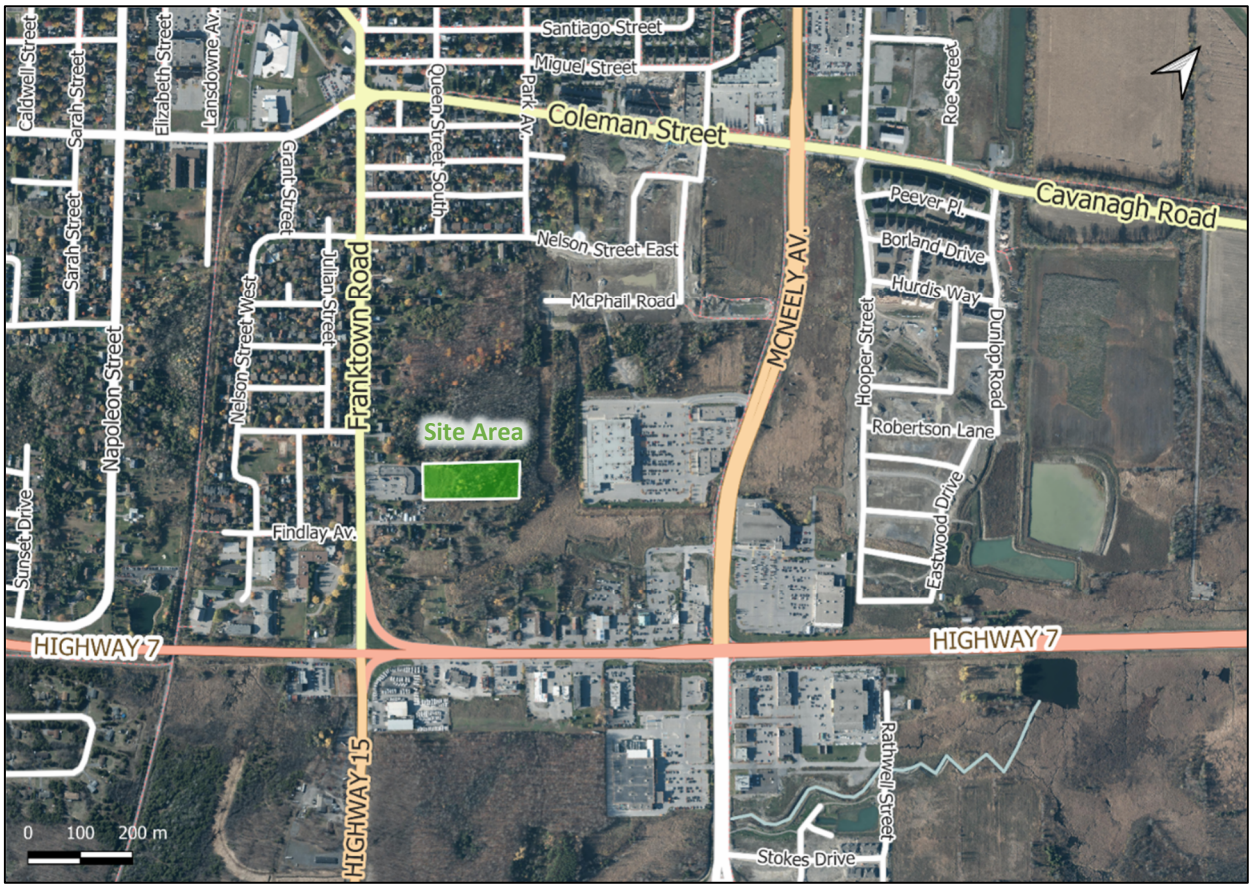
1 Introduction

This study has been prepared for a residential subdivision comprising 96 condominium units across two low-rise buildings and six freehold townhomes served by the extension of two previously planned local roads. As part of subdivision approval requirements this report will be submitted to the Town of Carleton Place and circulated to Lanark County and the Ministry of Transportation of Ontario. The format and methodologies applied within this report are responding to the General Guidelines for the Preparation of Traffic Impact Studies Ministry of Transportation (MTO, 2021). This study will include a description of the proposed development, a forecast of the vehicular traffic generated by the development, an operation assessment of the study area intersections, and a discussion on the site impacts and any mitigations required to support it.

2 Study Area

The site lies to the east of an existing retail plaza on Franktown Road and approximately 290 metres north of Highway 7. The parcel is a greenfield site, surrounded on all but the west side by other greenfield development areas. The planned land use of the parcel to the north is mixed retirement care, seniors' apartments, and residential dwellings, and a planned residential subdivision borders the site to the east. Figure 1 illustrates the study area context.

Figure 1: Area Context Plan



Source: https://www.openstreetmap.org/ Accessed: April 8, 2022

2.1 Existing Area Road Network

Highway 7: Highway 7 is an Ontario Ministry of Transportation freeway with an undivided cross-section within the study area. To the east of Franktown Road, it has a five-lane urban cross-section including a two-way left-turn lane, and it has a two-lane rural cross-section to the west. The posted speed limit is 60 km/h and the right-of-way varies throughout the study area.

Highway 15: Highway 15 7 is an Ontario Ministry of Transportation freeway with a two-lane undivided rural cross-section. The posted speed limit is 50 km/h for 300 m south of Highway 7 and 70 km/h to the south, and the right-of-way varies throughout the study area.

McNeely Avenue: McNeely Avenue is a Lanark County arterial road with a two-lane rural cross-section including gravel shoulders and an asphalt pathway on the east side of the road to the north of Coleman Street and a four-lane urban cross-section to the south including gravel paths on both sides of the road. The posted speed limit is 60 km/h and the measured right-of-way is 37 metres.

Franktown Road: Franktown Road is a Town of Carleton Place arterial road with a two-lane cross-section. The cross-section is fully urban north of Alexander Street and includes sidewalks on both sides of the road. Between Alexander Street and Findlay Avenue, the cross-section is semi-urban, curbed with a sidewalk on the west side of the road and with a gravel shoulder on the east side of the road. South of Findlay Avenue, the cross-section is curbed on the east side of the road and has a gravel shoulder on the west side of the road. The posted speed limit is 50 km/h and the right-of-way varies between 13 metres, 18 metres, 23 metres, and 27.5 metres within the study area.

Coleman Street: Coleman Steet is a Town of Carleton Place collector road with a two-lane urban cross-section. West of Franktown Road sidewalks are included on both sided of the road and a cycletrack is provided on the north side of the road. Between Franktown Road and Christie Street an asphalt pathway is present on the north side of the road, and east of Christie Street, a sidewalk is present on the south side of the road and an asphalt pathway is provided on the north side of the road. The posted speed limit is 50 km/h and the measured right-of-way varies from 18.0 metres 40.0 metres within the study area.

Park Avenue: Park Avenue is a Town of Carleton Place collector road with a two-lane urban cross-section including a sidewalk on the west side of the road. The unposted speed limit is assumed to be 50 km/h and the measured right-of-way is 12 metres.

Nelson Street: Nelson Street is a Town of Carleton Place local road with a two-lane urban cross-section. The unposted speed limit is assumed to be 50 km/h and the measured right-of-way is 20 metres to the west of Franktown Road and 12 metres to the east.

Findlay Avenue: Findlay Avenue is a Town of Carleton Place local road with a two-lane urban cross-section including a sidewalk on the south side of the road. The unposted speed limit is assumed to be 50 km/h and the measured right-of-way is 20 metres.

McGregor Street: McGregor Street is a Town of Carleton Place local road with a two-lane urban cross-section including a sidewalk on the west side of the road. The unposted speed limit is assumed to be 50 km/h and the measured right-of-way is 20 metres

Christie Street: Christie Street is a Town of Carleton Place local road with a two-lane urban cross-section including a sidewalk on the west/north side of the road. The unposted speed limit is assumed to be 50 km/h and the measured right-of-way is 24 metres north of its 90-degree bend, and 20 metres to the west of the bend.

2.2 Existing Intersections

The key existing area intersections as arrived at through consultation with the Town, County, and Province have been summarized below:

Franktown Road at Coleman Street	The intersection of Franktown Road at Coleman Street is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a shred through/channelized right-turn lane, and the southbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary right-turn lane. The eastbound and westbound approaches each consist of a shared left-turn/through lane and an auxiliary channelized right-turn lane. No turn restrictions were noted.
Franktown Road at Nelson Street West / Nelson Street East	The intersection of Franktown Road at Nelson Street West/Nelson Street East is an unsignalized intersection stop-controlled on the minor approaches of Nelson Street West and Nelson Street East. All approaches consist of shared all-movements lanes. No turn restrictions were noted.
Franktown Road at Findlay Avenue	The intersection of Franktown Road at Findlay Avenue is an unsignalized T-intersection stop-controlled on the minor approach of Findlay Avenue. The northbound approach consists of a shared left-turn/through lane and the southbound approach consists of a shared through/right-turn lane. The eastbound approach consists of a shared left-turn/right-turn lane. No turn restrictions were noted.
Franktown Road / Highway 15 at Highway 7	The intersection of Franktown Road/Highway 15 at Highway 7 is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a shared through/channelized right-turn lane and the southbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, a through lane, and an auxiliary right-turn lane, and the westbound approach consists of an auxiliary left-turn lane, a through lane, and a channelized right-turn lane. No turn restrictions were noted.
Park Avenue at Coleman Street	The intersection of Franktown Road at Nelson Street West/Nelson Street East is an unsignalized intersection stop-controlled on the minor approaches of Park Avenue. The northbound and southbound approaches each consist of a shared all-movements lane. The eastbound and westbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. No turn restrictions were noted.
McGregor Street / Christie Street at Coleman Street	The intersection of McGregor Street/Christie Street at Coleman Street East is an unsignalized intersection stop-controlled on the minor approaches of McGregor Street and Christie Street. The northbound and southbound approaches each consist of a shared all-movements lane. The eastbound approach consists of a shared left-turn/through lane and a shared through/right-turn lane, and the westbound

approach consists of a shared left-turn/through lane and a right-turn lane. No turn restrictions were noted.

2.3 Cycling and Pedestrian Facilities

Sidewalks are provided along both sides of Franktown Road north of Alexander Street, and on Coleman Street west of Franktown Road. Sidewalks are provided along one side of Franktown Road between Alexander Street and Findlay Avenue, on Coleman Street between Christie Street and McNeely Avenue, on Park Avenue, Findlay Avenue, McGregor Street, and Christie Street.

Asphalt pathways are located on one side of Coleman Street east of Franktown Road, and on McNeely Avenue north of Coleman Street. Gravel pathways are located on both sides of McNeely Avenue south of Coleman Street. A cycletrack is located on the north side of Coleman Street west of Franktown Road.

2.4 Existing Transit

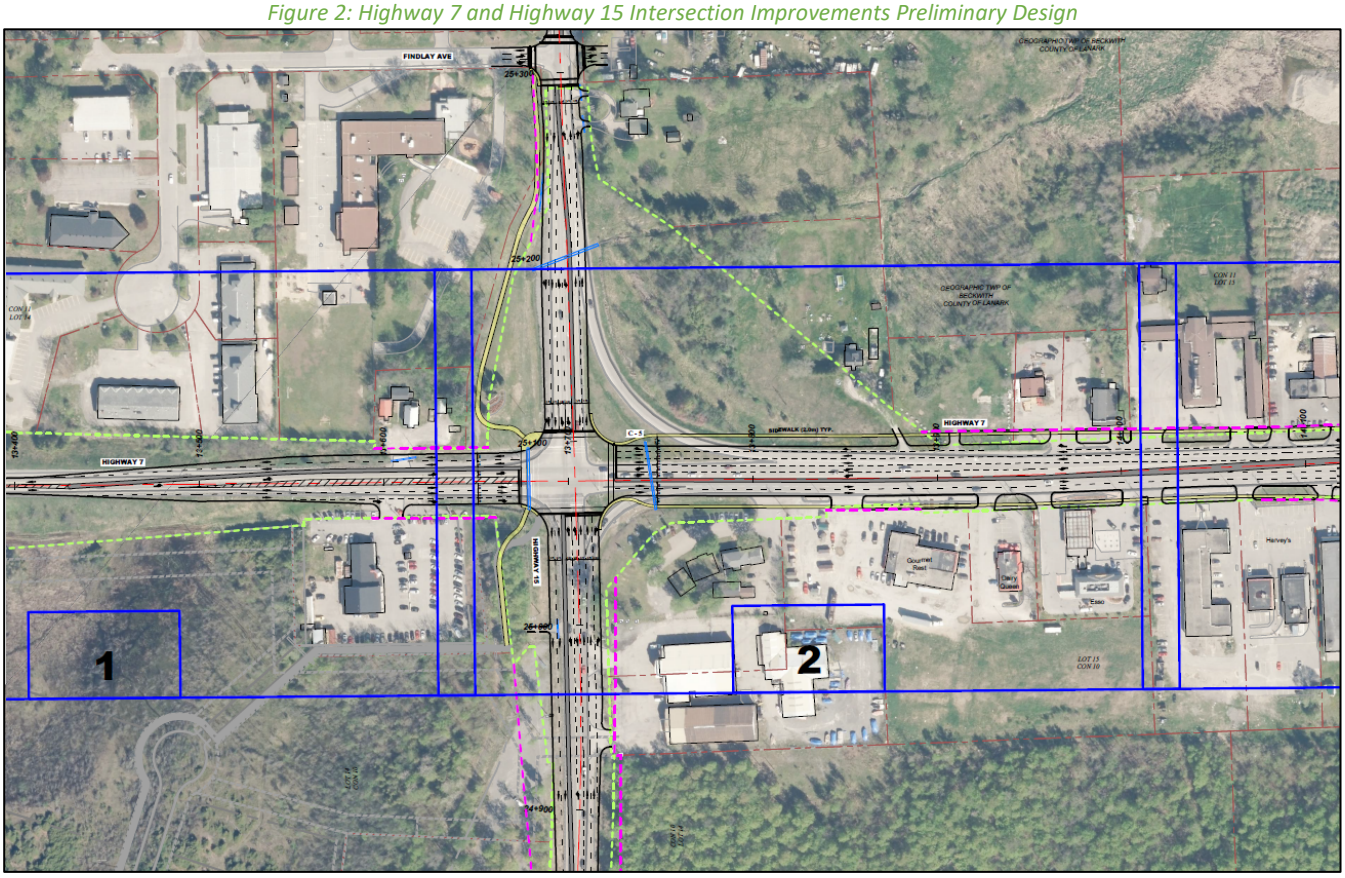
Typically, commuter bus service between Carleton Place and Ottawa/Gatineau during AM and PM weekday peak periods comprising the OC Transpo rural partner route #538 is provided by Classic Alliance Motorcoach.

2.5 Future Changes to the Area Transportation Network

Highway 7 and Highway 15 Intersection Improvements

The Ministry of Transportation retained WSP to complete a Preliminary Design and Class Environmental Assessment Study for improvements to the intersection of Highway 7 and Highway 15. As part of this study approach lane configurations and active mode facilities at the intersection were investigated. Also investigated within the Highway 7 and Highway 15 Intersection Improvements Transportation Environmental Study Report (TESR) was a new road connection between Franktown Road and McNeely Avenue. This connection would form the east leg of the Franktown Road at Findlay Avenue intersection, which would be signalized. Figure 2 illustrates the preliminary design of the intersection from Appendix L of the Highway 7 and Highway 15 Intersection Improvements TESR.

Figure 2: Highway 7 and Highway 15 Intersection Improvements Preliminary Design



Source: https://hwy7-15ea.ca/ Accessed: April 8, 2022

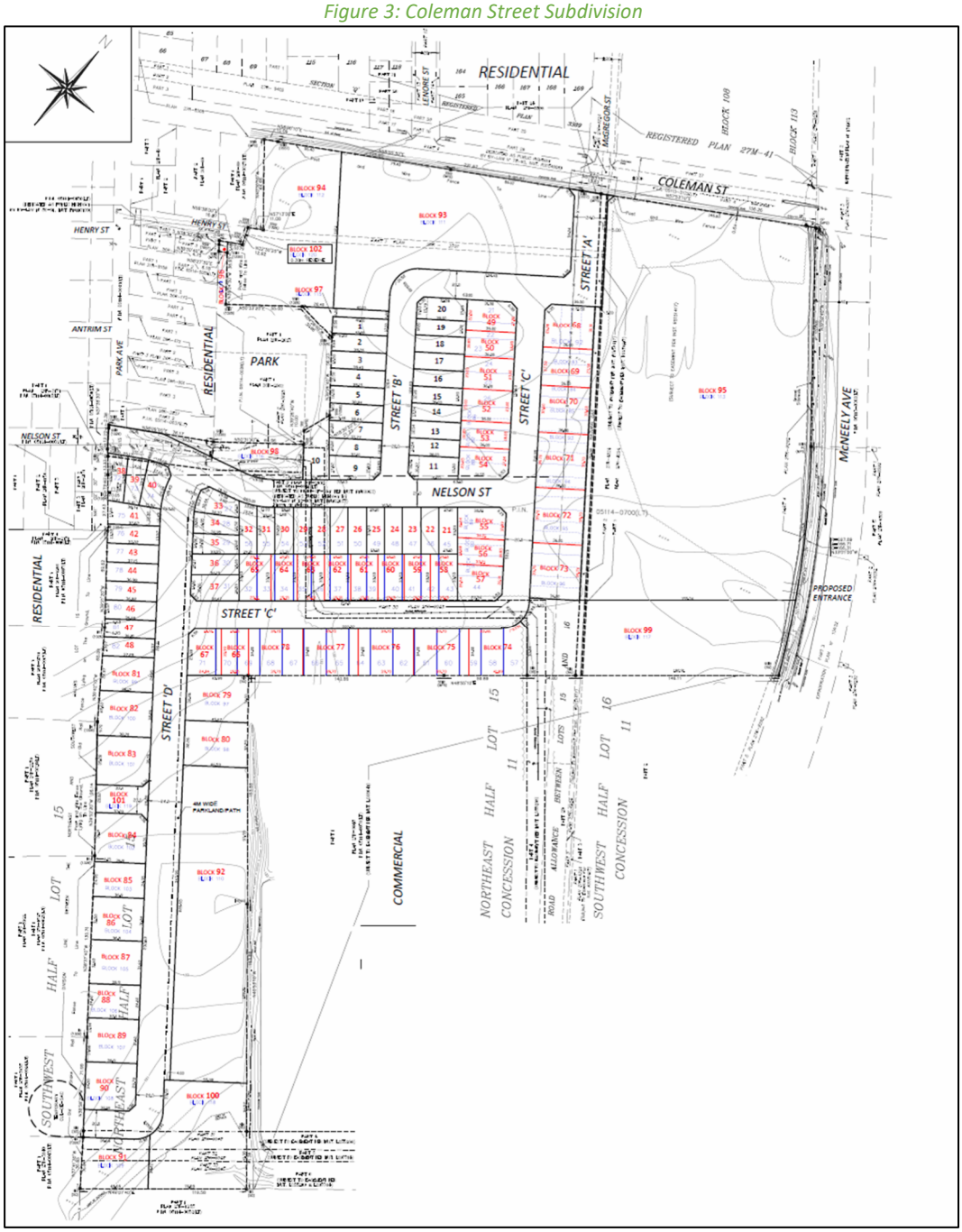
2.6 Other Study Area Developments

As confirmed by the Town of Carleton Place, the two studies that will explicitly be accounted for in the background traffic and road network conditions are:

Coleman Subdivision

The proposed development plan consists of 48 single detached dwellings, 262 townhouse and/or low-rise dwellings, and one commercial block. The development is anticipated to be built-out by 2024 and to generate 163 new two-way AM and 206 new two-way PM peak hour auto trips. Figure 3 illustrates the planned development to the east, to which the subjected development is proposed to connect at the terminus of Street 'D'. (McIntosh Perry, 2019)

Figure 3: Coleman Street Subdivision



347 Franktown Road

The proposed development plan consists of a retirement care home, a senior's apartment building, a commercial plaza and a townhouse development. The first phase of development is anticipated to be built-out by 2023 and the full development by 2027, and the full build-out is forecasted to generate 77 new two-way AM and 114 new two-way PM peak hour auto trips. (BT Engineering, 2021)

In addition to these two developments, traffic from other developments outside of the study area will be assigned to the road network as provided within the Highway 7 and Highway 15 Intersection Improvements TESR. These TESR background development volumes are provided for the horizons of 2025 and 2029. Linear extrapolation will

be used to estimate the volumes at horizons outside of these years, and linear interpolation will be used to estimate the volumes horizons between these years. It is noted that volumes from the Coleman Street Subdivision are included in these volumes, and thus were discounted from the two horizons' volumes.

The background development volumes within the study area have been provided in Appendix A.

3 Site Plan Review

3.1 Proposed Development

The proposed development is a residential subdivision comprising six townhouses, and two condominium buildings of 48 units each, for a total of 102 dwelling units along an extension of two planned public roads within the adjacent developments. Figure 4 illustrates the proposed concept plan.

3.1.1 New Streets

The proposed development includes a new extension of a planned north-south public road on the east side of the 347 Franktown Road development as illustrated in Figure 4. This public road extension is also to include a 90-degree bend and is to connect to a road terminus in the Coleman Street Subdivision, labelled "Street 'D'" in Figure 3. These connections will facilitate access to Nelson Street East and the intersecting local roads accessing Coleman Street.

The new public road proposed as part of the subject development includes a 20-metre right-of-way with a 9.0-metre roadway on the north-south alignment, and an 8.5-metre roadway on the east-west alignment. Sidewalks are proposed along both sides of the new road through the development area.

3.1.2 Circulation and Access

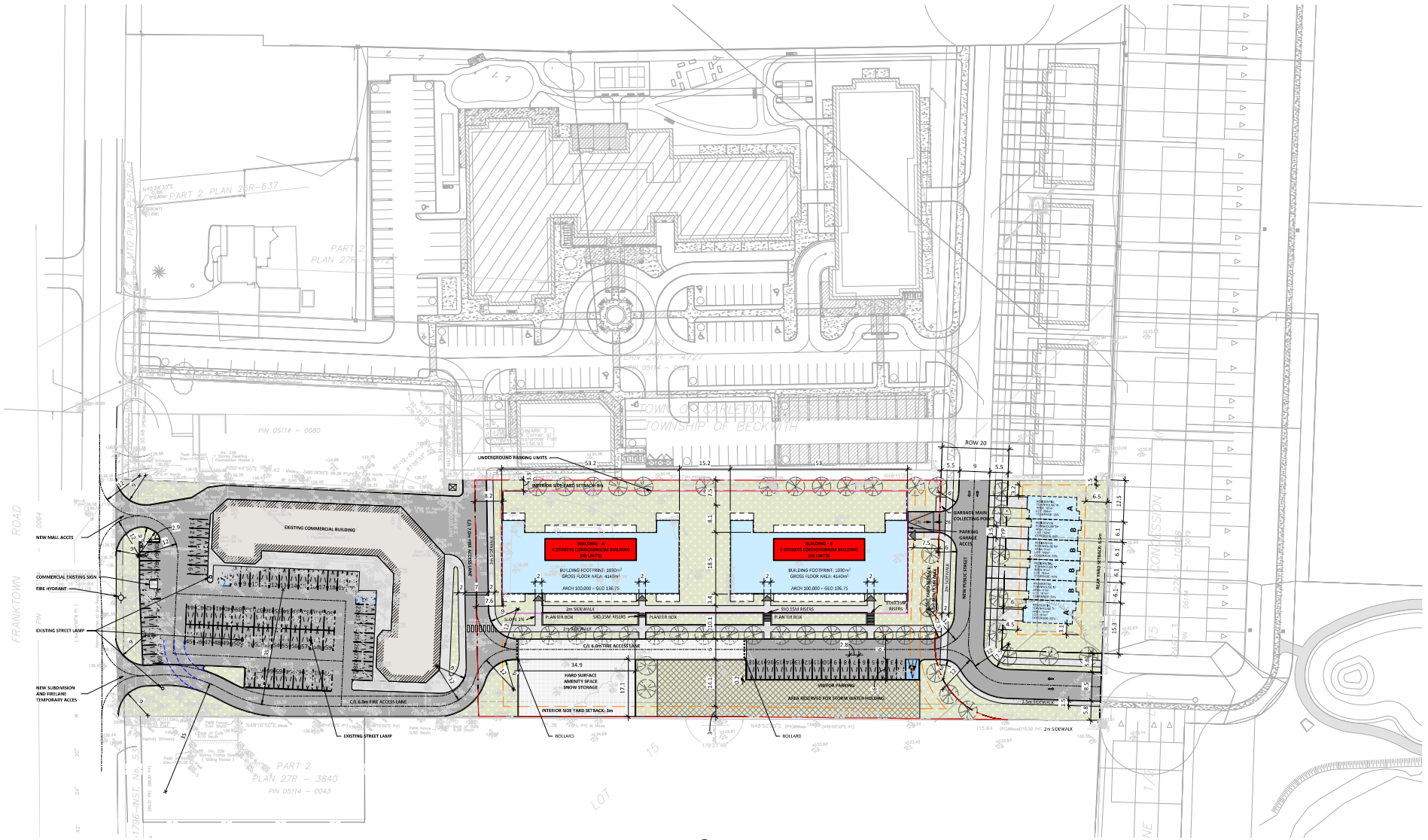
Vehicle access to the townhouse units is proposed via private driveways to each unit on the east side of the new public road. Access for residents of the condominium units is to be provided via a 6.0-metre-wide ramp to underground parking and for visitors of the condominium units via a surface lot comprising eighteen spaces. The surface lot is proposed to access the new public road via a 6.0-metre-wide driveway north of the 90-degree bend.

The driveway to the underground parking and the driveway to the surface visitor parking lot are proposed to be stop controlled on the minor access approaches and meet the minimum widths from The Town of Carleton Place Development Permit By-Law. No turn lanes are proposed to the driveways.

Garbage collection for the condominium units is proposed as taking place on the new public roadway at the proposed underground garage access. Garbage collection for the townhomes is proposed via residential collection.

A temporary emergency access route is to be provided from the south (east of the adjacent retail plaza parcel on Franktown Road) via a fire access lane as part of the 347 Franktown Road development. An on-site fire access lane is designated through the visitor parking lot's drive aisle and the adjacent hard surface amenity and snow storage area. While this east-west emergency access route will connect to the temporary north-south emergency access route, a change in materiality will delineate the uses and knockdown bollards will prevent cut-through traffic in the interim conditions before the connection is severed.

No concerns were noted for car or truck access to the site driveways, or for emergency vehicle access to the fire access lane.



1 SITE PLAN
1 : 400

North

355 FRANKTOWN RD - FRANKTWON DEVELOPMENT

96 CONDOMINIUMS UNITS
6 FREEHOLD TOWNHOUSES

102 UNITS TOTAL

PARKINGS

RESIDENTIAL COMPLEX
RESIDENTIAL: 116 (RATIO 1.21)
VISITOR: 24 (RATIO .25)
BIKE: 48 (RATIO .5)

COMMERCAL PLAZA
COMMERCIAL: 80

SITE PLAN LEGEND

- LOT LINE
- BUILDING SETBACK
- SERVITUDE
- 0000 GEO — ELEVATION GEODESIQUE
- NEW TREE
- DEMOLISHED BUILDING
- EXISTING BUILDING
- LANDSCAPED AREA
- PAVER
- SIDEWALK
- AMPHALT

PROJECT
FRANKTOWN DEVELOPMENT
355 Franktown Rd.
Carleton Place, ON K7C 4N6

OWNER

ARCHITECT
PMA ARCHITECTES

PLANNER
FOTENN Planning + Design
396 Cooper Street, Suite 300, Ottawa ON K2P 2Y7
613.730.5709 www.fotenn.com

CIVIL
McINTOSH PERRY
115 WALGREEN ROAD, R.R. 3 CARP, OTTAWA, ON K0A 1L0

LANDSCAPE
JAMES B. LENNOX & ASSOCIATES INC. LANDSCAPE ARCHITECTS

MECHANICAL

STRUCTURAL

KEY PLAN

ARCHITECT SEAL

REVISIONS

NO	DESCRIPTION	DATE
1	FOR CO-ORDINATION	2023-09-28

NOTE
IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON THE SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT. ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS. DO NOT SCALE DRAWINGS.

DO NOT USE FOR CONSTRUCTION

DATE 2023-09-28
DESIGNED P.POWERLEAU
DRAWN P.POWERLEAU
PROJECT No 21006
CHECKED F.MARTIN

SHEET TITLE
SITE PLAN

SHEET No
A101

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3.1.3 Design for Active Modes

A 2.0-metre-wide sidewalk with boulevard is proposed along both sides of the new road on the north-south alignment, where on the east-west alignment this configuration continues on the north side and the south side consists of a 1.5-metre-wide sidewalk abutting the roadway. Sidewalks connect the condominium building entrances, including stairs on the three easterly main entrances due to the site grades, and the westerly connection is accessible via a 2% slope. An east-west walkway is proposed at grade with the building entrances, between each entrance connection permitting accessible access from the west of the site.

A fully accessible building entrance is provided on the east side of the east condominium building adjacent to the garage entrance, with a walkway connection to the sidewalk on the east side of the property.

3.1.4 Parking

Parking for residents of the condominiums is proposed via an underground parking garage comprising 130 spaces of which two spaces are designated barrier-free. Parking for the townhomes is proposed via the private driveways and private garages within the units. The proposed plan meets the Town's Development Permit By-Law requires Parking (1.25 parking spaces per condominium dwelling unit or 120 spaces).

Eighteen vehicle parking spaces for visitors are proposed for the condominium in a surface lot, of which one space is designated barrier-free. The Town's Development Permit By-law requires 0.25 visitor parking spaces per condominium dwelling unit, equating to 24 spaces, therefore the site will require an exemption for the visitor parking, but is meeting the barrier-free visitor vehicle parking space requirement.

Bicycle parking for the condominium units is proposed as comprising 54 spaces with 15 exterior spaces via surface racks, and the remaining 39 spaces in the underground parking garage. Bicycle parking for the townhome units is assumed to be within each of the dwellings. The bike parking meets the Town's Development Permit By-Law requirements (0.5 spaces per condominium dwelling unit plus six spaces for developments of 20 or more dwelling units for the condominium component, or a total of 54 spaces).

4 Study Area and Development Traffic

4.1 Study Horizons

The anticipated build-out year is 2024. As a result, the full build-out plus five years horizon year is 2029, and the build-out plus ten-year horizon is 2034.

4.2 Time Periods

As the proposed development is composed entirely of residential units, the weekday AM and PM peak hours will be examined.

4.3 Existing Peak Hour Travel Demand

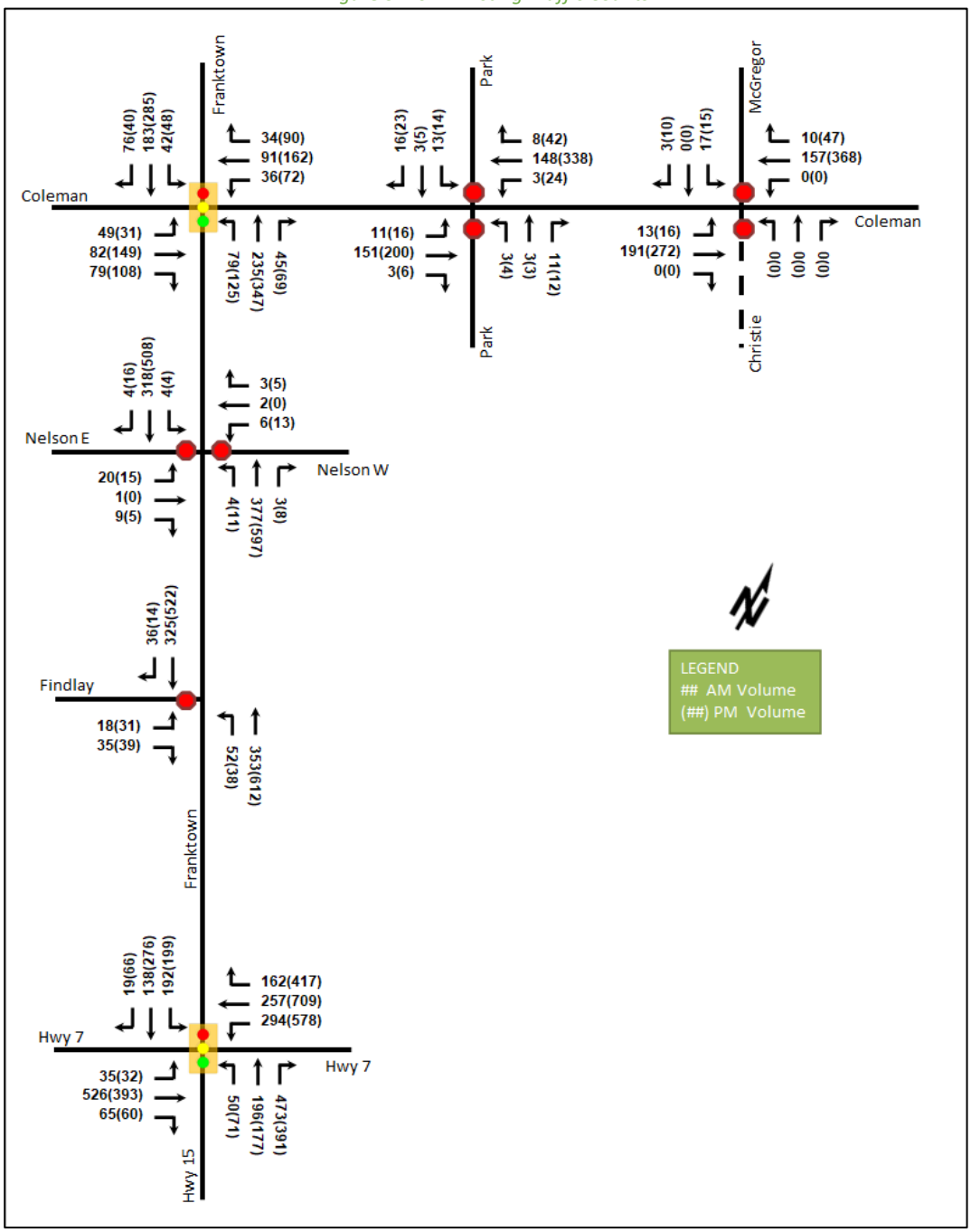
Existing turning movement volumes for the study area intersections were collected from area Transportation Impact Studies and the Highway 7 and Highway 15 Intersection Improvement TESR (WSP, 2020). Table 1 summarizes the data sources by intersection and Figure 5 illustrates these existing traffic volumes grown to the 2022 horizon. Volumes on Christie Street will be provided in the future conditions based upon the findings of the Coleman Street Subdivision TIS (McIntosh Perry, 2019)

Table 1: Traffic Volume Sources

Intersections	Data Source
Park Avenue @ Coleman Street **Franktown Road @ Nelson Street**	347 Franktown Road Transportation Impact Assessment Report, Revision 1 (BTE, 2021)

Intersections	Data Source
Franktown Road @ Findlay Avenue	
Franktown Road/Highway 15 @ Highway 7	Highway 7 and Highway 15 Intersection Improvements TESR (WSP, 2020)
Franktown Road @ Coleman Street **McGregor Street @ Coleman Street**	Coleman Street Subdivision Traffic Impact Study – Addendum (McIntosh Perry, 2019)

Figure 5: 2022 Existing Traffic Counts



4.4 Background Network Travel Demands

4.4.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.5. The Highway 7 and Highway 15 improvements are assumed to be in place for the buildout plus five-year horizon of 2029, and the signalization of the intersection of Franktown Road and Findlay Avenue including the new east leg have been included within the buildout plus ten-year horizon conditions.

4.4.2 Background Growth

Based upon the Highway 7 and Highway 15 Intersection Improvements TESR, the historical growth within the study area has been calculated as 1.5%. The methodology employed within the TESR included this historical growth rate as a background rate for forecasting future volumes, and explicitly considered all development planned at the time that would impact the corridor. While considered to be conservative, this methodology will be used within the subject study.

A background growth rate of 1.5% will be bi-directionally applied to the mainline volumes on Franktown Road and Coleman Street, and to all movements at the intersection of Franktown Road/Highway 15 at Highway 7.

4.4.3 Future Background Traffic Volumes

The future background volumes were obtained by applying the background growth to the existing volumes and superimposing the background development volumes described in Section 2.6. Future background volumes for the 2024 horizon are illustrated in Figure 6, for the 2029 horizon are illustrated in Figure 7, and for the 2034 horizon are illustrated in Figure 8.

Figure 6: 2024 Future Background Volumes

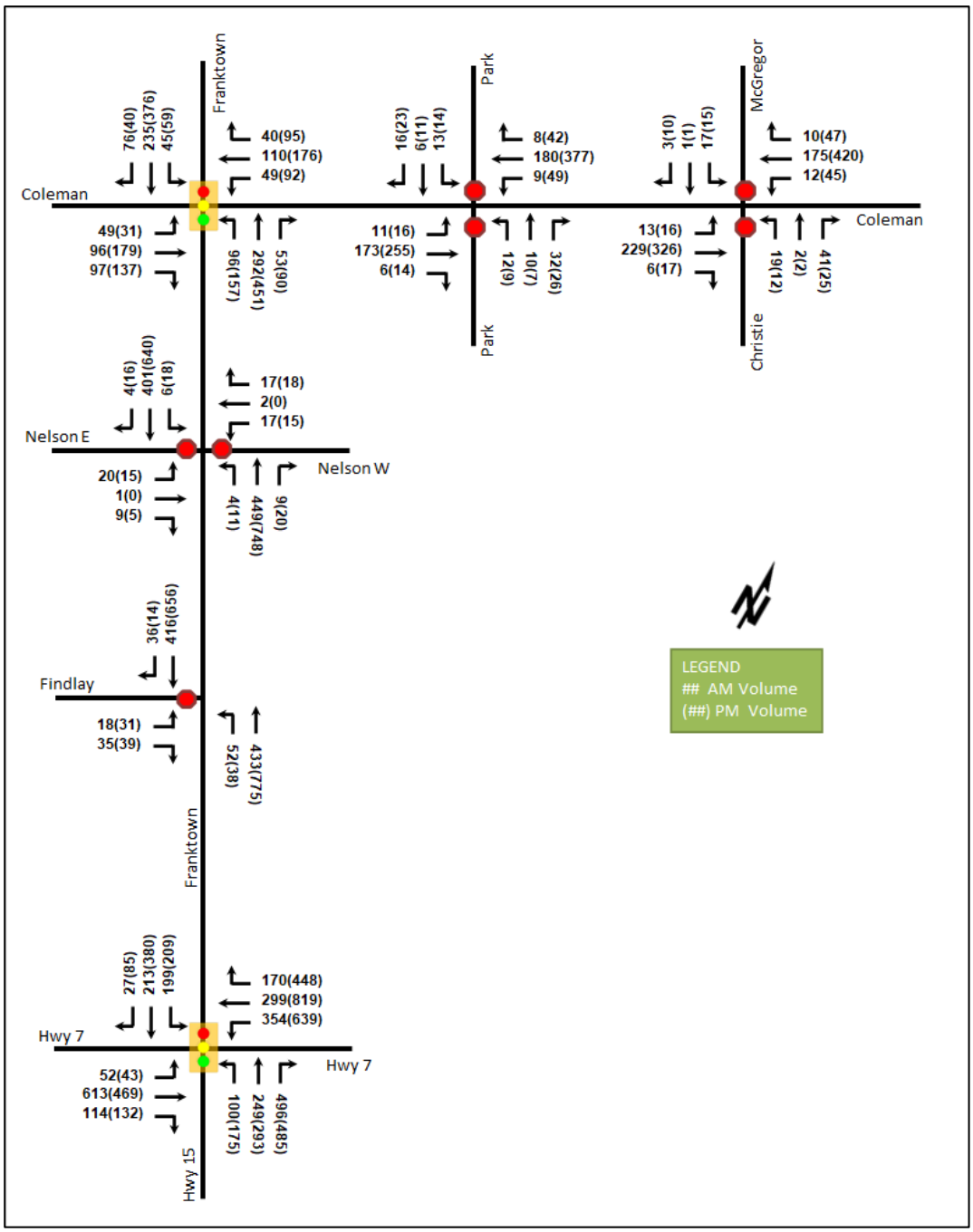


Figure 7: 2029 Future Background Volumes

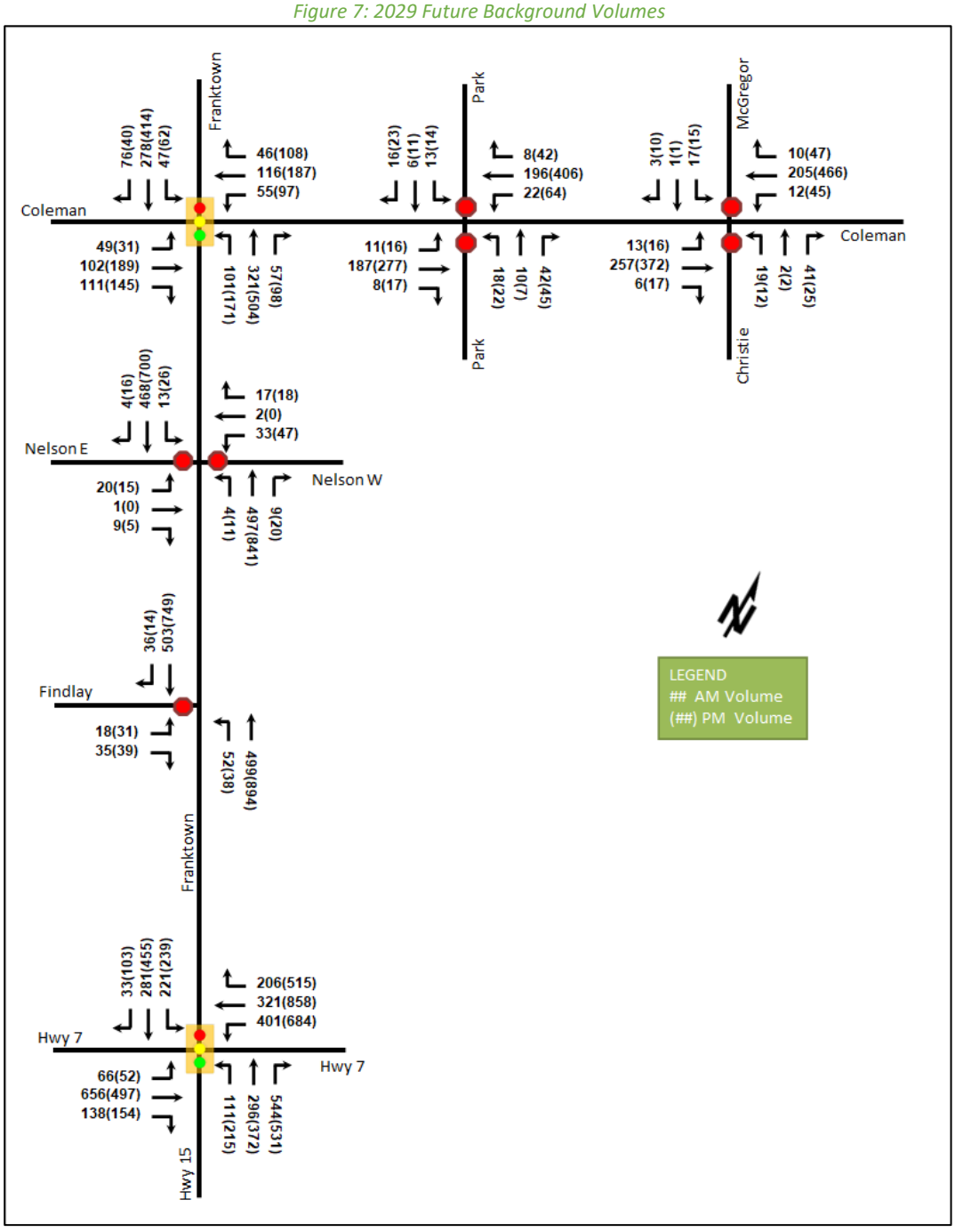
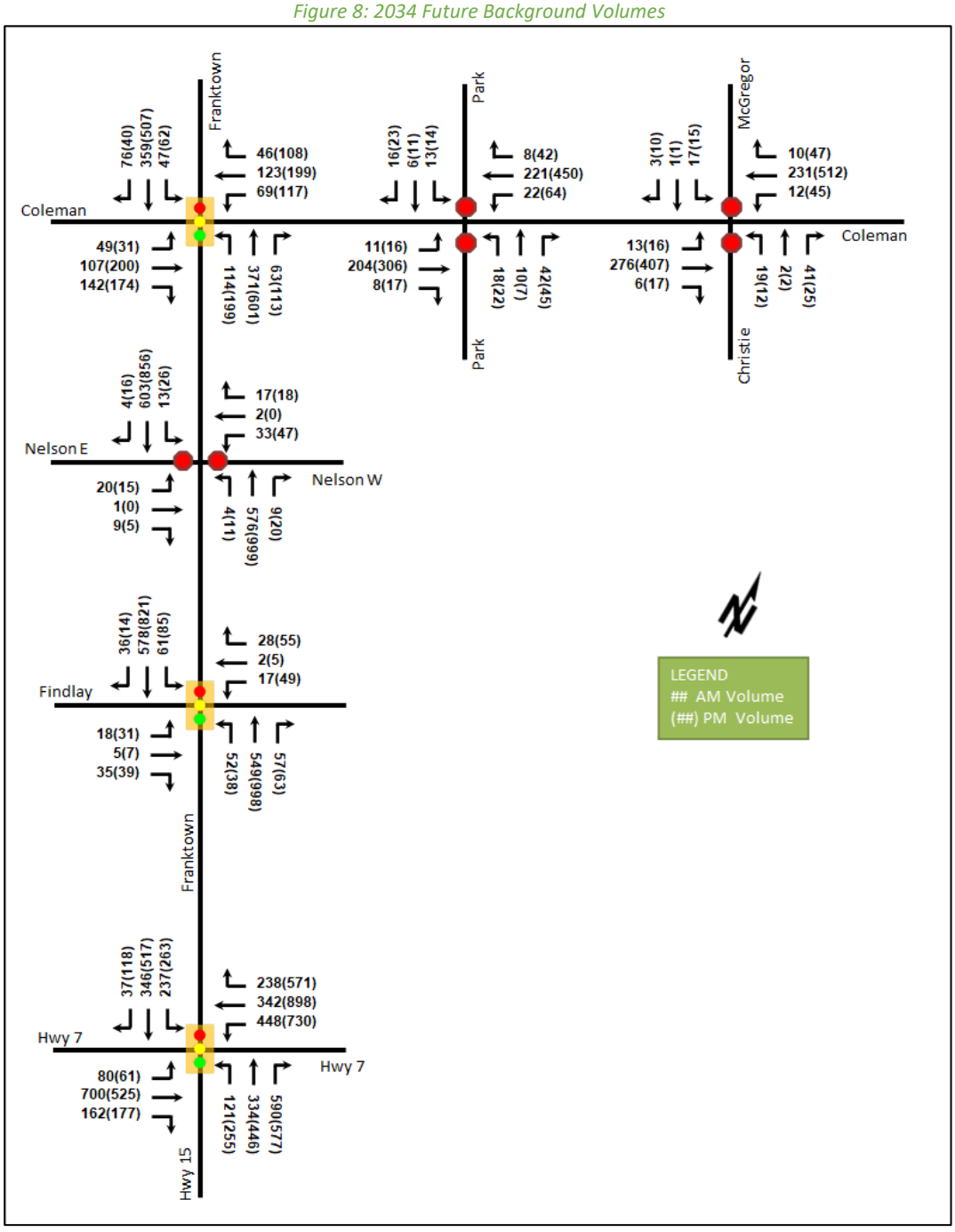


Figure 8: 2034 Future Background Volumes



4.5 Development-Generated Travel Demand

4.5.1 Trip Generation and Mode Shares

Traffic generation for the proposed development has been prepared using the vehicle trip rates both the townhomes and condominium units using the average rates from the ITE Trip Generation Manual 11th Edition (2021). Table 2 summarizes the vehicle trip rates for the proposed land use.

Table 2: Trip Generation Vehicle Trip Rates

Dwelling Type	ITE Land Use Code	Peak Hour	Vehicle Trip Rate
Multi-Family Low Rise	220	AM	0.47
		PM	0.57

Using the above vehicle trip rates, the total vehicle trip generation has been estimated. Table 3 below illustrates the total vehicle trip generation for both the townhomes and condominium units.

Table 3: Total Vehicle Trip Generation – Scenario 1

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Multi-Family Low Rise	**102**	12	36	48	36	22	58

As shown above, 48 AM and 58 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

4.5.2 Trip Distribution

The trip distributions from the adjacent traffic studies were based upon existing travel patterns observed within the study area. The distributions from these studies were analyzed and confirmed based upon the area directional distributions, turning movement splits, and a general knowledge of the traffic patterns withing the Town of Carleton Place. Table 4 below summarizes the distributions.

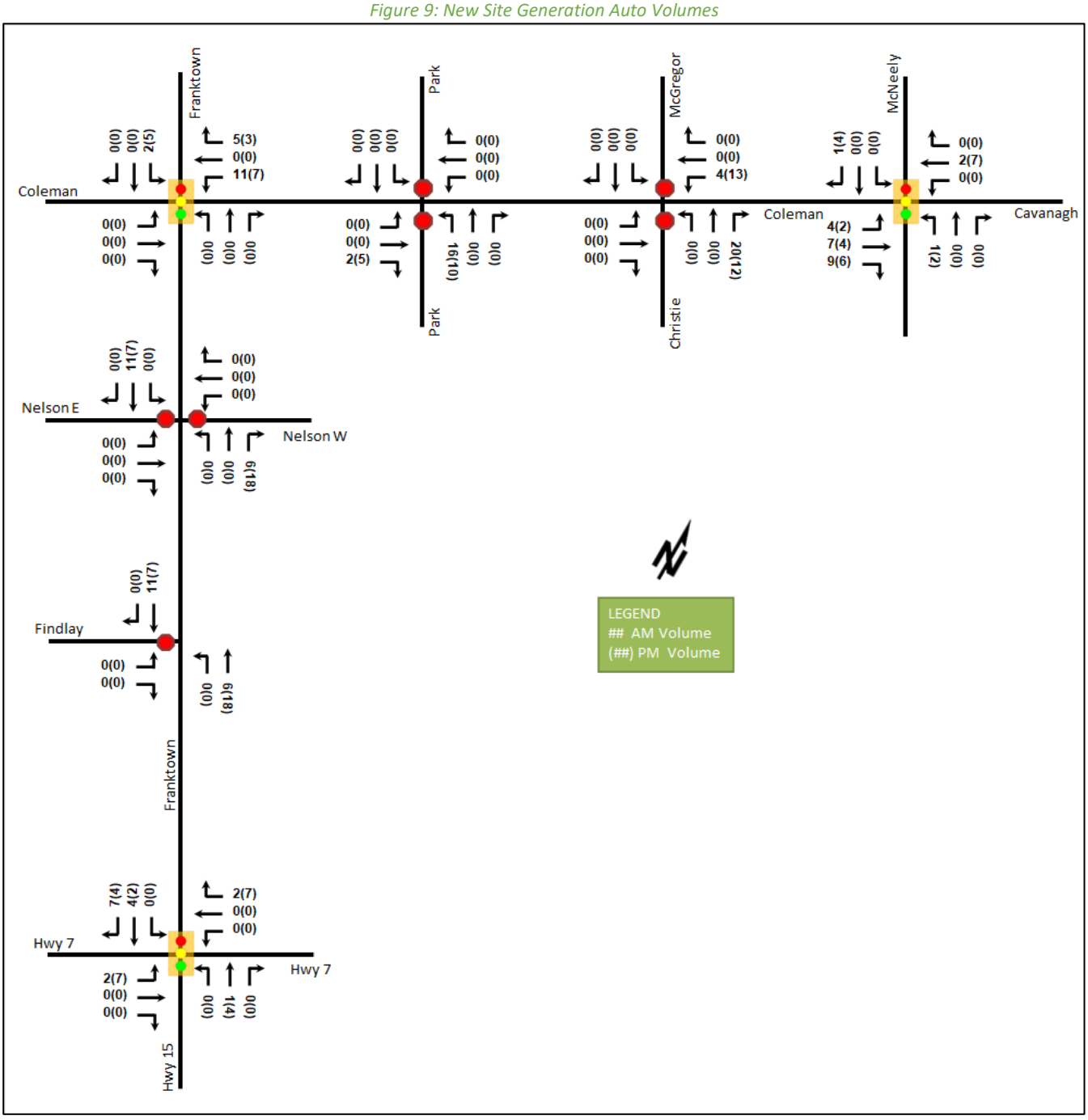
Table 4: Trip Distribution

To/From	Percent of Trips	Via
North	25%	15% Franktown Rd,10% McNeely Ave
South	10%	10% Hwy 15
East	45%	20% Cavanagh Rd,25% Hwy 7
West	20%	20% Hwy 7
Total	**100%**	**100%**

4.5.3 Trip Assignment

Using the distribution outlined above, the trips generated by the site have been assigned to the site access intersections and study area road network. While not operationally analyzed within this report, at the request of Lanark County, the volumes assigned to the intersection of Coleman Street/Cavanagh Road at McNeely Avenue have been included for the purposes of understanding the future conditions of McNeely Avenue. Figure 9 illustrates the new site generated volumes.

Figure 9: New Site Generation Auto Volumes



4.5.4 Future Total Traffic Volumes

The future total volumes were obtained by superimposing the subject development volumes on the future background volumes at each horizon. Future background volumes for the 2024 horizon are illustrated in Figure 10, for the 2029 horizon are illustrated in Figure 11, and for the 2034 horizon are illustrated in Figure 12.

Figure 10: 2024 Future Total Volumes

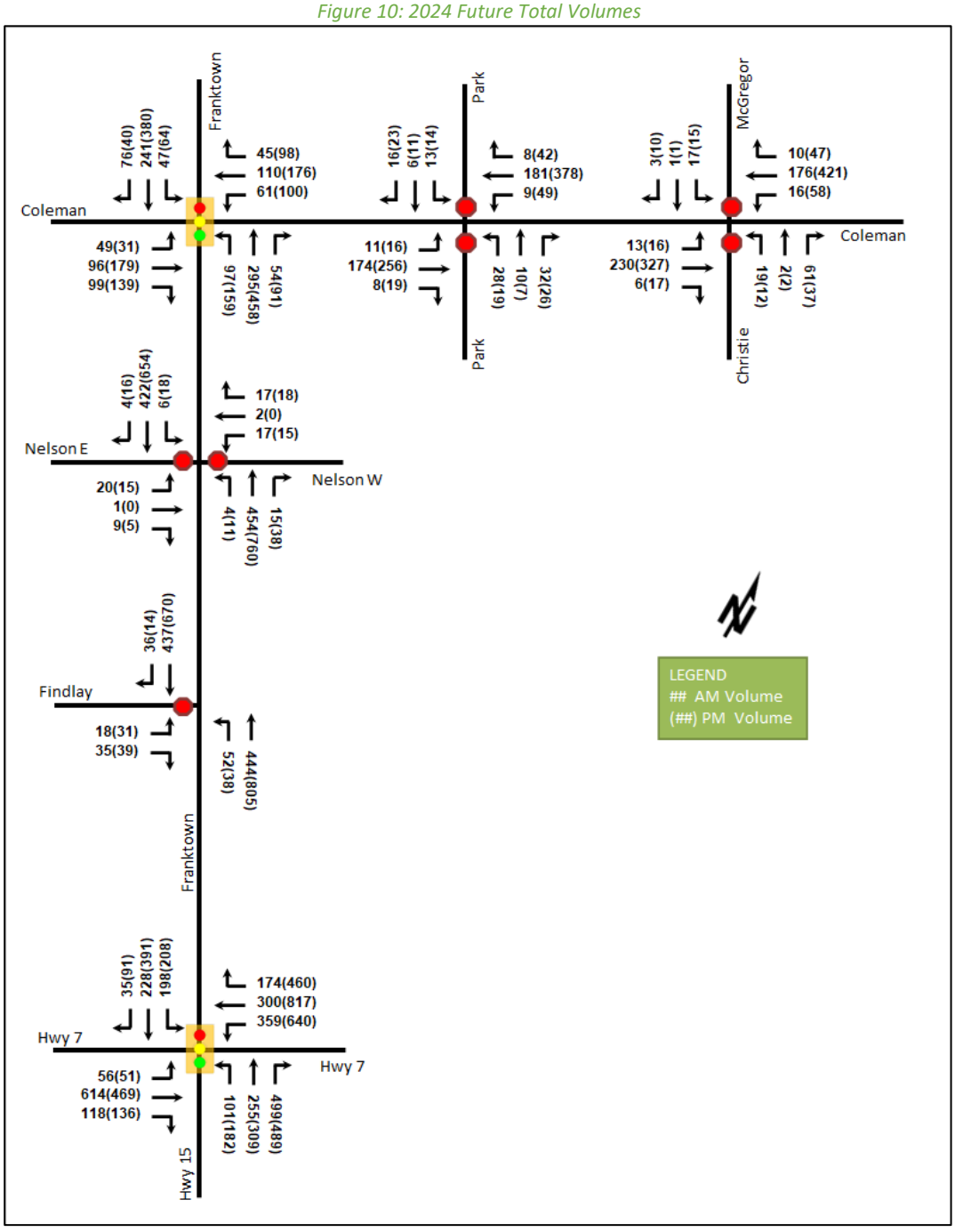


Figure 11: 2029 Future Total Volumes

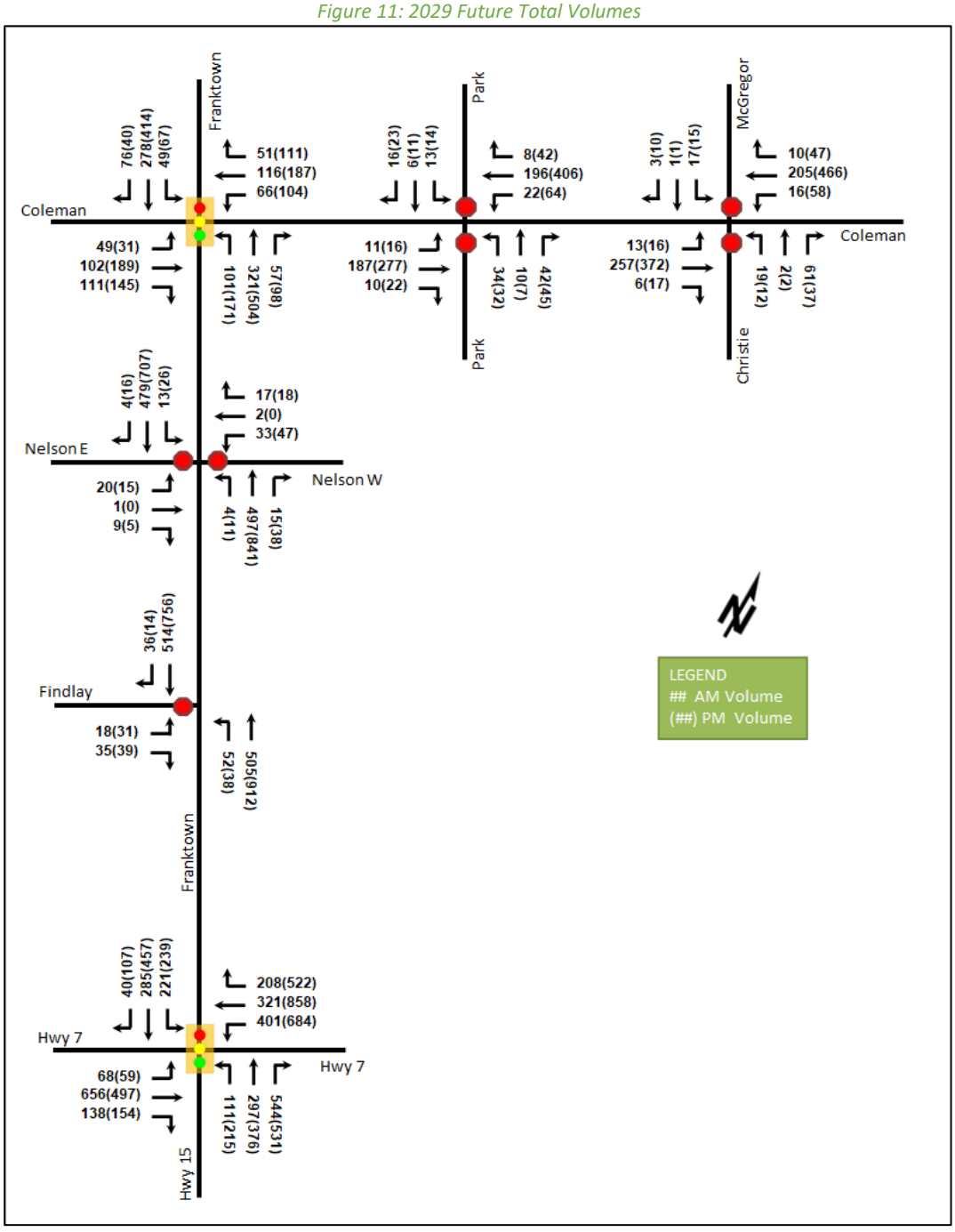
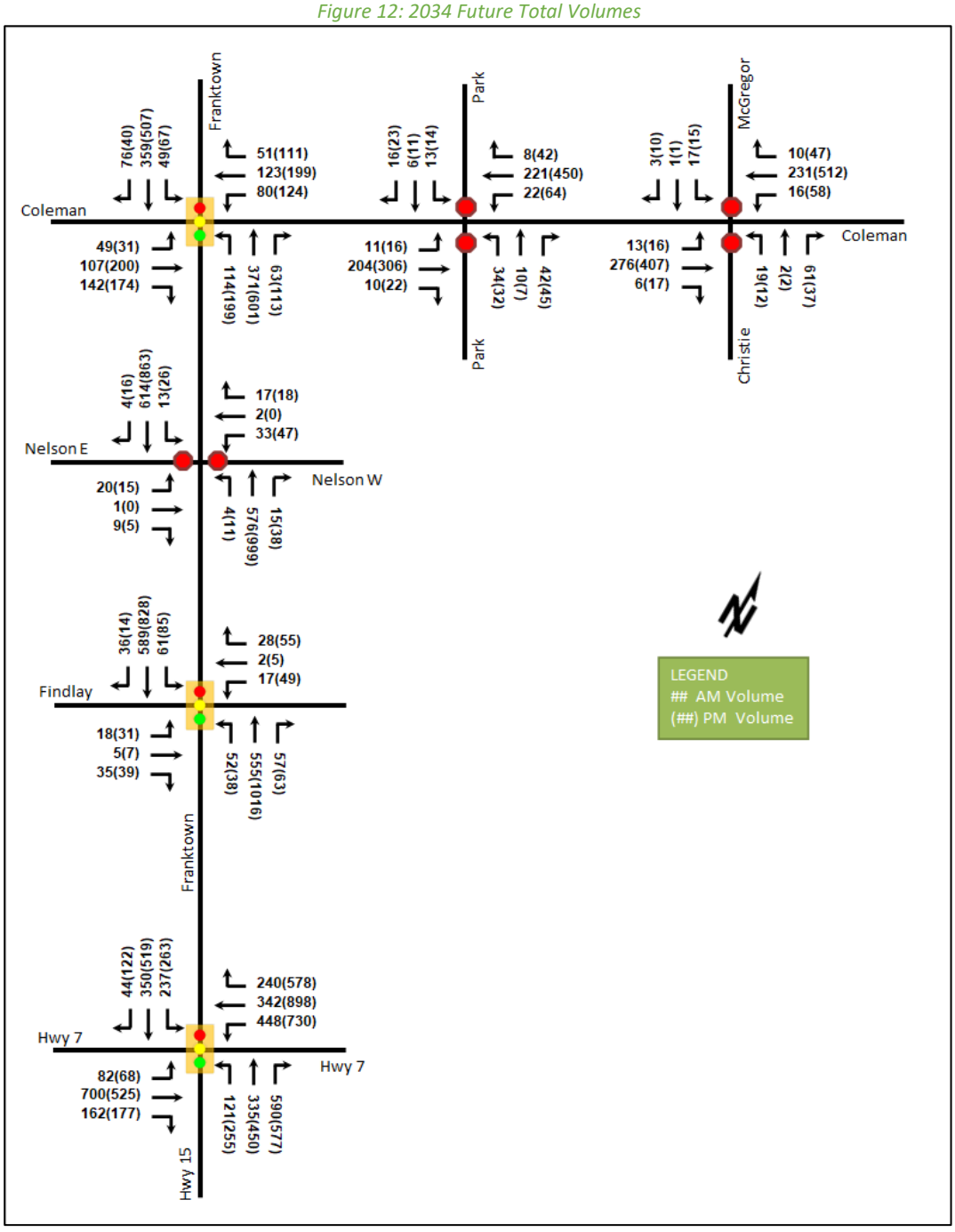


Figure 12: 2034 Future Total Volumes



5 Traffic Impacts

5.1 Operational Analysis

Synchro version 11 was used to model traffic conditions and analyze the operations for each the existing horizon, the future background horizons, and the future total horizons. The level of service for signalized intersections is based on HCM 6th Edition lane group delay for individual movements and average control delay for the overall intersection, and average control delay for unsignalized intersections.

5.1.1 Existing Operations

Table 5 summarizes the existing intersection operations. The Synchro worksheets are provided in Appendix B.

Table 5: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St *Signalized*	EBL/T	B	0.42	19.6	25.6	B	0.45	18.5	33.2
	EBR	-	-	-	4.6	-	-	-	8.4
	WBL/T	B	0.41	19.5	24.6	B	0.59	19.8	45.2
	WBR	-	-	-	0.0	-	-	-	5.8
	NBL	A	0.13	5.8	8.8	A	0.25	8.0	14.6
	NBT/R	A	0.31	8.5	41.1	B	0.50	12.7	**#82.8**
	SBL	A	0.07	6.1	5.5	A	0.11	8.3	6.7
	SBT	A	0.25	8.7	27.5	B	0.45	13.1	48.7
	SBR	A	0.12	7.8	3.3	A	0.07	9.6	0.0
	Overall	**B**	-	**11.4**	-	**B**	-	**14.2**	-
Franktown Rd at Nelson St W / Nelson St E *Unsignalized*	EB	C	0.09	15.9	2.3	D	0.13	29.2	3.0
	WB	C	0.04	15.6	0.8	D	0.12	28.5	3.0
	NB	A	0.00	8.0	0.0	A	0.01	8.7	0.0
	SB	A	0.00	8.2	0.0	A	0.01	8.9	0.0
	Overall	**A**	-	**1.0**	-	**A**	-	**1.1**	-
Franktown Rd at Findlay Ave *Unsignalized*	EBL/R	B	0.13	13.8	3.0	D	0.31	25.5	9.8
	NBL/T	A	0.05	8.3	1.5	A	0.04	8.8	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	-	**1.4**	-	**A**	-	**1.7**	-
Franktown Rd / Hwy 15 at Hwy 7 *Signalized*	EBL	B	0.07	18.3	15.8	C	0.13	30.5	17.9
	EBT	C	0.71	31.2	**#230.9**	C	0.64	34.4	**#163.7**
	EBR	B	0.10	18.6	1.4	C	0.12	24.0	0.4
	WBL	C	0.83	34.6	**#144.7**	**F**	**1.20**	**129.0**	**#277.1**
	WBT	B	0.26	10.9	65.0	B	0.72	19.5	**#247.2**
	WBR	-	-	-	12.4	-	-	-	32.5
	NBL	D	0.23	45.7	19.5	D	0.43	51.5	28.9
	NBT/R	D	0.81	54.8	**#280.9**	D	0.78	54.6	**#246.7**
	SBL	E	0.89	72.7	**#88.9**	E	0.86	65.5	**#90.5**
	SBT	C	0.31	34.6	34.8	D	0.63	39.3	76.6
	SBR	C	0.05	31.8	0.0	C	0.18	33.2	6.9
	Overall	**D**	-	**35.9**	-	**E**	-	**56.1**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Park Ave at Coleman St *Unsignalized*	EBL	A	0.01	7.6	0.0	A	0.02	8.2	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.00	7.6	0.0	A	0.02	7.7	0.8
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.03	10.1	0.8	B	0.04	12.2	0.8
	SB	B	0.05	10.5	1.5	B	0.10	13.9	2.3
	Overall	**A**	**-**	**1.6**	**-**	**A**	**-**	**1.7**	**-**
Christie St / McGregor St at Coleman St *Unsignalized*	EBT/L	A	0.01	7.6	0.0	A	0.02	8.3	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	-	0.0	0.0	A	-	0.0	0.0
	WBR	-	-	-	-	-	-	-	-
	NB	-	-	-	-	-	-	-	-
	SB	B	0.03	10.7	0.8	B	0.06	13.2	1.5
	Overall	**A**	**-**	**0.8**	**-**	**A**	**-**	**0.7**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections operate well in the existing conditions with the exception of the intersection of Franktown Road/Highway 15 at Highway 7 during the PM peak hour where the westbound left-turn movement is over theoretical capacity and may be subject to high delays. At this intersection, the eastbound through, westbound left, northbound through/right and southbound left movements may exhibit extended queues during both peak hours, and the westbound through movement may exhibit extended queues during the PM peak hour.

The northbound through/right movement at the intersection of Franktown Road at Coleman Street may also exhibit extended queues during the PM peak hour.

5.1.2 2024 Future Background Operations

Table 6 summarizes the 2024 future background intersection operations. The Synchro worksheets are provided in Appendix C.

Table 6: 2024 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St *Signalized*	EBL/T	B	0.40	19.1	25.4	B	0.47	19.3	34.8
	EBR	-	-	-	5.8	-	-	-	10.0
	WBL/T	B	0.45	19.4	27.6	C	0.61	20.7	**#53.5**
	WBR	-	-	-	0.0	-	-	-	5.3
	NBL	A	0.15	6.1	9.8	A	0.30	8.5	16.2
	NBT/R	A	0.35	9.0	46.9	B	0.58	14.2	**#104.8**
	SBL	A	0.07	6.5	5.5	A	0.13	8.6	7.3
	SBT	A	0.30	9.4	32.9	B	0.52	14.3	56.8
	SBR	A	0.12	8.1	2.5	A	0.07	9.6	0.0
	Overall	**B**	**-**	**11.6**	**-**	**B**	**-**	**15.1**	**-**
Franktown Rd at Nelson St W / Nelson St E *Unsignalized*	EB	C	0.10	17.8	2.3	E	0.17	40.9	4.5
	WB	C	0.10	16.2	2.3	D	0.19	31.2	5.3
	NB	A	0.00	8.1	0.0	A	0.01	8.9	0.0
	SB	A	0.01	8.3	0.0	A	0.02	9.3	0.8
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**1.4**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Findlay Ave ***Unsignalized***	EBL/R	B	0.13	14.7	3.0	D	0.34	31.0	10.5
	NBL/T	A	0.05	8.4	0.8	A	0.04	9.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**1.6**	**-**
Franktown Rd / Hwy 15 at Hwy 7 ***Signalized***	EBL	C	0.10	20.5	19.7	D	0.26	49.6	18.8
	EBT	D	0.79	37.5	**#245.6**	D	0.85	53.4	**#159.4**
	EBR	C	0.18	21.3	11.3	C	0.29	32.7	13.7
	WBL	E	0.96	59.7	**#153.1**	**F**	**1.52**	**274.5**	**#257.2**
	WBT	B	0.28	11.6	66.3	C	0.85	32.1	**#232.1**
	WBR	-	-	-	11.6	-	-	-	25.4
	NBL	D	0.40	46.3	32.6	E	0.79	67.7	**#78.8**
	NBT/R	D	0.83	53.7	**#290.0**	D	0.66	43.8	**#337.6**
	SBL	E	0.88	71.8	**#84.1**	D	0.77	52.0	**#96.9**
	SBT	D	0.42	35.2	49.2	C	0.61	33.8	106.3
	SBR	C	0.06	31.1	0.0	C	0.16	26.9	10.2
	Overall	**D**	**-**	**41.3**	**-**	**F**	**-**	**87.5**	**-**
Park Ave at Coleman St ***Unsignalized***	EBL	A	0.01	7.6	0.0	A	0.01	8.2	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.01	7.6	0.0	A	0.04	7.9	0.8
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.08	10.7	2.3	B	0.09	13.5	2.3
	SB	B	0.06	11.0	1.5	C	0.12	15.5	3.0
	Overall	**A**	**-**	**2.3**	**-**	**A**	**-**	**2.2**	**-**
Christie St / McGregor St at Coleman St ***Unsignalized***	EBT/L	A	0.01	7.6	0.0	A	0.02	8.3	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	0.01	7.7	0.0	A	0.04	8.1	0.8
	WBR	-	-	-	-	-	-	-	-
	NB	B	0.09	10.6	2.3	B	0.09	14.2	2.3
	SB	B	0.04	11.3	0.8	C	0.07	15.2	1.5
	Overall	**A**	**-**	**2.1**	**-**	**A**	**-**	**1.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections at the 2024 background horizon operate similarly to the existing conditions. At this horizon, the overall intersection of Franktown Road/Highway 15 at Highway 7 is forecasted to experience high delay and the northbound left-turn movement may exhibit extended queues, both during the PM peak hour.

5.1.3 2029 Future Background Operations

Table 7 summarizes the 2029 future background intersection operations. Given the proposed geometric changes at the intersection of Franktown Road/Highway 15 at Highway 7, protected left-turn phases have been included on all approaches, and a protected northbound right-turn phase overlapping with the protected westbound left-turn phase is provided. It is noted that westbound U-turns are assumed to be restricted under the proposed phasing. The Synchro worksheets are provided in Appendix D.

Table 7: 2029 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St ***Signalized***	EBL/T	B	0.41	19.1	26.3	C	0.51	27.8	51.1
	EBR	-	-	-	7.4	-	-	-	12.5
	WBL/T	B	0.47	19.5	29.4	C	0.71	31.3	**#84.3**
	WBR	-	-	-	0.0	-	-	-	10.9
	NBL	A	0.16	6.4	10.5	A	0.31	9.2	22.5
	NBT/R	A	0.39	9.6	53.7	B	0.54	14.3	124.5
	SBL	A	0.08	6.7	5.8	A	0.13	9.4	9.6
	SBT	B	0.36	10.2	40.1	B	0.46	14.4	82.3
	SBR	A	0.12	8.3	2.5	B	0.05	10.1	0.7
	Overall	**B**	**-**	**12.0**	**-**	**B**	**-**	**18.1**	**-**
Franktown Rd at Nelson St W / Nelson St E ***Unsignalized***	EB	C	0.12	20.8	3.0	**F**	**0.22**	**55.4**	**6.0**
	WB	C	0.20	21.8	5.3	**F**	**0.68**	**99.1**	**25.5**
	NB	A	0.00	8.3	0.0	A	0.01	9.1	0.0
	SB	A	0.01	8.4	0.0	A	0.03	9.8	0.8
	Overall	**A**	**-**	**1.8**	**-**	**A**	**-**	**4.6**	**-**
Franktown Rd at Findlay Ave ***Unsignalized***	EBL/R	C	0.16	17.4	3.8	E	0.46	47.9	15.8
	NBL/T	A	0.05	8.7	1.5	A	0.05	9.5	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**2.1**	**-**
Franktown Rd / Hwy 15 at Hwy 7 ***Signalized***	EBL	E	0.79	71.4	28.5	E	0.79	75.5	24.7
	EBT	D	0.80	51.0	**#106.0**	D	0.59	42.6	72.5
	EBR	D	0.38	41.1	12.2	D	0.41	41.0	3.8
	WBL	E	0.89	68.4	57.7	E	0.93	64.4	**#117.0**
	WBT	C	0.29	30.3	39.4	C	0.59	27.4	107.6
	WBR	C	0.42	33.8	15.4	D	0.79	38.9	57.2
	NBL	E	0.68	61.1	22.4	E	0.83	74.2	**#46.6**
	NBT	C	0.29	31.8	45.7	D	0.53	42.9	56.9
	NBR	D	0.82	37.2	118.0	D	0.82	38.5	116.8
	SBL	E	0.81	69.3	**#45.3**	E	0.83	72.6	**#50.3**
	SBT/R	C	0.27	29.0	46.3	D	0.77	54.3	83.7
	Overall	**D**	**-**	**45.5**	**-**	**D**	**-**	**46.8**	**-**
Park Ave at Coleman St ***Unsignalized***	EBL	A	0.01	7.7	0.0	A	0.01	8.3	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.02	7.7	0.0	A	0.05	8.0	1.5
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.11	11.2	3.0	C	0.18	15.7	5.3
	SB	B	0.06	11.6	1.5	C	0.14	17.1	3.8
	Overall	**A**	**-**	**2.7**	**-**	**A**	**-**	**2.8**	**-**
Christie St / McGregor St at Coleman St ***Unsignalized***	EBT/L	A	0.01	7.7	0.0	A	0.02	8.5	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	0.01	7.8	0.0	A	0.04	8.2	0.8
	WBR	-	-	-	-	-	-	-	-
	NB	B	0.09	11.0	2.3	C	0.10	15.4	2.3
	SB	B	0.04	11.8	0.8	C	0.08	16.4	1.5
	Overall	**A**	**-**	**1.9**	**-**	**A**	**-**	**1.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00

m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections at the 2029 future background horizon operate similarly to the 2024 future background conditions with the exceptions of the intersection of Franktown Road/Highway 15 at Highway 7 given the proposed intersection improvements and the intersection of Franktown Road at Nelson Street East/Nelson Street West.

At the intersection of Franktown Road/Highway 15 at Highway 7, capacity constraints are alleviated by the TESR modifications proposed for the approach configurations. Extended queueing may be exhibited on the eastbound through and southbound through movements during the AM peak hour, and on the westbound left, northbound left, and southbound left movements during the PM peak hour.

At the intersection of Franktown Road at Nelson Street East/Nelson Street West, high delays may be experienced on the eastbound and westbound approaches. As through traffic on Franktown Road increases, the availability of gaps in the bi-directional traffic stream for drivers on the minor approaches to complete turns is reduced and delays are anticipated to increase. This effect is evident on the eastbound approach of the intersection of Franktown Road and Findlay Avenue, where the delay is approaching 50 seconds.

5.1.4 2034 Future Background Operations

Table 7 summarizes the 2034 future background intersection operations. The Synchro worksheets are provided in Appendix E.

Table 8: 2034 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St *Signalized*	EBL/T	B	0.40	19.2	27.3	C	0.49	27.3	53.6
	EBR	-	-	-	10.3	-	-	-	13.6
	WBL/T	C	0.50	20.0	33.0	C	0.75	33.8	**#99.9**
	WBR	-	-	-	0.0	-	-	-	12.2
	NBL	A	0.20	7.0	12.3	B	0.44	12.1	26.0
	NBT/R	B	0.45	10.6	**#68.3**	B	0.66	18.5	**#180.7**
	SBL	A	0.08	7.1	6.1	B	0.16	12.0	9.6
	SBT	B	0.47	11.9	53.6	B	0.60	18.9	101.5
	SBR	A	0.12	8.7	2.5	B	0.06	11.7	0.7
	Overall	**B**	**-**	**12.8**	**-**	**C**	**-**	**21.1**	**-**
Franktown Rd at Nelson St W / Nelson St E *Unsignalized*	EB	D	0.16	27.9	4.5	**F**	**0.38**	**109.4**	**10.5**
	WB	D	0.27	29.9	7.5	**F**	**1.12**	**273.2**	**40.5**
	NB	A	0.00	8.7	0.0	A	0.01	9.7	0.0
	SB	A	0.01	8.7	0.0	B	0.04	10.5	0.8
	Overall	**A**	**-**	**2.0**	**-**	**B**	**-**	**10.1**	**-**
Franktown Rd at Findlay Ave *Signalized*	EBL	C	0.08	25.9	5.5	D	0.17	35.5	10.9
	EBT/R	C	0.27	25.9	6.3	C	0.27	33.3	9.0
	WBL	C	0.08	26.2	5.3	D	0.24	35.4	15.2
	WBT/R	C	0.21	25.5	5.2	C	0.36	34.2	9.8
	NBL	A	0.09	6.8	5.1	B	0.09	10.4	5.4
	NBT	A	0.44	4.7	63.7	A	0.76	9.0	**#205.7**
	NBR	A	0.05	2.8	1.2	A	0.06	2.8	3.5
	SBL	A	0.10	6.2	8.2	B	0.28	18.8	14.4
	SBT/R	A	0.50	5.4	73.3	A	0.64	7.4	117.6
	Overall	**A**	**-**	**6.6**	**-**	**B**	**-**	**10.8**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd / Hwy 15 at Hwy 7 ***Signalized***	EBL	E	0.79	68.7	33.1	E	0.79	75.8	**#30.1**
	EBT	D	0.82	51.1	**#106.4**	D	0.66	45.7	78.0
	EBR	D	0.43	41.2	16.4	D	0.50	44.8	9.2
	WBL	E	0.90	69.9	66.5	E	0.95	66.1	**#125.8**
	WBT	C	0.30	29.7	43.1	C	0.63	29.0	112.2
	WBR	C	0.47	34.2	16.8	D	0.90	50.1	84.2
	NBL	E	0.70	60.9	24.0	E	0.86	75.0	**#53.7**
	NBT	C	0.36	34.8	51.3	D	0.63	45.1	68.3
	NBR	D	0.92	50.7	**#162.4**	D	0.87	42.4	**#136.3**
	SBL	E	0.83	71.9	**#50.3**	E	0.89	76.3	**#56.3**
	SBT/R	D	0.36	37.4	62.0	E	0.91	68.7	**#110.0**
	Overall	**D**	**-**	**48.9**	**-**	**D**	**-**	**52.1**	**-**
Park Ave at Coleman St ***Unsignalized***	EBL	A	0.01	7.7	0.0	A	0.02	8.4	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.02	7.7	0.0	A	0.05	8.1	1.5
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.11	11.5	3.0	C	0.20	17.0	5.3
	SB	B	0.06	11.9	1.5	C	0.15	18.6	3.8
	Overall	**A**	**-**	**2.6**	**-**	**A**	**-**	**2.7**	**-**
Christie St / McGregor St at Coleman St ***Unsignalized***	EBT/L	A	0.01	7.7	0.0	A	0.02	8.6	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	0.01	7.8	0.0	A	0.04	8.3	0.8
	WBR	-	-	-	-	-	-	-	-
	NB	B	0.10	11.3	2.3	C	0.11	16.7	3.0
	SB	B	0.04	12.2	0.8	C	0.08	17.6	2.3
	Overall	**A**	**-**	**1.8**	**-**	**A**	**-**	**1.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections at the 2034 future background horizon operate similarly to the 2029 future background conditions with the exception of Franktown Road at Findlay Avenue which is forecasted to operate differently given the proposed geometric and control changes. At this intersection, extended queueing may be noted on the northbound through movement during the PM peak hour at this horizon, potentially spilling back into the intersection of Franktown Road/Highway 15 at Highway 7.

At the intersection of Franktown Road/Highway 15 at Highway 7, extended queueing may be exhibited on the northbound right movement during both peak hours and on the eastbound left and southbound through/right movements during the PM peak hour at this horizon.

5.1.5 2024 Future Total Operations

Table 6 summarizes the 2024 future total intersection operations. The Synchro worksheets are provided in Appendix F.

Table 9: 2024 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St ***Signalized***	EBL/T	B	0.39	18.9	25.3	B	0.46	19.1	34.8
	EBR	-	-	-	5.9	-	-	-	10.1
	WBL/T	B	0.46	19.5	29.5	C	0.62	20.8	**#56.3**
	WBR	-	-	-	0.0	-	-	-	5.7
	NBL	A	0.15	6.3	10.3	A	0.31	8.7	16.5
	NBT/R	A	0.36	9.3	49.1	B	0.60	14.8	**#107.3**
	SBL	A	0.08	6.6	5.9	A	0.14	8.9	7.7
	SBT	A	0.31	9.7	34.8	B	0.53	14.6	57.3
	SBR	A	0.12	8.3	2.5	A	0.07	9.8	0.0
	Overall	**B**	**-**	**11.9**	**-**	**B**	**-**	**15.4**	**-**
Franktown Rd at Nelson St W / Nelson St E ***Unsignalized***	EB	C	0.10	18.3	2.3	E	0.17	42.8	4.5
	WB	C	0.10	16.6	2.3	D	0.20	32.8	5.3
	NB	A	0.00	8.2	0.0	A	0.01	9.0	0.0
	SB	A	0.01	8.3	0.0	A	0.02	9.5	0.8
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**1.4**	**-**
Franktown Rd at Findlay Ave ***Unsignalized***	EBL/R	C	0.13	15.1	3.0	D	0.36	33.0	11.3
	NBL/T	A	0.05	8.5	0.8	A	0.04	9.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**1.7**	**-**
Franktown Rd / Hwy 15 at Hwy 7 ***Signalized***	EBL	C	0.11	20.8	21.0	D	0.31	50.9	22.0
	EBT	D	0.80	38.3	**#246.1**	D	0.85	53.4	**#159.4**
	EBR	C	0.18	21.7	12.2	C	0.29	32.9	13.9
	WBL	E	0.99	68.3	**#155.6**	**F**	**1.52**	**275.9**	**#257.7**
	WBT	B	0.28	11.8	66.3	C	0.84	31.9	**#231.0**
	WBR	-	-	-	11.9	-	-	-	31.0
	NBL	D	0.40	46.1	33.2	E	0.85	78.6	**#85.2**
	NBT/R	D	0.83	53.5	**#295.0**	D	0.69	45.3	**#349.4**
	SBL	E	0.87	70.4	**#84.1**	E	0.80	56.2	**#96.4**
	SBT	D	0.44	35.2	52.7	C	0.63	34.4	109.9
	SBR	C	0.08	31.0	0.0	C	0.17	27.0	10.8
	Overall	**D**	**-**	**42.7**	**-**	**F**	**-**	**88.2**	**-**
Park Ave at Coleman St ***Unsignalized***	EBL	A	0.01	7.6	0.0	A	0.01	8.2	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.01	7.6	0.0	A	0.04	7.9	0.8
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.11	11.3	3.0	C	0.13	15.2	3.0
	SB	B	0.06	11.1	1.5	C	0.12	15.6	3.0
	Overall	**A**	**-**	**2.7**	**-**	**A**	**-**	**2.4**	**-**
Christie St / McGregor St at Coleman St ***Unsignalized***	EBT/L	A	0.01	7.6	0.0	A	0.02	8.3	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	0.01	7.7	0.0	A	0.05	8.1	0.8
	WBR	-	-	-	-	-	-	-	-
	NB	B	0.11	10.5	3.0	B	0.11	13.6	3.0
	SB	B	0.04	11.6	0.8	C	0.07	15.7	1.5
	Overall	**A**	**-**	**2.4**	**-**	**A**	**-**	**1.8**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections at the 2024 future total horizon operate similarly to the 2024 future background conditions. No new capacity issues are noted.

5.1.6 2029 Future Total Operations

Table 7 summarizes the 2029 future total intersection operations. The Synchro worksheets are provided in Appendix G.

Table 10: 2029 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St *Signalized*	EBL/T	B	0.40	18.9	26.2	C	0.50	27.6	51.1
	EBR	-	-	-	7.3	-	-	-	12.5
	WBL/T	B	0.48	19.5	31.3	C	0.72	31.5	**#87.7**
	WBR	-	-	-	0.0	-	-	-	11.4
	NBL	A	0.16	6.5	11.0	A	0.32	9.5	22.5
	NBT/R	A	0.39	9.9	55.4	B	0.54	14.8	124.5
	SBL	A	0.08	6.8	6.3	A	0.14	9.7	10.1
	SBT	B	0.36	10.4	41.1	B	0.47	14.8	82.3
	SBR	A	0.12	8.5	2.5	B	0.05	10.4	0.7
	Overall	**B**	**-**	**12.2**	**-**	**B**	**-**	**18.5**	**-**
Franktown Rd at Nelson St W / Nelson St E *Unsignalized*	EB	C	0.12	21.1	3.0	**F**	**0.23**	**58.3**	**6.0**
	WB	C	0.20	22.1	5.3	**F**	**0.69**	**103.2**	**25.5**
	NB	A	0.00	8.3	0.0	A	0.01	9.1	0.0
	SB	A	0.01	8.5	0.0	A	0.03	9.8	0.8
	Overall	**A**	**-**	**1.8**	**-**	**A**	**-**	**4.7**	**-**
Franktown Rd at Findlay Ave *Unsignalized*	EBL/R	C	0.16	17.8	4.5	**F**	**0.48**	**51.1**	**17.3**
	NBL/T	A	0.05	8.8	1.5	A	0.05	9.5	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**2.2**	**-**
Franktown Rd / Hwy 15 at Hwy 7 *Signalized*	EBL	E	0.79	71.0	29.2	E	0.79	73.2	27.3
	EBT	D	0.80	51.0	**#106.0**	D	0.59	42.6	72.5
	EBR	D	0.38	41.1	12.2	D	0.41	41.0	3.8
	WBL	E	0.89	68.4	57.7	E	0.93	64.4	**#117.0**
	WBT	C	0.29	30.5	39.5	C	0.59	28.0	107.6
	WBR	C	0.42	34.0	15.5	D	0.81	40.9	63.2
	NBL	E	0.68	61.1	22.4	E	0.83	74.2	**#46.6**
	NBT	C	0.29	31.8	45.8	D	0.53	43.0	57.6
	NBR	D	0.82	37.2	118.0	D	0.82	38.5	116.8
	SBL	E	0.81	69.3	**#45.3**	E	0.83	72.6	**#50.3**
	SBT/R	C	0.29	29.2	47.3	E	0.78	55.1	84.5
	Overall	**D**	**-**	**45.4**	**-**	**D**	**-**	**47.2**	**-**
Park Ave at Coleman St *Unsignalized*	EBL	A	0.01	7.7	0.0	A	0.01	8.3	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.02	7.7	0.0	A	0.05	8.0	1.5
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.14	11.8	3.8	C	0.22	17.3	6.0
	SB	B	0.06	11.6	1.5	C	0.14	17.2	3.8
	Overall	**A**	**-**	**3.0**	**-**	**A**	**-**	**3.0**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Christie St / McGregor St at Coleman St ***Unsignalized***	EBT/L	A	0.01	7.7	0.0	A	0.02	8.5	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	0.01	7.8	0.0	A	0.05	8.2	1.5
	WBR	-	-	-	-	-	-	-	-
	NB	B	0.12	10.8	3.0	B	0.12	14.6	3.0
	SB	B	0.04	12.1	0.8	C	0.08	17.1	2.3
	Overall	**A**	**-**	**2.2**	**-**	**A**	**-**	**1.7**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections at the 2029 future total horizon operate similarly to the 2029 future background conditions. At the intersection of Franktown Road at Findlay Avenue, during the PM peak hour, the addition of the 27 two-way site-generated through volumes on Franktown Road are forecasted to increase delay on the eastbound approach from the background conditions by 3.2 seconds in the total conditions, thereby scoring LOS F.

5.1.7 2034 Future Total Operations

Table 7 summarizes the 2034 future total intersection operations. The Synchro worksheets are provided in Appendix H.

Table 11: 2034 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Coleman St ***Signalized***	EBL/T	B	0.39	19.0	26.9	C	0.48	27.0	53.8
	EBR	-	-	-	10.3	-	-	-	13.6
	WBL/T	C	0.52	20.1	35.1	C	0.75	34.4	**#103.1**
	WBR	-	-	-	0.0	-	-	-	12.9
	NBL	A	0.21	7.1	12.3	B	0.44	12.5	26.0
	NBT/R	B	0.45	10.9	**#68.3**	B	0.67	19.2	**#180.7**
	SBL	A	0.09	7.3	6.3	B	0.18	12.4	10.1
	SBT	B	0.47	12.1	53.6	B	0.61	19.5	101.5
	SBR	A	0.12	8.8	2.5	B	0.06	12.1	0.7
	Overall	**B**	**-**	**13.0**	**-**	**C**	**-**	**21.6**	**-**
Franktown Rd at Nelson St W / Nelson St E ***Unsignalized***	EB	D	0.17	28.6	4.5	**F**	**0.39**	**115.3**	**10.5**
	WB	D	0.27	30.6	8.3	**F**	**1.16**	**292.2**	**41.3**
	NB	A	0.00	8.8	0.0	A	0.01	9.7	0.0
	SB	A	0.01	8.7	0.0	B	0.04	10.6	0.8
	Overall	**A**	**-**	**2.0**	**-**	**B**	**-**	**10.6**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Findlay Ave *Signalized*	EBL	C	0.08	25.9	5.5	D	0.17	35.5	10.9
	EBT/R	C	0.27	25.9	6.3	C	0.27	33.3	9.0
	WBL	C	0.08	26.2	5.3	D	0.24	35.4	15.2
	WBT/R	C	0.21	25.5	5.2	C	0.36	34.2	9.8
	NBL	A	0.09	6.9	5.2	B	0.09	10.6	5.4
	NBT	A	0.44	4.7	65.7	A	0.77	9.3	**#211.8**
	NBR	A	0.05	2.8	1.2	A	0.06	2.8	3.5
	SBL	A	0.10	6.3	8.2	B	0.29	19.8	15.0
	SBT/R	A	0.50	5.5	75.5	A	0.64	7.5	119.5
	Overall	**A**	-	**6.6**	-	**B**	-	**11.0**	-
Franktown Rd / Hwy 15 at Hwy 7 *Signalized*	EBL	E	0.80	68.5	33.7	E	0.79	79.3	**#35.0**
	EBT	D	0.82	51.1	**#106.4**	D	0.66	45.7	78.0
	EBR	D	0.43	41.2	16.4	D	0.50	44.8	9.2
	WBL	E	0.90	69.9	66.5	E	0.95	66.1	**#125.8**
	WBT	C	0.30	29.9	43.2	C	0.63	29.6	112.2
	WBR	C	0.48	34.5	17.0	D	0.92	53.9	90.5
	NBL	E	0.70	60.9	24.0	E	0.86	75.0	**#53.7**
	NBT	C	0.36	34.9	51.5	D	0.64	45.3	69.0
	NBR	D	0.92	50.7	**#162.4**	D	0.87	42.4	**#136.3**
	SBL	E	0.83	71.8	**#50.1**	E	0.89	76.1	**#56.3**
	SBT/R	D	0.37	37.6	63.4	E	0.93	72.0	**#111.4**
	Overall	**D**	-	**48.9**	-	**D**	-	**52.9**	-
Park Ave at Coleman St *Unsignalized*	EBL	A	0.01	7.7	0.0	A	0.02	8.4	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.02	7.7	0.0	A	0.05	8.1	1.5
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.15	12.3	3.8	C	0.25	19.0	7.5
	SB	B	0.06	12.0	1.5	C	0.15	18.7	3.8
	Overall	**A**	-	**2.9**	-	**A**	-	**3.0**	-
Christie St / McGregor St at Coleman St *Unsignalized*	EBT/L	A	0.01	7.7	0.0	A	0.02	8.6	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBT/L	A	0.01	7.8	0.0	A	0.05	8.3	1.5
	WBR	-	-	-	-	-	-	-	-
	NB	B	0.12	11.0	3.0	C	0.13	15.8	3.8
	SB	B	0.04	12.5	0.8	C	0.09	18.5	2.3
	Overall	**A**	-	**2.1**	-	**A**	-	**1.7**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

The study area intersections at the 2034 future total horizon operate similarly to the 2034 future background conditions. No new capacity issues are noted. As in the background conditions, the 95th percentile queue on the northbound through movement at the intersection of Franktown Road at Findlay Avenue may spill back into the intersection of Franktown Road/Highway 15 at Highway 7.

5.2 Discussion and Mitigation Options

5.2.1 Franktown Road Corridor

The general trend of increasing background traffic along Franktown Road resulting in left-turn movements from side roads being subject to increased delays is noted between the study area horizons. This effect is due to the

unavailability of gaps in the bi-directional traffic stream for drivers to make the desired turns onto Franktown Road. As noted with the intersection of Franktown Road at Findlay Avenue between the 2029 future total horizon and 2034 future total horizon, signalization may address this issue. While potentially not meeting volume warrants, it is recommended that the Town of Carleton Place investigate strategic signalization of the Franktown Road corridor to achieve its desired operations. Such signalization would not be required to support the subject development, however.

It is noteworthy that the background volumes applied represent a conservative scenario. Periodic monitoring of the traffic conditions by the MTO is recommended to compare the realized traffic increase against the growth assumptions presented in the Highway 7 and Highway 15 Intersection Improvements TESR.

5.2.2 Queueing and Spillback

Through macroscopic analysis, queueing on the northbound approach of the intersection of Franktown Road at Findlay Avenue was reported to have the potential to spill back to the intersection of Franktown Road/Highway 15 at Highway 7 during the PM peak hour at the 2034 horizons. Running a microscopic analysis at this horizon using SimTraffic version 11, a maximum queue of 163.2 metres was reported in the PM peak hour, as provided in Appendix I. Furthermore, optimizing the signal timing for queueing, the 95th percentile queues on this approach during the PM peak hour at the 2034 future total horizon may be reduced to 61.4 metres as reported by a SimTraffic analysis. Table 12 summarizes the operations with the proposed timing adjustments, noting that the queue reported is higher than that from the SimTraffic analysis. The SimTraffic analysis and Synchro worksheets for the optimized PM peak hour 2034 future total horizon are provided in Appendix I.

Table 12: 2034 Future Total PM Peak Hour Northbound Queue Optimization

Intersection	Lane	PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)
Franktown Rd at Findlay Ave *Signalized*	EBL	E	0.23	55.3	16.1
	EBT/R	D	0.32	51.7	12.3
	WBL	E	0.32	55.2	22.8
	WBT/R	D	0.43	53.0	13.4
	NBL	A	0.08	9.0	m0.8
	NBT	A	0.71	7.4	207.5
	NBR	A	0.05	2.4	m0.0
	SBL	B	0.25	16.5	11.0
	SBT/R	A	0.59	6.1	105.4
	Overall	**B**	**-**	**11.0**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
V/C = volume-to-capacity ratio

It is noted that the operations of the intersection of Franktown Road at Findlay Avenue during the PM peak hour at the 2034 future total horizon operate satisfactorily when optimized for queue length on the northbound approach. Therefore, given the opportunity to reduce queues through signal timing changes, no concern is noted for the spillback from this approach for the intersection of Franktown Road/Highway 15 at Highway 7.

6 Conclusions and Recommendations

The proposed residential development is anticipated to produce negligible transportation impacts.

It is recommended that the Ministry of Transportation of Ontario and Town of Carleton Place consider the spillback from the intersection of Franktown Road at Findlay Road, and that the Town of Carleton Place consider the performance of side streets along Franktown Road, each through the Town monitoring the mainline volumes on Franktown Road ultimately realized in the future.

It is recommended that, from a transportation perspective, the proposed development applications proceed.

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