



11448, 11458 & 11480 84 AVENUE, DELTA, BC

Traffic and Parking Study

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1.0 INTRODUCTION

WATT Consulting Group (WATT) was retained by Northcastle Brixton Estate Inc. to prepare a Traffic and Parking Study for the proposed re-development of 11448, 11458, and 11480 84 Avenue in Delta, BC for the City of Delta (City).

1.1 The Site Today

The development site is surrounded by single family houses to the west and south, a townhouse development to the east, and bounded by 84 Avenue in the north.

The site location, lot layout, and study intersections are illustrated in **Figure 1**. The existing site is occupied by three single family houses.



11448, 11458 & 11480 84 Avenue, Delta, BC
Transportation Impact Study (TIS)

Figure 1
Site Location



1.2 Proposed Development

The proposed re-development includes 158 strata dwelling units in a mid-rise apartment building.

The proposed access is on 84 Avenue as the south leg (4th leg) of the 84 Avenue & Social Heart Loop intersection.

The development will displace the 3 single family houses. The date of occupancy of the development is expected to be in 2027.

1.3 This Report

This report is provided as part of the development permit application being submitted to the City of Delta. The report contains the following:

- An overview of the transportation context in the vicinity of the site, including vehicular, pedestrian, cycling, and transit facilities, and area travel characteristics.
- An overview of the proposed development program.
- An assessment of the existing traffic activity patterns and volumes in the study area during the weekday morning and afternoon peak periods.
- An assessment of the trip generation and assignment characteristics of the proposed development.
- A review of vehicular traffic operations at intersections in the area under existing (2024), opening year (2027), five-year planning horizon (2032), and ten-year planning horizon (2037), including an assessment of the operational impacts of the proposed development.
- A review of the expected off-street vehicle parking demand for the proposed site to support the vehicle parking supply plan.



2.0 TRANSPORTATION CONTEXT

2.1 Road Network

The existing road network, lane configuration, and intersection control are illustrated in Figure 2. The study area consists of five roadways.

84 Avenue is an east-west collector road under the jurisdiction of the City. This section of 84 Avenue extends from Nordel Way in the west to 120 Street / Scott Road in the east, where it continues further east under the jurisdiction of the City of Surrey. For most of the study area, 84 Avenue has a two-lane cross-section (one lane in each direction). Auxiliary turn lanes are provided at all the study intersections. Painted bike lanes are available between 112 Street and 116 Street. Shared lane signs (vehicles and bicycles) are available for the remainder of 84 Avenue in the study area. Bike route guide signs are installed nearing the intersection with 116 Street. Cyclist push buttons are provided at all the study intersections. Limited curbside parking is available on both sides of the road in between the curb bulges. Sidewalk is available on both sides of the road.

116 Street is a north-south collector road under the jurisdiction of the City. 116 Street extends from north of Bailey Crescent crossing Nordel Way in the north to Cory Drive in the south crossing 72 Avenue. In the study area, 116 Street has a two-lane cross-section (one lane in each direction). Auxiliary left turn lanes are provided at 84 Avenue. Sharrow and Shared lane signs (vehicles and bicycles) are available. Bike route guide signs are installed nearing the intersection with 84 Avenue. Cyclist push buttons are provided at the intersection with 84 Avenue. Curbside parking is not available on both sides of the road. Sidewalk is available on both sides of the road.

112 Street is a north-south collector road under the jurisdiction of the City. 112 Street extends from 92A Avenue in the north to 72 Avenue in the south. For most of the study area, 112 Street has a two-lane cross-section (one lane in each direction). Auxiliary left turn lanes are provided at 84 Avenue. 112 Street is an informal bike route, where bicycles share the lane with vehicles. Cyclist push buttons are provided at the intersection with 84 Avenue. Curbside parking is not available on both sides of the road. Sidewalk is available on both sides of the road.

114 Street is a north-south local road under the jurisdiction of the City. This section of 114 Street extends from 80 Avenue in the south to 84 Avenue in the north, where it continues north as the access to the adjacent North Delta Recreation Centre. In the study area, 114 has a two-lane cross-section (one lane in each direction). Auxiliary right turn lane is provided at 84 Avenue for the southbound approach. A Multi-Use Pathway (MUP) is available on the west side of the road south of 84 Avenue. Curbside parking is available on both sides of the road. Sidewalk is available on the east side of the road and as part of the MUP on the west side of the road.



Social Heart Loop is a north-south access road to the adjacent North Delta Centre for the Arts and the underground parking for the adjacent development. Auxiliary turn lanes are provided. Cyclist push buttons are provided at the intersection with 84 Avenue. Sidewalks is available on the east side of the road.

2.2 Study Intersections

The study area consists of four intersections.

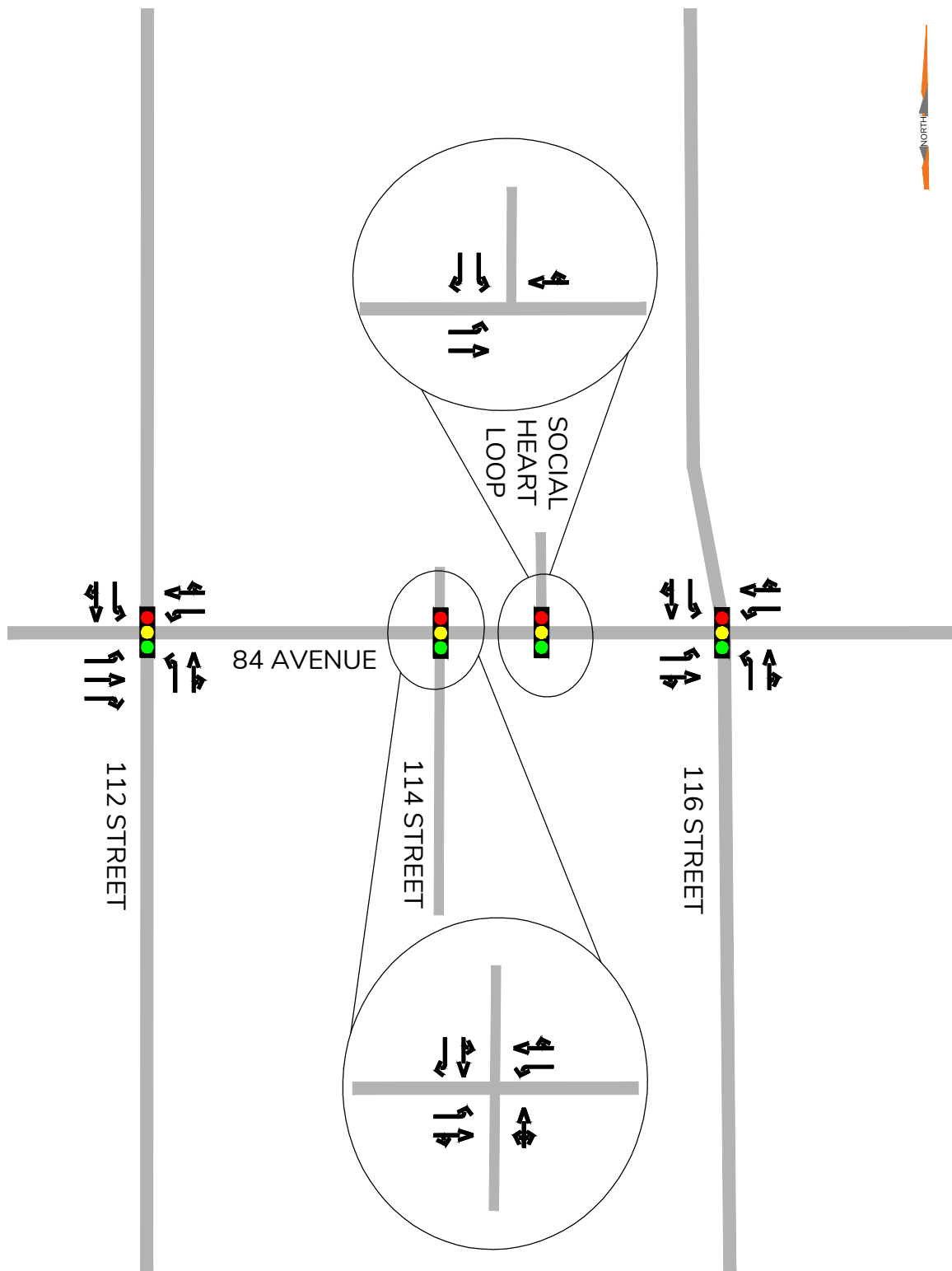
84 Avenue & 112 Street is a signalized four-legged intersection. All approaches have a shared through-right lane and a dedicated left turn lane, except for eastbound approach where a dedicated lane is provided for each movement (left, through, and right).

Pedestrian crossings are available on all four legs of the intersection. A push-button actuated signal is available for cyclists on all four approaches.

84 Avenue & 116 Street is a signalized four-legged intersection. All approaches have a shared through-right lane and a dedicated left turn lane. Pedestrian crossings are available on all four legs of the intersection. A push-button actuated signal is available for cyclists on all four approaches.

84 Avenue & 114 Street is a signalized four-legged intersection. Eastbound and westbound approaches have a shared through-right lane and a dedicated left turn lane. Southbound approach has a shared lane between left and through movements, and a dedicated right turn lane. Northbound approach has one lane for all movements. Eastbound and westbound approaches have a through painted bike lane. Pedestrian crossings are available on all four legs of the intersection. A push-button actuated signal is available for cyclists on all four approaches.

84 Avenue & Social Heart Loop is currently a signalized three-legged intersection. Eastbound and southbound approaches have a dedicated lane for each movement. Westbound approach has a shared through-right lane. Eastbound and westbound approaches have a through painted bike lane. Pedestrian crossings are available on the west leg and the north leg of the intersection. A push-button actuated signal is available for cyclists on the westbound and southbound approaches.





2.3 Transit Network

Table 1 summarizes the transit routes in the site vicinity. The development is served by four bus routes, which provides connections to key employment, institutional, and recreational locations such as Strawberry Hill Shopping Centre, Scottsdale Mall, Kwantlen Polytechnic University, Scottsdale Exchange, Newton Exchange, Surrey Memorial Hospital, and Surrey Central SkyTrain Station. The existing bus stop is located within 350 metres from the development, which is less than a four-minutes walking distance.

It should be noted that the R6 Scott Road Rapid Bus service has been introduced starting January 2024 which will provide future residents at the proposed development with high-frequency, limited-stop bus service every 7.5 minutes during peak hours and 15 minutes during off-peak hours, connecting residents to the Scott Road SkyTrain station for high-speed, uninterrupted regional travels (Expo Line) and the Newton Exchange for localized travels. The R6 bus stops are located at the 84 Avenue / 120 Street intersection, 1km walking distance from the development site.

Table 1 - Existing Transit Services

Route	Direction	Walking Distance	Service Frequency (Peak Hours)
301 – Newton Exchange / Brighthouse Station	East/West	250m	15 mins
314* – Surrey Central Station / Sunbury	East/West	70m	30 mins
316 – Surrey Central Station / Scottsdale	North/South	350m	30 mins
391* – Scottsdale / Scott Road Station	North/South	300m	30 mins

*Limited Bus Service



2.4 Cycling Network

The existing area cycling network is illustrated in Figure 3. The site has adequate connections to the network of cycling routes in the City.

84 Avenue and 116 Street are part of the on-street bike route that has signs or pavement markings. 84 Avenue has painted on-street bike lanes that separates from vehicle traffic and bike route guide signs. 116 Street currently has sharrows, shared lane signs, and bike route guide signs installed. On 114 Street, a MUP is available on the west side of the road south of 84 Avenue. Off-street routes are available across the adjacent North Delta Community Park. 112 Street is part of the informal on-street bike route that shares the lane with vehicles. Push-button actuated signal is available for cyclists at all of the study intersections.

According to the Delta Cycling Master Plan, 84 Avenue, 112 Street, and 116 Street are planned to be upgraded to a protected on-street cycling route. The upgrade would allow a more comfortable riding experience for cyclists of different ages and abilities.

2.5 Pedestrian Environment

The walking infrastructure is good in proximity to the site. Sidewalks are available on both sides of 84 Avenue, 112 Street, 114 Street, and 116 Street. Although sidewalk is not available on the west side of Social Heart Loop, internal walkways are available as part of North Delta Community Park, providing an even more direct and comfortable route for pedestrians. Pedestrian crossings are available at all the study intersections. A mid-block crosswalk with flashing beacon is available on 84 Avenue between 112 Street and 114 Street, providing direct connection to the internal pathway at North Delta Community Park.





3.0 PROPOSED DEVELOPMENT

3.1 Overview

Table 2 summarizes the development plan.

Table 2 - Development Program

Site Element	Details
Residential Units	158 strata units
Vehicular Access	Accesses to the underground parking is proposed on 84 Avenue. The parking access will form the 4 th leg of the 84 Avenue & Social Heart Loop intersection.
Cyclist Access	Bicycle parking is proposed to be located underground. Cyclists can access through the parkade access that is shared with vehicles.
Pedestrian Access	Pedestrian access is proposed to be located on 84 Avenue.



4.0 TRAFFIC VOLUMES

4.1 Traffic Analysis Scenarios and Design Periods

Vehicle traffic operational analysis has been undertaken for the weekday morning (AM) and afternoon (PM) peak hour under the following conditions:

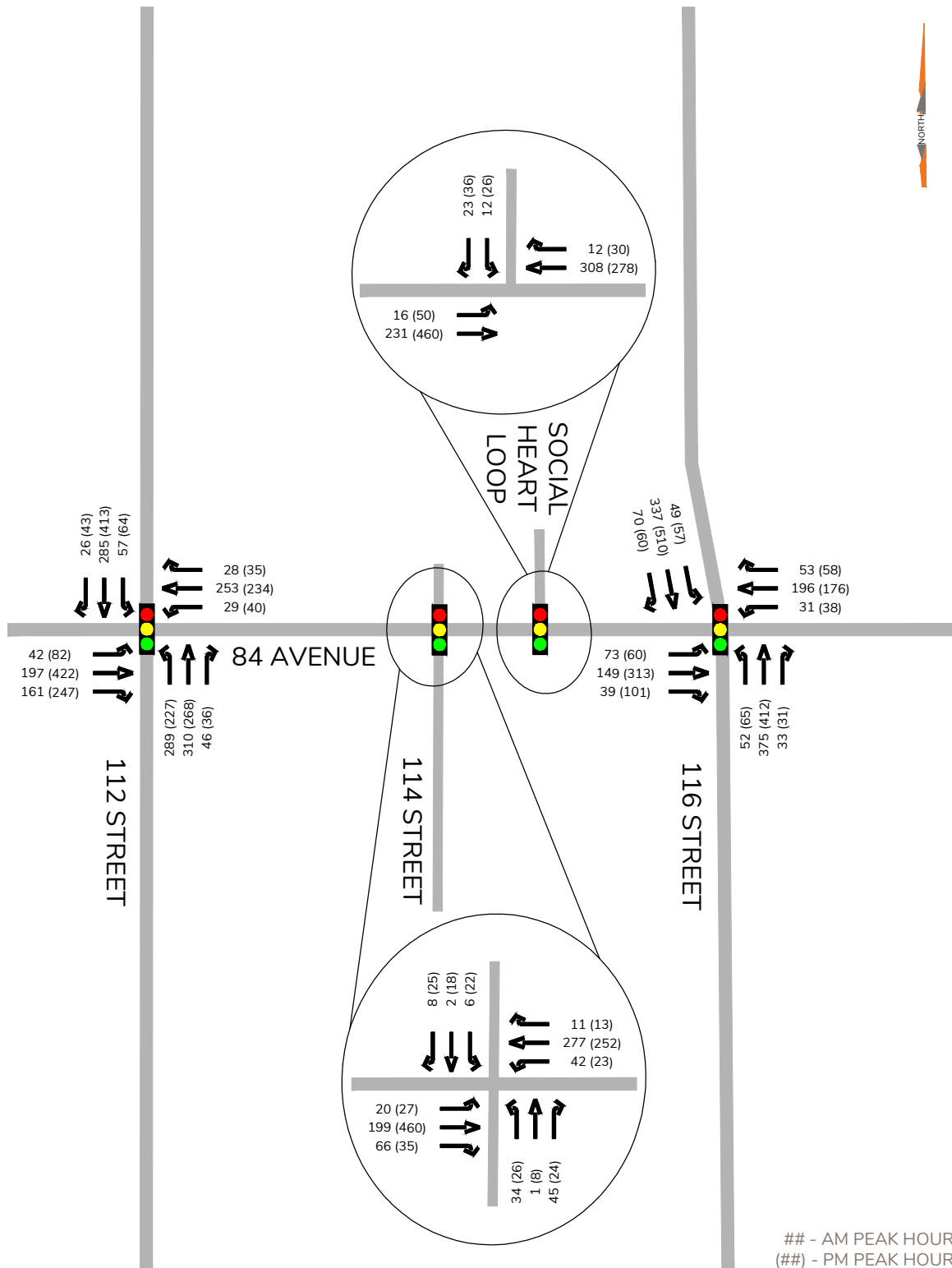
- **Existing traffic:** traffic activity under current conditions.
- **Background traffic:** traffic activity levels in the future, which includes allowances for corridor growth and other background developments.
- **Post-development traffic:** traffic activity levels in the future with the site redeveloped and projected site-generated traffic added to the road network.

Traffic operations are discussed in the following sections for these scenarios:

- 2024: Existing Conditions
- 2027: Opening Day, background and post-development conditions
- 2032: Five-year horizon after opening day, background and post-development conditions
- 2037: Ten-year horizon after opening day, background and post-development conditions

4.2 Existing Traffic

Turning movement volumes were collected on Thursday February 15th, 2024 between 6:00AM and 9:00AM to identify the AM peak hour, and 3:00PM to 6:00PM to identify the PM peak hour at the study intersections. The AM and PM peak hours were found to be between 8:00AM and 9:00AM, and 4:30PM and 5:30PM respectively. The existing traffic volumes for the weekday AM and PM peak hour are illustrated in Figure 4.





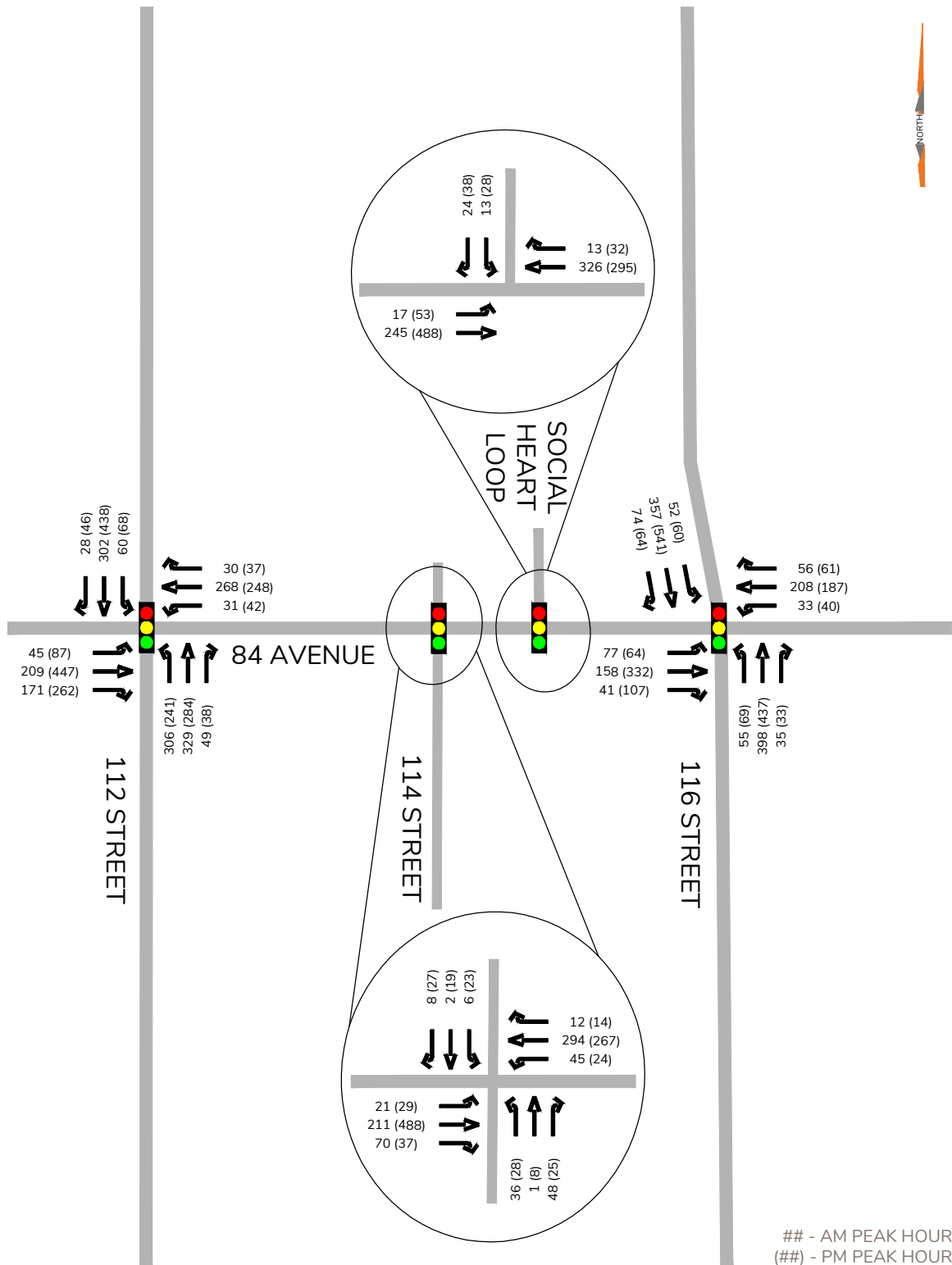
4.3 Background Traffic Volumes

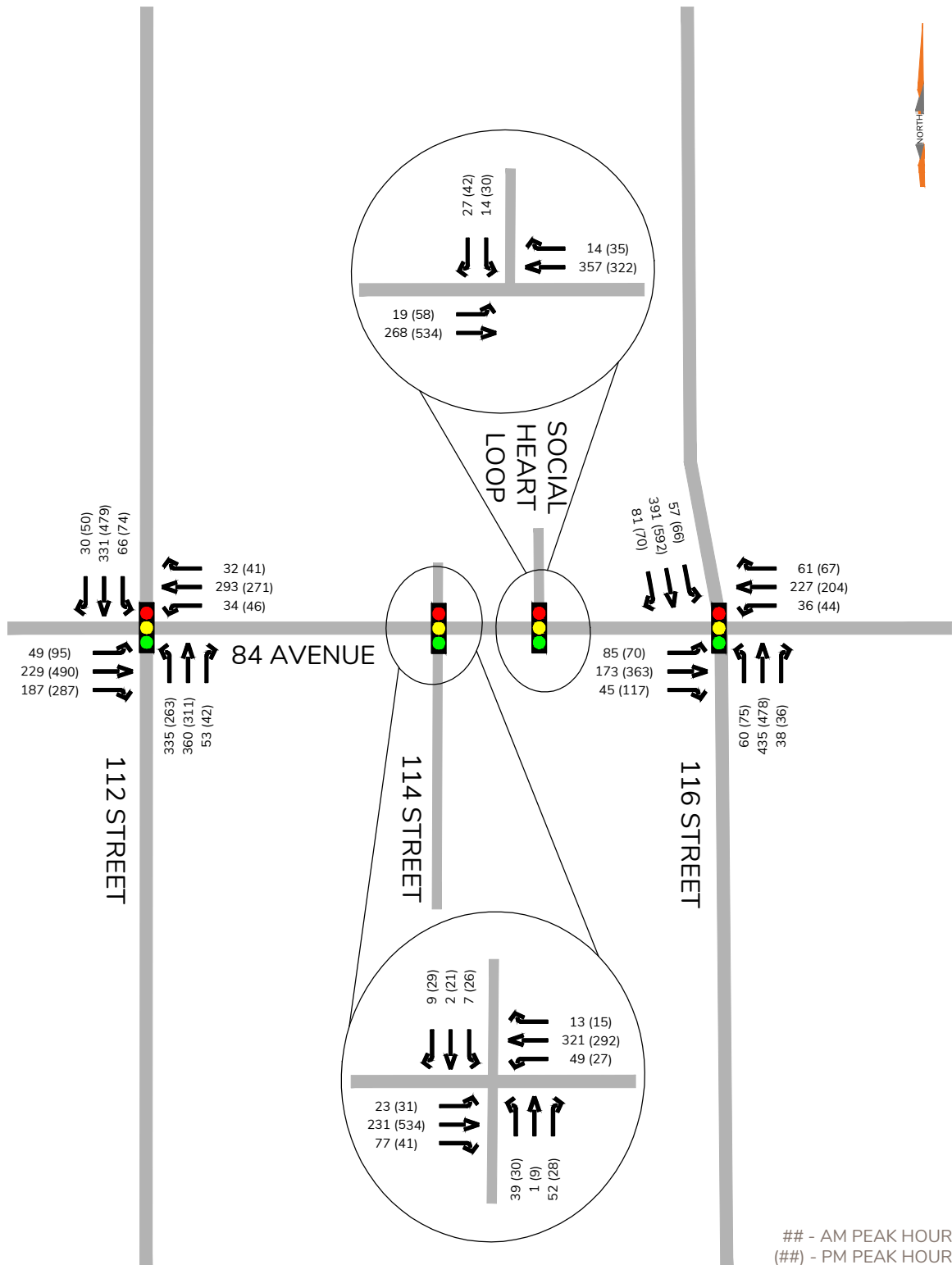
4.3.1 Corridor Growth

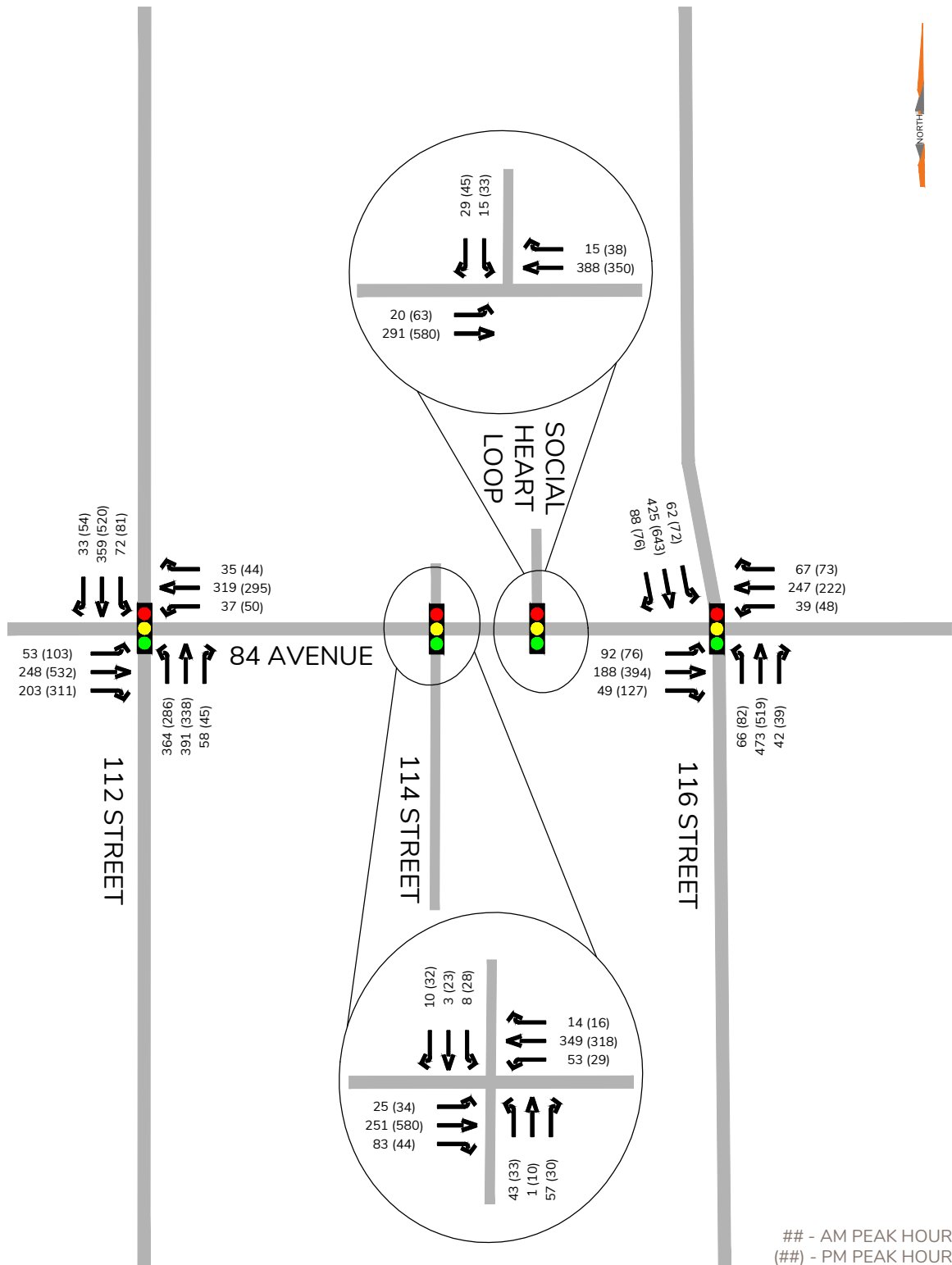
Corridor growth for all study roads was forecast using a +2.0% annual linear growth rate applied to the existing 2024 volumes to all the horizon years. This growth would capture background traffic growth and any traffic growth due to adjacent redevelopments.

4.3.2 Background Traffic Volumes

Background traffic volumes are the sum of the existing traffic volumes and corridor growth. Background traffic volumes for the 2027 opening day, 2032 five-year horizon year, and 2037 ten-year horizon year are illustrated in Figure 5, Figure 6, and Figure 7 respectively.









4.4 Site Traffic Volumes

The weekday peak hour trip generation rates are obtained from Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition. They are then used to estimate the number of site-generated trips for the proposed development. The trip generation rates are summarized in Table 3.

Table 3 - Trip Generation Rates

Land Use	Trip Generation Source	Setting	Units	Trip Type	Weekday AM Peak Hour Trip Rate			Weekday PM Peak Hour Trip Rate		
					Rate	In	Out	Rate	In	Out
Residential Multi-Family (Mid-Rise)	ITE 221 Multi-family Housing (Mid-Rise)	General Urban / Suburban	Dwelling Units	Vehicles	0.37	23%	77%	0.39	61%	39%

Based on the vehicle trip generation rates notes above, the number of external vehicle trips expected to be generated by the proposed development are shown in Table 4.

Table 4 - Trip Generation, Baseline Conditions

Land Use	Trip Generation Source	Setting	Units	Trip Type	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
					Total	In	Out	Total	In	Out
Residential Multi-Family (Mid-Rise)	ITE 221 Multi-family Housing (Mid-Rise)	General Urban / Suburban	158 units	Vehicles	59	14	45	62	38	24

It should be noted that the estimated vehicles trips and rates for baseline conditions are for a general urban / suburban setting where vehicular trips exceed 95% according to the ITE Trip Generation Handbook. In some cases, the averages by land use are 100% vehicle trips. As such, the trip estimates in Table 4 do not account for localized transportation mode share in Delta. Therefore, the adjustments shown in Table 5 were applied to the baseline vehicle trips based on mode share data obtained from TransLink's 2017 Metro Vancouver Trip Diary:



Table 5 - Mode Share and Vehicle Occupancy

Vehicle		Transit	Active (Walk, Bike, Other)
Mode Share	Average Vehicle Occupancy		
82%	1.3 people per car	6%	12%

Table 6 summarizes the total vehicle trips with localized mode share adjustment for Delta. This represents the net external vehicle trips expected to be generated by the proposed development which is 37 vehicle trips in the AM peak hour and 39 vehicle trips in the PM peak hour.

Table 6 - Trip Generation, Net External Vehicle Trips

Land Use	Units	Trip Type	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
			Total	In	Out	Total	In	Out
Residential Multi-Family (Mid-Rise)	158 units	Vehicles	37	9	28	39	24	15

4.4.1 Trip Distribution and Assignment

The trip distribution pattern for site-generated traffic was established based on the existing traffic patterns at each intersection.

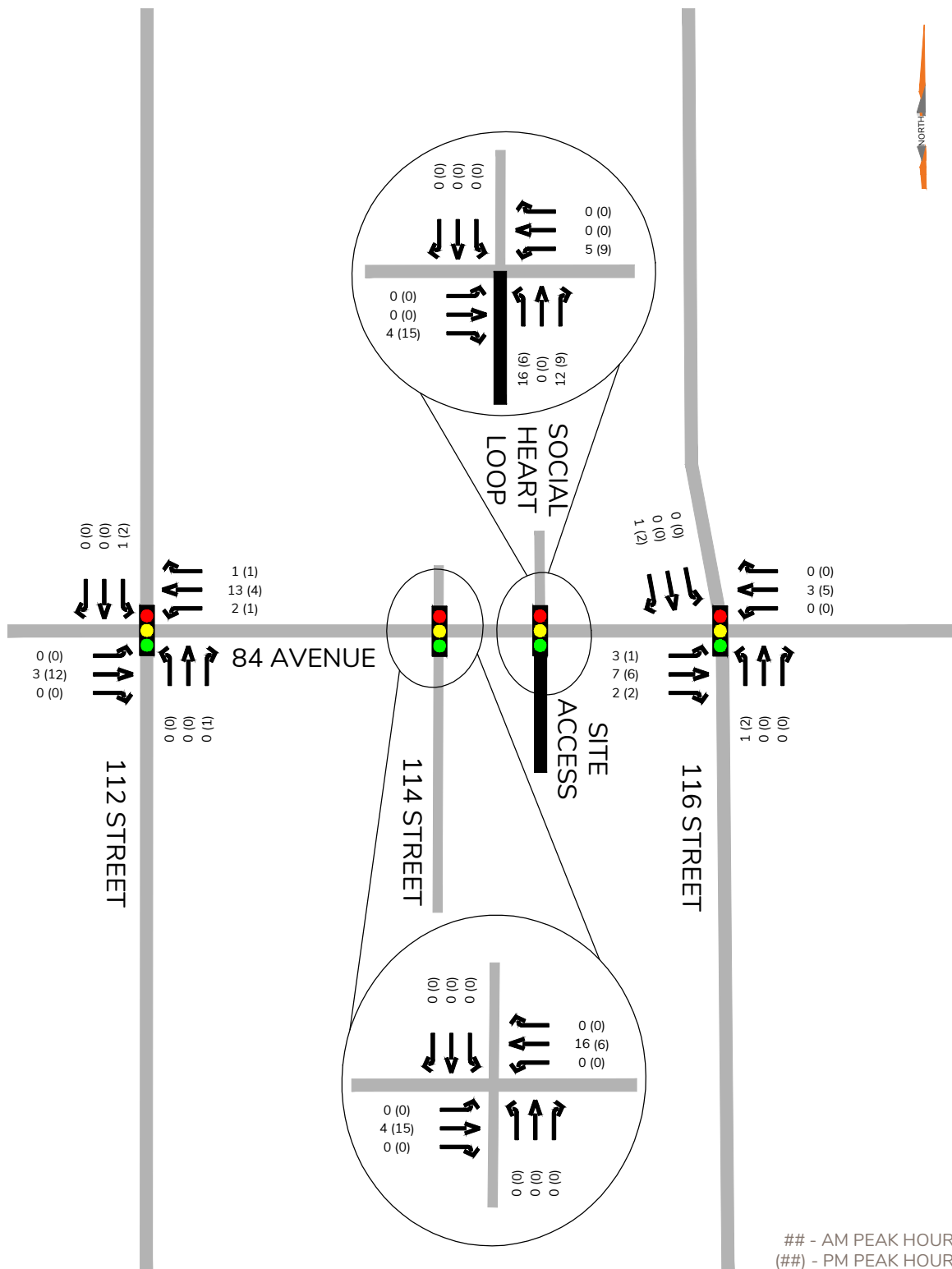
It is assumed the site-generated traffic will access/egress the study area through a collector road. As a result, no site-generated traffic is assigned to/from 114 Street and Social Heart Loop as they are a local road and an access road respectively.

The distribution of inbound and outbound traffic adopted for the proposed development is summarized in Table 7. The net new site traffic volumes assigned to the area road network are illustrated in Figure 8.



Table 7 – Site Trip Distribution

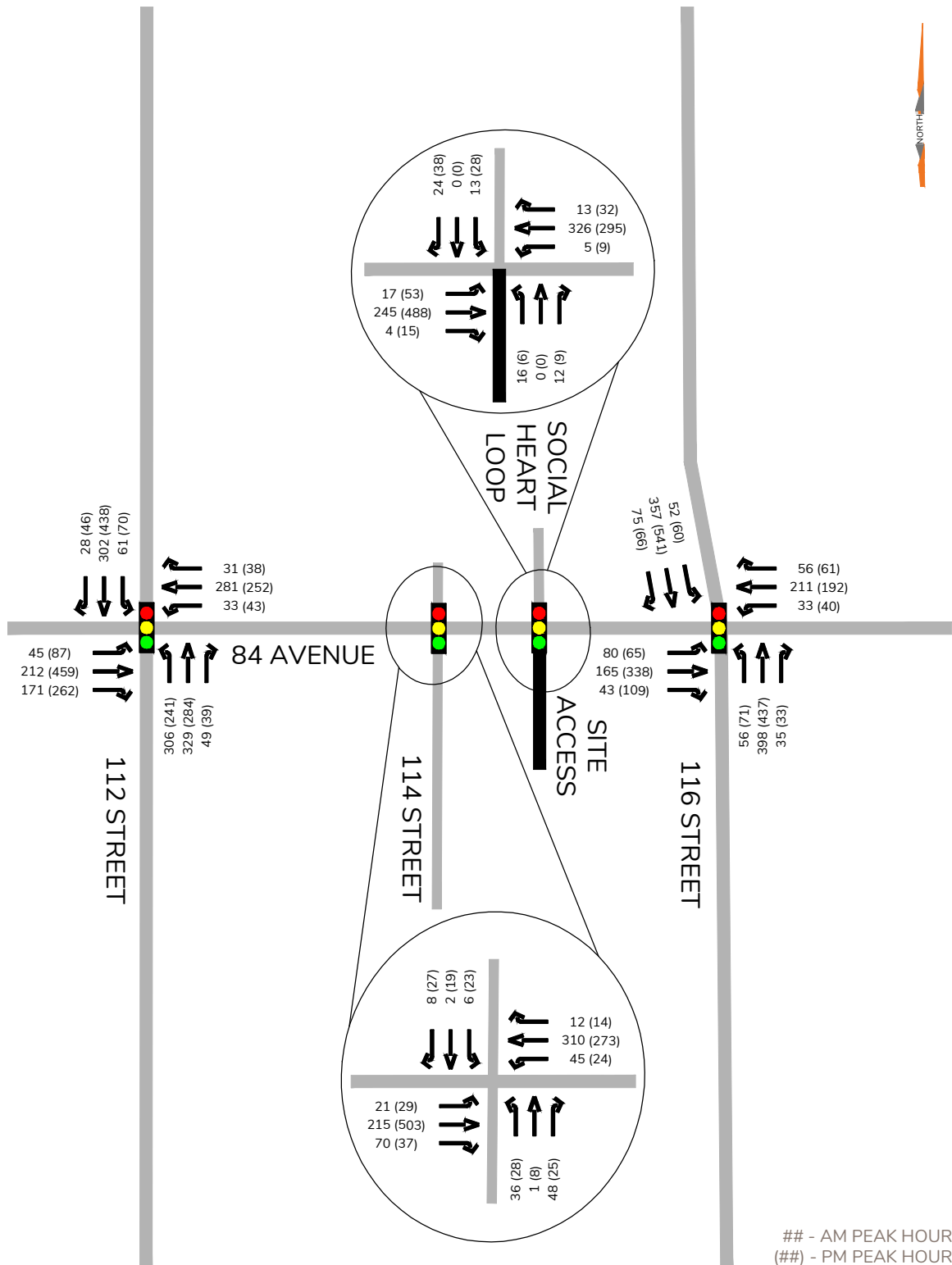
Route	From /To	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
84 Avenue	East	35%	24%	22%	40%
	West	29%	48%	50%	30%
112 Street	North	8%	5%	8%	4%
	South	7%	5%	4%	5%
114 Street	South	-	-	-	-
Social Heart Loop	North	-	-	-	-
116 Street	North	12%	12%	8%	8%
	South	9%	6%	8%	13%
Total		100%	100%	100%	100%

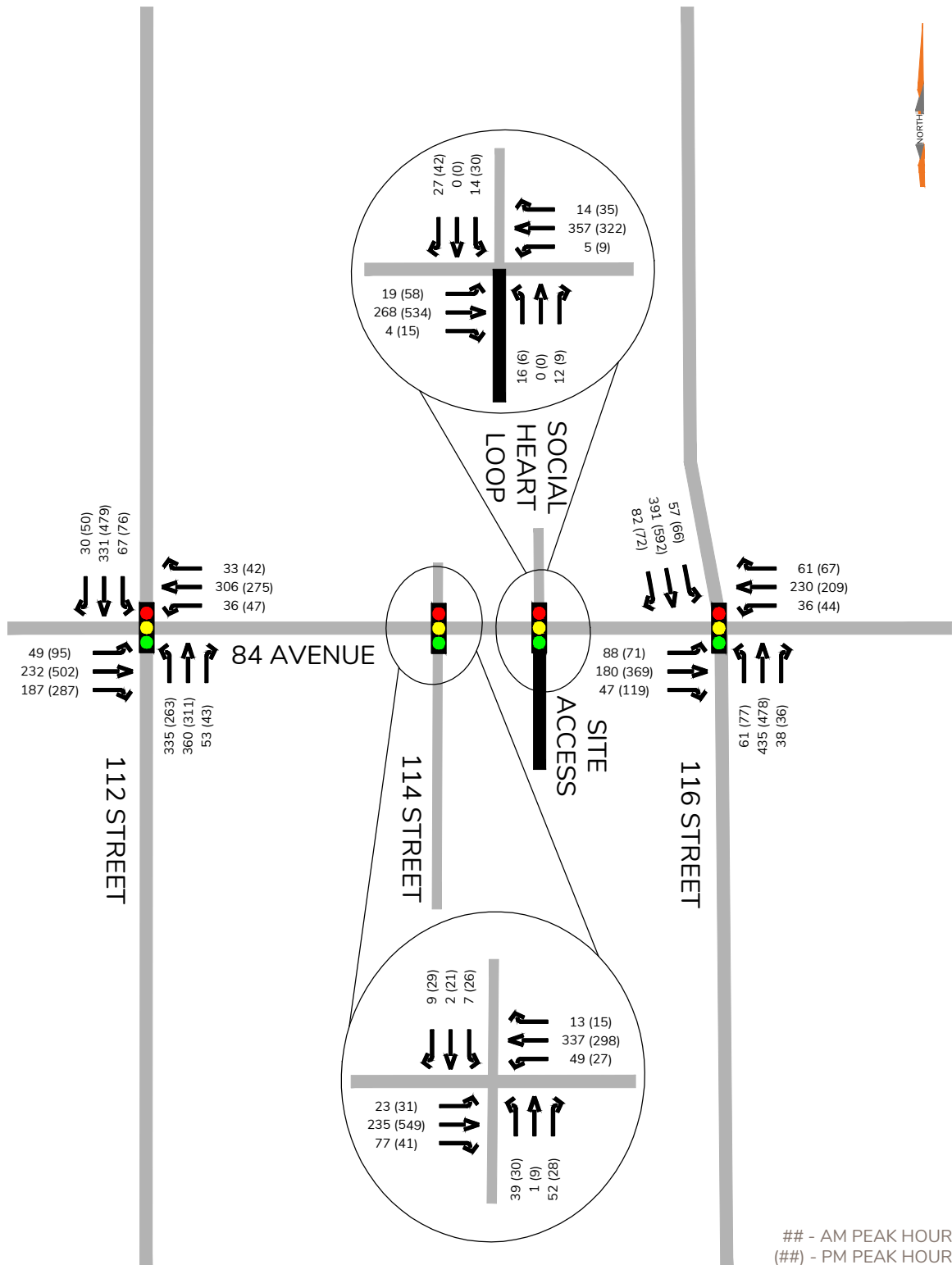


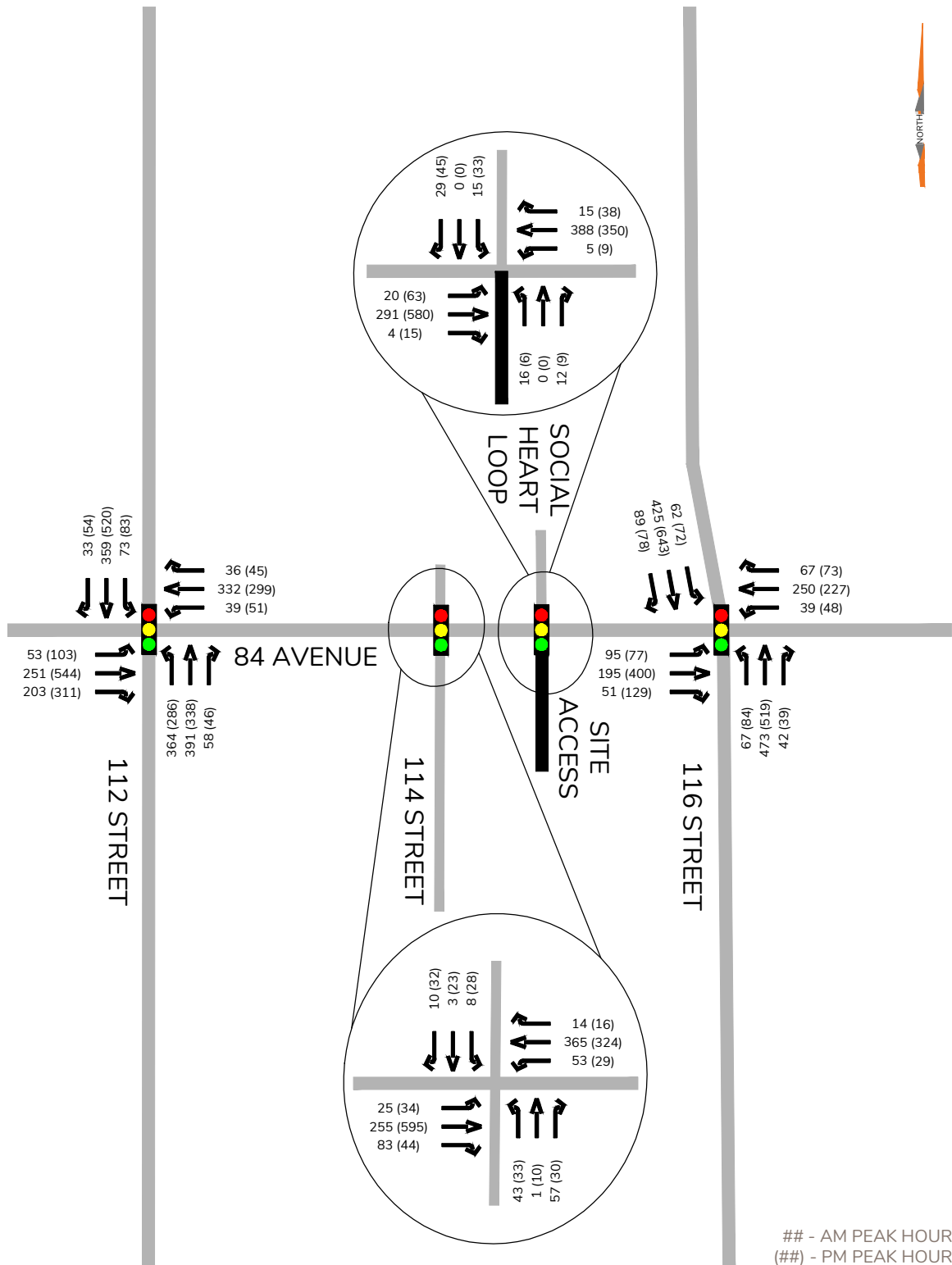


4.5 Post-Development Traffic Volumes

Post-development traffic volumes are the sum of the background traffic volumes and net new site traffic volumes. Post-development traffic volumes for opening day (2027), five-year horizon (2032), and ten-year horizon (2037) are illustrated in **Figure 9**, **Figure 10**, and **Figure 11** respectively.









5.0 TRAFFIC OPERATIONS ANALYSIS

5.1 Methodology

Analysis of vehicular traffic conditions at the study area intersections was undertaken using Synchro version 11. Synchro and SimTraffic is a two-part traffic modelling software that provides analysis of traffic conditions based on the Highway Capacity Manual. A detailed description is provided in **Appendix A**.

5.2 Input and Calibration Parameters

Heavy Vehicle

Heavy vehicle percentages incorporated into the analysis were based on information provided as part of the intersection turning movement counts.

Peak Hour Factor

Peak hour factors (PHF) incorporated into the analysis were calculated from the intersection turning movement counts.

Lane Configuration

Lane configuration mirrored existing conditions for all scenarios within the report.



5.3 84 Avenue & 112 Street

Traffic operational results for the 84 Avenue & 112 Street intersection are summarized in Table 8.

Under existing conditions, 84 Avenue & 112 Street operates at Level of Service (LOS) C or better and Volume-to-Capacity ratio (V/C) 0.79 or lower during the AM and PM peak hours. However, the 95th percentile queue lengths for eastbound left, eastbound right, northbound left, and southbound left exceeds the available storage lengths. The City should extend the storage lengths for these turn lanes.

Under the 2027 background conditions, all movements operate at LOS D or better and V/C 0.82 or lower during the peak hours. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS D or better), lane capacity (V/C 0.83 or lower) or queuing.

Under the 2032 background conditions, all movements operate at LOS D or better and V/C 0.89 or lower. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS D or better), lane capacity (V/C 0.90 or lower), or queuing.

In the 2037 background conditions, the northbound left turn vehicle delay is expected to increase to LOS E and V/C 1.05. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS E or better), lane capacity (V/C 1.06 or lower), or queuing.



Table 8 – 84 Avenue & 112 Street Traffic Operations

Key Movement	Existing (2024)				Background				Post Development			
	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)
2024/27 Horizon Year (Opening Day)												
EBL	0.23 (0.30)	C (C)	22 (23)	20 (40)	0.25 (0.33)	C (C)	23 (24)	25 (40)	0.26 (0.33)	C (C)	23 (24)	25 (45)
EBT	0.44 (0.73)	C (C)	22 (31)	45 (135)	0.46 (0.77)	C (C)	23 (33)	55 (260)	0.45 (0.78)	C (C)	23 (34)	50 (245)
EBR	0.34 (0.47)	A (B)	5 (13)	30 (55)	0.35 (0.49)	A (B)	6 (14)	35 (55)	0.35 (0.49)	A (B)	6 (14)	35 (60)
WBL	0.13 (0.26)	B (C)	19 (25)	15 (30)	0.14 (0.30)	B (C)	20 (27)	20 (30)	0.14 (0.32)	B (C)	20 (28)	20 (35)
WBTR	0.64 (0.48)	C (C)	27 (23)	60 (60)	0.67 (0.50)	C (C)	28 (24)	60 (65)	0.68 (0.50)	C (C)	28 (24)	65 (60)
NBL	0.68 (0.61)	B (B)	19 (17)	50 (45)	0.76 (0.69)	C (C)	24 (23)	55 (45)	0.77 (0.69)	C (C)	25 (23)	55 (50)
NBTR	0.41 (0.33)	B (B)	11 (12)	60 (50)	0.44 (0.35)	B (B)	12 (12)	75 (55)	0.44 (0.35)	B (B)	12 (12)	65 (60)
SBL	0.23 (0.21)	C (C)	21 (21)	25 (50)	0.24 (0.22)	C (C)	21 (22)	35 (45)	0.25 (0.23)	C (C)	21 (22)	35 (50)
SBTR	0.66 (0.79)	C (C)	27 (34)	70 (105)	0.69 (0.82)	C (D)	28 (37)	70 (135)	0.69 (0.83)	C (D)	28 (37)	80 (140)
2032 Horizon Year (5-Year Post-Build)												
EBL	-	-	-	-	0.30 (0.38)	C (C)	25 (26)	25 (45)	0.31 (0.38)	C (C)	25 (26)	25 (45)
EBT	-	-	-	-	0.48 (0.82)	C (D)	24 (38)	50 (350)	0.48 (0.83)	C (D)	24 (38)	50 (430)
EBR	-	-	-	-	0.37 (0.53)	A (B)	7 (15)	40 (55)	0.37 (0.53)	A (B)	7 (16)	40 (55)
WBL	-	-	-	-	0.16 (0.41)	C (C)	21 (33)	20 (35)	0.16 (0.43)	C (D)	21 (35)	20 (40)
WBTR	-	-	-	-	0.71 (0.54)	C (C)	30 (25)	65 (65)	0.72 (0.54)	C (C)	30 (25)	75 (100)
NBL	-	-	-	-	0.89 (0.85)	D (D)	39 (42)	60 (55)	0.90 (0.86)	D (D)	41 (43)	60 (55)
NBTR	-	-	-	-	0.48 (0.38)	B (B)	13 (13)	85 (60)	0.49 (0.38)	B (B)	13 (13)	75 (75)
SBL	-	-	-	-	0.27 (0.24)	C (C)	22 (22)	35 (60)	0.28 (0.25)	C (C)	22 (23)	35 (60)
SBTR	-	-	-	-	0.73 (0.88)	C (D)	30 (43)	75 (190)	0.74 (0.88)	C (D)	31 (43)	75 (175)
2037 Horizon Year (10-Year Post-Build)												
EBL	-	-	-	-	0.36 (0.44)	C (C)	27 (28)	30 (45)	0.38 (0.44)	C (C)	28 (28)	30 (45)
EBT	-	-	-	-	0.51 (0.88)	C (D)	25 (43)	60 (350)	0.51 (0.89)	C (D)	25 (45)	65 (345)
EBR	-	-	-	-	0.40 (0.57)	A (B)	7 (17)	45 (60)	0.40 (0.57)	A (B)	8 (17)	45 (55)
WBL	-	-	-	-	0.17 (0.58)	C (D)	21 (52)	20 (40)	0.18 (0.61)	C (D)	21 (55)	30 (45)
WBTR	-	-	-	-	0.74 (0.57)	C (C)	32 (26)	75 (75)	0.76 (0.58)	C (C)	33 (26)	85 (85)
NBL	-	-	-	-	1.05 (0.96)	E (E)	76 (65)	65 (55)	1.06 (0.97)	E (E)	80 (66)	65 (60)
NBTR	-	-	-	-	0.53 (0.41)	B (B)	14 (13)	135 (70)	0.53 (0.41)	B (B)	14 (13)	145 (80)
SBL	-	-	-	-	0.30 (0.26)	C (C)	23 (23)	45 (65)	0.30 (0.27)	C (C)	23 (23)	45 (70)
SBTR	-	-	-	-	0.77 (0.93)	C (D)	33 (50)	105 (235)	0.78 (0.93)	C (D)	33 (51)	95 (215)

Notes: XX (XX) = AM (PM); 95th percentile queue lengths are rounded to the nearest 5 metres.



The delay and lane capacity issues for the northbound left turn in 2037 due to background traffic can be mitigated with signal timing optimization as summarized in **Table 9**. With signal timing optimization, all movements will operate at LOS D or better and V/C 0.95 or lower.

As noted under existing traffic conditions, the storage lengths for the left turn lanes and the eastbound right turn lane should be extended. For the eastbound approach, the north access to 11146 84 Avenue should be closed to extend the eastbound left turn lane for the 84 Avenue and 112 Street intersection. For the westbound approach, the curb bulge and the curbside parking on the north side of 84 Avenue can be moved east to extend the westbound left turn lane. For the northbound approach, the existing gore lines will need to be removed up to the east access to 11146 84 Avenue to extend the northbound left turn lane. For the southbound approach, the existing gore lines will need to be removed up to the access to 8440 112 Street to extend the southbound left turn lane.

The City should also improve active transportation facilities and transit service along 84 Avenue to encourage mode shift and reduce vehicular volumes along the corridor, thereby maintaining good traffic operations in the long term without having to make significant changes to the intersection.

Table 9 – 84 Avenue & 112 Street Mitigated Traffic Operations

Key Movement	Background				Post Development			
	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)
2037 Horizon Year (10-Year Post-Build)								
EBL	0.50 (0.49)	D (C)	39 (30)	30 (45)	0.57 (0.48)	D (C)	50 (30)	35 (45)
EBT	0.58 (0.95)	C (D)	29 (54)	110 (345)	0.59 (0.94)	C (D)	30 (53)	70 (345)
EBR	0.43 (0.59)	A (B)	8 (16)	45 (55)	0.44 (0.58)	A (B)	10 (18)	45 (55)
WBL	0.21 (0.54)	C (D)	24 (45)	30 (70)	0.23 (0.57)	C (D)	26 (51)	45 (60)
WBTR	0.85 (0.61)	D (C)	43 (27)	85 (190)	0.88 (0.61)	D (C)	49 (27)	95 (105)
NBL	0.86 (0.87)	C (D)	34 (42)	60 (55)	0.84 (0.90)	C (D)	32 (48)	60 (60)
NBTR	0.49 (0.40)	B (B)	11 (11)	80 (75)	0.48 (0.41)	B (B)	11 (12)	80 (70)
SBL	0.33 (0.27)	C (C)	25 (21)	40 (70)	0.32 (0.27)	C (C)	25 (22)	45 (70)
SBTR	0.86 (0.95)	D (D)	43 (53)	85 (225)	0.83 (0.94)	D (D)	40 (51)	85 (220)

Notes: XX (XX) = AM (PM); 95th percentile queue lengths are rounded to the nearest 5 metres.



5.4 84 Avenue & 116 Street

Traffic operational results for the 84 Avenue & 116 Street intersection are summarized in Table 10.

Under existing conditions, 84 Avenue & 116 Street operates at LOS C or better and V/C 0.78 or lower during the AM and PM peak hours. The 95th percentile queue length for southbound left turns is exceeding the available storage length in the PM peak hour.

Under the 2027 background conditions, all movements continue to operate at LOS C or better, V/C 0.82 or lower, and no additional queuing issues during the peak hours. The development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS C or better), lane capacity (V/C 0.82 or lower), or queuing.

Under the 2032 background conditions, all movements continue to operate at LOS C or better and V/C 0.89 or lower. The 95th percentile queue length for northbound left turn lane exceeds the available storage length. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS C or better), lane capacity (V/C 0.89 or lower), or queuing.

In the 2037 background conditions, all movements operate at LOS D or better, V/C 0.95 or lower, and no additional queuing issues. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS D or better), lane capacity (V/C 0.96 or lower), or queuing.

To mitigate the queue spillage at the northbound left turn lane and the southbound left turn lane due to background traffic growth, the City should extend the storage lengths of these lanes. For the northbound approach, the median in between 84 Avenue and 83 Avenue will need to be removed to extend the northbound left turn lane. For the southbound approach, the northbound left turn lane at 84A Avenue & 116 Street will need to be removed to allow for extending the southbound left turn lane at 84 Avenue and 116 Street intersection. The 84A Avenue & 116 Street intersection would need to be restricted to right-in right-out movements only.

The City should also improve active transportation facilities and transit service along 84 Avenue to encourage mode shift and reduce vehicular volumes along the corridor, thereby maintaining good traffic operations in the long term without having to make significant changes to the intersection.



Table 10 – 84 Avenue & 116 Street Traffic Operations

Key Movement	Existing (2024)				Background				Post Development			
	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)
2024/27 Horizon Year (Opening Day)												
EBL	0.22 (0.16)	B (B)	12 (12)	25 (25)	0.23 (0.18)	B (B)	12 (12)	25 (30)	0.23 (0.18)	B (B)	12 (12)	25 (30)
EBTR	0.34 (0.68)	B (B)	11 (18)	35 (70)	0.36 (0.72)	B (B)	11 (19)	35 (75)	0.37 (0.73)	B (B)	11 (20)	40 (75)
WBL	0.09 (0.16)	B (B)	11 (12)	15 (20)	0.09 (0.18)	B (B)	11 (13)	15 (20)	0.09 (0.19)	B (B)	11 (13)	15 (20)
WBTR	0.46 (0.39)	B (B)	13 (12)	40 (35)	0.48 (0.41)	B (B)	13 (12)	40 (35)	0.48 (0.41)	B (B)	13 (12)	45 (40)
NBL	0.12 (0.35)	A (B)	9 (16)	20 (25)	0.13 (0.42)	A (C)	10 (20)	20 (30)	0.13 (0.44)	A (C)	10 (21)	25 (40)
NBTR	0.45 (0.60)	B (B)	11 (15)	50 (55)	0.47 (0.63)	B (B)	11 (16)	60 (60)	0.47 (0.63)	B (B)	11 (16)	60 (75)
SBL	0.11 (0.20)	A (B)	9 (12)	20 (40)	0.12 (0.23)	A (B)	10 (12)	25 (40)	0.12 (0.23)	A (B)	10 (12)	25 (45)
SBTR	0.45 (0.78)	B (C)	11 (22)	55 (85)	0.47 (0.82)	B (C)	11 (24)	55 (100)	0.47 (0.82)	B (C)	11 (25)	55 (100)
2032 Horizon Year (5-Year Post-Build)												
EBL	-	-	-	-	0.26 (0.19)	B (B)	13 (12)	25 (35)	0.27 (0.20)	B (B)	13 (12)	25 (25)
EBTR	-	-	-	-	0.40 (0.76)	B (C)	12 (22)	35 (80)	0.41 (0.77)	B (C)	12 (23)	40 (75)
WBL	-	-	-	-	0.10 (0.23)	B (B)	11 (14)	15 (20)	0.10 (0.23)	B (B)	11 (14)	15 (20)
WBTR	-	-	-	-	0.53 (0.43)	B (B)	14 (13)	45 (40)	0.54 (0.44)	B (B)	14 (13)	45 (40)
NBL	-	-	-	-	0.24 (0.49)	B (C)	12 (25)	30 (40)	0.24 (0.51)	B (C)	12 (27)	20 (50)
NBTR	-	-	-	-	0.69 (0.69)	B (B)	16 (18)	60 (85)	0.69 (0.69)	B (B)	16 (18)	60 (90)
SBL	-	-	-	-	0.22 (0.29)	B (B)	12 (14)	30 (55)	0.22 (0.29)	B (B)	12 (14)	30 (55)
SBTR	-	-	-	-	0.69 (0.89)	B (C)	16 (31)	60 (235)	0.69 (0.89)	B (C)	16 (32)	65 (140)
2037 Horizon Year (10-Year Post-Build)												
EBL	-	-	-	-	0.30 (0.22)	B (B)	14 (13)	25 (40)	0.31 (0.22)	B (B)	14 (13)	25 (45)
EBTR	-	-	-	-	0.43 (0.82)	B (C)	13 (26)	40 (90)	0.45 (0.83)	B (C)	13 (26)	35 (85)
WBL	-	-	-	-	0.11 (0.29)	B (B)	11 (17)	15 (25)	0.11 (0.30)	B (B)	11 (17)	15 (20)
WBTR	-	-	-	-	0.58 (0.47)	B (B)	15 (13)	45 (50)	0.58 (0.47)	B (B)	15 (13)	50 (45)
NBL	-	-	-	-	0.28 (0.56)	B (C)	13 (31)	35 (80)	0.29 (0.58)	B (C)	13 (33)	30 (80)
NBTR	-	-	-	-	0.72 (0.74)	B (C)	18 (20)	80 (205)	0.72 (0.74)	B (C)	18 (20)	65 (215)
SBL	-	-	-	-	0.26 (0.36)	B (B)	13 (17)	35 (65)	0.26 (0.36)	B (B)	13 (17)	35 (70)
SBTR	-	-	-	-	0.72 (0.95)	B (D)	18 (41)	70 (295)	0.72 (0.96)	B (D)	18 (42)	80 (295)

Notes: XX (XX) = AM (PM); 95th percentile queue lengths are rounded to the nearest 5 metres.



5.5 84 Avenue & 114 Street

Traffic operational results for the 84 Avenue & 114 Street intersection are summarized in Table 11.

Under existing conditions, 84 Avenue & 114 Street operates at LOS C or better, V/C 0.39 or lower, and no queuing issues during the AM and PM peak hours.

Under the 2027 background conditions, all movements continue to operate at LOS C or better, V/C 0.41 or lower, and no queuing issues. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS C or better), lane capacity (V/C 0.42 or lower), or queuing.

Under the 2032 background conditions, all movements continue to operate at LOS C or better, V/C 0.45 or lower, and no queuing issues. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS C or better), lane capacity (V/C 0.46 or lower), or queuing.

In the 2037 background conditions, all movements continue to operate at LOS C or better, V/C 0.49 or lower, and no queuing issues. The addition of development traffic does not create any additional negative impacts at the intersection in terms of vehicle delay (LOS C or better), lane capacity (V/C 0.50 or lower), or queuing.



Table 11 – 84 Avenue & 114 Street Traffic Operations

Key Movement	Existing (2024)				Background				Post Development			
	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)
2024/27 Horizon Year (Opening Day)												
EBL	0.04 (0.04)	A (A)	9 (7)	10 (15)	0.04 (0.04)	A (A)	9 (7)	10 (10)	0.04 (0.04)	A (A)	9 (7)	10 (10)
EBTR	0.28 (0.39)	A (A)	8 (8)	30 (70)	0.30 (0.41)	A (A)	8 (9)	35 (65)	0.30 (0.42)	A (A)	9 (9)	40 (65)
WBL	0.08 (0.04)	A (A)	9 (8)	20 (15)	0.08 (0.05)	A (A)	9 (8)	15 (15)	0.09 (0.05)	A (A)	9 (8)	20 (15)
WBTR	0.29 (0.21)	A (A)	9 (7)	40 (35)	0.31 (0.22)	A (A)	9 (7)	45 (35)	0.32 (0.22)	A (A)	9 (7)	45 (35)
NBLTR	0.27 (0.21)	B (B)	12 (17)	25 (20)	0.28 (0.22)	B (B)	12 (17)	25 (20)	0.28 (0.22)	B (B)	12 (17)	20 (20)
SBLT	0.03 (0.15)	B (C)	19 (24)	10 (20)	0.03 (0.15)	B (C)	19 (24)	5 (20)	0.03 (0.15)	B (C)	19 (24)	10 (20)
SBR	0.03 (0.09)	A (A)	1 (7)	5 (10)	0.03 (0.09)	A (A)	1 (7)	10 (15)	0.03 (0.09)	A (A)	1 (7)	10 (15)
2032 Horizon Year (5-Year Post-Build)												
EBL	-	-	-	-	0.05 (0.04)	A (A)	9 (7)	10 (20)	0.05 (0.04)	A (A)	9 (7)	10 (10)
EBTR	-	-	-	-	0.32 (0.45)	A (A)	9 (9)	40 (75)	0.33 (0.46)	A (A)	9 (9)	45 (70)
WBL	-	-	-	-	0.10 (0.06)	A (A)	9 (8)	20 (15)	0.10 (0.06)	A (A)	9 (8)	20 (15)
WBTR	-	-	-	-	0.34 (0.24)	A (A)	10 (7)	45 (40)	0.35 (0.24)	A (A)	10 (7)	50 (40)
NBLTR	-	-	-	-	0.31 (0.24)	B (B)	12 (17)	20 (20)	0.31 (0.24)	B (B)	12 (17)	25 (25)
SBLT	-	-	-	-	0.03 (0.18)	B (C)	19 (25)	10 (20)	0.03 (0.18)	B (C)	19 (25)	10 (20)
SBR	-	-	-	-	0.03 (0.10)	A (A)	2 (7)	10 (10)	0.03 (0.10)	A (A)	2 (7)	10 (15)
2037 Horizon Year (10-Year Post-Build)												
EBL	-	-	-	-	0.06 (0.05)	A (A)	9 (7)	10 (25)	0.06 (0.05)	A (A)	9 (7)	15 (10)
EBTR	-	-	-	-	0.35 (0.49)	A (A)	9 (10)	45 (75)	0.36 (0.50)	A (A)	9 (10)	45 (80)
WBL	-	-	-	-	0.11 (0.06)	A (A)	9 (8)	20 (15)	0.11 (0.07)	A (A)	9 (8)	20 (15)
WBTR	-	-	-	-	0.36 (0.26)	A (A)	10 (7)	50 (45)	0.38 (0.26)	B (A)	10 (7)	50 (45)
NBLTR	-	-	-	-	0.33 (0.26)	B (B)	13 (17)	25 (25)	0.33 (0.26)	B (B)	13 (17)	25 (20)
SBLT	-	-	-	-	0.04 (0.19)	B (C)	19 (25)	10 (20)	0.04 (0.19)	B (C)	19 (25)	10 (20)
SBR	-	-	-	-	0.03 (0.11)	A (A)	2 (8)	10 (15)	0.03 (0.11)	A (A)	2 (8)	10 (15)

Notes: XX (XX) = AM (PM); 95th percentile queue lengths are rounded to the nearest 5 metres.



5.6 84 Avenue & Social Heart Loop

Traffic operational results for the 84 Avenue & Social Heart Loop intersection in background traffic conditions are summarized in **Table 12**.

Under existing conditions, 84 Avenue & Social Heart Loop operates at LOS B or better, V/C 0.30 or lower, and no queuing issues during the AM and PM peak hours. With background traffic growth, the intersection will continue to operate in acceptable conditions in 2027, 2032, and 2037 at LOS B or better, V/C 0.42 or lower, and no queuing issues.

Table 12: 84 Avenue & 114 Street - Background Traffic Operations

Key Movement	Existing (2024)				Background			
	V/C	LOS	Delay (s)	Queue (m)	V/C	LOS	Delay (s)	Queue (m)
2024/27 Horizon Year (Opening Day)								
EBL	0.03 (0.06)	A (A)	3 (3)	10 (15)	0.03 (0.06)	A (A)	3 (3)	10 (20)
EBTR	0.18 (0.30)	A (A)	3 (3)	15 (35)	0.19 (0.32)	A (A)	3 (4)	20 (45)
WBTR	0.27 (0.20)	A (A)	3 (3)	25 (25)	0.28 (0.21)	A (A)	3 (3)	25 (25)
SBL	0.04 (0.08)	B (B)	13 (13)	10 (15)	0.05 (0.08)	B (B)	14 (13)	10 (15)
SBR	0.09 (0.11)	A (A)	8 (7)	15 (15)	0.09 (0.11)	A (A)	8 (7)	15 (15)
2032 Horizon Year (5-Year Post-Build)								
EBL	-	-	-	-	0.03 (0.07)	A (A)	3 (3)	10 (20)
EBTR	-	-	-	-	0.21 (0.35)	A (A)	3 (4)	20 (40)
WBTR	-	-	-	-	0.31 (0.23)	A (A)	3 (3)	25 (30)
SBL	-	-	-	-	0.05 (0.09)	B (B)	14 (13)	10 (15)
SBR	-	-	-	-	0.11 (0.13)	A (A)	8 (7)	15 (15)
2037 Horizon Year (10-Year Post-Build)								
EBL	-	-	-	-	0.03 (0.09)	A (A)	3 (4)	10 (20)
EBTR	-	-	-	-	0.23 (0.42)	A (A)	3 (5)	25 (50)
WBTR	-	-	-	-	0.33 (0.28)	A (A)	3 (4)	25 (30)
SBL	-	-	-	-	0.06 (0.10)	B (B)	14 (14)	10 (15)
SBR	-	-	-	-	0.11 (0.14)	A (A)	7 (6)	15 (15)

Notes: XX (XX) = AM (PM); 95th percentile queue lengths are rounded to the nearest 5 metres.



In the post development scenario, the site access will form the 4th leg (south leg) of the intersection. As such, the existing traffic signal will need to be upgraded to signal control the south leg as well. A westbound left turn lane will also be needed at the intersection to manage westbound left turn queues and minimize impacts to the adjacent residential site access at 11490 84 Avenue.

A swept path analysis was performed to review the alignment of the south leg in relation to the existing intersection geometry as illustrated in **Figure 12**. To ensure concurrent northbound and southbound left turns without any conflicts, intersection guide line pavement markings should be installed for both movements. The south leg will also be constructed with a curb return and a decorative crosswalk to match the north and west crossing legs (note: electrical design team will ensure installation of loop detectors for the traffic signal on the south leg).

Figure 12 - Swept Path Analysis

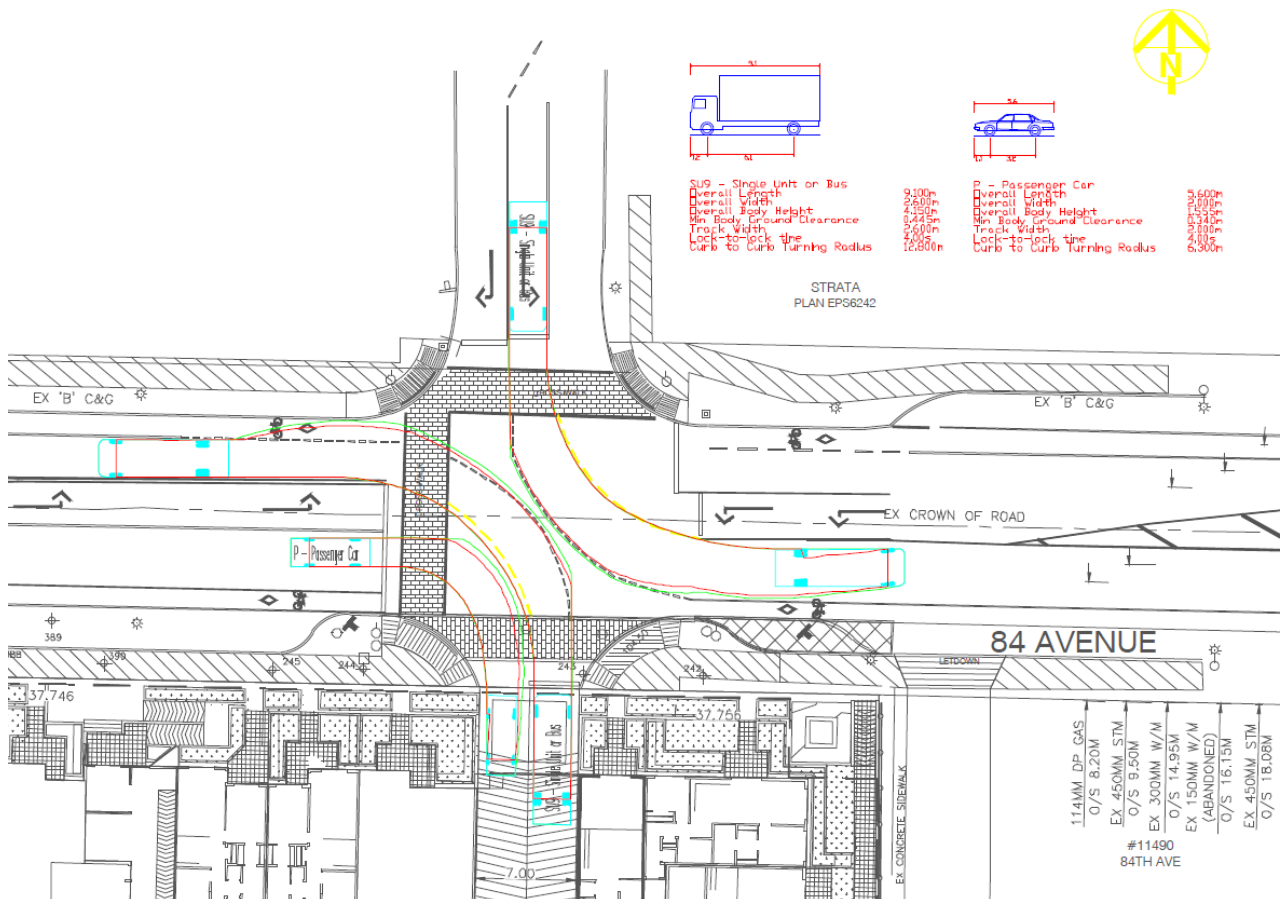




Table 13 summarizes the traffic operational results at the 84 Avenue & Social Heart Loop intersection with development traffic, a four-legged traffic signal operation with permitted phasing for both major and minor legs, and a westbound left turn lane. All movements will operate at LOS B or better, V/C 0.43 or lower, and no queuing issues. The westbound left turn lane is expected to have a 95th percentile queue length of 10m. To ensure large trucks don't encroach onto the painted bike lane when completing a southbound left turn, the westbound left turn lane stop bar is installed as an offset, 1.38m east of the westbound through/right turn lane stop bar. As the site access at 11490 84 Avenue is 15m from the westbound left turn lane stop bar, the 11490 84 Avenue site will have unimpeded access when the westbound approach is signal controlled in the red phase and westbound vehicles are queued up at the intersection.



Table 13 – 84 Avenue & Social Heart Loop – Post Development Traffic Operations

Key Movement	Post Development			
	V/C	LOS	Delay (s)	Queue (m)
2024/27 Horizon Year (Opening Day)				
EBL	0.03 (0.06)	A (A)	3 (3)	10 (20)
EBTR	0.20 (0.34)	A (A)	3 (4)	25 (45)
WBL	0.01 (0.01)	A (A)	3 (3)	5 (10)
WBTR	0.29 (0.22)	A (A)	4 (3)	30 (30)
NBLTR	0.08 (0.05)	A (A)	6 (4)	10 (10)
SBL	0.04 (0.07)	B (B)	11 (12)	10 (10)
SBR	0.06 (0.06)	A (A)	0 (0)	15 (15)
2032 Horizon Year (5-Year Post-Build)				
EBL	0.03 (0.08)	A (A)	3 (4)	10 (20)
EBTR	0.22 (0.40)	A (A)	3 (5)	25 (45)
WBL	0.01 (0.02)	A (A)	3 (4)	5 (10)
WBTR	0.32 (0.26)	A (A)	4 (4)	25 (30)
NBLTR	0.08 (0.06)	A (A)	6 (4)	10 (10)
SBL	0.05 (0.09)	B (B)	12 (13)	10 (15)
SBR	0.07 (0.07)	A (A)	0 (0)	15 (15)
2037 Horizon Year (10-Year Post-Build))				
EBL	0.04 (0.09)	A (A)	3 (4)	10 (15)
EBTR	0.24 (0.43)	A (A)	3 (5)	25 (50)
WBL	0.01 (0.02)	A (A)	3 (4)	5 (5)
WBTR	0.34 (0.28)	A (A)	4 (4)	30 (35)
NBLTR	0.08 (0.06)	A (A)	6 (4)	15 (10)
SBL	0.05 (0.10)	B (B)	12 (13)	10 (15)
SBR	0.08 (0.08)	A (A)	0 (0)	10 (15)

Notes: XX (XX) = AM (PM); 95th percentile queue lengths are rounded to the nearest 5 metres.



6.0 SITE ACCESS

Access to the site will be provided from a driveway which will form the south leg of the 84 Avenue / Social Heart Loop signalized intersection. The Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads* (2017) provides recommended minimum intersection sight distances for drivers turning onto a road from a signalized intersection. Assuming a design vehicle as a passenger vehicle and a design speed of 50 km/h, northbound right turns at the site access should be provided with 95 metres of sight distance to the west. This sight distance will be available with the proposed site access design. Intersection sight distance to the east is not required as northbound left turns will be taking place when eastbound and westbound movements are signal controlled.

The TAC *Geometric Design Guide for Canadian Roads* (2017) provides suggested minimum corner clearances to access for residential driveways on local or collector roads and adjacent intersections to be 5 metres. The proposed site access location is more than 5 metres from adjacent intersections at 114 Street and 116 Street.

To mitigate any sightline issues for the adjacent 11490 84 Avenue site access, the existing hatched pavement markings should be upgraded with a curb extension.

7.0 OFF-STREET PARKING

7.1 Vehicle Parking – Required vs Proposed

Table 14 summarizes the bylaw requirements for minimum off-street vehicle parking and the proposed off-street vehicle parking supply for the development. The total bylaw requirement is 245 vehicle parking spaces, and the proposed supply is 209 vehicle parking spaces. The development is meeting the bylaw requirements for visitor parking (16 bylaw, 16 proposed) and proposing a 16% reduction from bylaw requirements for resident parking (229 bylaw, 193 proposed).



Table 14: Vehicle Parking - Bylaw Requirement vs Proposed

Land Use	Bylaw Required Parking Rate	Number of Units	Bylaw Required	Proposed Supply
Apartment Building – Studio, 1 Bed	1.3 spaces/unit	41	53.3	41
Apartment Building – 2 Bed or larger	1.5 spaces/unit	117	175.5	152
RESIDENT PARKING TOTAL			229	193
Apartment Building – Visitor Parking	0.1 spaces/unit	158	15.8	16
GRAND TOTAL			245	209

7.2 Expected Vehicle Parking Demand

7.2.1 ICBC Vehicle Ownership Data

Vehicle ownership data from 3 existing multi-family residential sites in Delta were collected from the Insurance Corporation of British Columbia (ICBC) and analyzed to determine how many vehicle parking spaces are actually needed on site to accommodate the number of vehicles owned by residents compared to the bylaw requirements for these sites. The selected sites are similar to the proposed development in that they are all strata sites located in residential areas and are a similar distance from the recently introduced R6 Rapid Transit bus stops.

Table 15 summarizes the bylaw required vehicle parking spaces and the actual vehicle parking demand for the study sites based on vehicle ownership. The data indicates that, on average, vehicle parking demand from residents is 19% less than the bylaw requirements for vehicle parking. The proposed development is planning to provide resident parking at 16% less than the bylaw requirement and therefore, is providing sufficient off-street vehicle parking for future residents.



Table 15: Vehicle Parking - Bylaw Requirement vs Vehicle Ownership

Property Address	Type of Housing	Bylaw Required Vehicle Parking	Resident Vehicle Ownership (ICBC)	% Less Than Bylaw Required
6712 Baker Road	Townhouse - Strata	138	112	19%
11501 84 Avenue	Strata – Apartment, Townhouse	109	101	7%
7167 116 Street	Strata - Townhouse	80	56	30%
AVERAGE				19%

7.2.2 Future Vehicle Parking Demands

The introduction of the R6 Scott Road RapidBus service starting from January 2024 along Scott Road/120 Street now provides residents of Delta with high-frequency, limited-stop bus service every 7.5 minutes during peak hours and 15 minutes during off-peak hours, connecting residents to the Scott Road SkyTrain station for high-speed, uninterrupted regional travels (Expo Line) and the Newton Exchange for localized travels. With bus stops located at the 120 Street/84 Avenue intersection, these bus stops will be a 1km walking distance from the subject site or a 16-minute walking time. The proximity of the rapid transit bus stops to the proposed development site is expected to further reduce the need for vehicle ownership in the future at the subject site and therefore, reduce the need for off-street vehicle parking.

The 2018 Metro Vancouver Regional Parking Study found that strata sites which are more than 800m walking distance from the frequent transit network have an average vehicle parking rate of 1.09 vehicles / dwelling unit. Based on the regional vehicle parking demand rate, the proposed development is expected to have a demand of 172 (158 units x 1.09 vehicles/unit) vehicle parking spaces for resident parking. The proposed supply of 193 vehicle parking spaces for resident parking is greater than the expected vehicle parking demand.



7.2.3 Summary of Expected Vehicle Parking Demand

Based on the data findings from ICBC vehicle ownership data at existing strata sites in Delta and the Metro Vancouver study of vehicle parking demand for sites close to frequent transit, the proposed supply of 193 vehicle parking spaces for future residents is supported.

7.3 Transportation Demand Management (TDM) Measures

Transportation demand management (TDM) is the application of strategies and policies to influence individual travel choice, most commonly to reduce single-occupant vehicle travel. TDM measures typically aim to encourage sustainable travel, enhance travel options, and decrease vehicle parking demand. The following sections present a menu of recommended TDM measures that the applicant could pursue for this development to further reduce off-street vehicle parking demand from future residents.

7.3.1 Unbundled Parking

Unbundled parking means the purchase of a parking space for strata owners will be separated from the purchase of the dwelling unit. Research has found a vehicle ownership reduction of 6 to 8% when unbundled parking is implemented.¹

Parking space availability could be prioritized for the larger two- and three-bedroom units while remaining spaces can be offered to the studio and one-bedroom units. This is consistent with research from the Metro Vancouver 2018 Regional Parking Study that found larger units generate higher parking demand.

Unbundled parking can be implemented through purchase agreements with residents for the strata lots. Marketing for the dwelling units should specify there is limited reserved parking spaces available for purchase and limited on-street parking available.

¹ Schure, J., Napolitan, F., & Hutchinson, R., (2012). "Cumulative Impacts of Carsharing and Unbundled Parking on Vehicle Ownership and Mode Choice." *Transportation Research Record*, 2319(1).

Mobility Lab (2018). *Arlington County Residential Building Study*. <https://mobilitylab.org/research-document/arlington-county-residential-building-study-aggregate-analysis-update/>



7.3.2 E-Bike Parking

The proposed development could encourage increased use of sustainable modes like cycling and reduce the need for vehicle ownership by providing improved facilities for e-bike parking. Currently, the City's Zoning Bylaw requires resident bicycle storage areas to include a minimum of one electrical outlet for every four required bicycle spaces (equivalent to 25%) to facilitate charging of electric motor assisted cycles. The development could equip 50% of the resident bicycle parking spaces with an electrical outlet to support increased use of e-bikes.

7.3.3 Communications & Marketing

Communications and marketing on sustainable transportation options specific to the subject site should be proactively offered to residents. At a minimum, this should include an information package provided during the resident move-in process. This could include:

- Bus schedules and route maps for nearby transit service (Route R6, 301, 314, 316, and 391).
- Map showing a recommended walking route to the nearest bus stop, including the R6 RapidBus stop.
- Information on cycling, including cycling routes and nearby bicycle shops and repair locations.
- Map showing recommended routes to key destinations and their travel time, such as the Superstore on 120 St and 82 Avenue.

The applicant could consider other opportunities to promote sustainable transportation options such as locating wayfinding signage in prominent locations that provides visitors and the public information on nearby walking, cycling, and transit routes, and major destinations. For example, this could include the designated safe routes to schools in the area (e.g., Richardson Elementary, North Delta Secondary School). Suggested locations include the residential lobby. The US Federal Highway Administration indicates parking demand reductions ranging from less than 1% in areas with low transit up to 5% in areas with high transit for these type of strategies.²

² US FHWA. (2012). *Integrating Demand Management into the Transportation Planning Process: A Desk Reference*.



7.4 Bicycle Parking

Table 16 summarizes the off-street bicycle parking requirements for the proposed development. A total of 163 bicycle parking spaces are required. The development is providing 163 bicycle parking spaces and is meeting the bylaw requirements for bicycle parking.

Table 16: Bicycle Parking Requirements

Land Use	Land Use Subcategory	Bylaw Requirement	Proposed
Residential - Apartment building	Residents	158	158
	Visitors	5	5
TOTAL		163	163

7.5 Loading

The City's Zoning Bylaw requires 1 loading space per building for residential sites with more than 80 dwelling units. The development is providing 1 loading space and is meeting the bylaw requirements for loading.



8.0 CONCLUSIONS

The proposed development will replace the existing 3 single family houses with a mid-rise apartment building consisting of 158 strata dwelling units which are expected to generate 37 vehicle trips and 39 vehicle trips in the AM and PM peak hours respectively.

With background traffic growth, the northbound left turn at 84 Avenue / 112 Street intersection is expected to operate at LOS E and V/C 1.05 in 2037. This issue can be mitigated with signal timing changes for the intersection. With signal timing improvements, all movements at all study area intersections will operate at LOS D or better, and V/C 0.95 or lower until 2037. The 95th percentile queue lengths for eastbound left, eastbound right, northbound left, and southbound left at 84 Avenue / 112 Street, and the northbound left and southbound left at 84 Avenue / 116 Street exceed the available storage lengths. The City should extend the storage lengths for these turn lanes.

With development traffic, the 84 Avenue / Social Heart Loop intersection will have a south leg as a result of the development site access. As such, the existing traffic signal will need to be upgraded with signalization for the south leg and permitted phasing arrangement for the major and minor legs. To ensure concurrent northbound and southbound left turns with no conflicts, intersection guide line pavement markings should be installed for both movements. To ensure southbound left turns from large trucks do not encroach onto the painted bike lane, the westbound left turn lane stop bar should be installed at an offset, 1.38m from the westbound through/right turn lane stop bar. The 95th percentile queues for westbound left turns are expected to be 10m, thus will not impede access for the 11490 84 Avenue site access located 15m from the westbound left turn lane stop bar. Development traffic will not create any additional traffic impacts at any of the other study area intersections.

The site has good pedestrian facilities in the study area with sidewalks on both sides of 84 Avenue and pedestrian crossings with signalized intersections. The Delta Cycling Master Plan also plans to upgrade 84 Avenue with protected cycling facilities. The site is located within 350 meters from existing bus stops which provide bus connections to key employment, institutional, and recreational locations such as Strawberry Hill Shopping Centre, Scottsdale Mall, Kwantlen Polytechnic University, Scottsdale Exchange, Newton Exchange, Surrey Memorial Hospital, and Surrey Central SkyTrain Station. In addition, the recent introduction of the R6 Rapid Bus route in 2024 with bus stops located at a 1km walking distance from the site at 120 Street / 84 Avenue provides future residents with high-frequency bus service every 7.5 minutes during peak hours.



ICBC vehicle ownership data for multi-family residential sites in Delta revealed that vehicle parking demand from residents are 19% lower than the City's bylaw requirements for off-street vehicle parking. In addition, Metro Vancouver's 2018 Regional Parking Study indicates that sites near the frequent transit network have vehicle parking demand rates of 1.09 vehicles/unit. This is equivalent to 172 vehicle parking spaces for future residents at the proposed site. The development's proposed vehicle parking supply of 193 spaces for resident parking at a 16% reduction from bylaw requirements is supported. For transportation demand management (TDM) measures, it is suggested that the development offers unbundled parking spaces by separating the purchase of a parking stall from the purchase of an apartment unit; provide electrical outlets for 50% of the resident bicycle parking stalls for e-bike usage, and supply communications and marketing materials on sustainable transportation to residents during the move-in process.

9.0 RECOMMENDATIONS

For the City's consideration and review:

1. Optimize the signal timings at the 84 Avenue / 112 Street intersection.
2. Extend the storage lengths for eastbound left, eastbound right, northbound left, and southbound left at 84 Avenue / 112 Street intersection.
3. Extend the storage lengths for northbound left and southbound left at 84 Avenue / 116 Street intersection.

For the Applicant:

1. Upgrade the traffic signal for the existing T-intersection at 84 Avenue / Social Heart Loop intersection into a four-legged signalized intersection with the site access as the south leg and permitted phasings for major and minor legs. Electrical to install loop detectors with registered SRWs on the south leg.
2. Provide a westbound left turn lane with a 15-meter storage length at 84 Avenue / Social Heart Loop intersection and a 1.38m offset for the stop bar.

APPENDIX A: SYNCHRO BACKGROUND

SYNCHRO MODELLING SOFTWARE DESCRIPTION

The traffic analysis was completed using Synchro and SimTraffic traffic modelling software. Results were measured in delay, level of service (LOS), and 95th percentile queue length. SimTraffic integrates established driver behaviours and characteristics to simulate actual conditions by randomly “seeding” or positioning vehicles travelling throughout the network. The simulation is run ten times (ten different random seedings of vehicle types, behaviours and arrivals) to obtain statistical significance of the results.

Levels of Service

Traffic operations are typically described in terms of levels of service, which rates the amount of delay per vehicle for each movement and the entire intersection. Levels of service range from LOS A (representing best operations) to LOS E/F (LOS E being poor operations and LOS F being unpredictable/disruptive operations). LOS E/F are generally unacceptable levels of service under normal everyday conditions. A LOS C or better is considered acceptable operations, while D is considered to be on the threshold between acceptable and unacceptable operations. Operations will typically need to operate at LOS C or better for through movements and LOS E or better for other traffic movements with lower order roads.

The hierarchy of criteria for grading an intersection or movement not only includes delay times, but also takes into account traffic control type (stop signs or traffic signal). For example, if a vehicle is delayed for 19 seconds at an unsignalized intersection, it is considered to have an average operation, and would therefore be graded as an LOS C. However, at a signalized intersection, a 19 second delay would be considered a good operation and therefore it would be given an LOS B. The table below indicates the range of delay for LOS for signalized and unsignalized intersections.

Table B1 – LOS Criteria by Intersection Traffic Control

Level of Service (LOS)	Unsignalized Intersection Average Vehicle Delay (sec/veh)	Signalized Intersection Average Vehicle Delay (sec/veh)
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80