

Date: March 14, 2022
File No: 7635-01

Greg Nielsen
GD Nielsen Homes
Suite 129, 1305 Welch Street
North Vancouver, BC
V7P 1B3

Dear Mr. Nielsen:

Re: 6155 Eagleridge Place, West Vancouver – Traffic Impact Study

1.0 BACKGROUND

GD Nielsen Homes is proposing to redevelop the single-family residential property at 6155 Eagleridge Place as six (6) single-family detached homes, six (6) duplex residences and eight (8) multi-family rental residences consistent with the existing RS – Single Family Dwelling zoning. The site is illustrated by **FIGURE 1**. Copies of the architectural plans and stats are included as **APPENDIX A**.

The site is expected to be built-out and occupied by the end of 2025.

**FIGURE 1
SITE**



2.0 SCOPE OF WORK

The scope of work for this study is based on the *Transportation Impact Assessment Guidelines for Development Projects* from the District of West Vancouver. The categories of Transportation Impact Assessment (TIA) are the following:

- LEVEL 1 – Projects expected to generate between 10 to 30 vehicles at afternoon peak period.
- LEVEL 2 – Projects expected to generate between 31 to 150 vehicles at afternoon peak period.
- LEVEL 3 – Projects expected to generate more than 151 vehicles at afternoon peak period.

Based on the preceding, CTS determine the TIA to be Level 1. CTS therefore assessed the following:

Parking:

- Confirm bylaw parking requirements are met.
- Assess if parking provided is adequate to meet the parking demand of the site's unit owners and visitors.
- Identify if there are potential parking impacts along adjacent roadways in nearby residential neighbourhoods.

Traffic:

- Conduct analysis to identify site-generated traffic using industry recognized tools. The analysis is to be based on opening day conditions.
- Confirm the adjacent road network has the capacity to accommodate site-generated traffic.

Sight Lines:

- Confirm minimum sight line requirements are met.

3.0 Parking Assessment

With reference to the District of West Vancouver *Zoning Bylaw No. 4662, Section 141 - Parking for Single Family Dwelling, Duplex Dwelling and Multi-Family Rental Dwelling Uses*, the on-site vehicle parking requirement was determined to be per **TABLE 1**.

**TABLE 1
PARKING REQUIREMENT AND PROVISION**

Use	Zoning Bylaw 4662	Rate	Scope	Requirement	Provision
Residential (Single-Family)	141.01(2)(a)	1.0 parking space per residential unit	6 units	6	12
Residential (Duplex)	141.01(2)(a)	1.0 parking space per residential unit	6 units	6	12
Residential (Multi-Family)	302.13(1)(a)	1.0 parking space per dwelling unit	8 units	8	8
Visitor		0.2 parking space per residential unit	20 units	4	4
TOTAL NUMBER OF PARKING SPACES				24	36

The on-site vehicle parking requirement is exceeded.

In terms of parking off-site, the parking regulation on Eagleridge Place is 3 hours from 7:00 AM to 7:00 PM. Therefore, those on-street parking spaces on Eagleridge Place could also be available for visitor parking.

4.0 Traffic Impact Assessment

4.1 Site Vehicle Trip Generation

With reference to the Institute of Transportation Engineers (ITE) *Trip Generation Manual 11th Edition - Code 210 (Single-Family Detached Housing)* for the proposed single-family residences, *Code 215 (Single-Family Attached Housing)* for the proposed duplex residences, and *Code 220 (Multi-family Housing)* for the proposed multi-family rental residences, the proposed development is expected to generate the following number of vehicle trips during the weekday morning and afternoon peak hours. See **TABLE 2**.

**TABLE 2
VEHICLE TRIP GENERATION**

Land Use	Peak Hour	Trip Generation Variable	Scope of Development	Vehicle Trip Generation Rate	Trip Rate Source	Directional Split		Peak Hour Volumes		
						% in	% out	in	out	total
Single-Family Detached Housing	Weekday Morning	Dwelling Units	6	0.70	ITE 11th Edition Code 210	26%	74%	1	4	5
	Weekday Afternoon			0.94		63%	37%	4	2	6
Single-Family Attached Housing (Duplexes)	Weekday Morning	Dwelling Units	6	0.48	ITE 11th Edition Code 215	31%	69%	1	2	3
	Weekday Afternoon			0.57		57%	43%	2	2	4
Multi-Family Housing (Low-Rise)	Weekday Morning	Dwelling Units	8	0.40	ITE 11th Edition Code 220	24%	76%	1	3	4
	Weekday Afternoon			0.51		63%	37%	3	2	5
TOTAL WEEKDAY MORNING PEAK HOUR								3	9	12
TOTAL WEEKDAY AFTERNOON PEAK HOUR								9	6	15

In total 12 vehicle trips (3 inbound and 9 outbound) are expected during the weekday morning peak hour and 15 vehicle trips (9 inbound and 6 outbound) are expected during the weekday afternoon peak hour. This is equivalent to 1 vehicle movement every 5.0 minutes in the weekday morning peak hour 1 vehicle movement every 4.0 minutes weekday afternoon peak hour.

FIGURE 2 and **FIGURE 3** illustrate the site generated traffic volumes in the weekday morning and afternoon peak hours.

FIGURE 2
WEEKDAY MORNING PEAK HOUR SITE GENERATED TRAFFIC VOLUMES

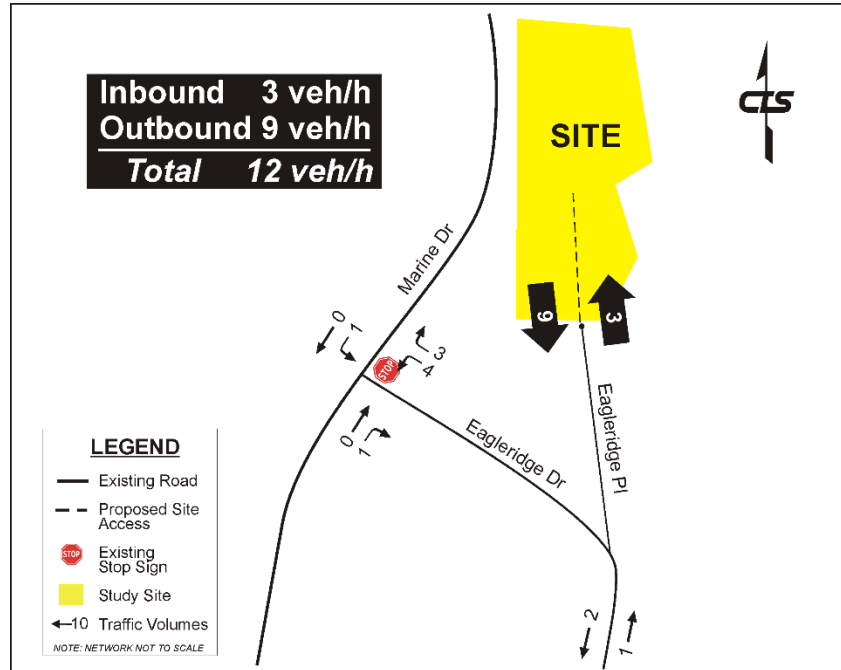
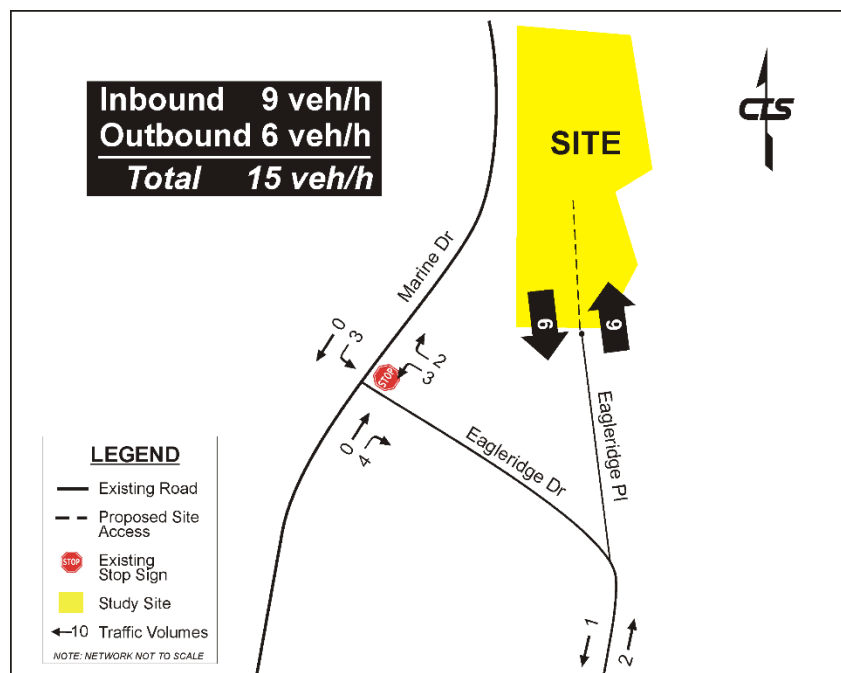


FIGURE 3
WEEKDAY AFTERNOON PEAK HOUR SITE GENERATED TRAFFIC VOLUMES



4.2 Peak Hour Traffic Volumes

CTS conducted an intersection traffic movement count at Marine Drive and Eagleridge Drive on Thursday, December 2, 2021, from 07:00 to 09:00, 11:00 to 13:00, and 15:00 to 18:00 to augment available historical traffic data. The traffic count data was tabulated and reviewed to ensure data integrity and validity, to determine the weekday morning and afternoon peak hours, which are illustrated by **FIGURE 4** and **FIGURE 5** respectively. Copies of the traffic volume summary sheets are included as **APPENDIX B**.

FIGURE 4
2021 WEEKDAY AM PEAK HOUR BASE TRAFFIC VOLUMES

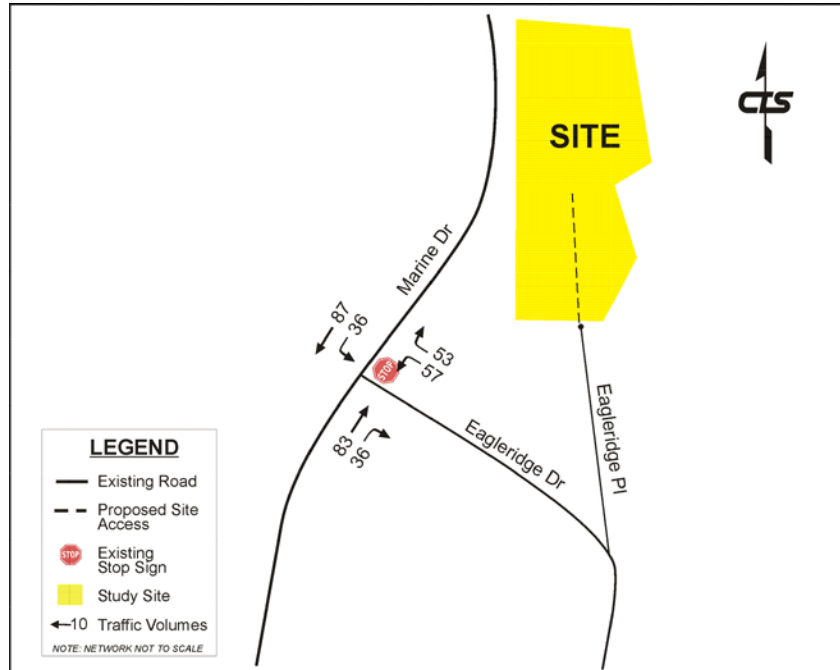
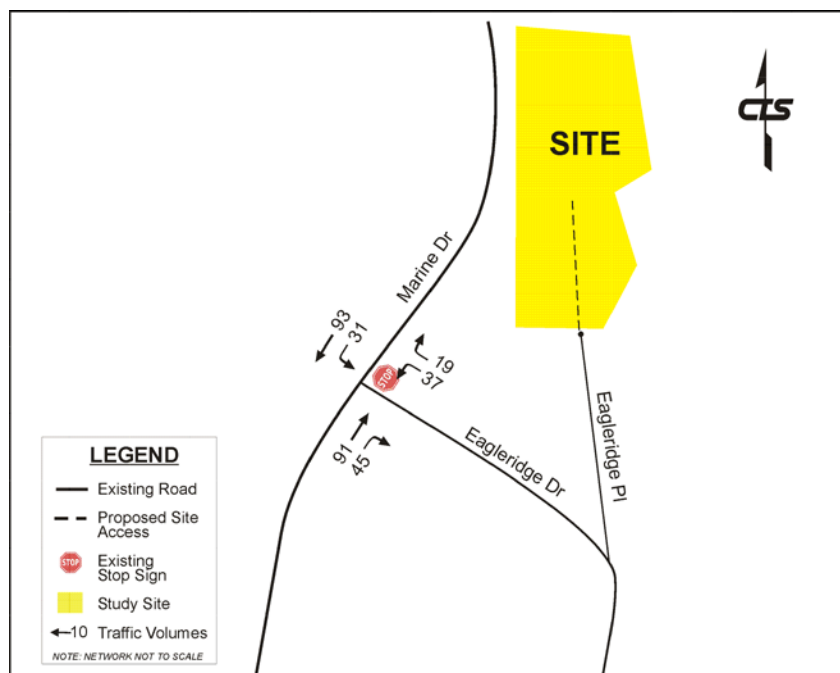


FIGURE 5
2021 WEEKDAY PM PEAK HOUR BASE TRAFFIC VOLUMES



The year 2025 is anticipated to be the year of build-out for the proposed development. The 2021 base traffic volumes were factored up by a traffic volume growth rate of 1.0% per annum (simple straight line) to represent the base year 2025 traffic volumes.

FIGURE 6 and **FIGURE 7** illustrate the total projected traffic for the 2025 weekday morning and afternoon peak hours consisting of both base and site generated traffic from the proposed development.

FIGURE 6
2025 WEEKDAY AM PEAK HOUR BASE + SITE TRAFFIC VOLUMES

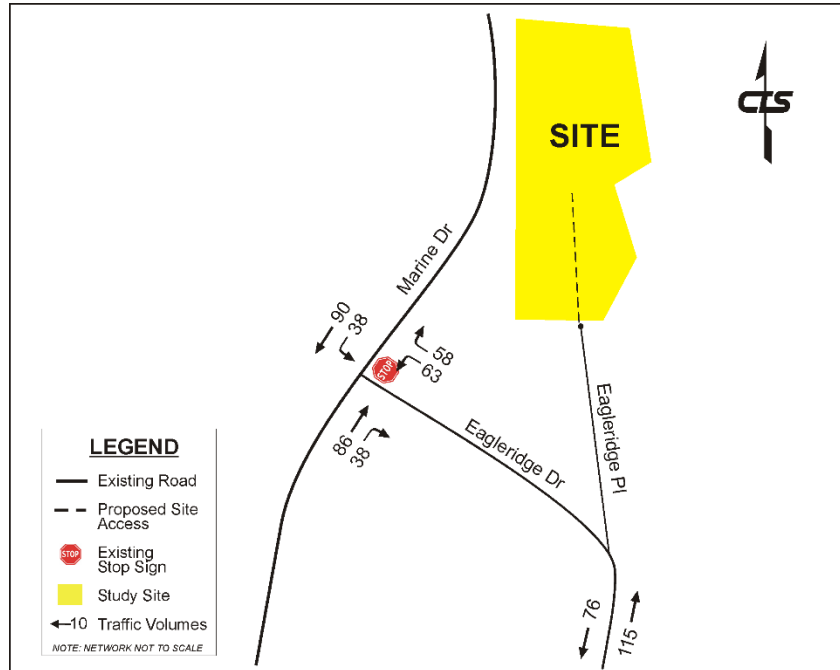
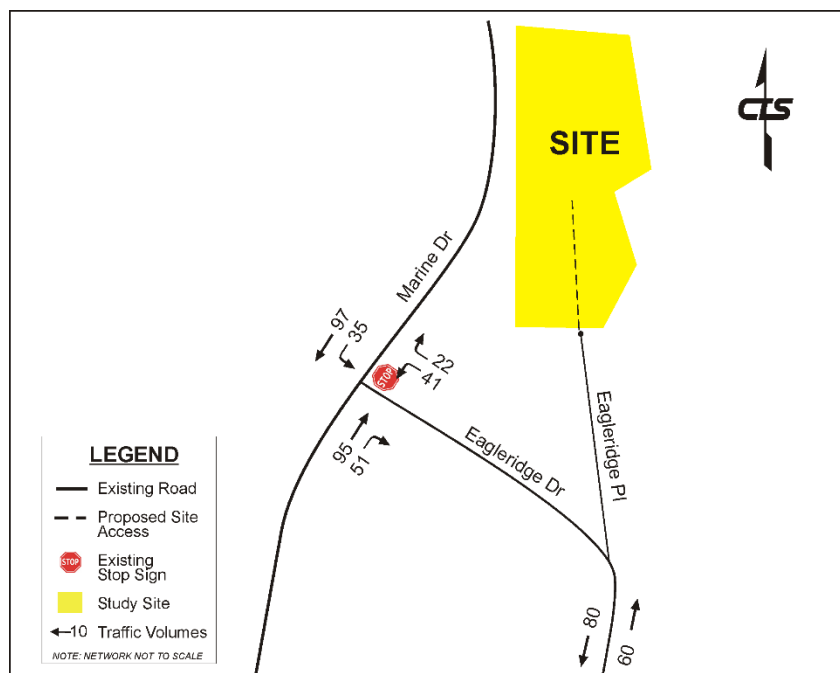


FIGURE 7
2025 WEEKDAY PM PEAK HOUR BASE + SITE TRAFFIC VOLUMES



4.3 Intersection Capacity Analysis

Capacity analysis was performed for the intersection of Marine Drive and Eagleridge Drive, to determine the intersection level of service (LOS) that is provided to motorists. LOS for the intersection is defined in terms of delay (seconds per vehicle), which is a measure of driver discomfort and frustration, fuel consumption and lost travel time.

Highway Capacity Software (HCS) was used for the unsignalized intersection analysis. The following assumptions were made with respect to the intersection capacity analysis:

- Saturation flow rate = 1,900 passenger cars/hour of green time/lane (pcphgpl)
- Heavy vehicle percentage for roads = 2.0%
- Peak hour factor (PHF) = 0.70 for the morning and 0.85 for the afternoon which are the average PHF from the surveyed intersection.

TABLE 3 summarizes and compares the main performance parameters including the Level of Service (LOS) and the delay per vehicle (in seconds) for the intersection capacity analysis.

**TABLE 3
CAPACITY ANALYSIS SUMMARY FOR UNSIGNALIZED INTERSECTION**

Intersection	Time of Day	Scenario	Performance Measure	Eastbound			Westbound			Northbound			Southbound			LOS	Notes	
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right			
Marine Drive (N/S) and Eagleridge Drive (E/W)	Weekday Morning Peak Hour	2021 Base	Volumes				57		53				83	36	36	87	A	OK
			Delay				10.9			0.0			7.7					
			95% Queue (veh)				0.8			0.0			0.1					
		2025 Base + Site	Volumes				63		58				86	38	38	90	A	OK
			Delay				11.1			0.0			7.7					
			95% Queue (veh)				0.9			0.0			0.1					
	Weekday Afternoon Peak Hour	2021 Base	Volumes				37		19				91	45	31	93	A	OK
			Delay				10.0			0.0			7.6					
			95% Queue (veh)				0.3			0.0			0.1					
		2025 Base + Site	Volumes				41		22				95	51	35	97	A	OK
			Delay				10.1			0.0			7.6					
			95% Queue (veh)				0.3			0.0			0.1					

Delay = Average Delay (seconds/vehicle)

Intersection approaching capacity (LOS 'D' or 'E'); or medium approach delays (25sec to <50sec)

Intersection equals or exceeds capacity (LOS 'F'); or high approach delays (=> 50sec)

95% Queue = UNSIGNALIZED QUEUE IS PER VEHICLE

The intersection of Marine Drive at Eagleridge Drive currently operates as a stop-controlled intersection with Marine Drive operating as free-flow. For 2021 base conditions, the intersection operates at an overall LOS A (excellent) during the weekday AM and PM peak hours. By the year 2025 with site generated traffic volumes i.e. build-out, the intersection remains at an overall LOS A (excellent) during the weekday AM and PM peak hours.

4.4 Road Capacity Analysis

Eagleridge Drive is a collector road connecting Highway 1 to the east and Marine Drive to the west. There is one northbound through lane and one southbound through lane. With reference to the Transportation Association of Canada (TAC) *Geometric Design Guidelines for Canadian Roads – Table 2.6.5: Characteristics of Urban Roads*, a collector road can be expected to carry up to 8,000 vehicles per day or up to 1,000 vehicles per hour.

Referencing the traffic volume summary sheets included as **APPENDIX B**, adjacent to site there were on average 182 vehicles on Eagleridge Drive during the weekday morning peak hour and 132 vehicles during the weekday afternoon peak hour. Projecting both the 2021 weekday morning and afternoon peak hour vehicle volumes at 1% per annum to 2025 i.e. build-out, gives 189 vehicles and 137 vehicles respectively. Both vehicle volumes are well below the theoretical capacity for a collector road.

Site generated vehicle trips add less than one percent to the theoretical eastbound/westbound lane capacity on Eagleridge Drive in the weekday morning peak and afternoon peak hours. Summation of the background and site generated weekday morning and afternoon peak hour vehicle volumes results in total vehicle volumes that are well below the capacity for a collector road.

The proposed the proposed development will have a negligible effect on the operation of Eagleridge Drive.

5.0 Sight Line Assessment

CTS undertook a sight line assessment to/from the proposed access on Eagleridge Drive. The sight line measured from the back of curb to/from the west was approximately 70 meters. The sight line measured from the back of curb to/from the east was approximately 60 meters.

With reference to the Transportation Association of Canada (TAC) *Geometric Design Guidelines for Canadian Roads Table 2.5.3: Stopping Sight Distance on Grades*, the Stopping Sight Distance for a road posted at 30 km/h is 35 meters on a 9% downgrade and 29 meters on a 9% upgrade. The Stopping Sight Distance is met.

With reference to the Transportation Association of Canada (TAC) *Geometric Design Guidelines for Canadian Roads Table 2.5.3: Stopping Sight Distance on Grades*, the Stopping Sight Distance for a road operating at 40 km/h is 53 meters on a 9% downgrade and 43 meters on a 9% upgrade. The Stopping Sight Distance is met.

Of note, there is a speed bump on Eagleridge Drive located 180 meters to the east of Eagleridge Place. Also, there is a signed and marked pedestrian crossing with overhead flashing beacon located on Eagleridge Drive just 28 meters to the west of Eagleridge Place.

6.0 TRANSPORTATION DEMAND MANAGEMENT

Walking

There is a pathway on Eagleridge Drive connecting to the Seaview Trail/Spirit Trail less than 150 meters from the proposed development site. The Spirit Trail will ultimately connect Horseshoe Bay, Dundarave, Ambleside, Lions Gate Bridge, District of North Vancouver and City of North Vancouver.

Cycling

The Spirit Trail is less than 150 meters from the proposed development site. The Spirit Trail will ultimately connect Horseshoe Bay, Dundarave, Ambleside, Lions Gate Bridge, District of North Vancouver and City of North Vancouver.

Marine Drive is also a popular informal cycling route for road riders.

Transit

There is transit service on Marine Drive within a 200 meter walk from the proposed development site.

#250 – Horseshoe Bay/Dundarave. Service is every 10 minutes during peak periods. For travel within the District of West Vancouver the service is frequent.

#250 - Vancouver. Service is every 30 minutes during peak periods.

Given the proximity of transit and the frequency, the proposed development could be considered transit orientated.

7.0 CONCLUSIONS

CTS undertook an assessment of parking and traffic for six (6) single-family detached homes, six (6) duplex residences and eight (8) multi-family rental residences at 6155 Eagleridge Place in the District of West Vancouver. Based on the assessment the following can be stated:

- The on-site parking supply exceeds the Bylaw requirement. On-site parking is not expected to overflow onto residential streets.
- The net increase in site generated trips, is negligible.
- The intersection of Eagleridge Drive and Marine Drive operates at level of service A (excellent) for both existing and build-out scenarios and it can accommodate the site traffic volumes with no required operational or/and geometrical improvements.
- The impact to lane capacity and operation on Eagleridge Drive, is negligible.
- Stopping Sight Distance to/from the proposed access is met for a posted speed of 30 km/h and an operating speed of 40 km/h.

8.0 RECOMMENDATIONS

It is recommended that the technical rationale provided by this Traffic and Parking Assessment supporting six (6) single-family detached homes, six (6) duplex residences and eight (8) multi-family rental residences at 6155 Eagleridge Place, be accepted by the District of West Vancouver.

In closing, please call the undersigned should there be questions and/or comments relating to this letter report and its contents.

Yours truly,

CREATIVE TRANSPORTATION SOLUTIONS LTD.
PERMIT TO PRACTICE No: 1000697



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APPENDICES

APPENDIX A

Site Plan and Stats

APPENDIX B

Traffic Volume Summary Sheets



Marine Dr & Eagleridge Dr

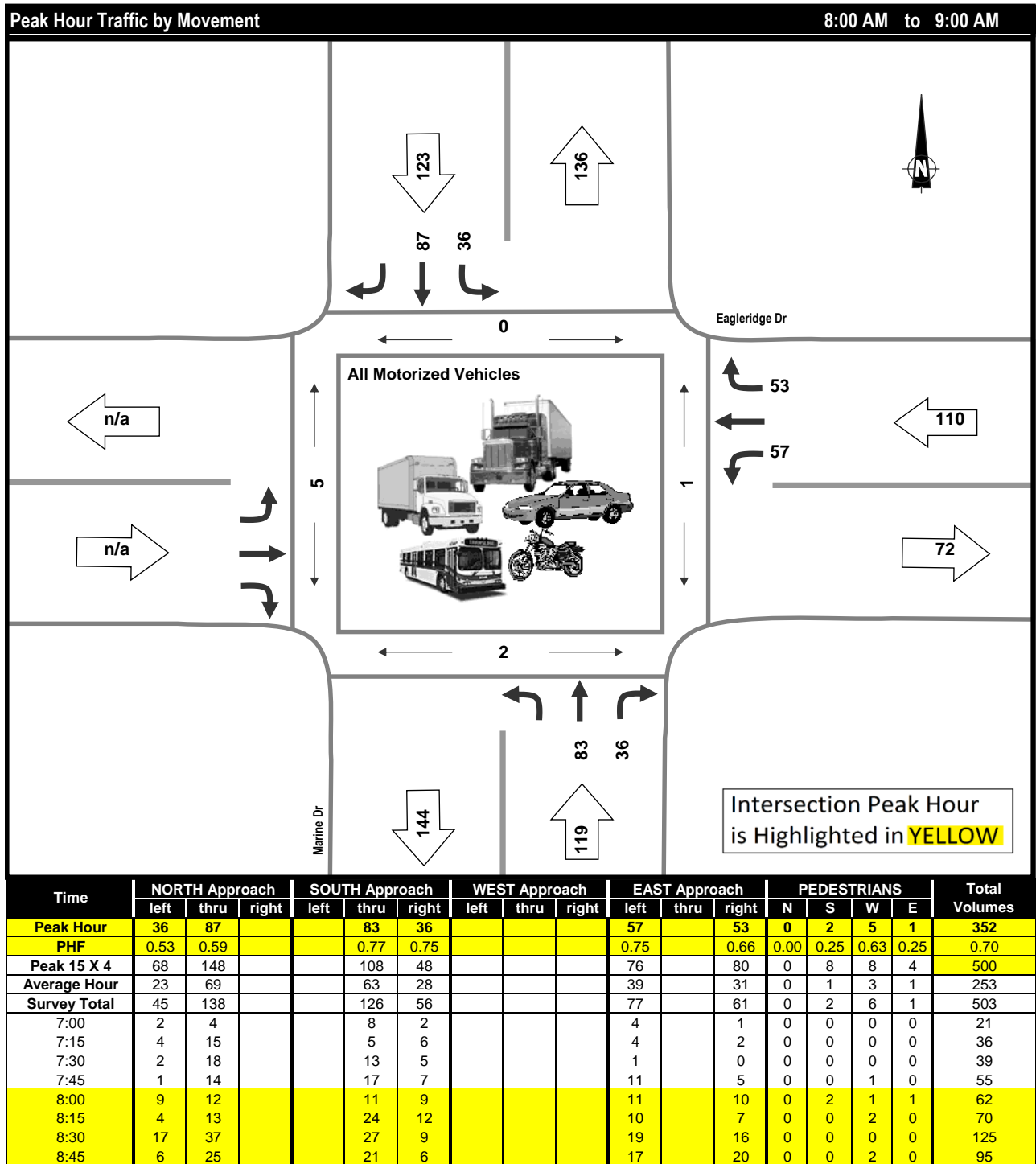
Thursday, December 02, 2021

Vehicle Classification Summary

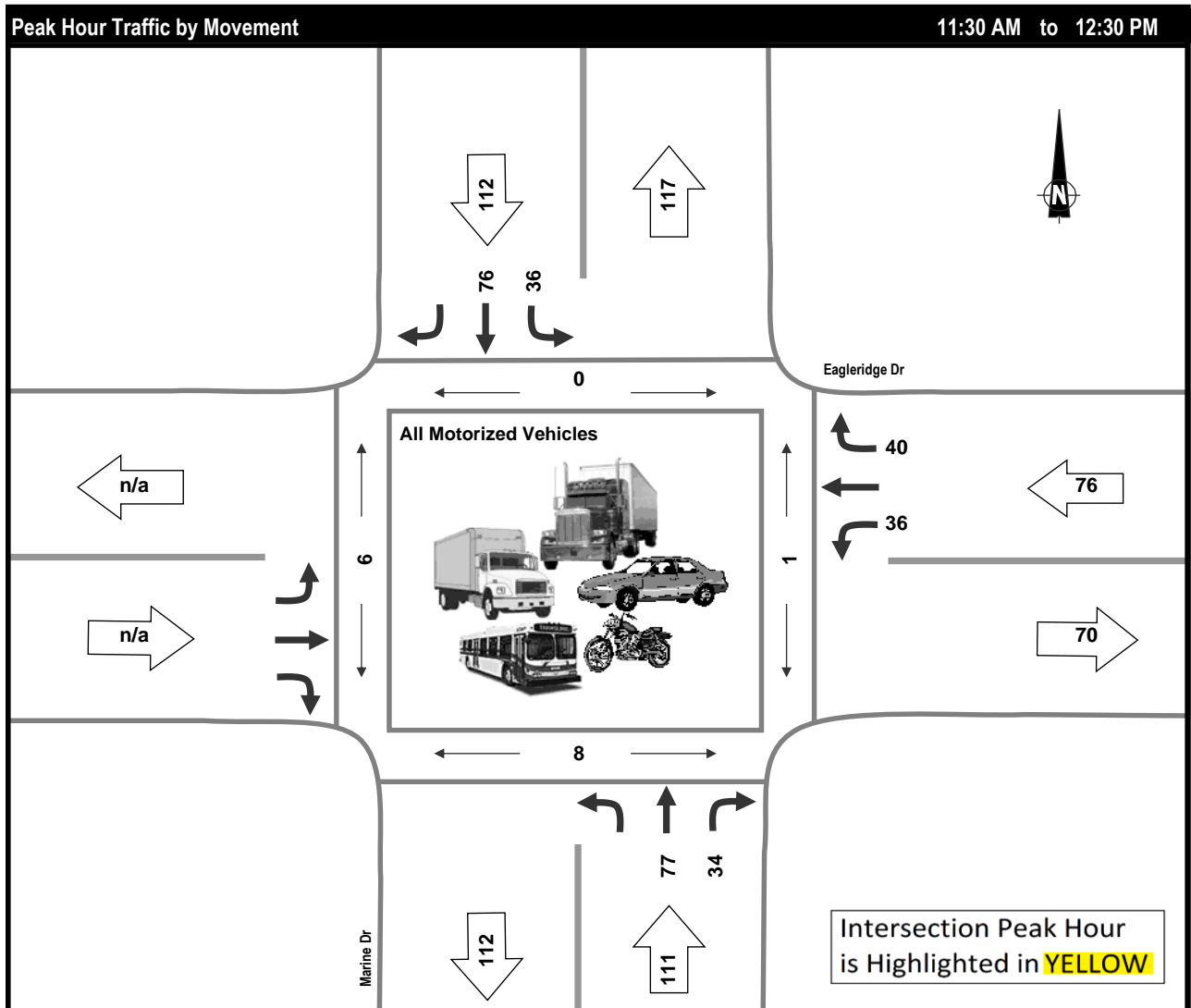
Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
Municipality: West Vancouver
Weather: Cloudy
Notes: Pandemic Data.

Time Period	Entering Intersection	Vehicle Classification				Total
		Passenger Cars	Heavy Vehicles (3 or more axles)			
Morning (07:00 - 09:00)	Volume	493	10			503
	%	98.0%	2.0%			100.0%
Midday (11:00 - 13:00)	Volume	571	6			577
	%	99.0%	1.0%			100.0%
Afternoon (15:00 - 18:00)	Volume	766	2			768
	%	99.7%	0.3%			100.0%
Total (7 Hours)	Volume	1,830	18			1,848
	%	99.0%	1.0%			100.0%

Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
 Municipality: West Vancouver
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles
 Notes: Pandemic Data.



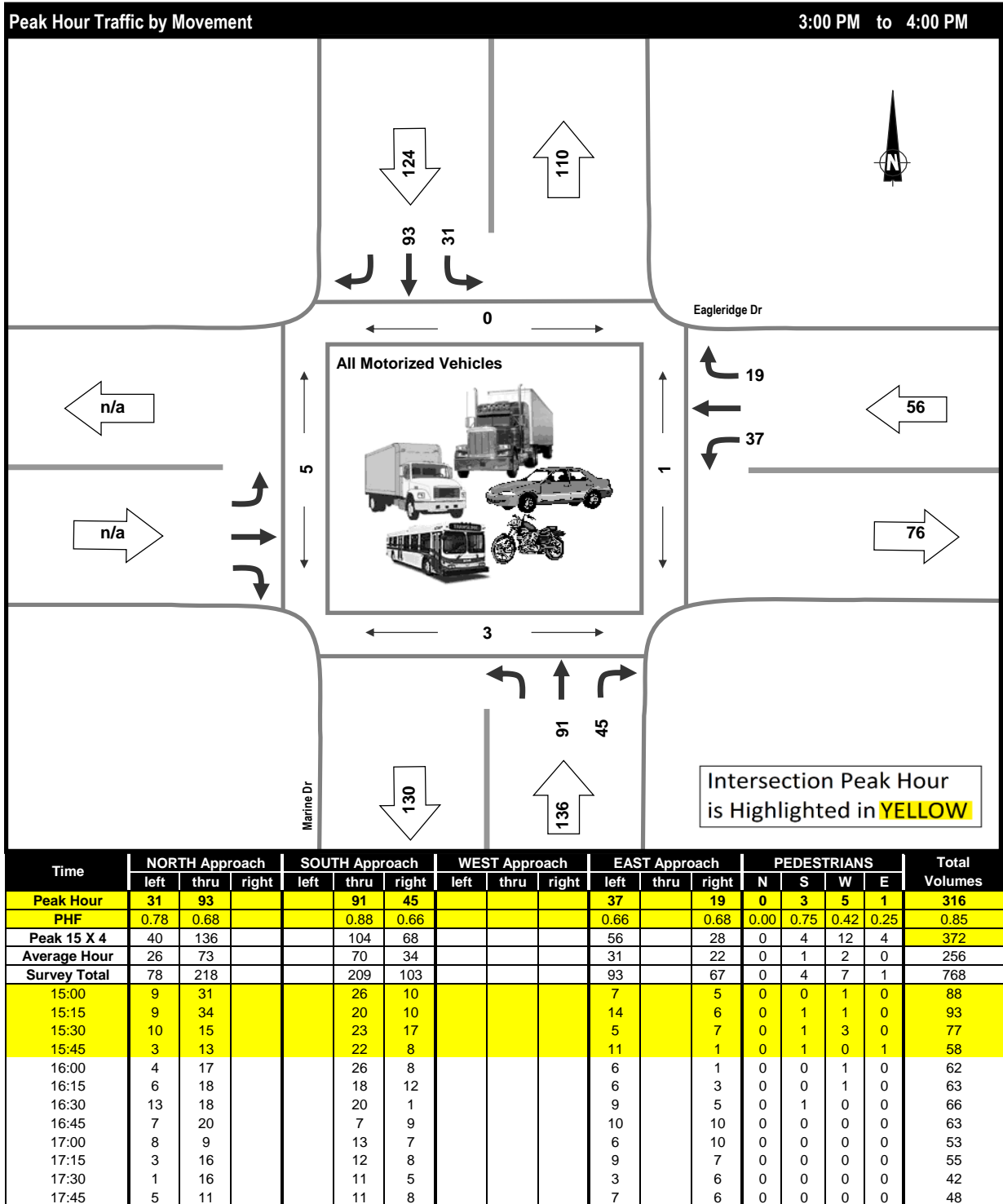
Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
 Municipality: West Vancouver
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles
 Notes: Pandemic Data.



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	36	76			77	34				36		40	0	8	6	1	299
PHF	0.69	0.95			0.80	0.77				0.82		0.71	0.00	0.50	0.50	0.25	0.91
Peak 15 X 4	52	80			96	44				44		56	0	16	12	4	328
Average Hour	36	67			77	36				34		40	0	6	5	1	290
Survey Total	71	133			154	72				67		80	0	12	9	2	577
11:00	7	16			12	10				9		6	0	0	1	0	60
11:15	6	11			24	7				6		8	0	2	0	0	62
11:30	13	20			24	11				9		5	0	1	1	1	82
11:45	1	20			20	10				11		12	0	4	3	0	74
12:00	13	19			15	8				10		14	0	0	0	0	79
12:15	9	17			18	5				6		9	0	3	2	0	64
12:30	14	20			13	12				8		15	0	2	2	1	82
12:45	8	10			28	9				8		11	0	0	0	0	74

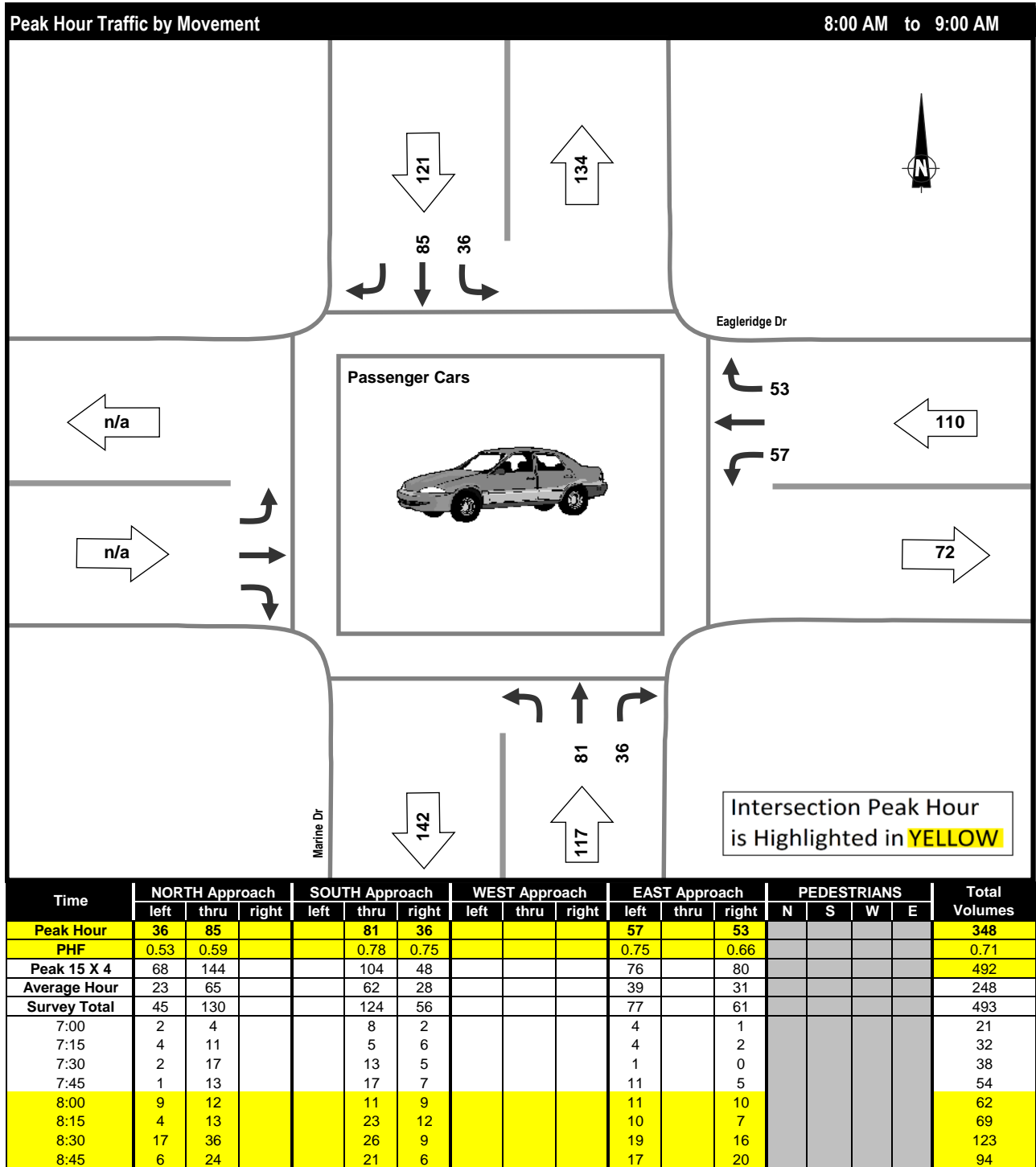
Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
Municipality: West Vancouver
Weather: Cloudy
Vehicle Class: All Motorized Vehicles
Notes: Pandemic Data.

Afternoon Peak Period

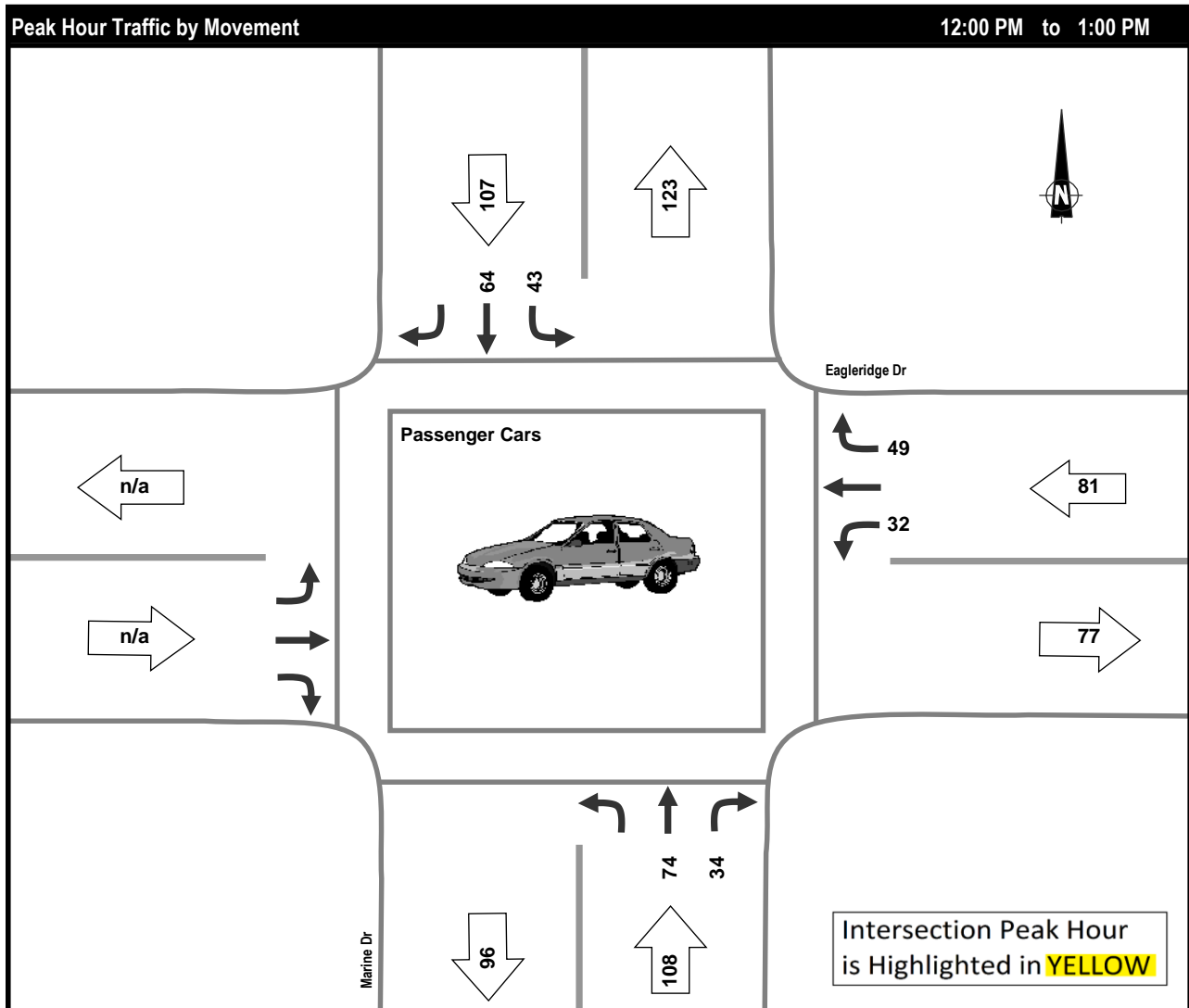


Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
Municipality: West Vancouver
Weather: Cloudy
Vehicle Class: Passenger Cars
Notes: Pandemic Data.

Morning Peak Period



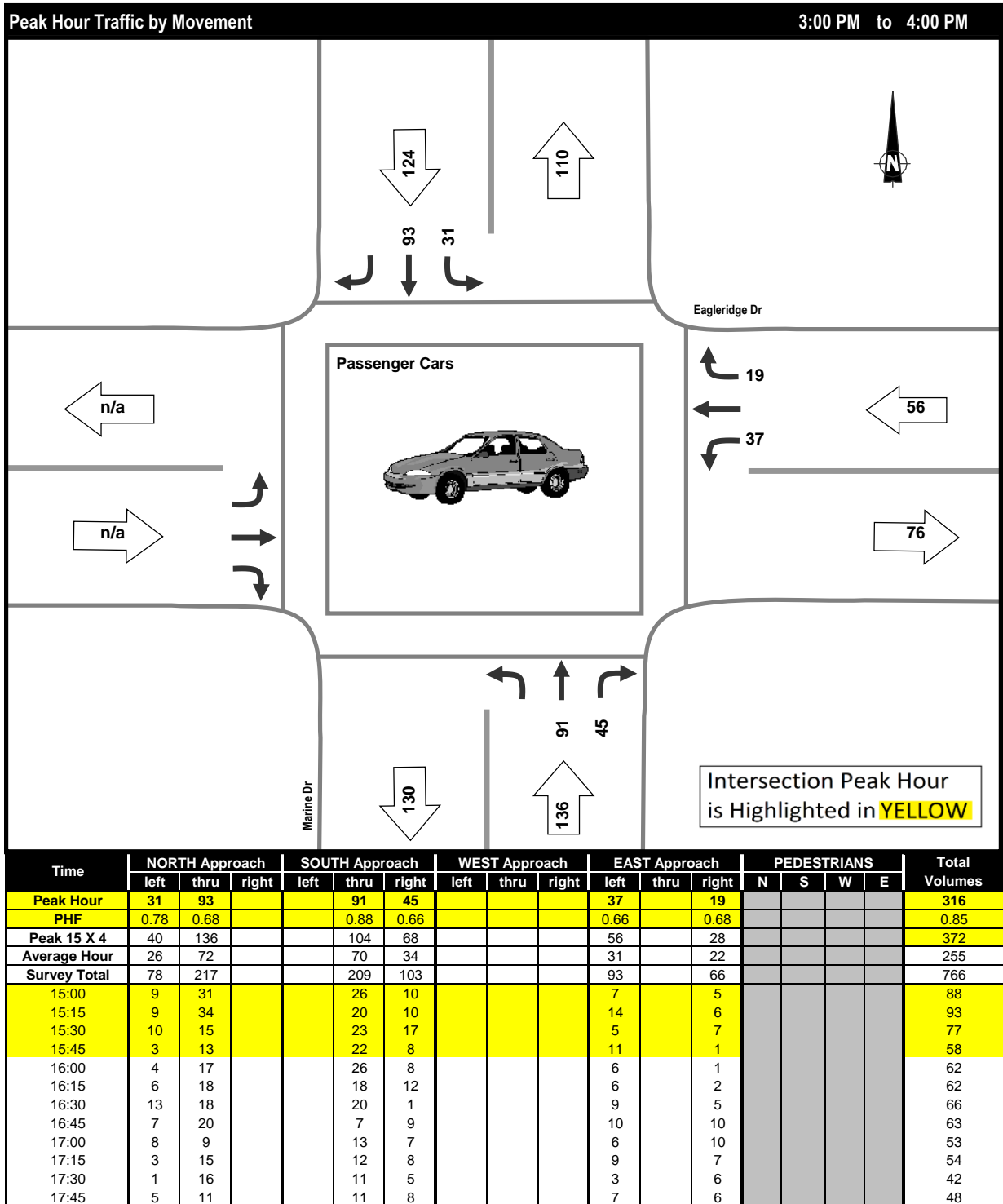
Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
 Municipality: West Vancouver
 Weather: Cloudy
 Vehicle Class: Passenger Cars
 Notes: Pandemic Data.



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	43	64			74	34				32		49					296
PHF	0.77	0.80			0.66	0.71				0.80		0.82					0.90
Peak 15 X 4	56	80			112	48				40		60					328
Average Hour	35	65			77	36				34		40					287
Survey Total	70	129			153	72				67		80					571
11:00	7	15			12	10				9		6					59
11:15	6	11			24	7				6		8					62
11:30	13	19			24	11				9		5					81
11:45	1	20			19	10				11		12					73
12:00	12	18			15	8				10		14					77
12:15	9	16			18	5				6		9					63
12:30	14	20			13	12				8		15					82
12:45	8	10			28	9				8		11					74

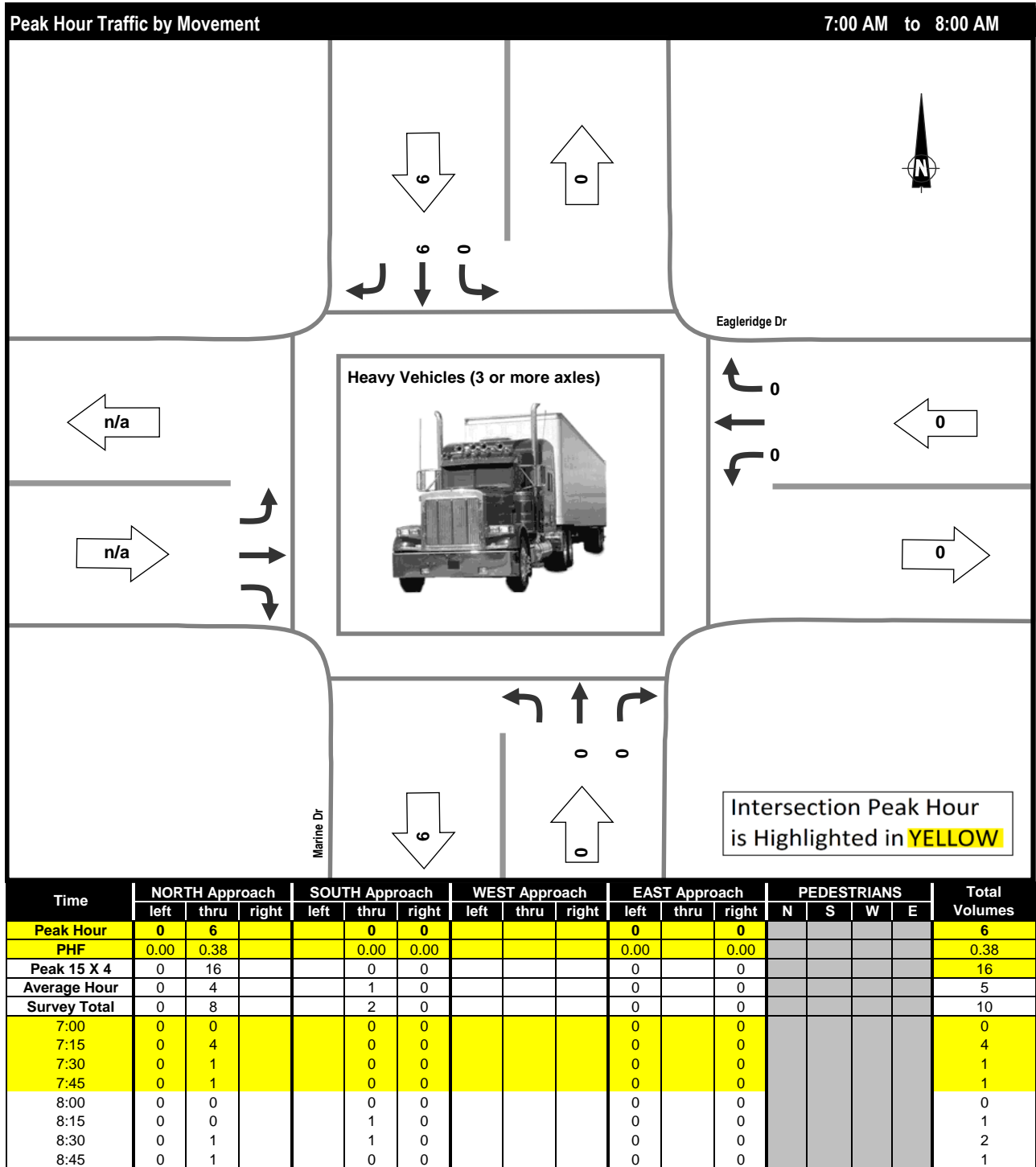
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Municipality: West Vancouver
Weather: Cloudy
Vehicle Class: Passenger Cars
Notes: Pandemic Data.

Afternoon Peak Period



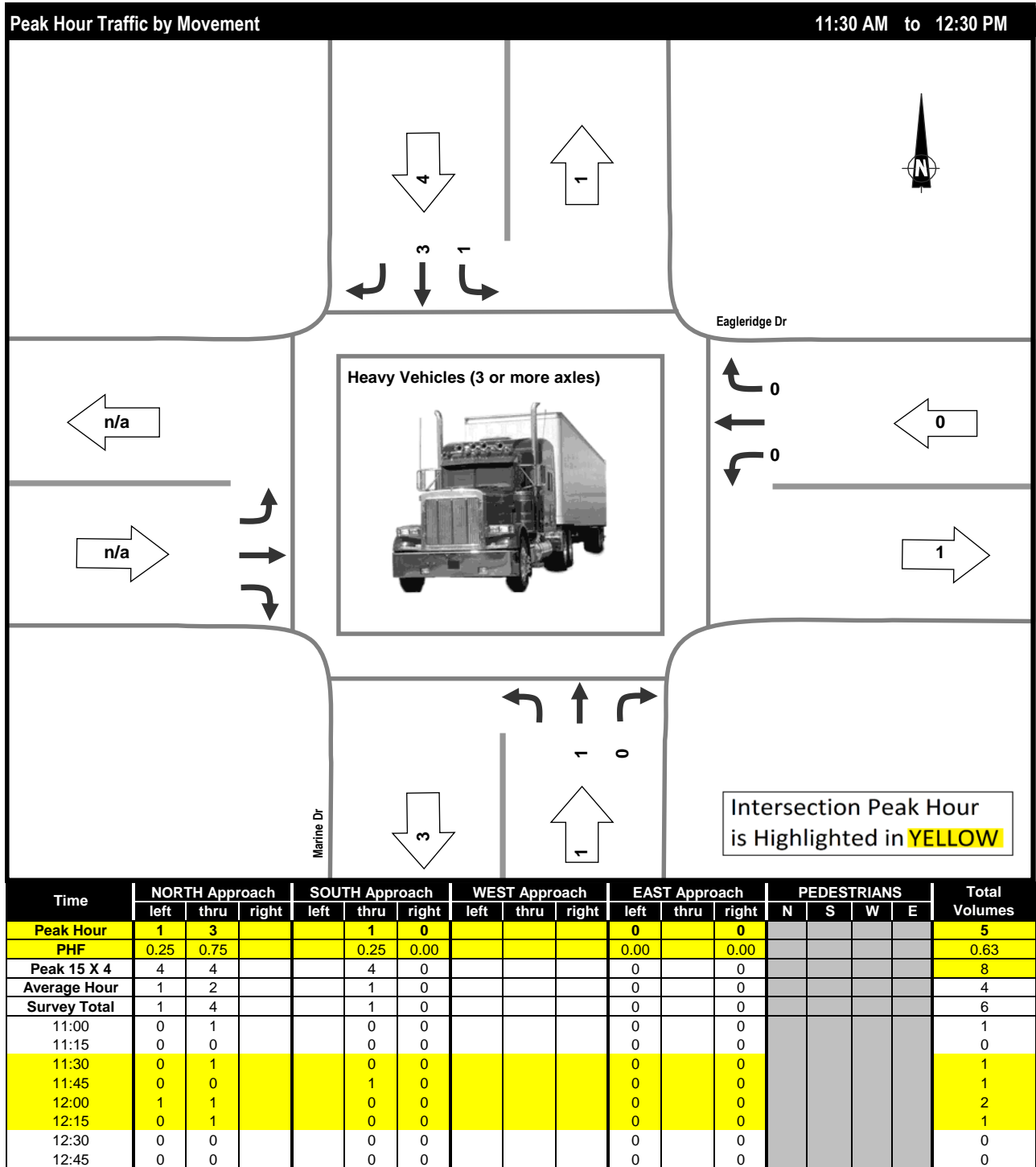
Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
Municipality: West Vancouver
Weather: Cloudy
Vehicle Class: Heavy Vehicles (3 or more axles)
Notes: Pandemic Data.

Morning Peak Period

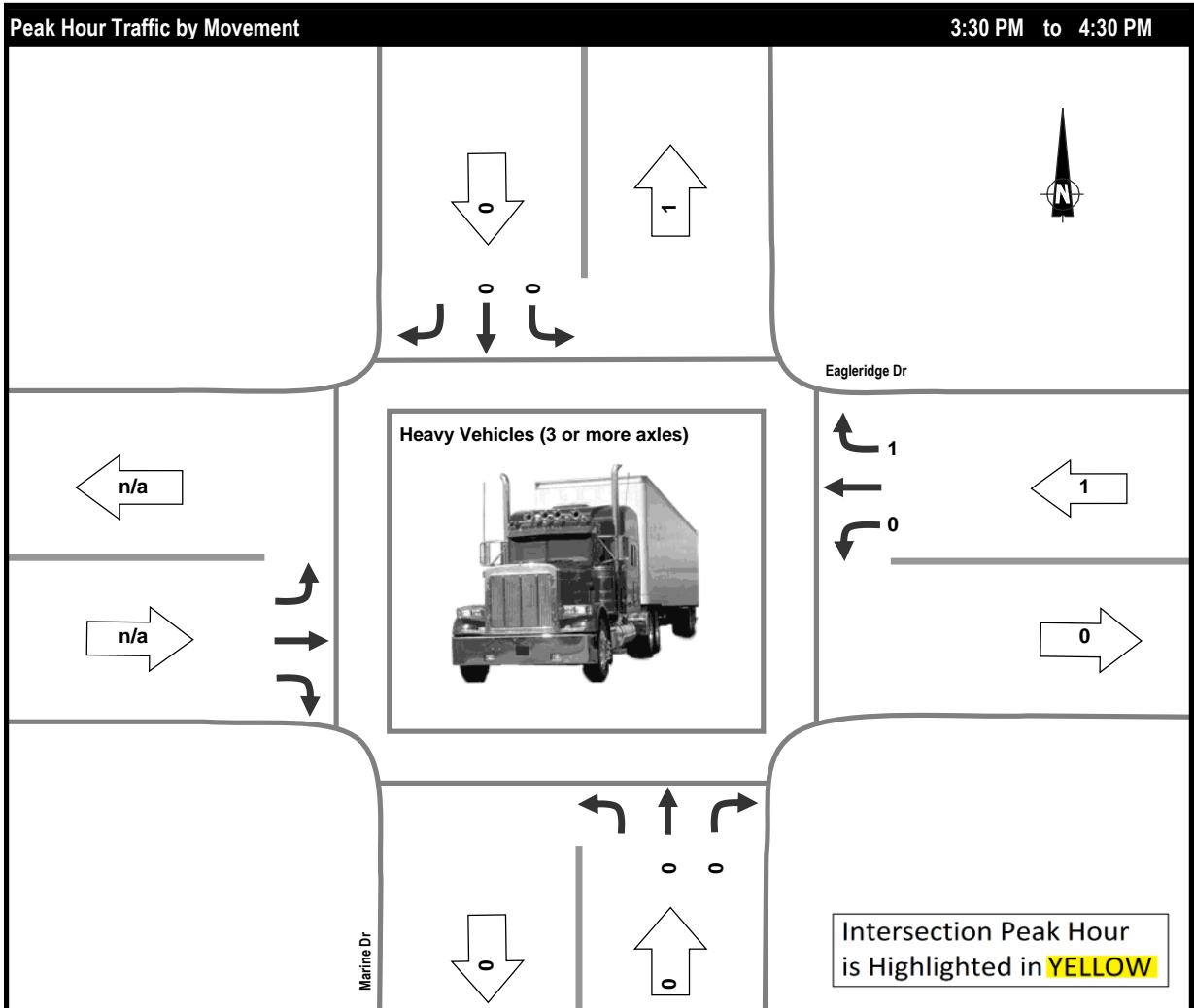


Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
Municipality: West Vancouver
Weather: Cloudy
Vehicle Class: Heavy Vehicles (3 or more axles)
Notes: Pandemic Data.

Midday Peak Period

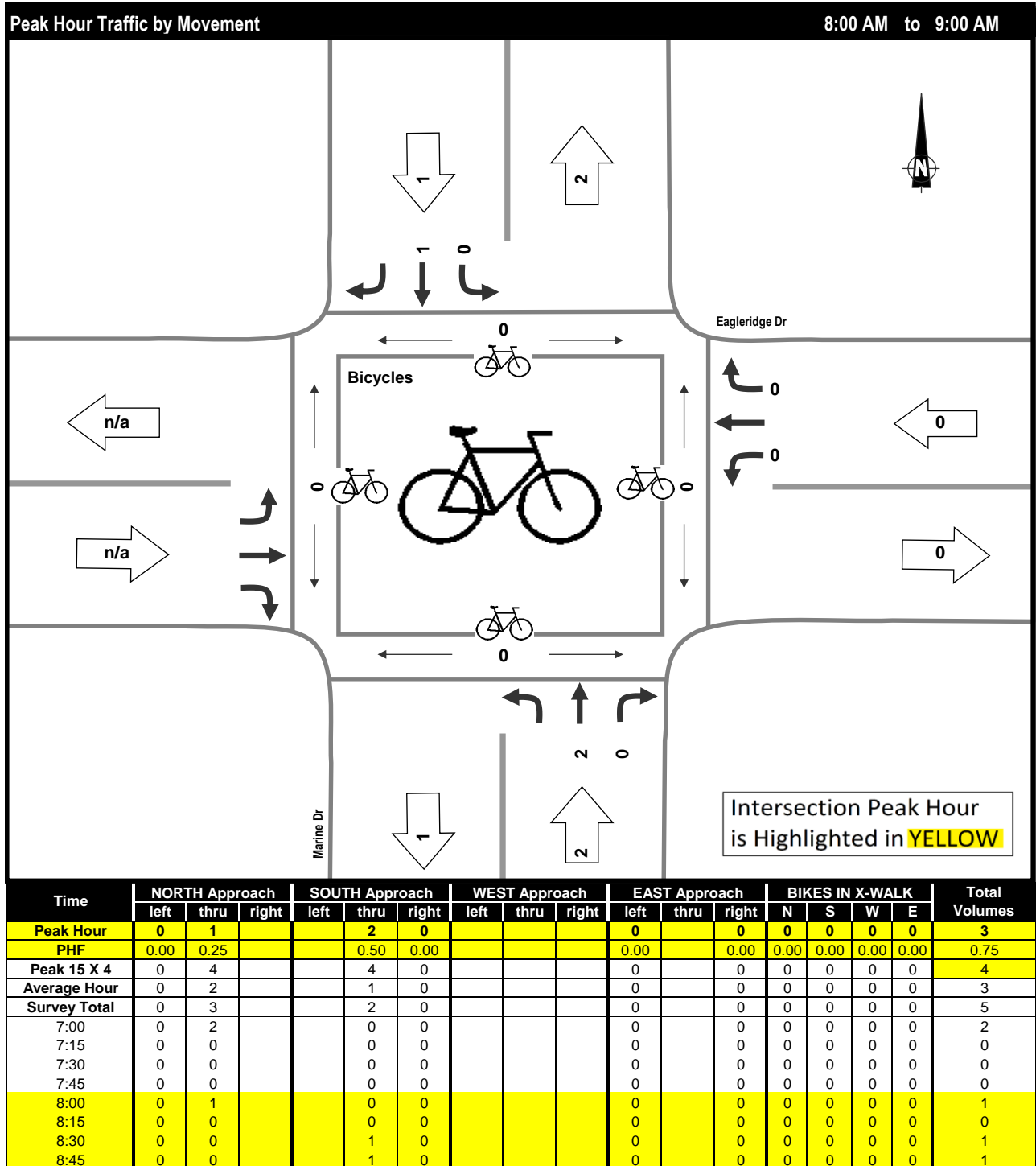


Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
 Municipality: West Vancouver
 Weather: Cloudy
 Vehicle Class: Heavy Vehicles (3 or more axles)
 Notes: Pandemic Data.

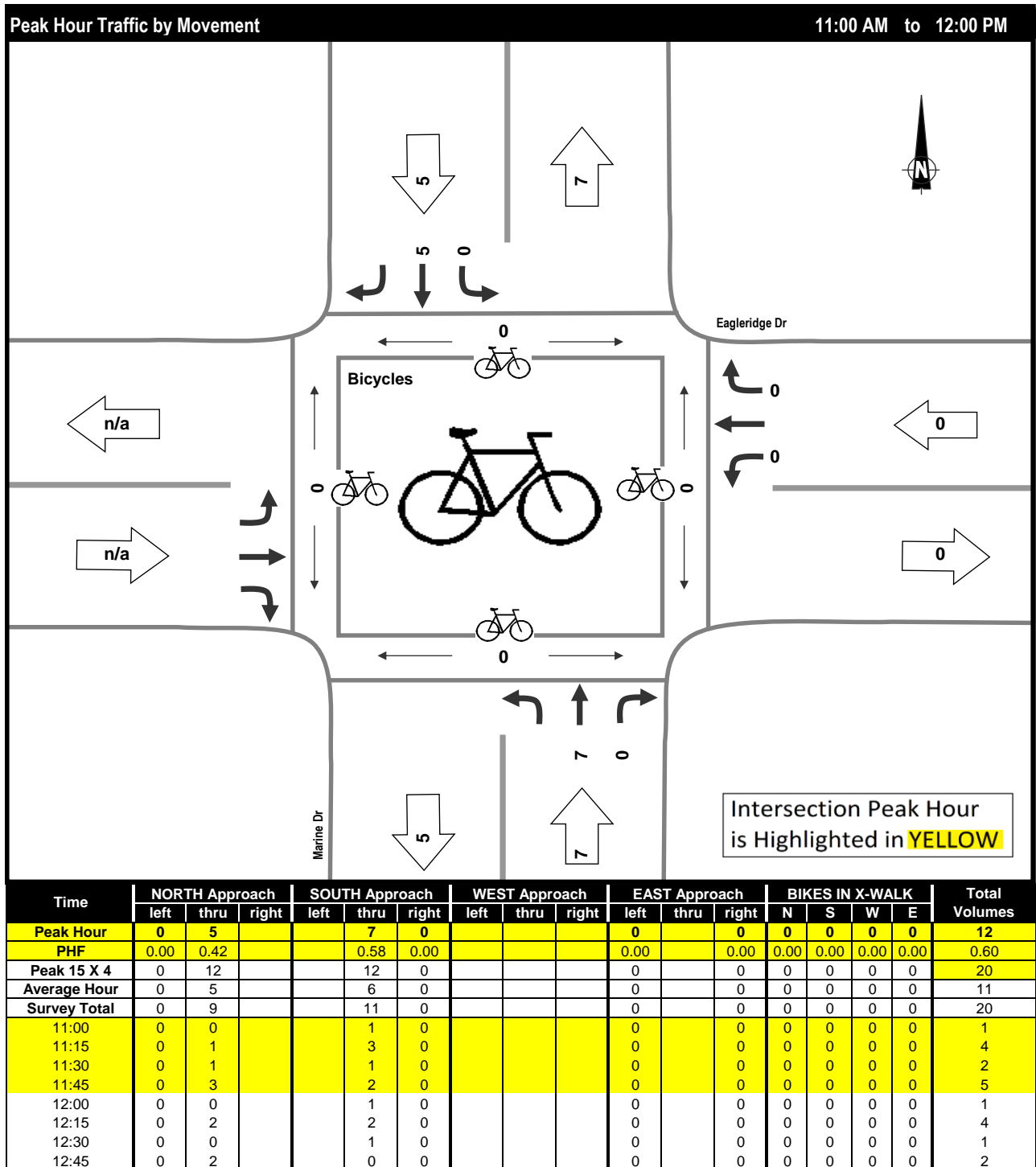


Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0			0	0				0		1					1
PHF	0.00	0.00			0.00	0.00				0.00		0.25					0.25
Peak 15 X 4	0	0			0	0				0		4					4
Average Hour	0	0			0	0				0		0					0
Survey Total	0	1			0	0				0		1					2
15:00	0	0			0	0				0		0					0
15:15	0	0			0	0				0		0					0
15:30	0	0			0	0				0		0					0
15:45	0	0			0	0				0		0					0
16:00	0	0			0	0				0		0					0
16:15	0	0			0	0				0		1					1
16:30	0	0			0	0				0		0					0
16:45	0	0			0	0				0		0					0
17:00	0	0			0	0				0		0					0
17:15	0	1			0	0				0		0					1
17:30	0	0			0	0				0		0					0
17:45	0	0			0	0				0		0					0

Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
 Municipality: West Vancouver
 Weather: Cloudy
 Vehicle Class: Bicycles
 Notes: Pandemic Data.

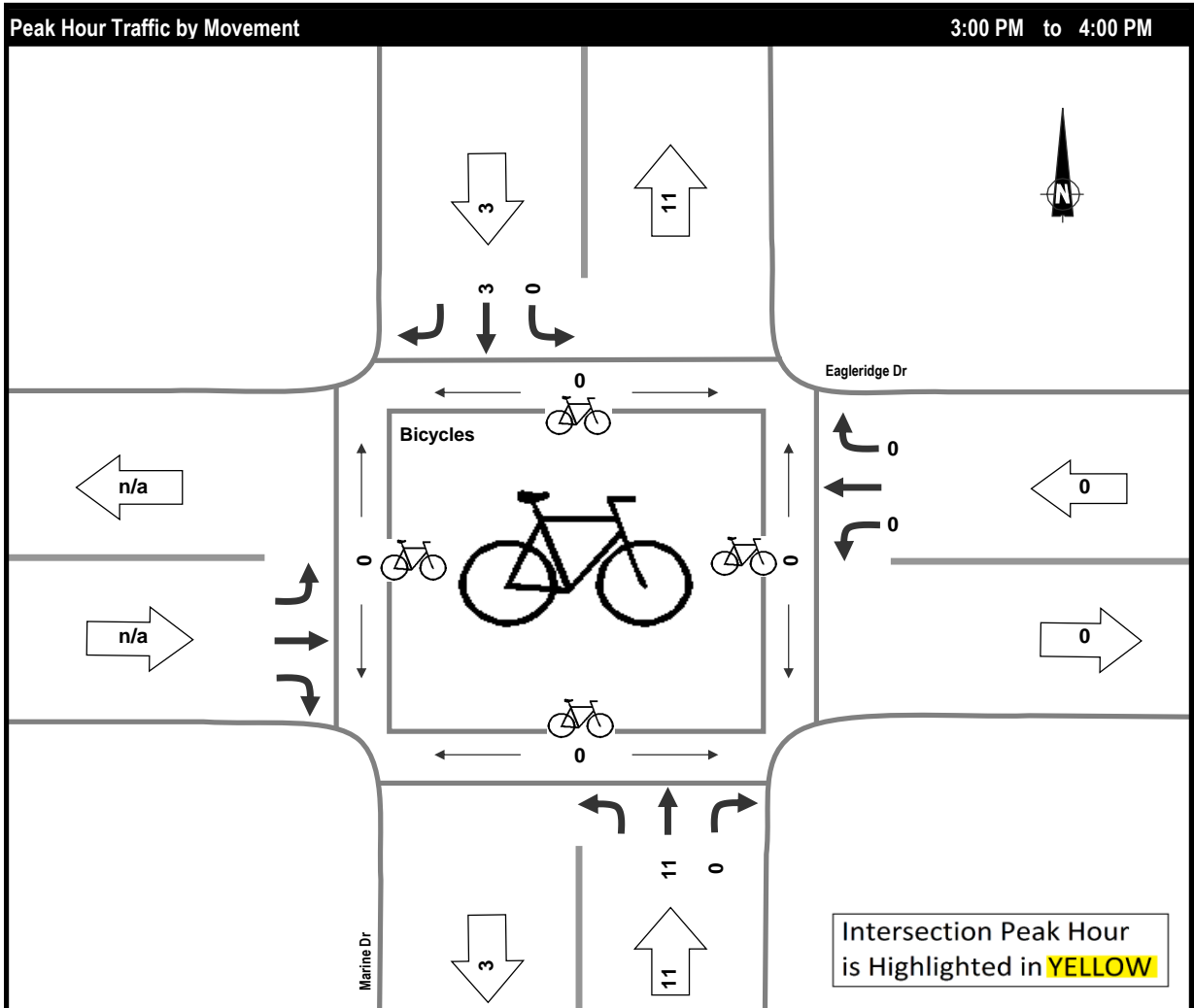


Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
 Municipality: West Vancouver
 Weather: Cloudy
 Vehicle Class: Bicycles
 Notes: Pandemic Data.



Project: #7635: 6155 Eaglecrest Place Traffic Impact Study
Municipality: West Vancouver
Weather: Cloudy
Vehicle Class: Bicycles
Notes: Pandemic Data.

Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			BIKES IN X-WALK				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	3			11	0				0		0	0	0	0	0	14
PHF	0.00	0.38			0.69	0.00				0.00		0.00	0.00	0.00	0.00	0.00	0.58
Peak 15 X 4	0	8			16	0				0		0	0	0	0	0	24
Average Hour	0	2			5	0				0		0	0	0	0	0	7
Survey Total	0	7			16	0				0		0	0	0	0	0	23
15:00	0	2			4	0				0		0	0	0	0	0	6
15:15	0	0			2	0				0		0	0	0	0	0	2
15:30	0	1			4	0				0		0	0	0	0	0	5
15:45	0	0			1	0				0		0	0	0	0	0	1
16:00	0	3			2	0				0		0	0	0	0	0	5
16:15	0	0			0	0				0		0	0	0	0	0	0
16:30	0	0			0	0				0		0	0	0	0	0	0
16:45	0	0			1	0				0		0	0	0	0	0	1
17:00	0	0			0	0				0		0	0	0	0	0	0
17:15	0	0			2	0				0		0	0	0	0	0	2
17:30	0	1			0	0				0		0	0	0	0	0	1
17:45	0	0			0	0				0		0	0	0	0	0	0