TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

Hotel Vancouver Rezoning

Transportation Assessment and Management Study

Version 1

Prepared for

Larco Investments Ltd

Date

November 30, 2022

Project No.

04-20-0074

November 30, 2022
04-20-0074

Wendy LeBreton
Manager of Development
Larco Investments Ltd
1700 – 900 W Georgia Street
Vancouver, BC
V6C 2W6

Dear Wendy:

Re: Hotel Vancouver Rezoning
Transportation Assessment and Management Study (TAMS)

As requested, Bunt & Associates Engineering Ltd. (Bunt) has completed a Transportation Assessment and Management Study for the proposed development of a new tower at the Hotel Vancouver located at 900 W Georgia Street in Downtown Vancouver.

The following TAMS report outlines the existing and future traffic conditions on the adjacent transportation network. The report also reviews the development's proposed vehicle parking, bicycle parking, passenger loading, and service loading provision and strategy. In addition, a Loading Management Plan and Transportation Demand Management Plan are included.

We trust this report will provide the necessary transportation support for the rezoning process.

Yours truly,
Bunt & Associates

Jordan Eccles, P.Eng.
Transportation Engineer

Yulia Liem, P.Eng., PTOE
Principal

cc: Art Phillips
Rob Cadeau - Architects Alliance

CORPORATE AUTHORIZATION

Prepared By: Jordan Eccles, P.Eng.

Bunt & Associates Engineering Ltd.
1550-1050 West Pender Street
Vancouver, BC V6E 3S7
Canada

Reviewed By: Yulia Liem, P.Eng., PTOE
Principal

Telephone: +1 604 685 6427
Facsimile: +1 604 685 6579

Date: 2022-11-30
Project No. 04-20-0074
Status: Version 1

Approved By: Yulia Liem, P.Eng., PTOE
Principal

Permit No. 1000468



2022-11-30

This document was prepared by Bunt & Associates for the benefit of the Client to whom it is addressed. The copyright and ownership of the report rests with Bunt & Associates. The information and data in the report reflects Bunt & Associates' best professional judgment in light of the knowledge and information available to Bunt & Associates at the time of preparation. Except as required by law, this report and the information and data contained are to be treated as confidential and may be used and relied upon only by the client, its officers and employees. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Bunt & Associates accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

TABLE OF CONTENTS

EXECUTIVE SUMMARY I
1. INTRODUCTION 1
1.1 Study Purpose & Objectives 1
1.2 Study Scope & Area 1
1.3 Organization of Report 3
1.4 Proposed Development 3
2. EXISTING CONDITIONS 6
2.1 Land Use 6
2.2 Existing Transportation Network 6
2.2.1 Road Network 6
2.2.2 Transit Network 8
2.2.3 Cycling & Pedestrian Networks 8
2.3 Current Relevant Policies & Plans 10
2.3.1 Municipal Plans 10
2.4 Existing Traffic Volumes 12
2.4.1 Traffic Data Collection Program 12
2.4.2 Existing Site Vehicle Trip Generation 12
2.4.3 Existing Parking Supply 13
2.5 Existing Operations 14
2.5.1 Performance Thresholds 14
2.5.2 Existing Conditions Analysis Assumptions 16
2.5.3 Existing Operational Analysis Results 17
3. FUTURE TRAFFIC CONDITIONS 24
3.1 Traffic Forecasts 24
3.1.1 Background Traffic Forecasts 24
3.1.2 Site Traffic 24
3.2 Total Traffic Volumes and Operations 32
3.2.1 Site Access Assumptions 32
3.2.2 Total Traffic and Operations 32
3.2.3 Total Traffic and Operations – with Mitigation 37
3.2.4 Summary of Traffic Impacts & Recommended Mitigations 39
4. SITE PLAN DESIGN REVIEW 40
4.1 Parking Supply 40

4.1.1 Vehicle Parking 40
4.1.2 Passenger Loading Space 40
4.1.3 Bicycle Parking 41
4.1.4 Loading Spaces 42
4.2 Loading Management Plan 46
4.3 Parking Layout & On-Site Vehicle Circulation 47
4.3.1 Ground Floor 47
4.3.2 Loading Area 52
4.4 Car Elevator Access 56
4.4.1 Operations Analysis 56
5. TRANSPORTATION DEMAND MANAGEMENT PLAN 57
5.1 Background 57
5.2 TDM Plan Summary 57
5.3 Proposed TDM Measure Details 58
5.3.1 Summary 60
6. CONCLUSIONS & RECOMMENDATIONS 61
6.1 Proposed Development 61
6.2 Existing Conditions 61
6.3 Future Traffic Conditions 62
6.4 Site Design Review 63
6.5 Transportation Demand Management 64
APPENDIX A Terms of Reference
APPENDIX B Traffic Data
APPENDIX C Synchro Reports
APPENDIX D Loading Data Locations
APPENDIX E Car Elevator Analysis
APPENDIX F TDM Worksheets

EXHIBITS

Exhibit 1.1: Site Location & Study Area 2
Exhibit 1.2: Site Plan 5
Exhibit 2.1: Existing Laning & Traffic Control 7
Exhibit 2.2: Site Accessibility 9
Exhibit 2.3: Existing AM and PM Peak Hour Traffic Volumes 18
Exhibit 2.4: Existing Peak Hour Pedestrian & Cycling Volumes 19
Exhibit 3.1: Site Traffic Forecasts 30
Exhibit 3.2: Total AM and PM Peak Hour Traffic Volumes 33

Exhibit 4.1: Passenger Vehicle (P-TAC) Circulation – Inbound 48
Exhibit 4.2: Passenger Vehicle (P-TAC) Circulation – Outbound 49
Exhibit 4.3: Loading Elevator Maneuver (HSU) – Inbound 50
Exhibit 4.4: Loading Elevator Maneuver (HSU) – Outbound 51
Exhibit 4.5: Loading Turntable Clearance 53
Exhibit 4.6: Class A Loading Accessibility 54
Exhibit 4.7: Class B Loading Accessibility 55

TABLES

Table 1.1: Study Intersections 1
Table 1.2: Proposed and Existing Land Uses 4
Table 2.1: Existing Street Characteristics 6
Table 2.2: Nearby Transit Stops 8
Table 2.3: Summary of Available and Counted Traffic Data 12
Table 2.4: Existing Site Trip Generation 13
Table 2.5: Intersection Level of Service Thresholds 14
Table 2.6: Existing Traffic Operations 20
Table 3.1: Bunt Trip Generation Survey Results (Offices in Downtown Vancouver Locations) 25
Table 3.2: Trip Rates for Proposed Land Uses 26
Table 3.3: Site Trip Generation – New Vehicle Trips 26
Table 3.4: Hotel Trip Generation Comparison 27
Table 3.5: Site Trip Generation – Total Vehicle Trips 27
Table 3.6: Site Trip Generation – Total Vehicle Trips by Trip Destination 28
Table 3.7: Estimated Trip Distribution 29
Table 3.8: Net Change in Future Intersection Vehicle Volumes with New Site Trips 31
Table 3.9: Total Traffic Operations 34
Table 3.10: Total Mitigated Traffic Operations 37
Table 4.1: Vehicle Parking Supply Requirement & Provision 40
Table 4.2: Passenger Loading Supply Requirement & Provision 41
Table 4.3: Bicycle Parking Supply Requirement & Provision 42
Table 4.4: Loading Supply Requirement & Provision 43
Table 4.5: Observed Daily Loading Rates and Duration 44
Table 4.6: Estimated Loading Demand 45
Table 5.1: Proposed TDM Measures 58
Table 5.2: End of Trip Facility Requirement 59

EXECUTIVE SUMMARY

Study Background and Purpose

Larco Investments Ltd. (Larco) is proposing to rezone the site at 900 W Georgia Street in Vancouver, BC, to retain the heritage hotel building and demolish the adjacent health club and pool addition to allow for construction of a new tower. The new tower will be adjacent to the existing heritage hotel and comprise primarily of new office and retail uses as well as provide a new ballroom and spa for the existing hotel. The two buildings are proposed to share underground parking and loading which will accessed via vehicle elevators. The City of Vancouver has required a Transportation Assessment and Management Study to review the transportation impacts of the proposed development to support the rezoning application.

Proposed Development

The proposed development consists of a single new tower that will replace the existing health club and pool that is situated on the south side of the parcel above the existing ground floor vehicle court. The proposed tower will consist of a mix of land uses including 16,680 m^2 of office, 929 m^2 of retail, 1,361 m^2 of restaurant, 469m^2 of spa, and 914m^2 of ballroom. The proposed tower will be connected to the existing heritage hotel at the lower levels for the proposed spa and ballroom land uses.

Existing Conditions

The site is located in the centre of Downtown Vancouver and has excellent access to a wide array of frequent bus routes and is within 200m of SkyTrain stations on the Canada Line and Expo Lines. The site is well-served by the existing cycling network with high quality AAA (all ages and abilities) cycle routes on Hornby Street, Smithe Street, and Dunsmuir Street.

Existing traffic volumes were collected in 2015, 2018, and 2019 and the AM peak hour was found to occur between 7:45 – 8:45am while the PM peak hour was found to occur between 4:45 – 5:45pm. The existing Hotel Vancouver site was estimated to generate 109 two-way vehicle trips in the AM peak hour and 162 two-way vehicle trips in the PM peak hour.

The study area road network is busy and characterized by a dense urban grid with high pedestrian and cyclist crossing volumes, many turn restrictions, and short intersection spacing. Many intersections were found to have movements that exceeded acceptable performance thresholds in existing conditions including Burrard Street & W Georgia Street, Hornby Street & W Georgia Street, Burrard Street & Alberni Street, Burrard Street & Robson Street, Hornby Street & Robson Street, and a few of the minor accesses and laneways.

Future Traffic Conditions

The proposed new tower was estimated to generate 95 (87 in, 9 out) and 128 (32 in, 96 out) vehicle trips in the AM and PM peak hours, respectively. With the existing Hotel Vancouver trip generation, the entire site is estimated to generate 204 (138 in, 66 out) and 290 (123 in, 167 out) trips in the AM and PM peak

hours, respectively. As part of the redevelopment, the existing Burrard Street & Hotel Vancouver site access will be closed.

With the addition of 95 to 128 new vehicles trips from the proposed development, many of the existing traffic operations issues identified in the existing conditions were shown to worsen slightly. The built form of Downtown Vancouver and sustainable mode share targets from the City means there are limited opportunities for mitigation measures for vehicles beyond optimization of signal timings. Small signal timing changes were considered for the intersections of Burrard Street & W Georgia Street and Hornby Street & W Georgia Street and were shown to improve traffic operations for select individual movements.

Site Design Review

The development is proposing to provide 201 parking spaces across 3 underground parking levels accessed by 2 car elevators given the site's physical constraints and difficulties in providing access ramps to the proposed parking levels. This parking stall provision meets the bylaw requirements as the site is in Downtown Vancouver. The underground parking and car elevators will be operated by valet services only for the hotel use and accessible stalls associated with the proposed new office and retail uses. Office and retail generated parking demand will be directed to the adjacent 777 Hornby Street parkade as in existing conditions.

The development is required to provide 11 Class A passenger loading spaces and 2 Class C spaces. The development is proposing to provide 7 Class A passenger loading spaces within the ground floor porte-cochere given the site's physical constraints. An existing 5-minute tour bus loading zone is provided on W Georgia Street fronting the Hotel Vancouver which accommodates existing Class C sized passenger loading and as the hotel use is not changing, no new Class C passenger spaces are proposed on-site.

The development is proposing to provide 203 Class A and 22 Class B bicycle parking spaces, exceeding the minimum bylaw requirements in order to satisfy the development's Transportation Demand Management (TDM) Plan.

The development is required to provide 6 Class A loading spaces, 9 Class B loading spaces, and 1 Class C loading space per the Parking Bylaw. 6 Class A and 5 Class B are proposed, where 2 of the 5 Class B are planned to be 3.0m longer than the bylaw minimum length to accommodate larger single unit trucks. Loading is provided underground and accessed via a loading elevator and turntable. A variance rationale has been prepared based on shared loading between the site's many land uses and a loading management plan.

Transportation Demand Management

The development is required to provide a Transportation Demand Management Plan with a required of 24 TDM points per land use. The key aspects of the TDM plan include public transit pass subsidies for hotel and retail employees, additional Class A bicycle parking, enhanced Class B bicycle parking, bicycle maintenance facilities and a bike wash station, improved end-of-trip facilities, walking improvements, transportation market services, and provision of multimodal wayfinding signage.

1. INTRODUCTION

1.1 Study Purpose & Objectives

Larco Investments Ltd. (Larco) is proposing to rezone the site at 900 W Georgia Street in Vancouver, BC, from DD (Downtown District) to CD-1 (Comprehensive Development) to retain the heritage hotel building and demolish the adjacent health club and pool addition to allow for construction of a new tower. The new tower will be adjacent to the existing heritage hotel and comprise primarily of new office and retail uses as well as provide a new ballroom and spa for the existing hotel. The two buildings are proposed to share underground parking and loading which will be accessed via vehicle elevators.

The City of Vancouver stated that a Traffic Assessment and Management Study (TAMS) is required to assess the transportation impact of the development and to support the rezoning application for this site. Larco retained Bunt & Associates to complete this transportation study.

1.2 Study Scope & Area

The scope of Bunt's study was agreed upon with the City of Vancouver through a Terms of Reference in 2020. The Terms of Reference can be found in **Appendix A**.

The study area is shown in **Exhibit 1.1** and is bounded by W Georgia Street to the north, Burrard Street to the west, Robson Street to the south, and Hornby Street to the east. Note, the Downtown Vancouver street network is generally oriented 45 degrees from true north and for the purposes of this report, Burrard Street is considered a north-south street and W Georgia Street is considered an east-west street.

The study intersections are summarized in **Table 1.1**.

Table 1.1: Study Intersections

INTERSECTION	TRAFFIC CONTROL
Burrard Street & W Georgia Street	Traffic Signal
Burrard Street & Alberni Street	Traffic Signal
Burrard Street & Hotel Vancouver Site Access	Unsignalized
Burrard Street & Southern Laneway	Unsignalized
Burrard Street & Eihu Lane	Unsignalized
Burrard Street & Robson Street	Traffic Signal
Hornby Street & W Georgia Street	Traffic Signal
Hornby Street & Hotel Vancouver Site Access	Unsignalized
Hornby Street & Robson Street	Traffic Signal
Robson Street & Laneway	Unsignalized



M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 1.1

Site Location

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

1.3 Organization of Report

The report sections of the study have been organized as follows:

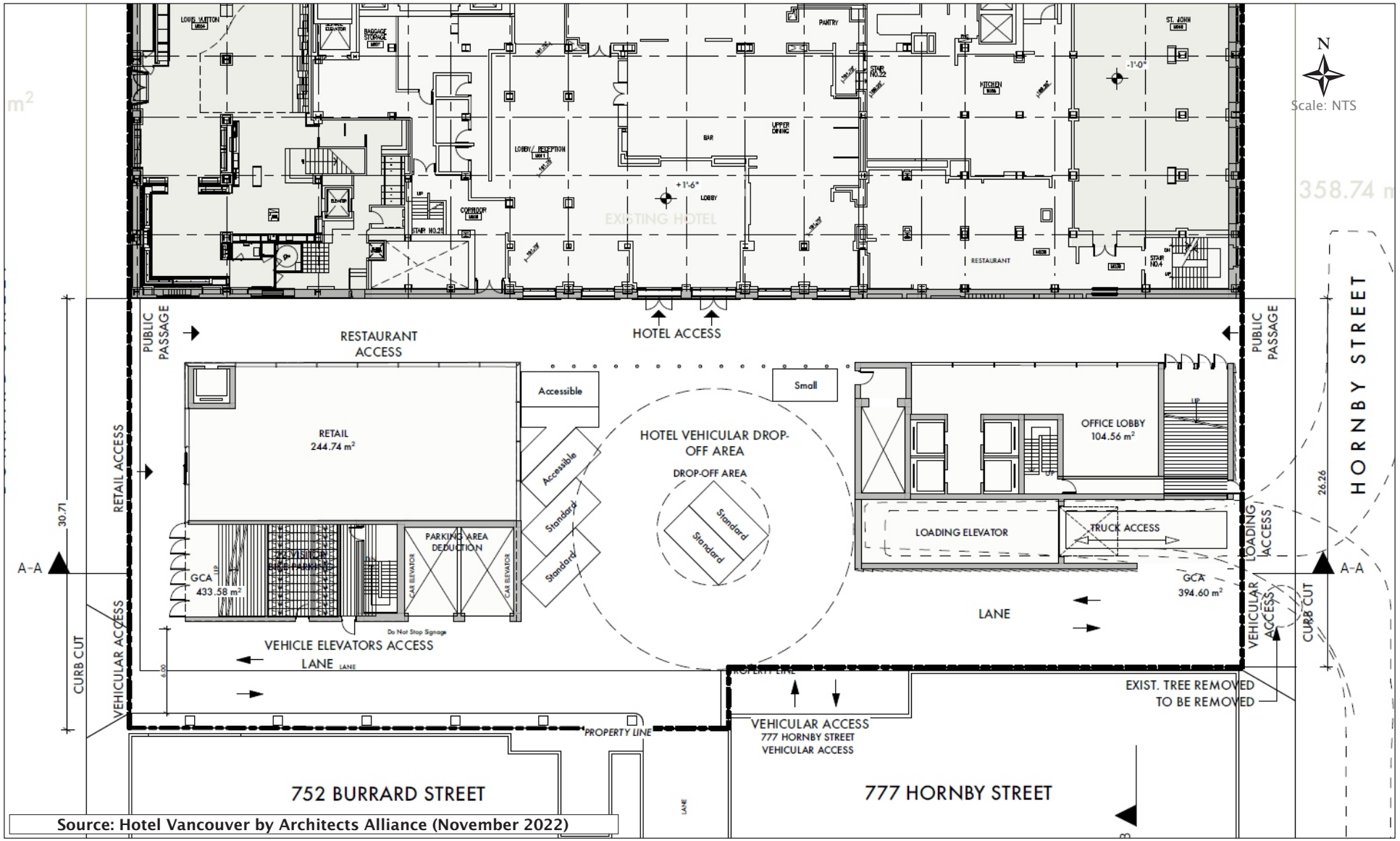
- **Section 1** presents the study background, study area, study scope, and details of the proposed development.
- **Section 2** describes the existing conditions at the site location, including current site characteristics, the existing road network, and existing traffic conditions on the adjacent street network
- **Section 3** estimates the trip generation due to the proposed development and presents the future traffic operations with the development in place.
- **Section 4** reviews the site design, vehicle circulation, and proposed vehicle and bicycle parking supply. A rationale is provided for the proposed loading provision as well as a review of the car lift operations.
- **Section 5** summarizes the transportation demand management measures planned for the site.
- **Section 6** provides the conclusions and recommendations of the study based on Bunt's analysis.

1.4 Proposed Development

The proposed development consists of a single new tower that will replace the existing health club and pool that is situated on the south side of the parcel above the existing ground floor vehicle court. The proposed tower will consist of a mix of land uses including office, retail, restaurant, spa, and ballroom. The proposed tower will be connected to the existing heritage hotel at the lower levels for access to the proposed spa and ballroom land uses. The proposed land use densities and existing remaining land uses are shown in **Table 1.2** below. The ground floor site plan is shown in **Exhibit 1.2.**

Table 1.2: Proposed and Existing Land Uses

LAND USE	DENSITY
Proposed New Tower	
Office	16,680 m^2
Retail	929 m^2
Restaurant	1,361 m^2
Hotel Spa	469 m^2
Hotel Ballroom	914 m^2
Existing Hotel Vancouver	
Hotel	500 rooms (58,777 m^2)
Office	2,777 m^2
Retail	2,566 m^2



Source: Hotel Vancouver by Architects Alliance (November 2022)

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 1.2
Site Plan

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

2. EXISTING CONDITIONS

This section details the existing conditions within the study network, including the existing transportation network, relevant policies and plans, and traffic volumes.

2.1 Land Use

The site is currently occupied by the existing Hotel Vancouver, a historic heritage hotel built in 1939 and is within the Downtown District (DD) zoning district. The Downtown District allows for a range of uses including but not limited to commercial, residential, institutional, and light industrial among others.

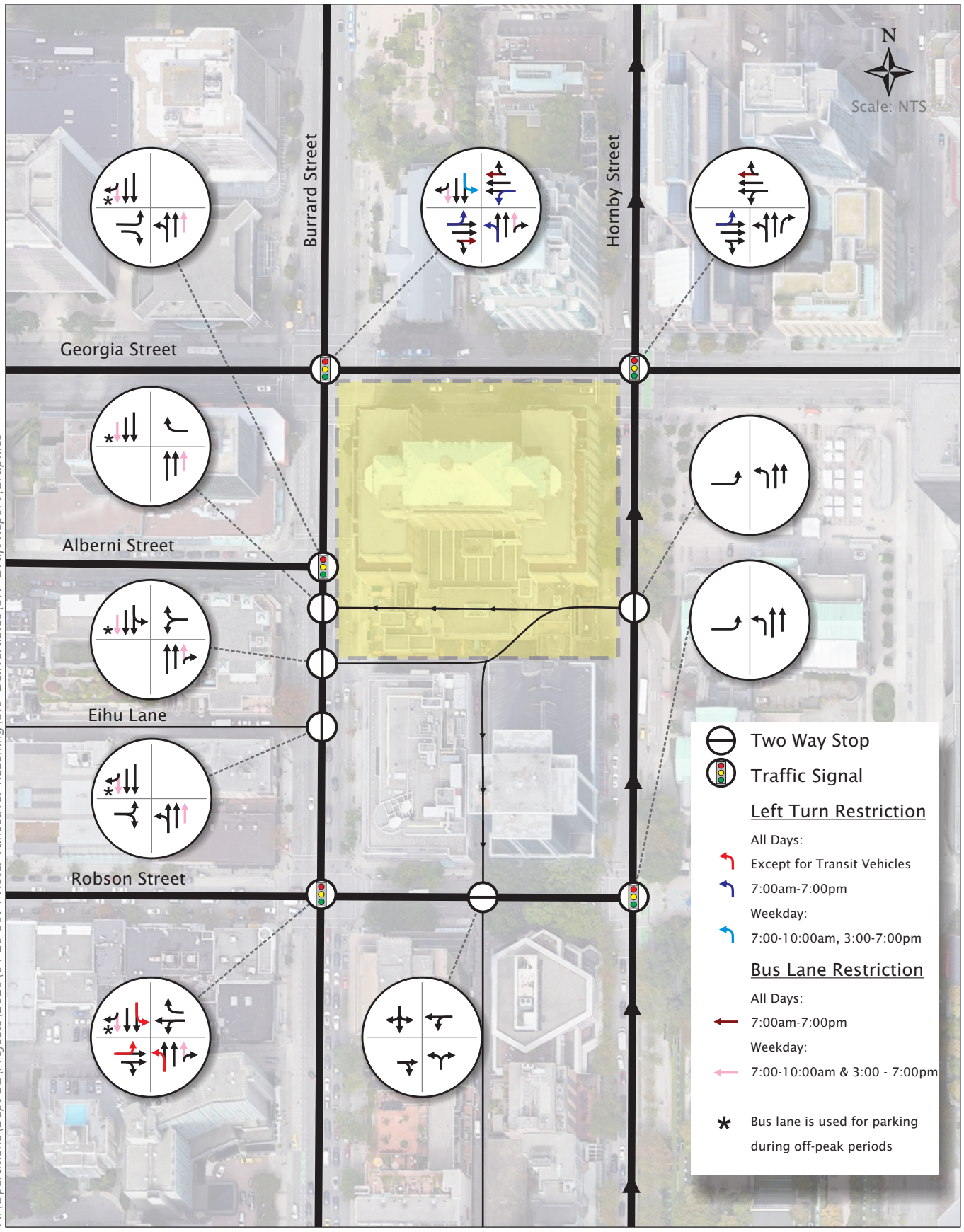
2.2 Existing Transportation Network

2.2.1 Road Network

The existing street characteristics are summarized in **Table 2.1** below and existing laning and traffic control are illustrated in **Exhibit 2.1.**

Table 2.1: Existing Street Characteristics

STREET	NUMBER OF TRAVEL LANES	POSTED SPEED	PARKING FACILITIES	TWO-WAY PEAK HOUR VOLUME
W Georgia Street	2 WB + 1 WB Bus Lane & 2 EB + 1 EB Bus Lane	50km/h	None	2,550 – 2,660
Burrard Street	2 NB + 1 NB Bus Lane & 2 SB + 1 SB Bus/Parking Lane	50km/h	On-Steet Parking West Curb Lane except 7:00 – 10:00am & 3:00 – 7:00pm	1,670 – 1,980
Robson Street	2 EB & WB Lanes	50km/h	None	400 - 460
Hornby Street	2 NB Lanes + 1 NB Parking Lane	50km/h	On-Street Parking West Curb Lane	940 – 1,240



M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 2.1

Existing Laning & Traffic Control

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

2.2.2 Transit Network

Table 2.2 summarizes the current transit services routes in close proximity to the development site.

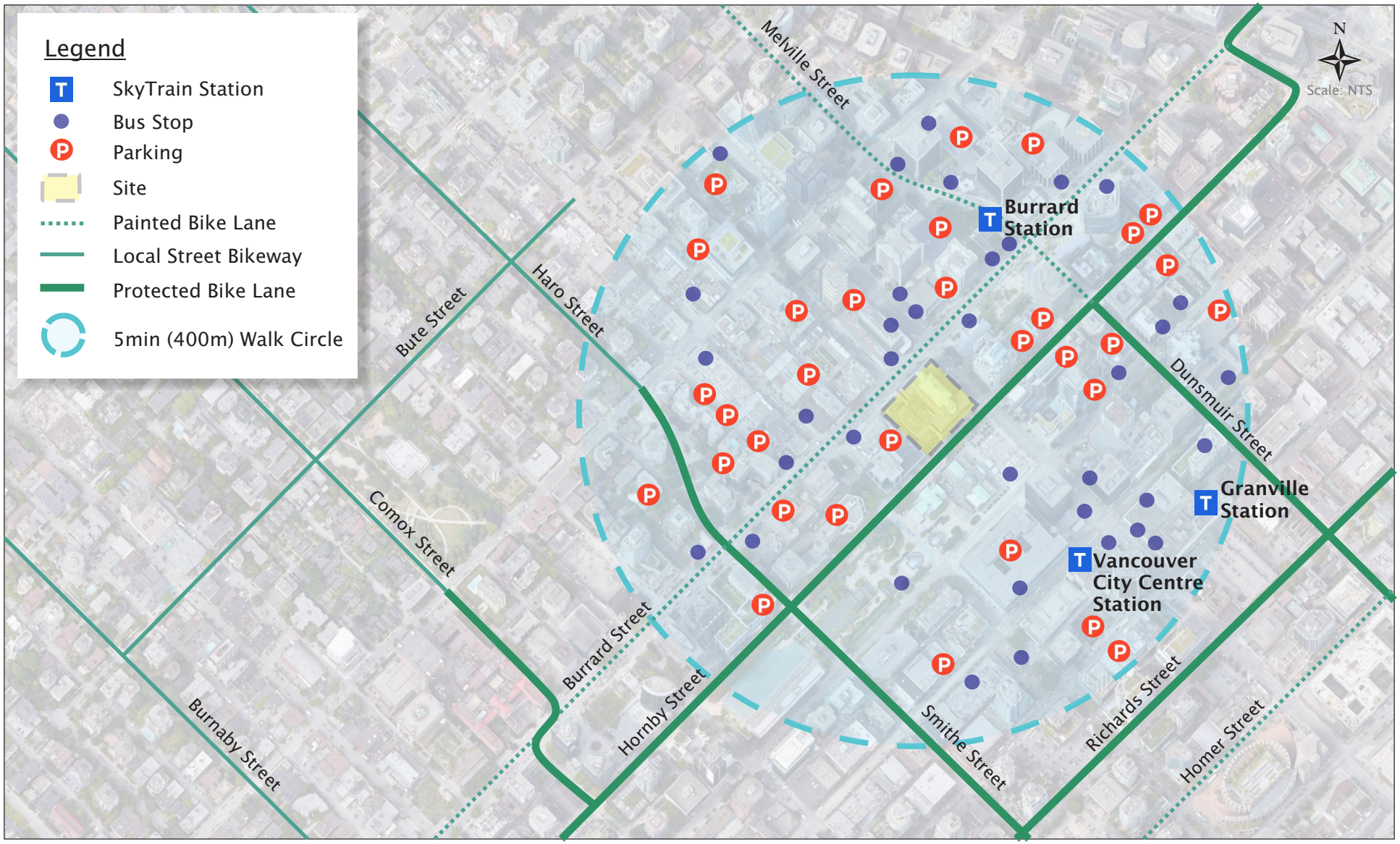
Table 2.2: Nearby Transit Stops

STOP LOCATION	SERVICE	ROUTE DESTINATION
W Georgia St & Burrard St	240, 241, 246, 247, 250, 253, 257, N24	North Vancouver, West Vancouver
W Georgia St & Robson St	002, 005, 044, N22	UBC, Dunbar, West End
Vancouver City Centre Station	Canada Line	Richmond, YVR Airport
Burrard Station	Expo Line	Burnaby, New Westminster, Surrey

The site is located in the centre of Downtown Vancouver and has excellent access to a wide array of frequent bus and rapid transit services. W Georgia Street, Robson Street, and Burrard Street are part of TransLink's Frequent Transit Network as are many other nearby streets within a 400m walk of the development site including W Pender Street and Granville Street. The site is within 200m of both the Canada Line's Vancouver City Centre Station and Expo Line's Burrard Station.

2.2.3 Cycling & Pedestrian Networks

With the development site's downtown setting, pedestrian and cyclists have great accessibility with a range of amenities within convenient walking distance and high-quality AAA (all ages and abilities) cycle routes. Hornby Street has a protected two-way cycle track providing convenient connection between Coal Harbour and False Creek. Burrard Street has a painted bike lane. Just outside the study area, Smithe Street to the south and Dunsmuir Street to the north also have protected two-way cycle tracks providing convenient east-west routes throughout the Downtown core. The site's accessibility for sustainable modes is shown in **Exhibit 2.2.**



M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 2.2

Site Accessibility

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

2.3 Current Relevant Policies & Plans

This section outlines the City's current transportation policies and plans that are relevant to the proposed development.

2.3.1 Municipal Plans

Transportation 2040 Action Plan

The Transportation 2040 Action Plan, adopted by Vancouver City Council in October 2012, is a long-term strategic vision for the City Vancouver that will help guide transportation and land use decisions and public investments for the years ahead.

The Transportation 2040 Plan builds on Greenest City's transportation goals by stating that its travel mode goal is to "make at least two-thirds of trips on foot, bike, and transit by 2040". In comparison, the Greenest City 2020 Action aims to make at least 50% of trips on foot, bike, and transit by 2020.

In addition, the Transportation 2040 Action Plan identified a number of policies concerning parking for new development projects. Specifically, the plan indicates that off-street parking requirements should be used to support reduced auto ownership and use. The proposed development is well in keeping with these policy directions identified in the Transportation 2040 Plan.

Climate Emergency Response

Vancouver is among one of the numerous cities around the world, and within the Metro Vancouver region declaring a climate emergency and committing to reduce pollution. On April 29, 2019, Vancouver City Council approved the Climate Emergency Response report that contains big shifts to reduce Vancouver's carbon pollution including:

- By 2030, 90% of people live within an easy walk and roll of their daily needs;
- By 2030, two thirds of trips in Vancouver will be by active transportation and transit;
- By 2030, 50% of the kilometres driven on Vancouver's roads will be by zero emissions vehicles.

These were previously Vancouver's targets for its Transportation 2040 plan which are now set for 10 years earlier.

Downtown Public Space Strategy

Prior to COVID-19 pandemic, City of Vancouver has worked with Council and other stakeholders to implement the Downtown Public Space Strategy to shape the public realm in Downtown Vancouver over the next 30 years. It also demonstrates the application of this approach to current and future public space policy and project developments in Vancouver.

This strategy plan provides a brief summary of population demographic and challenges in downtown Vancouver. This plan values all different aspects of public realm using, including walkability and accessibility within Downtown Vancouver area. In Strategy 6 "Connecting People and Places", the overall planning is as follow:

- Improve designs for streets, sidewalks, and walkways to encourage a walking and rolling culture.
- Develop a Street Typologies matrix to categorize streets and clarify their roles in transportation and public space networks to help inform transportation and public realm improvement projects.
- Provide clear and intuitive wayfinding to make the on-street experience easy and enjoyable for people to move through, navigate, and discover.

City of Vancouver Parking Bylaw

The City of Vancouver's Parking Bylaw (Bylaw 6059) regulates the provision of off-street parking for the parking of motor vehicles and bicycles within the City of Vancouver. In addition, the bylaw facilitates the loading and unloading of motor vehicles. As a policy identified in the Transportation 2040 Plan, the City has undertaken an exercise to clarify the parking bylaw to reflect broader City transportation objectives and to actively encourage strategies that reduce parking demand.

On July 25, 2018, the City of Vancouver approved changes to the Parking Bylaw. The staff report emphasized the importance of managing off-street parking for vehicles and bicycles and its influence to achieve long-term transportation goals. The City is investing significantly in transit, cycling and walking infrastructure along with a comprehensive housing strategy; this updated bylaw helps ensure these elements align with the City's goals for Transportation 2040.

The amendment to this bylaw will assist in advancing the Transportation 2040 actions by improving access to buildings, taking steps to address the needs of changing mobility, and driving investments in Transportation Demand Management (TDM) measures that encourage sustainability. The most significant changes put forward in the bylaw update included:

- Removal of parking minimums in Downtown Vancouver.
- Required provision of passenger loading spaces.
- Increased requirements for bicycle parking and end-of-trip facilities to better reflect current and future cycling mode share.

2.4 Existing Traffic Volumes

2.4.1 Traffic Data Collection Program

Study time periods for the project focused on the weekday commuter AM and PM peak periods as these are expected to represent peak vehicle demands for the existing street network and the project's main land use: office.

Data has been collected by both Bunt and provided by the City, covering the weekday AM (7:00 – 9:00 am) and PM (4:00 – 6:00 pm) peak periods for the study area intersections listed in **Table 2.3**. The count data documents transportation conditions in the study area covering vehicles, pedestrians, and cyclists. Peak hour only counts were conducted at the intersection of Burrard Street & Eihu Lane. Raw traffic count data is presented in **Appendix B**.

Table 2.3: Summary of Available and Counted Traffic Data

INTERSECTION	SOURCE	DATE OF COUNT (DD/MM/YY)	PEAK HOURS	
			AM	PM
Burrard Street & Robson Street (signalized)	CoV	15/05/19	08:00-09:00	17:00-18:00
Burrard Street & Alberni Street (signalized)	CoV	14/05/19	07:45-08:45	16:30-17:30
Burrard Street & West Georgia Street (signalized)	CoV	18/04/18	08:00-09:00	16:45-17:45
Hornby Street & Robson Street (signalized)	CoV	14/05/19	07:45-08:45	16:15-17:15
Hornby Street & West Georgia Street (signalized)	CoV	22/05/19	07:45-08:45	16:30-17:30
Burrard Street & existing Hotel Vancouver site access	Bunt	23/10/15	08:00-09:00	15:00-16:00
Hornby Street & existing Hotel Vancouver site access	Bunt	23/10/15	08:00-09:00	16:45-17:45
Burrard Street & unnamed E-W laneway between Alberni Street and Eihu Lane	Bunt	23/10/15	07:45-08:45	16:15-17:15
Burrard Street & Eihu Lane	Bunt	23/11/22	07:45-08:45	16:45-17:45
Robson Street & unnamed N-S laneway between Burrard Street and Hornby Street	Bunt	23/10/15	08:00-09:00	16:30-17:30
Hotel Driveway & 777 Hornby Parkade	Bunt	23/10/15	07:45-08:45	15:15-16:15
	OVERALL STUDY AREA PEAK HOUR		07:45-08:45	16:45-17:45

2.4.2 Existing Site Vehicle Trip Generation

Through discussion with the applicant team and operational staff at the existing Hotel Vancouver, as well as through on-site observations, it has been established that the existing site trip generation is formed of three components: pick-up/drop-off (PUDO) activity, self-parked guests/visitors, and valet-parked guests/visitors.

The PUDO activity takes place in the porte-cochere located within the existing east-west lane connecting Hornby Street with Burrard Street. Self-parking guests/visitors to the hotel predominantly park within the adjoining 777 Hornby Parkade, which is accessed from the lane to the south of the driveway used for PUDO activity. it is acknowledged that a small portion of self-parking guests are directed to other local public parkades during busy periods. The 777 Hornby Parkade is also used by valet services operated by the hotel; however, guests and visitors choosing to use valet services first arrive in the porte-cochere before passing their vehicles over to valet staff.

In order to capture the vehicle trips described above, a PUDO survey was completed on November 3, 2015 between the hours of 6:00 am and 9:00 pm. Separately, in/out counts were completed at the 777 Hornby Parkade on October 23, 2015 covering the weekday AM (7:00 – 9:00 am) and PM (4:00 – 6:00 pm) peak periods.

While the 777 Hornby Parkade captures the majority of self-parking and valet-parked hotel guest and visitor traffic, it should be noted that this is a public parkade and is therefore used by non-hotel traffic as well. As a result, the driveway survey completed at this location would contain non-hotel traffic. Despite this, no adjustments have been made to the counts and for robustness all vehicles counted have been assumed to be related to the hotel for the purposes of this assessment.

The results of the traffic counts described above are set out in **Table 2.4**.

Table 2.4: Existing Site Trip Generation

TRIP TYPE	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
PUDO	15	15	30	44	44	88
Self-Parked & Valet-Parked	64	15	79	23	51	74
TOTAL	**79**	**30**	**109**	**67**	**95**	**162**

As shown above, the existing site is anticipated to generate approximately 110 two-way vehicle trips during the AM peak hour and 160 two-way vehicle trips during the PM peak hour. To confirm, it is considered that these trips are already counted within the existing traffic volumes but it has been necessary to quantify the existing trip generation so as to allow for its reassignment within the assessment of the Total (with development) scenario described later within this report.

2.4.3 Existing Parking Supply

The 777 Hornby Parkade provides a total of 457 secured stalls over 8 levels; 4 split levels underground and 4 levels above ground.

Through anecdotal discussions with the operational staff at Hotel Vancouver, it is understood that the adjoining 777 Hornby Parkade accommodates the majority of the parking demand generated by the existing site. Although a small portion of self-parking guests are directed to other local public parkades

during busy periods, hotel staff confirm that it is rare that there is no available capacity at the 777 Hornby Parkade.

In addition to this, PUDO activity occurs within the existing porte-cochere for the hotel, which is located within the east-west lane connecting Hornby Street with Burrard Street. The porte-cochere accommodates approximately 3-4 vehicles in addition to a passing lane. East of this, upon turning into the lane from Hornby Street, there is a 'Taxi Zone' that accommodates approximately 3 vehicles.

For larger passenger vehicles, including coaches, there is a designated unloading area on West Georgia Street to the north of the hotel with a maximum time limit of 5 minutes. From here, guests and visitors of the hotel are able to enter through a northern pedestrian entrance. Informal coach loading and unloading takes place at the divergence of the two lanes opposite the 777 Hornby Parkade driveway.

2.5 Existing Operations

2.5.1 Performance Thresholds

The existing operations of study area intersections and access points were assessed using the methods outlined in the Highway Capacity Manual (HCM) 2000, using the Synchro 10 analysis software. The traffic operations were assessed using the performance measures of Level of Service (LOS) and volume-to-capacity (v/c) ratio.

The LOS rating is based on average vehicle delay and ranges from "A" to "F" based on the quality of operation at the intersection. LOS "A" represents optimal, minimal delay conditions while a LOS "F" represents an over-capacity condition with considerable congestion and/or delay. Delay is calculated in seconds and is based on the average intersection delay per vehicle.

Table 2.5 below summarizes the LOS thresholds for the six Levels of Service, for both signalized and unsignalized intersections.

Table 2.5: Intersection Level of Service Thresholds

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: Highway Capacity Manual

The volume to capacity (v/c) ratio of an intersection represents ratio between the demand volume and the available capacity. A v/c ratio less than 0.85 indicates that there is sufficient capacity to accommodate

demands and generally represents reasonable traffic conditions in suburban settings. A v/c value between 0.85 and 0.95 indicates an intersection is approaching practical capacity; a v/c ratio over 0.95 indicates that traffic demands are close to exceeding the available capacity, resulting in saturated conditions. A v/c ratio over 1.0 indicates a very congested intersection where drivers may have to wait through several signal cycles. In downtown and Town Centre contexts, during peak demand periods, v/c ratios over 0.90 and even 1.0 are common.

Performance thresholds that were used to trigger consideration of roadway or traffic control improvements are listed below:

Signalized Intersections:

- Overall intersection Level of Service = LOS D or better;
- Overall intersection V/C ratio = 0.85 or less;
- Individual movement Level of Service = LOS E or better; and,
- Individual movement V/C ratio = 0.90 or less.

Unsignalized Intersections and Roundabouts:

- Individual movement Level of Service = LOS E or better, unless the volume is very low in which case LOS F is acceptable.

In interpreting the analysis results, note that the HCM methodology reports performance differently for various types of intersection traffic control. In this report, the performance reporting convention is as follows:

- For signalized intersections: HCM 2000 output for overall LOS and V/C ratios as well as individual movement LOS and V/C is reported. HCM 2000 was utilized over HCM 6 as HCM 6 cannot analyze three out of the five signalized intersections within the study area due to non-NEMA phasing or laning incompatibility. Given over half of the signalized study area intersections cannot be analyzed, it was determined utilizing HCM 2000 for consistency in methodology between all intersections was appropriate. 95th Percentile Queues are reported as estimated by Synchro.
- For unsignalized intersections: HCM 2000 V/C output is reported just for individual lanes as the HCM methodology does not report overall performance. SimTraffic estimated queues and delays have been reported, as the HCM 2000 methodology does not directly take into account the gaps afforded by adjacent signalized intersections in a dense downtown environment.

The performance reporting conventions noted above have been consistently applied throughout this document and the detailed outputs are provided in **Appendix C**.

2.5.2 Existing Conditions Analysis Assumptions

Existing Traffic Volumes:

As set out previously, the traffic counts used to inform the analysis were obtained in 2015, 2018, and 2019. No growth has been applied to the existing traffic, as agreed in the ToR with the City. This is consistent with the observed traffic changes across Downtown Vancouver where traffic volumes entering the Downtown Core have not grown consistently as a direct result of ongoing efforts by the City to encourage the use of alternative transportation modes (transit, walking, and cycling).

Instead of applying growth, volumes between adjacent intersections were balanced as needed, with the intent of minimizing traffic unbalance. Traffic volume unbalance is an undesired yet inevitable situation when using traffic counts taken on multiple different years. It is Bunt's expectation that the effects of remaining volume unbalance are within normal volume variations and do not constitute a material impact to the results of this study.

The existing traffic counts at the intersection of Robson Street & Burrard Street were conducted in 2019. In 2020, the City of Vancouver implemented an eastbound left turn restriction for all vehicles except bicycles and buses. During the 2019 count, between 55 – 60 vehicles were counted in the peak hour completing the eastbound left turn. These eastbound left turning vehicles were assumed to shift to Alberni Street.

Signal Timings:

Existing signal timing plans were obtained from the City and used in the existing conditions analysis. All signalized intersections have been coded per their respective plans.

Synchro Parameters:

Saturation Flow Rate (SFR): The Synchro default for SFR is 1,900 vehicles per hour per lane (vphpl). Initial analysis of existing conditions with no change to standard default Synchro parameters indicated the Hornby Street & W Georgia Street intersection exhibited v/c ratios greater than the theoretical maximum of 1.0.

While a detailed Synchro model calibration was not undertaken by Bunt, based on this initial analysis, Bunt concluded that today, the WBR movement at the Hornby Street & W Georgia Street intersection and the SBR movement at the Burrard Street & Alberni Street have a higher than the default of 1,900 vphpl. The SFR for these movements was increased to 2,000 vphpl to bring these movements near an existing v/c ratio of 1.0.

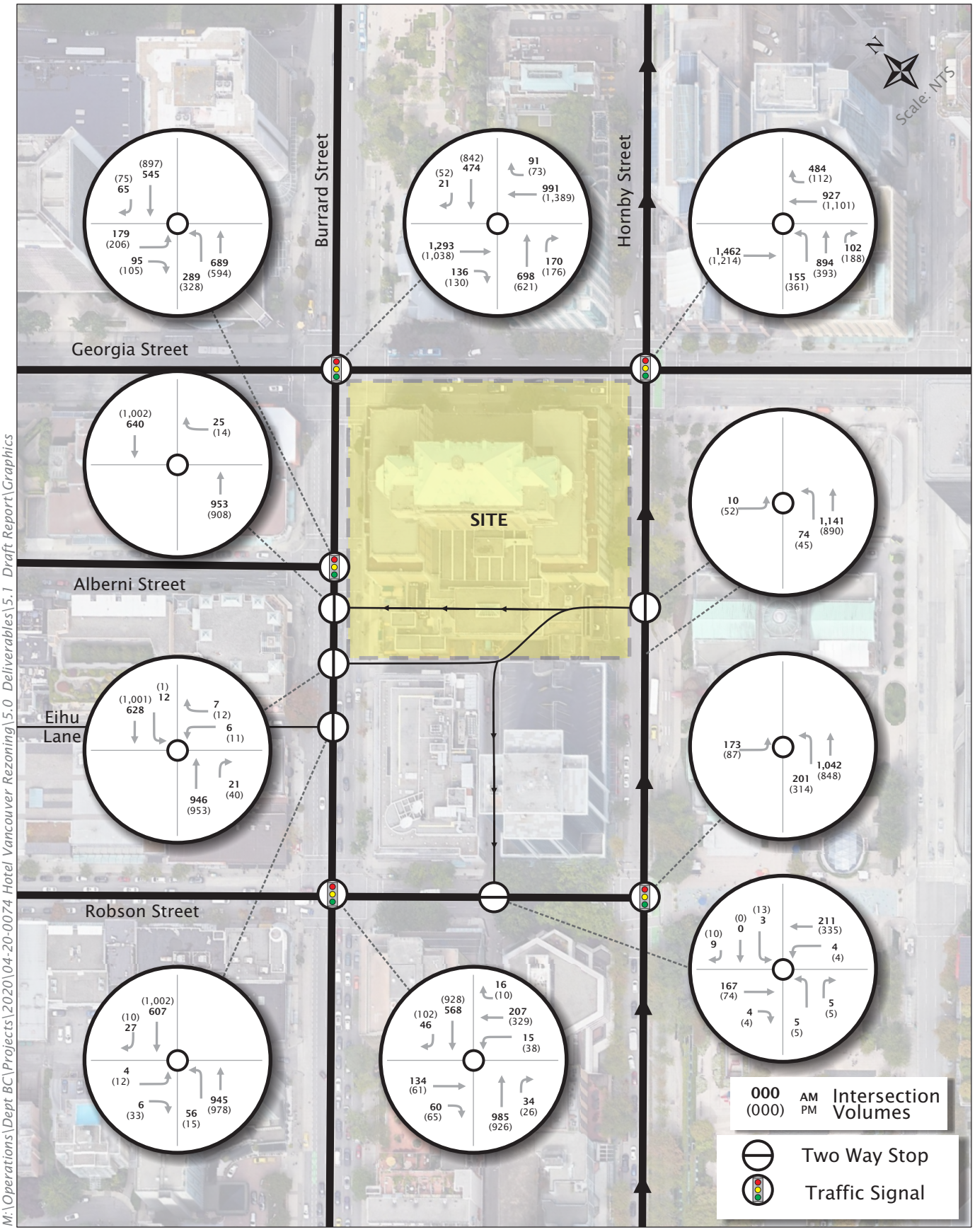
Additional Synchro parameters were adjusted as follows:

- Default peak hour factors and heavy vehicle percentages were changed to match those observed during the count program.
- The number of conflicting pedestrians and cyclists were entered in the models.

- In the absence of multi-modal counts at the Burrard Street & Eihu Lane intersection, pedestrian and cyclist movements were approximated based on movements counted at adjacent intersections.
- The site driveway intersections and Burrard Street & Eihu Lane were all modelled under the assumption that the minor approaches were enforced by 'yield' signs. Actual conditions show no signage in place at these intersections, but meaningful results were only possible with this assumption.

2.5.3 Existing Operational Analysis Results

Exhibit 2.3 illustrates the existing traffic volumes for the AM and PM peak hour. **Exhibit 2.4** summarizes the existing pedestrian and cyclist volumes.



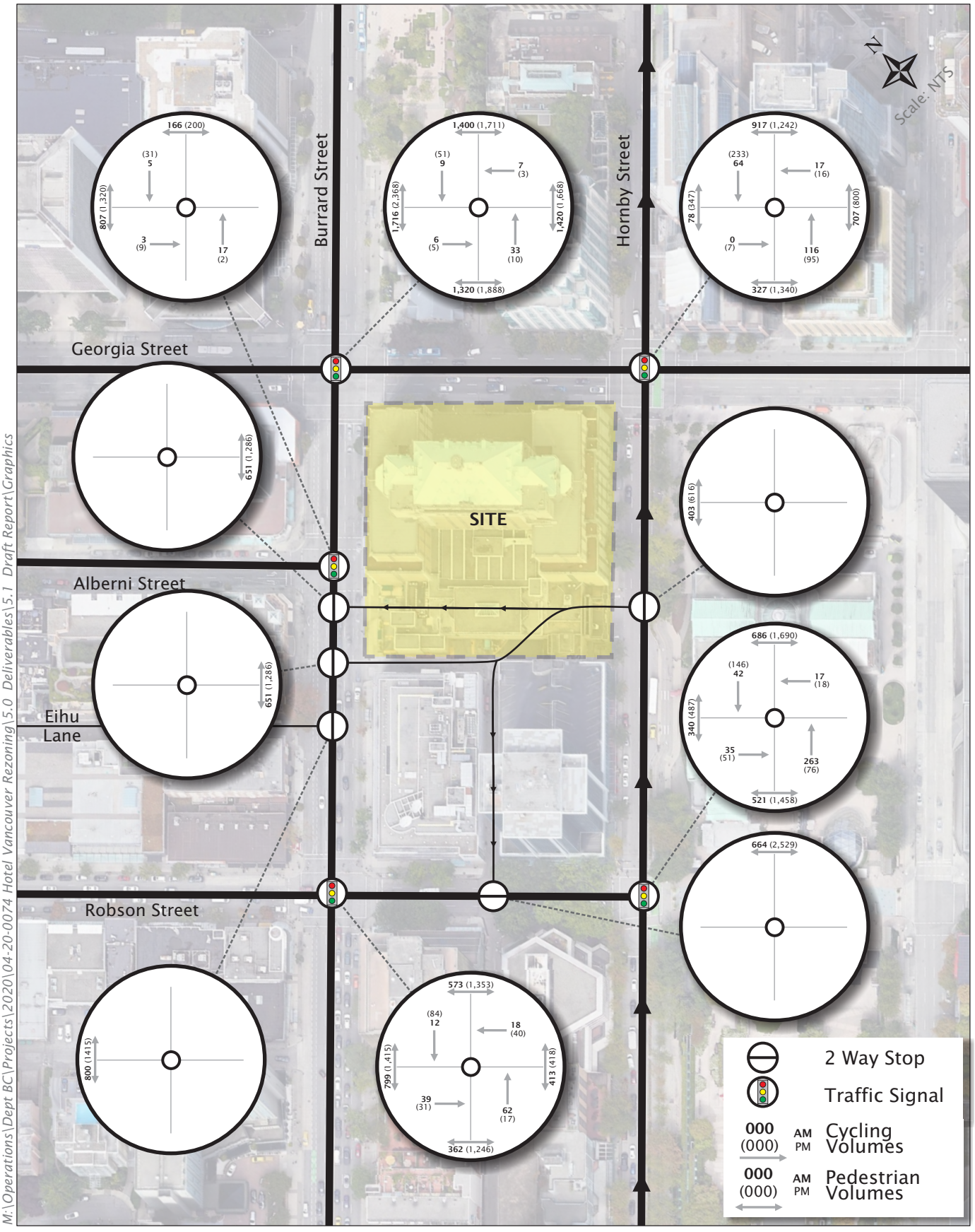
M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 2.3

Existing AM and PM Peak Hour Traffic Volumes

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates



M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 2.4

Existing Peak Hour Pedestrian & Cycling Volumes

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

Table 2.6 summarizes the traffic operations results. Synchro outputs can also be found in **Appendix C**.

Table 2.6: Existing Traffic Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Burrard St & W Georgia St (Traffic Signal)	*Overall*	*B*	*0.67*	-	*B*	*0.80*	-
	EBT	C	0.83	100	B	0.71	79
	EBR	B	0.33	21	B	0.38	22
	WBT	A	0.64	m36	B	**0.95**	m#129
	WBR	A	0.22	m2	B	0.18	m2
	NBT	B	0.50	41	B	0.47	m38
	NBR	B	0.49	m20	C	0.58	m23
	SBT	B	0.34	32	B	0.64	65
	SBR	B	0.03	3	B	0.12	8
Hornby St & W Georgia St (Traffic Signal)	*Overall*	*C*	***1.04***	-	*B*	***0.90***	-
	EBT	B	0.83	38	A	0.69	25
	WBT	C	0.76	77	C	0.88	#111
	WBR	E	**1.05**	#134	B	0.27	20
	NBTL	B	0.73	m23	A	0.60	m20
	NBR	D	0.62	m18	**F**	**0.98**	m#47
Burrard Street & Alberni Street (Traffic Signal)	*Overall*	B	0.71	-	C	0.78	-
	EBL	C	0.63	38	C	0.64	40
	EBR	B	0.16	14	B	0.23	15
	NBTL	B	0.68	#55	C	**1.04dl**	#91
	SBT	A	0.48	19	A	0.54	27
	SBR	B	0.39	#20	E	0.82	m#12
Burrard Street & Robson Street (Traffic Signal)	*Overall*	*B*	*0.51*	-	C	**0.97**	-
	EBTL	B	0.21	24	B	0.09	12
	EBR	B	0.11	10	B	0.15	11
	WBTL	C	0.36	53	C	0.60	67
	WBR	E	0.02	m4	**F**	0.01	m1
	NBT	B	0.62	67	B	0.62	66
	NBR	A	0.06	4	A	0.04	4
	SBT	A	0.36	18	A	0.61	36
	SBR	A	0.15	m2	**F**	**1.29**	m#46
Hornby Street & Robson Street (Traffic Signal)	*Overall*	*D*	*0.53*	-	C	0.38	-
	EBL	E	0.82	#57	C	0.41	23
	NBL	B	0.39	38	C	0.58	58
	NBT	D	**1.00**	#113	C	0.79	#73
Burrard Street & Northern Driveway (Unsignalized)	WBR	C	0.20	12	B	0.70	10
	NBT	A	0.31	18	B	0.27	20

	SBT	A	0.21	19	A	0.30	20
Hornby Street & Northern Driveway (Unsignalized)	EBL	C	0.05	8	C	0.47	27
	NBL	A	0.11	12	A	0.11	13
	NBT	A	0.38	5	A	0.29	66
Burrard Street & Southern Driveway	WBLR	C	0.17	7	E	**1.45**	12
	NBR	A	0.01	9	A	0.02	21
	NBT	A	0.31	19	B	0.27	13
	SBL	A	0.09	23	A	0.02	3
	SBT	A	0.27	23	A	0.40	3
Burrard Street & Eihu Lane (Unsignalized)	EBLR	**A**	0.01	3	E	**>1.50**	22
	NBL	E	0.06	46	**F**	0.44	45
	NBT	C	0.40	41	D	0.37	56
	SBT	A	0.19	12	A	0.30	4
	SBR	A	0.02	3	A	0.01	8
Robson Street & N-S Lane (Unsignalized)	EBTR	A	0.11	13	A	0.02	6
	WBTL	A	0.01	12	A	0.12	23
	SBLR	D	0.18	8	**F**	**>1.50**	30
	NBLR	C	0.22	8	**F**	**>1.50**	19

Bolded results indicate values that do not meet acceptable performance criteria.

"-" indicates a value not applicable to that particular intersection or movement.

"#" indicates that the 95th percentile volume exceeds capacity; therefore vehicle queue may be longer than reported.

"m" indicates that the volume for the 95th percentile queue is metered by an upstream signal.

Key findings and insights include:

Burrard Street & W Georgia Street

In the PM peak hour, the WBT movement was reported to operate above performance thresholds with a v/c ratio of 0.95.

Hornby Street & W Georgia Street

As mentioned previously, a calibration exercise was undertaken for this intersection, increasing the SFR on the WBR to 2,000 vphpl and the right turn factor increased to 1.00. Even with these measures, the WBR movement was shown to operate at a v/c ratio just above 1.00 in the AM peak hour. It is expected this slight underestimation of existing capacity is due to some pedestrian yielding during the permissive right turn phase or multiple vehicles completing their turn during the intergreen time. However, the key finding is the WBR movement is at capacity in existing conditions.

The protected-only NBR was reported to operate at LOS 'F' and with a v/c ratio of 0.97. As this movement crosses the Hornby Street two-way cycle track it is restricted to protected-only phasing with right turn on reds banned to increase pedestrian and cyclist safety.

Burrard Street & Alberni Street

The NBT/L movement was reported to operate as a defacto left turn with a v/c ratio of 1.04 due to the high left turning volume in the PM peak hour from a shared through/left lane. Left turn volumes are high at this location as northbound left turns are restricted at all other cross-streets along Burrard Street between Pacific Street and W Georgia Street. When modelled as a separate left turn lane, LOS 'C' was reported for both movements as well as a v/c ratio of 0.71 and 0.53 for the NBL and NBT movement, respectively.

Burrard Street & Robson Street

Similar to the intersection of Burrard Street & Alberni Street, the SBR was reported to operate with LOS 'F' and v/c ratio exceeding 1.0. The west leg crosswalk was observed to have over 1,400 pedestrians in the PM peak hour which was found to significantly reduce the capacity of this movement. When pedestrian volumes are so high in downtown environments where they effectively occupy the crosswalk during the entire phase, vehicles rely on turning during the intergreen phases which is expected to be under accounted for in HCM results.

Hornby Street & Robson Street

The NBT was reported to operate with a v/c ratio of 1.00, LOS 'D' and 95th percentile queue of 113m. This intersection was the first intersection in the City of Vancouver to have an all-walk phase and is adjacent to the Robson Street public plaza and has a high pedestrian priority.

Burrard Street & Northern Driveway

SimTraffic, Synchro's microsimulation module was utilized to assess the unsignalized intersections within the study area as SimTraffic better accounts for the gaps and platoons created by nearby signalized intersections. However, even with this microsimulation approach it is difficult to replicate downtown driving behaviour due to software limitations. In reality, low volume driveways and laneways in a dense urban grid rely on a combination of gaps created by upstream signals, high pedestrian volumes yielding on occasion to allow vehicles to turn, and minor street vehicles entering blocked intersections/yielding from the major vehicle movement when queues extend past driveways.

The existing WBR movement was found to operate at LOS 'C' assuming WBR vehicles can enter a blocked intersection. The WBR volume is low at 25 and 14 vehicles in the AM and PM peak hours, equating to 1 vehicle every 2 minutes or less.

Burrard Street & Eihu Lane

The NBL movement was reported to operate at a LOS 'E' in the AM peak hour. 56 vehicles were observed to complete this movement in the AM peak hour. In the PM peak hour, there were 12 EBL movements exiting the laneway which was reported to operate at a LOS 'E' while the NBL was reported to operate at a LOS 'F'. The vehicles turning in and out of this laneway would rely on a combination of gaps from adjacent signals, pedestrian yielding, and entering blocked intersections. Due to SimTraffic software limitations, it is not possible to model the behaviour of pedestrians yielding to a waiting vehicle at low volume unsignalized laneway access resulting in the poor operations for the shared northbound left/through movement and the eastbound direction. Pedestrian volumes on Burrard Street are very high during peak hours and with a random arrival pattern in SimTraffic, they occupy the crossing for most of the model period. During the count it was observed that most northbound left turning vehicles would turn when there was a gap in opposing southbound traffic, particularly during the northbound left protected phase at the downstream Burrard Street & Alberni Street and rely on pedestrian yielding once at the laneway crossing.

Robson Street & N-S Lane

Given the high east-west vehicle and pedestrian volumes observed along Robson Street, both the minor approaches at this intersection reported operational issues with v/c values greater than 1.00 and LOS ratings of 'F' on the NB and SB movements during the PM peak hour. In capacity terms, this is not possible as the intersection was observed to be able to operate under these volumes.

Volumes on these turning movements are minimal during existing conditions and do not exceed 13 vph on any individual movement during either peak hour. It is expected that actual conditions would be more reflective of a scenario that allows drivers to merge into gaps as traffic platoons occur as a result of signalisation along the corridor, thus reducing driver delay.

3. FUTURE TRAFFIC CONDITIONS

3.1 Traffic Forecasts

3.1.1 Background Traffic Forecasts

Background traffic is traffic that would be present on the road network if the site did not redevelop. For the purpose of this transportation assessment, it has been agreed with the City that a 0% growth rate is consistent with the observed traffic changes across Downtown Vancouver in recent times as a direct result of ongoing efforts by the City to encourage the use of alternative transportation modes (transit, walking, and cycling).

As a result, only a 'Total' (with development) scenario is considered within this section. Comparisons will be drawn against the results of the 'Existing' scenario summarised in the previous section of the report. Comparison of existing traffic conditions to conditions with the proposed site redeveloped allows identification of any mitigation measures related to the road network and traffic control which are a result of the proposed redevelopment.

3.1.2 Site Traffic

Trip Generation

The proposed development will include new office and retail floorspace, in addition to a number of ancillary components that include an increase in hotel floorspace (no new guest rooms are proposed) and restaurant uses, which is understood to be visited predominantly by future guests of the hotel. The proposal also includes a new ancillary spa, which will replace an existing health club and pool to be removed from the current offerings of the hotel.

It is expected that the proposed office and retail uses will generate new vehicle trips; however, the remaining uses are ancillary offerings to hotel guests and visitors. They would therefore not generate new trips but are instead considered within the existing hotel traffic described previously.

On this basis, the following discussion focusses on the anticipated vehicle trip generation of the new office and retail uses.

The proposed redevelopment will see future vehicle traffic associated with the proposed and existing uses utilising both the 777 Hornby Parkade and a new three level underground parkade. This parkade will provide a total of 201 vehicle parking spaces that will be accessed via two car lifts located to the west of the proposed porte-cochere location. Following discussions with the applicant, it is understood that the new parkade will accommodate existing hotel traffic and accessible parking associated with the new tower use; this will comprise of 9 accessible spaces based on minimum bylaw parking requirements. Note, the trip generation exercise for the accessible spaces has been conducted assuming 11 accessible spaces based on a previous site plan. As the difference in trip generation to the new parkade is negligible

between 9 and 11 accessible spaces, the resulting accessible stall trip generation calculations have not been updated.

The typical trip generation process for traffic studies is based on widely accepted methodologies from the Institute of Transportation Engineers (ITE) Trip Generation Manual that provides trip generation rates for specific land use codes. The 10th Edition Manual provided was used as at the outset of this study, the latest 11th edition was not released.

While the ITE Trip Generation Manual has been used to inform some components of the site trip generation, other resources including traffic count data held by Bunt has also been used to derive an estimate of new site traffic generated by the development. Further details on the source of the vehicle trip rates sourced for this assessment are listed below.

- Office (vehicle trip rates per parking space): Estimated based on similar developments in the Downtown Vancouver area. Bunt has surveyed office sites with similar characteristics in terms of land use and location, and the survey findings are summarised below in **Table 3.1**.

Table 3.1: Bunt Trip Generation Survey Results (Offices in Downtown Vancouver Locations)

SITE LOCATION	PARKING SUPPLY	PEAK PARKING DEMAND	TRIP RATE PER OCCUPIED STALL	
			AM	PM
1090 W Pender	500	390 (78% Occupancy)	0.36 (92% in)	0.28 (11% in)
1055 W Hastings	368	178 (69% Occupancy)	0.45 (95% in)	0.36 (5% in)
333 Seymour	141	105 (74% Occupancy)	0.38 (97% in)	0.36 (8% in)
WEIGHTED AVERAGE	-	-	**0.39 (94% IN)**	**0.32 (15% IN)**

- Office (vehicle trip rates per 1,000 sqft): ITE Trip Generation Manual 10th Edition General Office Use, Land Use Code 710, for "City Centre" areas. Note, no directional data was available for the peak hour trip rates and therefore the same weighted average directional splits shown in Table 3.1 were applied to the ITE rates.
- Retail (vehicle trip rates per 1,000 sqft): ITE Trip Generation Manual 10th Edition Shopping Centre Use, Land Use Code 820, for "General Urban / Suburban" area. Note, limited data was available for both "City Centre" and "Dense Multi-Use Urban" locations. It is Bunt's view that these rates are likely conservatively high for this site. Additionally, the office rates outlined above are for office sites with a retail podium; however, retail trip generation has been considered separately in this assessment for robustness.

These trip rates are summarised below in **Table 3.2**.

Table 3.2: Trip Rates for Proposed Land Uses

LAND USE	PARAMETER	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Office (LUC: n/a)	Per parking space	0.37	0.02	0.39	0.05	0.27	0.32
Office (LUC: 710)	Per 1000 sqft	0.45	0.03	0.48	0.08	0.43	0.50
Retail (LUC: 820)	Per 1000 sqft	0.58	0.36	0.94	1.83	1.98	3.81

Note: Land Use Code (LUC)

Understanding the ultimate origin/destination of the vehicle trips forms part of the trip generation methodology. First, it is important to understand how many office trips will be using the new parkade, which is done by applying the office vehicle trip rate per parking space to the proposed number of accessible parking spaces allocated to office uses within the new parkade.

Following this, the remaining office vehicle trip generation, which is assumed would use 777 Hornby, is calculated by applying the ITE vehicle trip rates to the total proposed office floorspace. The office trips already calculated as travelling to/from the new parkade have been subtracted from this total so as not to double count.

New retail trips have been calculated in the conventional but conservative approach by applying the typical ITE shopping centre vehicle trip rates to the proposed retail floorspace. With the dense Downtown environment and mixed-use nature of the development there is expected to be some internal capture between the retail, office, and existing hotel uses as well as a higher portion of walking trips than estimated with this approach.

New vehicle trips associated with the proposed development are outlined within **Table 3.3**.

Table 3.3: Site Trip Generation – New Vehicle Trips

LAND USE	DENSITY	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Office/Retail (New Parkade)	11 Accessible Spaces	4	0	4	1	3	4
Office (777 Hornby)	179,542 ft² (16,680 m²)	77	5	82	13	73	86
Retail	10,000 ft² (929 m²)	6	3	9	18	20	38
		87	8	95	32	96	128

The proposed development is expected to generate approximately 95 two-way vehicle trips during the AM peak hour and 130 two-way vehicle trips during the PM peak hour.

The existing hotel operators provided Bunt parking demand data for valet and self parking vehicles for 2022. The average hotel parking demand throughout the year was 50 vehicles per day and up to 75 vehicles per day in peak months. However, as a conservative assumption, all existing turning movements counted at the 777 Hornby Parkade have been assumed to be reassigned to the new parkade. Although unlikely that these are associated completely with the hotel, this assumption has been made for robustness. In the AM peak hour this equates to 79 two-way vehicle trips and in the PM peak hour this equates to 74 two-way trips. The resulting trips per stall for the hotel parking would be between 0.35 – 0.40 which is consistent with Downtown parkades Bunt has surveyed as shown previously in Table 3.1. In addition, Bunt has vehicle trip generation surveys for two Downtown Vancouver hotels as well as the average trip rates from the ITE Trip Generation Manual for a hotel in the city centre core which is shown below in **Table 3.4**.

Table 3.4: Hotel Trip Generation Comparison

SOURCE	DENSITY (HOTEL ROOMS)	AM PEAK HOUR TRIP RATE			PM PEAK HOUR TRIP RATE		
		IN	OUT	TOTAL	IN	OUT	TOTAL
1400 Robson Street	357	0.04	0.02	0.06	0.07	0.03	0.10
567 Hornby Street	113	0.01	0.04	0.05	0.03	0.01	0.04
ITE 310 – Hotel (City Centre Core)	-	0.10	0.11	0.21	0.09	0.09	0.18
AVERAGE		0.05	0.06	0.11	0.07	0.04	0.11

The average vehicle trip generation rate for these three sources is 0.11 trips per room in both the AM and PM peak hours. With the assumed 74 – 79 trips and 500 rooms at the Hotel Vancouver, the resulting trip rate is 0.15 trips per room which is higher than average and considered conservative. The directional distribution of existing trips into the 777 Hornby Parkade are skewed inbound in the AM and outbound in the PM which differs from the average of the three hotel sources, so the overall observed volume has been maintained but the directional distribution has been tweaked to match the hotel sources.

For completeness, the estimated total site vehicle trip generation is set out in **Table 3.5**. This includes existing hotel trips comprising PUDO vehicle trips, self-parking guests and visitors, and valet-parked trips.

Table 3.5: Site Trip Generation – Total Vehicle Trips

LAND USE	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Office/Retail (New Parkade) - New	4	0	4	1	3	4
Office (777 Hornby) - New	77	5	82	13	73	86
Retail - New	6	3	9	18	20	38
PUDO - Existing	15	15	30	44	44	88
Self-Parking / Valet Parking (Ex. 777 Hornby) - Existing	36	43	79	47	27	74
TOTAL	138	66	204	123	167	290

In total, the site is estimated to generate approximately 205 two-way vehicle trips during the AM peak hour and 290 two-way vehicle trips during the PM peak hour.

As mentioned, there will be three trip destinations for employees, guests, and visitors of the site: the new parkade, the existing 777 Hornby Parkade, and the redesigned porte-cochere.

The new parkade will accommodate hotel guests and visitors, as well as office and retail employees with accessible parking needs, while the 777 Hornby Parkade will accommodate the parking demand of the remaining office employees. The porte-cochere will serve PUDO activity and the valet services related to the new parkade.

A breakdown of the total vehicle trip generation of the site by trip destination is provided below in **Table 3.6**. The new parkade totals include the trips transferred from 777 Hornby.

Table 3.6: Site Trip Generation – Total Vehicle Trips by Trip Destination

TRIP DESTINATION	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
New Parkade	40	43	83	48	30	78
777 Hornby	83	8	91	31	93	124
Porte-Cochere Only	15	15	30	44	44	88
TOTAL	138	66	204	123	167	290

During both peak hours, the existing 777 Hornby Parkade is expected to experience the highest volume of two-way vehicle trips generated by the existing and proposed uses. However, it should be noted that although the porte-cochere will serve only as an ultimate trip destination for PUDO trips, trips to the new parkade will also be required to pass through the porte-cochere as they will be valet parked and this will serve as a temporary waiting area.

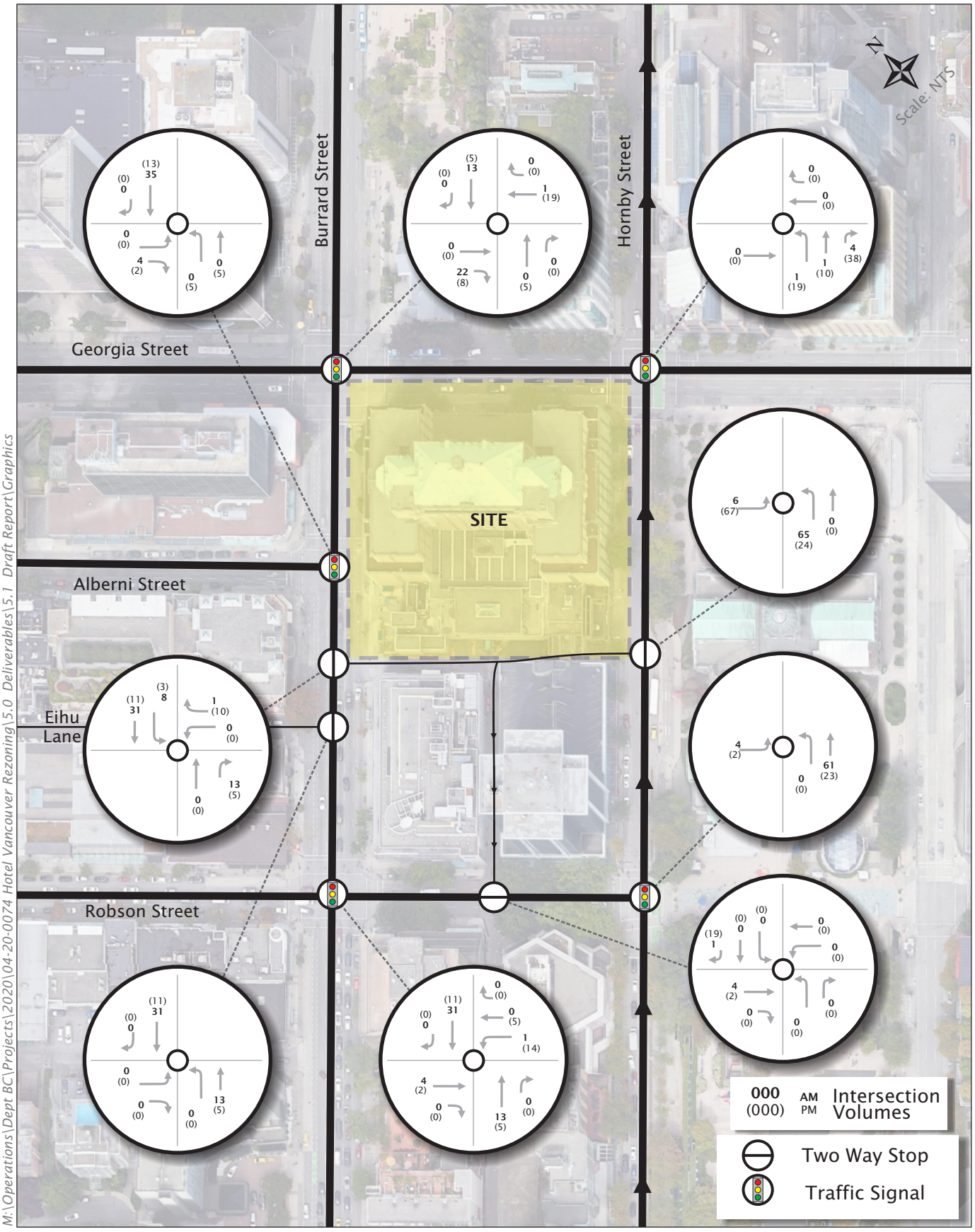
Trip Distribution & Assignment

Once the trip generation was estimated, the next step in the process involved the trip distribution analysis for the site. Bunt undertook trip distribution by considering the existing vehicle patterns and the turning movement restrictions at the study area intersections. Trip assignment or route choice was based on existing traffic patterns and engineering judgement considering the turning restrictions and shortest path. **Table 3.7** summarizes the estimated trip distribution patterns for the site traffic in the morning and afternoon peak hour.

Table 3.7: Estimated Trip Distribution

ORGIN/DESTINATION (STUDY AREA GATEWAYS)	AM PEAK HOUR		PM PEAK HOUR	
	IN (%)	OUT (%)	IN (%)	OUT (%)
Burrard Street (North)	15%	5%	15%	5%
Hornby Street (North)	0%	10%	0%	10%
W Georgia Street (West)	25%	15%	25%	20%
W Georgia Street (East)	0%	50%	0%	40%
Alberni Street	5%	5%	5%	5%
Eihu Lane	0%	0%	0%	0%
Robson Street (West)	5%	5%	5%	5%
Burrard Street (South)	15%	10%	15%	15%
Laneway (south of Robson Street)	0%	0%	0%	0%
Hornby Street (South)	35%	0%	35%	0%
TOTAL	100%	100%	100%	100%

The resulting estimated site traffic volumes are shown in **Exhibit 3.1**.



M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 3.1

Site Traffic Forecasts

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

The new trip generation Hotel Vancouver contribution to the Total traffic scenarios when compared to existing traffic volumes is shown in **Table 3.8**. The 'Site' traffic is only reflective of the estimated trips generated by the new proposed land uses, trips generated by the existing hotel uses were already accounted for in the existing surveys.

Table 3.8: Net Change in Future Intersection Vehicle Volumes with New Site Trips

INTERSECTION	AM PEAK HOUR VOLUMES			PM PEAK HOUR VOLUMES		
	EXISTING	SITE	% CHANGE	EXISTING	SITE	% CHANGE
Burrard Street & West Georgia Street	3,873	36	0.9%	4,321	37	0.9%
Burrard Street & Alberni Street	1,862	40	2.1%	2,205	24	1.1%
Burrard Street & South Laneway	1,620	53	3.3%	1,961	29	1.5%
Burrard Street & Eihu Lane	1,597	44	2.8%	1,949	16	0.8%
Burrard Street & Robson Street	1,995	49	2.5%	2,440	37	1.5%
Robson Street & Laneway	408	5	1.2%	450	21	4.7%
Hornby Street & West Georgia Street	4,025	6	0.1%	3,369	67	2.0%
Hornby Street & existing Hotel Vancouver site access	1,225	72	5.9%	987	91	9.2%
Hornby Street & Robson Street	1,416	65	4.6%	1,249	24	1.9%

The % change due to the proposed development on external intersections (non-site access points) range from 1 – 5% which is within a typical daily fluctuation for an intersection. The largest percentage changes occur at the site accesses at Hornby Street and Burrard Street.

At all off-site intersections, the percentage change of total site trips does not exceed 10%.

3.2 Total Traffic Volumes and Operations

3.2.1 Site Access Assumptions

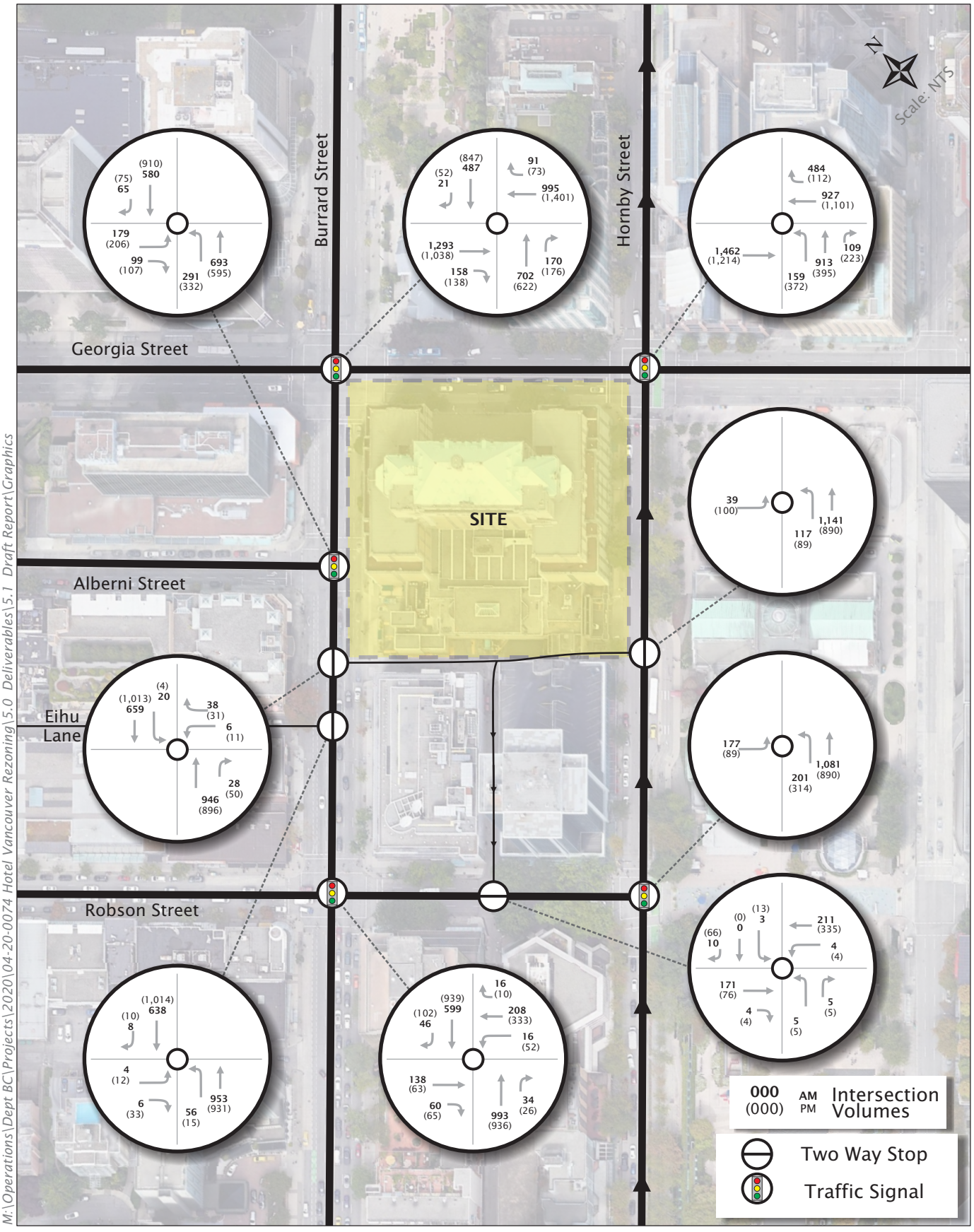
The following has been assumed for the site access arrangement in the 'Total' scenario:

- Burrard Street & Hotel Vancouver Site Access: Closed.
- Burrard Street & Southern Laneway: Remains full movement
- Hornby Street & Site Access: Remains left-in/left-out
- Robson Street & North-South Laneway: Remains southbound/outbound only.

As part of the redevelopment, the existing Hotel Vancouver right-out site access on Burrard Street is proposed to be closed. This is discussed in more detail in Section 4.3.

3.2.2 Total Traffic and Operations

Exhibit 3.2 illustrates the resulting traffic volumes for the Total AM and PM peak hour. These volumes were entered into the Synchro software to produce Total traffic operations models. **Table 3.9** summarizes the Total (unmitigated) traffic operations.



M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\5.0 Deliverables\5.1 Draft Report\Graphics

Exhibit 3.2

Total AM and PM Peak Hour Traffic Volumes

Hotel Vancouver Rezoning
04-20-0074 November 2022

bunt & associates

Table 3.9: Total Traffic Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Burrard St & W Georgia St (Traffic Signal)	*Overall*	*B*	*0.68*	-	*B*	*0.81*	-
	EBT	C	0.83	100	B	0.71	79
	EBR	B	0.39	25	B	0.40	24
	WBT	A	0.64	m36	C	**0.95**	m#132
	WBR	A	0.22	m2	B	0.18	m2
	NBT	B	0.51	44	B	0.47	m38
	NBR	B	0.49	m20	C	0.58	m23
	SBT	B	0.35	33	B	0.64	66
	SBR	B	0.03	3	B	0.12	8
Hornby St & W Georgia St (Traffic Signal)	*Overall*	*C*	***1.05***	-	*C*	***0.94***	-
	EBT	B	0.83	38	A	0.69	25
	WBT	C	0.76	77	C	0.88	#111
	WBR	E	**1.05**	#134	B	0.27	20
	NBTL	B	0.74	m22	A	0.61	m18
	NBR	D	0.65	m19	**F**	**1.16**	m#57
Burrard Street & Alberni Street (Traffic Signal)	*Overall*	B	0.72	-	C	0.78	-
	EBL	C	0.63	38	C	0.64	40
	EBR	B	0.17	14	B	0.24	15
	NBTL	B	0.69	#59	C	**1.07dl**	#90
	SBT	B	0.51	21	A	0.55	28
	SBR	B	0.40	#21	E	0.78	m#12
Burrard Street & Robson Street (Traffic Signal)	*Overall*	*B*	*0.48*	-	C	**0.99**	-
	EBT	B	0.21	24	B	0.09	13
	EBR	B	0.11	10	B	0.15	11
	WBTL	C	0.36	53	C	0.64	71
	WBR	E	0.02	m4	E	0.01	m1
	NBT	B	0.58	62	B	0.44	66
	NBR	A	0.06	4	B	0.62	4
	SBT	A	0.38	21	A	0.61	41
	SBR	A	0.15	m2	**F**	**1.29**	m#45
Hornby Street & Robson Street (Traffic Signal)	*Overall*	*E*	*0.55*	-	C	0.40	-
	EBL	E	0.84	#59	C	0.41	23
	NBL	B	0.39	38	C	0.58	58
	NBT	E	**1.03**	#120	C	0.83	#85
Hornby Street & Northern Driveway (Unsignalized)	EBL	B	0.26	14	**F**	**1.17**	27
	NBL	A	0.17	14	A	0.21	13
	NBT	A	0.38	20	A	0.29	66
	WBLR	D	0.42	15	E	**>1.50**	12

Burrard Street & Southern Driveway	NBR	A	0.02	9	A	0.03	21
	NBT	A	0.31	15	A	0.27	13
	SBL	B	0.15	27	A	0.09	3
	SBT	A	0.28	18	A	0.41	3
Burrard Street & Eihu Lane (Unsignalized)	EBLR	B	0.22	5	D	**>1.50**	7
	NBL	C	0.39	50	**F**	0.45	50
	NBT	C	0.41	63	D	0.38	53
	SBT	A	0.20	6	A	0.31	17
	SBR	A	0.02	3	A	0.01	4
Robson Street & N-S Lane (Unsignalized)	EBTR	A	0.11	11	A	0.05	6
	WBTL	B	0.01	16	B	0.12	23
	SBLR	C	0.18	7	**F**	**>1.50**	30
	NBLR	B	0.22	8	**F**	**>1.50**	19

Bolded results indicate values that do not meet acceptable performance criteria.

"-" indicates a value not applicable to that particular intersection or movement.

"#" indicates that the 95th percentile volume exceeds capacity; therefore vehicle queue may be longer than reported.

"m" indicates that the volume for the 95th percentile queue is metered by an upstream signal.

As with the 'Existing' scenario, operational issues persist in the 'Total' scenario for key individual movements at many signalized intersections while minor movements from unsignalized intersections would still rely on a combination of gaps from upstream signals, pedestrian yielding behaviour across busy letdowns and laneways, and minor vehicles entering blocked intersections when queues extend past accesses on the major road.

The closure of Burrard Street & Hotel Vancouver Site Access and shifting of these outbound volumes to the Southern Laneway is expected to have a positive effect on the surrounding street network. The existing site access is very closely spaced to the intersection of Burrard Street & Alberni Street as well as only 10m from the Southern Laneway. Its removal would eliminate a direct private access to an important arterial road as well as remove vehicle/pedestrian conflict points across the letdown of a busy pedestrian sidewalk.

With the addition of site traffic to the network, the following summarizes key operational changes from those described previously under existing conditions.

Burrard Street & W Georgia Street

As in existing conditions, the WBT movement was reported to operate above acceptable thresholds with a v/c ratio of 0.95.

Hornby Street & West Georgia Street

The v/c ratio for the NBR movement was reported to increase from 0.98 to 1.16 and remain at LOS 'F' in the PM peak hour. This movement is protected-only with right turn on reds prohibited due to the Hornby Street two-way cycle track. There is limited opportunity to improve operations for this movement beyond small signal timing changes.

Burrard Street & Alberni Street

The v/c ratio for the shared northbound through/left movement was reported to increase to 1.07 and continue to operate as a defacto left turn with the high left turning volume. When modelled with a separate left turn lane, both movements reported LOS 'C' and a v/c ratio of 0.72 and 0.53 for the NBL and NBT, respectively.

Hornby Street & Northern Driveway

This access is anticipated to be the busiest driveway access for the development and the EBL movement was reported to operate with a v/c ratio exceeding 1.00 and LOS 'F' in the PM peak hour. Although left-turn movements only are permitted onto a one-way road, there is a high volume of both vehicle and pedestrian traffic that site traffic would need to yield to. It is anticipated that in reality driver delay would be better than reported as drivers would be able to merge into gaps as traffic platoons occur as a result of signalisation along the corridor and general yielding behaviour exhibited in a busy and dense downtown grid.

Burrard Street & Southern Driveway

The westbound movements exiting the driveway was reported to operate at LOS 'E' with a v/c ratio exceeding 1.50. These poor operations are primarily caused by the existing WBL movements in which there were between 5 – 11 observed under existing conditions. Future site trips were not assigned to the WBL movement given the difficulty of completing a left turn across Burrard Street from the minor leg. In reality if drivers do not want to complete a left turn across Burrard Street they have the option to exit to the south at Robson Street and turn left at the intersection of Burrard Street & Robson Street.

Robson Street & N-S Lane

As in existing conditions, poor operations were reported for the NB and SB approaches, primarily due to the high pedestrian volumes crossing the laneway.

3.2.3 Total Traffic and Operations – with Mitigation

The built form of the Downtown Vancouver means that there are limited opportunities for mitigation beyond optimization of signal timings and changes to signal phases, which have been reviewed for intersections in the study network with demonstrated capacity issues. Due to coordination of signals throughout Downtown, no changes to cycle times have been considered for mitigation purposes.

It is understood that the City is targeting a goal of two thirds of all person trips to be completed by non-car modes by 2030. Providing additional road capacity in the Downtown core would not be in accordance with these targets and therefore mitigation measures that would require widening to existing intersection layouts has not been considered.

Furthermore, mitigation at the site driveways on Hornby Street and existing Robson Street and Burrard Street public laneways have not been considered. The creation of an all-way stop or signalized intersection would not be appropriate at either location given the relatively low traffic volumes and dominance of the surrounding corridors in terms of vehicle volumes, while additional laning is not feasible due to the existing right-of-way.

While LOS ratings of 'F' have been observed at many unsignalized intersection in both the 'Existing' and 'Total' scenarios, it has been explained that actual vehicle delay is likely to be an improvement on the results that have been reported using Synchro and SimTraffic. It is anticipated that in reality, drivers would be able to merge into gaps along both Hornby Street, Burrard Street, and Robson Street as traffic platoons occur as a result of signalisation upstream along the corridor and yielding behaviour exhibited by vehicles and pedestrians that have the right-of-way in busy locations for these lower volume driveways.

Changes in operational performance when compared with the unmitigated 'Total' scenario are shown in **Table 3.10** and described below.

Table 3.10: Total Mitigated Traffic Operations

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM			PM		
		LOS	V/C	95TH Q (M)	LOS	V/C	95TH Q (M)
Burrard St & W Georgia St (Traffic Signal)	*Overall*	*B*	*0.68*	-	*B*	*0.81*	-
	EBT	C	0.83	100	B	0.71	79
	EBR	B	0.39	25	B	0.40	24
	WBT	A	0.64	m36	C	**0.95**	m#132
	WBR	A	0.22	m2	B	0.18	m2
	NBT	B	0.51	44	B	0.47	m38
	NBR	B	0.49	m20	C	0.58	m23
	SBT	B	0.35	33	B	0.64	66
	SBR	B	0.03	3	B	0.12	8
Burrard St & W Georgia St (Traffic Signal)	*Overall*	*B*	*0.68*	-	*B*	*0.81*	-
	EBT	C	0.83	100	B	0.66	74

Mitigated	EBR	B	0.39	25	B	0.38	22
	WBT	A	0.64	m36	B	0.89	m57
	WBR	A	0.22	m2	A	0.17	m1
	NBT	B	0.51	44	B	0.51	42
	NBR	B	0.49	m20	C	0.63	#15
	SBT	B	0.35	33	C	0.70	70
	SBR	B	0.03	3	B	0.13	9
Hornby St & W Georgia St (Traffic Signal)	*Overall*	*C*	***1.05***	-	*C*	***0.94***	-
	EBT	B	0.83	38	A	0.69	25
	WBT	C	0.76	77	C	0.88	#111
	WBR	E	**1.05**	#134	B	0.27	20
	NBTL	B	0.74	m22	A	0.61	m18
	NBR	D	0.65	m19	**F**	**1.16**	m#57
Hornby St & W Georgia St (Traffic Signal) Mitigated	*Overall*	B	**1.01**	-	C	0.92	-
	EBT	B	0.77	41	B	0.75	28
	WBT	B	0.70	72	D	**0.96**	#119
	WBR	D	0.90	#91	B	0.30	21
	NBTL	A	0.80	m26	A	0.57	m14
	NBR	E	0.84	m19	E	**0.93**	m#49

Bolded results indicate values that do not meet acceptable performance criteria.

"-" indicates a value not applicable to that particular intersection or movement.

"#" indicates that the 95th percentile volume exceeds capacity; therefore vehicle queue may be longer than reported.

"m" indicates that the volume for the 95th percentile queue is metered by an upstream signal.

Burrard Street & W Georgia Street

Signal timings during the PM peak were optimized to improve the operation of the WBT movement. Shifting two seconds of green time from the N-S phases to the E-W phases was found to improve the v/c ratio of the WBT from 0.95 to 0.89 and bring all individual movements to within acceptable thresholds.

Hornby Street & W Georgia Street

In the AM peak hour, two seconds from the protected NBR phase and one second from the permissive WBR phase was added to WBR protected phase to increase the phase split to 13 seconds. This was found to improve operations for this movement to a v/c ratio of 0.90 and LOS 'D'. All other movements were reported to remain within acceptable thresholds.

In the PM peak hour, the signal timing plan was optimized to take one second from the WBR protected phase and one second from the WBR permissive phase and added to the protected northbound right phase. These signal timing tweaks were found to improve operations for the NBR to a v/c ratio of 0.93 and LOS 'E'.

3.2.4 Summary of Traffic Impacts & Recommended Mitigations

Overall, the changes to signal timings would improve select individual movements to operate within acceptable thresholds. In general, the Hotel Vancouver development was forecasted to increase vehicle trip generation by approximately 90 – 125 vehicles which was shown to worsen operations for some movements already identified to exceed thresholds in existing conditions. In addition, the trip generation estimated is higher than anticipated as a robust approach. The Downtown street network is busy in existing conditions and there are limited opportunities to improve vehicle operations with the existing built form beyond signal timing changes.

4. SITE PLAN DESIGN REVIEW

4.1 Parking Supply

The City of Vancouver's Parking Bylaw outlines the required number of parking spaces for vehicles, loading, passenger loading, and bicycles for new developments. The following section outlines the bylaw rates and corresponding requirements for each of these. As the entire site is being rezoned and the existing hotel and proposed new tower will share vehicle parking, loading, and bicycle parking, the bylaw requirements have been applied to both buildings.

4.1.1 Vehicle Parking

City of Vancouver vehicle parking rates and required number of parking spaces are outlined in **Table 4.1**.

Table 4.1: Vehicle Parking Supply Requirement & Provision

LAND USE	DENSITY	MINIMUM BYLAW RATE	MAXIMUM BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED
Heritage Hotel	63,920 m^2	Accessible Spaces – 1 space for the first 500 m^2 plus 0.4 per each additional 1,000 m^2 GFA	Maximum of 1 space per 115 m^2	35 - 733 spaces	201
New Tower	20,353 m^2				

As the development is situated Downtown, there are no parking minimums (aside from accessible stalls) and is subject to a parking maximum rate of 1 space per 115 m^2. The accessible parking requirement is 35 stalls and the maximum supply allowed is 733 stalls. The development is proposing to provide 201 parking stalls across three parking levels accessed by two car elevators and operated valet services only. As all underground parking will be valet services only, no accessible sized stalls are provided as individuals would be picked-up and dropped-off in the porte-cochere on the ground level where accessible-sized passenger loading spaces are provided.

4.1.2 Passenger Loading Space

The development's required and proposed passenger loading supply is detailed in **Table 4.2**.

Table 4.2: Passenger Loading Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE		BYLAW SUPPLY REQUIREMENT		PROVIDED
		CLASS A	CLASS C	CLASS A	CLASS C	
Hotel	500 Rooms	1 space per 50 rooms up to 200 units and one additional space for each additional 75 units	1 space for every 200 rooms up to 400 units, and one additional space for each additional 300 rooms	8	2	Class A – 4 Class C - 0
Retail/Restaurant	4,856 m^2	1 space for each 4,000 m^2	-	1	0	Class A - 1
Office	19,457 m^2	1 space for each 10,000 m^2	-	2	0	Class A - 2
TOTAL				11	2	7

The development is required to provide 11 Class A passenger loading spaces and 2 Class C spaces. The development is proposing to provide 7 Class A passenger loading spaces within the porte-cochere. This represents a variance of 4 Class A stalls from the bylaw requirements. The development has a constrained ground floor plan and passenger loading will occur both within the porte-cochere itself and the spaces allocated along the periphery of the porte-cochere and within the centre island. 7 Class A passenger loading spaces is the maximum that could be reasonably accommodated on the ground floor level. 2 accessible, 4 standard, and 1 small car sized stalls are proposed. As the parking levels are accessed only through car elevators and valet services there is not an opportunity to provide additional Class A passenger loading underground. The porte-cochere will be managed by the valet service, therefore, the operation of the passenger space activities will be managed so as not to overspill to the road network.

An existing 5-minute tour bus loading zone is provided on W Georgia Street fronting the Hotel Vancouver which accommodates existing Class C sized passenger loading. As only the existing hotel use would require Class C spaces and the hotel use is not changing, no Class C passenger loading spaces are proposed on-site and they are assumed to remain on W Georgia Street.

4.1.3 Bicycle Parking

Well managed, secure, accessible, and covered bicycle parking will be provided as part of the development plan. Bicycle parking supply requirements and provisions are summarized in **Table 4.3**.

Table 4.3: Bicycle Parking Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE		BYLAW SUPPLY REQUIREMENT		PROVIDED
		CLASS A	CLASS B	CLASS A	CLASS B	
Hotel	500 Rooms	1 per 30 rooms	6 spaces for over 75 rooms	17	6	Class A – 203 Class B - 22
Retail/Restaurant	4,856 m^2	1 per 340 m^2	6 spaces for over 1,000 m^2	14	6	
Office	19,457 m^2	1 per 170 m^2	6 spaces for over 1,000 m^2	114	6	
TOTAL				145	18	

The development is required to provide 145 Class A and 18 Class B bicycle parking spaces. The development is proposing to provide 203 Class A and 22 Class B spaces. This represents a 40% increase over the minimum Class A requirement to satisfy the development's Transportation Demand Management Plan, detailed further in Section 5.1.

The Class A spaces will be provided below grade in the basement and sub-basement levels across two separate bicycle rooms and accessed through a shared elevator. Class B spaces are provided in a covered, well-lit, and secure visitor bicycle parking room on the ground floor level.

4.1.4 Loading Spaces

The development's loading supply requirement and provisions are summarized in **Table 4.4**.

Table 4.4: Loading Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED
Hotel	500 Rooms	Class A – 3 Spaces between 500 – 699 rooms Class B - 3 Spaces between 400 – 599 rooms Class C - None	Class A – 3 Class B – 3 Class C - 0	Class A – 6 Class B - 5
Retail/Restaurant	4,856 m^2	Class A – None Class B – 2 Spaces for the first 2,325 m^2 and one additional space or each additional 2,325m^2 Class C – 1 space between 2,000 – 5,000 m^2	Class A – 0 Class B – 3 Class C - 1	
Office	19,457 m^2	Class A – 3 Spaces between 15,000 – 20,000 m^2 Class B - 3 Spaces between 10,000 – 28,000 m^2 Class C - None	Class A – 3 Class B - 3 Class C - 0	

The development is required to provide 6 Class A spaces, 9 Class B spaces, and 1 Class C spaces per the Parking Bylaw. The development is proposing to provide 6 Class A spaces and 5 Class B spaces. Of the 5 Class B spaces proposed, 2 are planned to be 11.5m long, 3.0m longer than the Class B bylaw minimum length in order to accommodate larger Heavy Single Unit (HSU) type trucks. A variance rationale based on shared loading between uses and strict loading management has been provided below.

Loading for the development is provided in the basement accessed through a single loading elevator and a loading turntable is provided to reduce the maneuvering space required. With a loading elevator and turntable arrangement a robust management plan will be necessary to ensure the elevator and turntable are available for arriving and departing vehicles.

Bunt has created a shared loading demand model to quantify service vehicle loading demand based estimated daily demand and average duration for different land uses and truck sizes. The model operates with the key assumption that a Loading Management Plan is in place with scheduled loading activities supervised by the Loading Manager. Bunt has surveyed a number of sites related to the proposed land

uses which can be found in **Appendix D**. In particular for the hotel land use, Bunt surveyed the loading activity of the Hotel Vancouver in November 2015 and surveyed 3 other Downtown Vancouver hotels across multiple days in 2022.

The following describes the shared loading methodology and assumptions:

- Observed duration and daily loading demand data from the multiple loading surveys were used to determine 'typical average' loading duration and daily loading demand rates for the different vehicle types by land use.
- A Loading Space Demand (vehicle-hours) was calculated by vehicle type and land use based on the average loading duration, daily demand rate, and minimum loading time increment of 15 minutes.
- Loading activity is assumed to occur over a 10-hour (8:00am to 6:00pm) weekday period.
- The supply of stalls required to accommodate the Loading Space Demand of all shared uses was calculated. Sharing of loading stalls between all land uses is assumed.

Table 4.5 below summarizes the loading demand rate and average duration of Bunt's loading surveys. The resulting estimated daily loading vehicles and loading demand (vehicle-hours) is shown in **Table 4.6**.

Table 4.5: Observed Daily Loading Rates and Duration

LAND USE		CLASS A	CLASS B	
		P-TAC	LSU	MSU
Hotel	Rate (veh/day/room)	0.033	0.010	0.020
	Average Duration	37 min	15 min	19 min
Retail	Rate (veh/day/10,000 sf)	2.580	0.860	0.553
	Average Duration	43 min	40 min	20 min
Restaurant	Rate (veh/day/10,000 sf)	7.500	1.000	3.400
	Average Duration	33 min	14 min	18 min
Office	Rate (veh/day/10,000 sf)	0.963	0.340	0.196
	Average Duration	32 min	13 min	18 min

Table 4.6: Estimated Loading Demand

LAND USE	CLASS A			CLASS B – LSU			CLASS B – MSU/HSU		
	Duration Per Vehicle (Hr)	# of Daily Vehicles	Loading Demand (Veh-Hours)	Duration Per Vehicle (Hr)	# of Daily Vehicles	Loading Demand (Veh-Hours)	Duration Per Vehicle (Hr)	# of Daily Vehicles	Loading Demand (Veh-Hours)
Hotel	0.75[1]	17	12.75	0.25	5	1.25	0.50	10	5.00
Retail	0.75	10	7.50	0.75	4	3.00	0.50	3	1.50
Restaurant	0.75	11	8.25	0.25	2	0.50	0.50	5	2.50
Office	0.75	21	15.75	0.25	8	2.00	0.50	5	2.50
TOTAL	-	**59**	**44.25**	-	**19**	**6.75**	-	**23**	**11.50**

(1) All average loading durations are rounded up to the nearest 15 minutes

Based on Bunt loading survey's, the development is estimated to generate approximately 100 loading vehicles per day (59 Class A, 42 Class B) and with a loading demand of 44.25 (vehicle-hours) and 18.25 (vehicle-hours) for Class A and Class B stalls, respectively. With the proposed 6 Class A and 5 Class B loading spaces and an assumed supply of 10 hours per day, the utilization rate would be 74% and 30%, respectively. With a lower expected utilization of Class B stalls, on occasion Class A vehicles could use the larger Class B spaces should this be necessary and permitted by scheduling.

Bunt surveyed the existing Hotel Vancouver in November 2015 in which a peak loading demand of 3 Class A vehicles and 3 Class B vehicles was observed. The addition of 2 Class B stalls and 3 Class A stalls in combination with sharing between land uses and loading scheduling is expected to be sufficient to accommodate the loading demand of the development.

No Class C spaces are proposed. Based on Bunt's loading surveys the demand for Class C loading is expected to be negligible for the proposed land use mix and the loading elevator and turntable are not sized to accommodate Class C vehicles. The development will be able to communicate the maximum size of trucks it can accommodate through its scheduling process to manage that no Class C vehicles deliver to the site. The loading elevator and turntable are sized to accommodate a heavy single unit truck (11.5m long) to provide the development some flexibility in accommodating single unit trucks larger than the minimum Class B Bylaw length (8.5m).

4.2 Loading Management Plan

Loading operations for the site will follow the Loading Management Plan (LMP) outlined below. The intent of the LMP is to ensure loading activities are scheduled, arriving vehicles are aware of the unique access arrangement and its restrictions with a loading elevator and turntable, and these facilities are available for arriving and departing vehicles to minimize impacts to the public street network. The LMP will include the following:

- An appointed staff member will act as the Loading Area Manager, responsible for being the single point-of-contact that manages and coordinates delivery schedules for loading activities associated with the site. In addition, the Loading Area Manager will be responsible for supervising on-site loading activities including use of the loading elevator and turntable.
- All loading activities for the site will be confined to the designated loading spaces.
- All loading activities will be scheduled, and priority given to inbound vehicles to minimize impacts to the public street network.
- No loading activities for the development shall be undertaken on public right-of-way. Stopping/parking restrictions along the City's property will be enforced by the City of Vancouver.
- An information package or 'use of loading spaces' policy will be forwarded to all tenants to inform them of the expected loading operations at the development. In turn, all tenants will be responsible with having their suppliers/drivers review this information package before arriving at the site. The package would include:
    - Loading Area Manager contact information.
    - Vehicle dimension restrictions (i.e no Class C sized vehicles).
    - Information on delivery routing and how to access to loading elevator from Hornby Street.
    - Operating hours of the loading area.
- Compliance with the loading management protocols and scheduling is mandatory. The Loading Area Manager will make every effort to record any violation of the Loading Management Plan and notify tenants/distributors of violations.

4.3 Parking Layout & On-Site Vehicle Circulation

4.3.1 Ground Floor

The existing porte-cochere operates one-way from east to west between Hornby Street and Burrard Street with a turnaround location just before Burrard Street. A redesigned circular porte-cochere is proposed alongside of the removal of the existing one-way outbound site access to Burrard Street.

The redesigned porte-cochere on the ground floor will serve an important function of accommodating both private pick-up/drop-off and valet movements. Passenger vehicles parking for the hotel and accessible stalls related to the new office and retail land uses will enter the porte-cochere to drop-off their vehicle and valet services will take their vehicle either directly to the car elevator if available or dwell in one of the proposed passenger loading spaces.

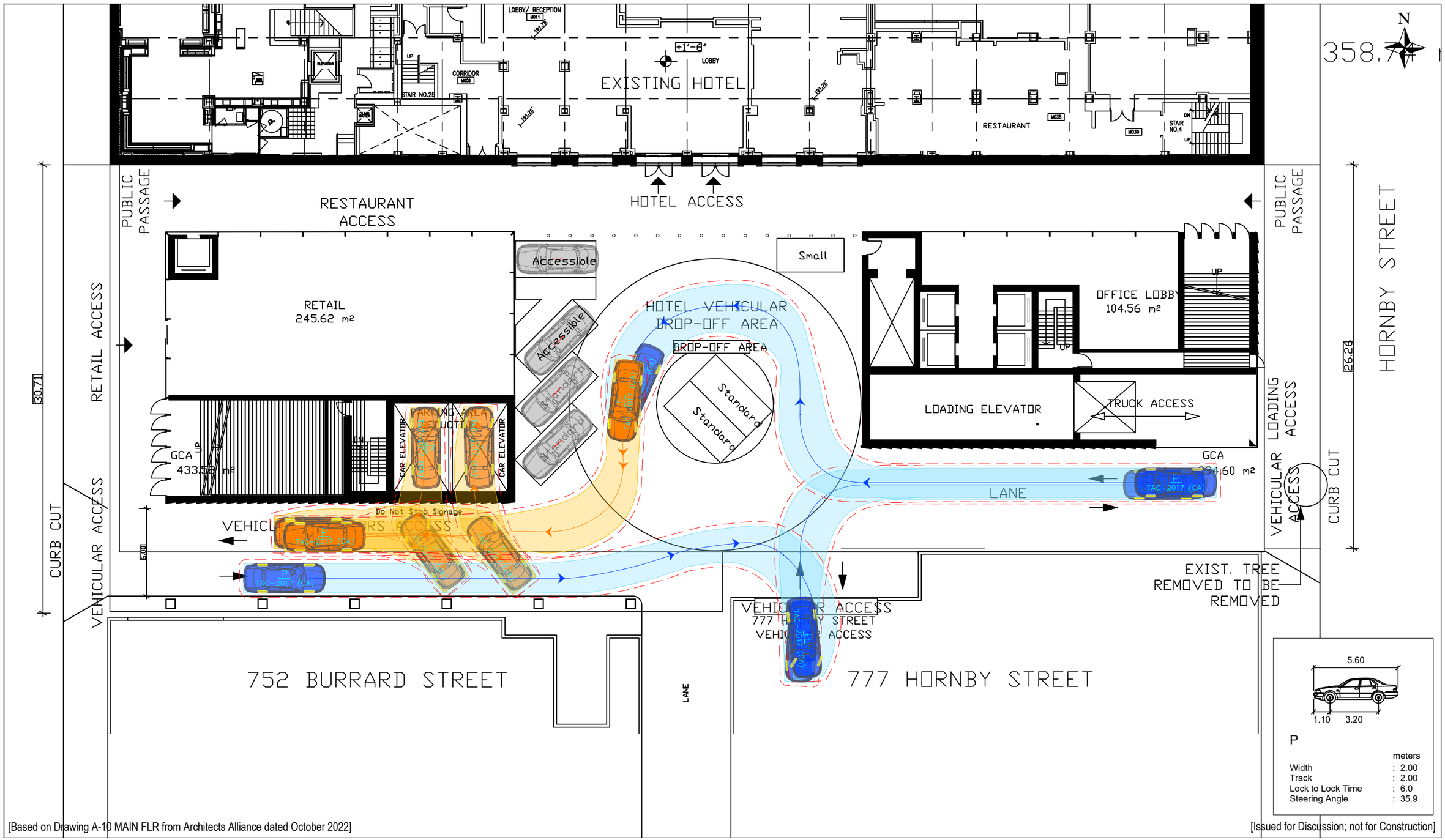
The loading elevator is provided on the east side of the site with direct access from Hornby Street.

Key findings from the AutoTURN review of the ground floor:

- Passenger design vehicles (P-TAC) can maneuver through the porte-cochere while all planned passenger loading spaces are occupied.
- Passenger design vehicles (P-TAC) can maneuver in/out of the proposed passenger loading spaces.
- Vehicles awaiting the car elevator will be required to dwell in one of the proposed passenger loading spaces. Do not stop signage is proposed along the public east-west lane in which the car elevators are accessed to discourage non-site vehicles from stopping in front of the car elevators. Larger passenger vehicles will require a corrective maneuver to enter the car elevator in a straight orientation when accessing from the porte-cochere.
- Access to/from the existing 777 Hornby Street parkade can be maintained.
- A portion of the wall has been removed to permit large Class B (HSU) vehicles to enter and exit the proposed loading elevator from Hornby Street.

Exhibits 4.1 and **4.2** highlight key passenger vehicle swept path maneuvers for the ground floor. **Exhibits 4.3** and **4.4** illustrate the maneuvers into and out of for the largest single unit truck design vehicle that can be accommodated in the basement level (HSU).

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\Swpt_Pth\04-20-0074_SwptPath_AT_V03.1.dwg
2022/11/18 12:55, Plotted by Jordan Eccles



5.60

1.10 3.20

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

[Based on Drawing A-10 MAIN FLR from Architects Alliance dated October 2022]

[Issued for Discussion; not for Construction]

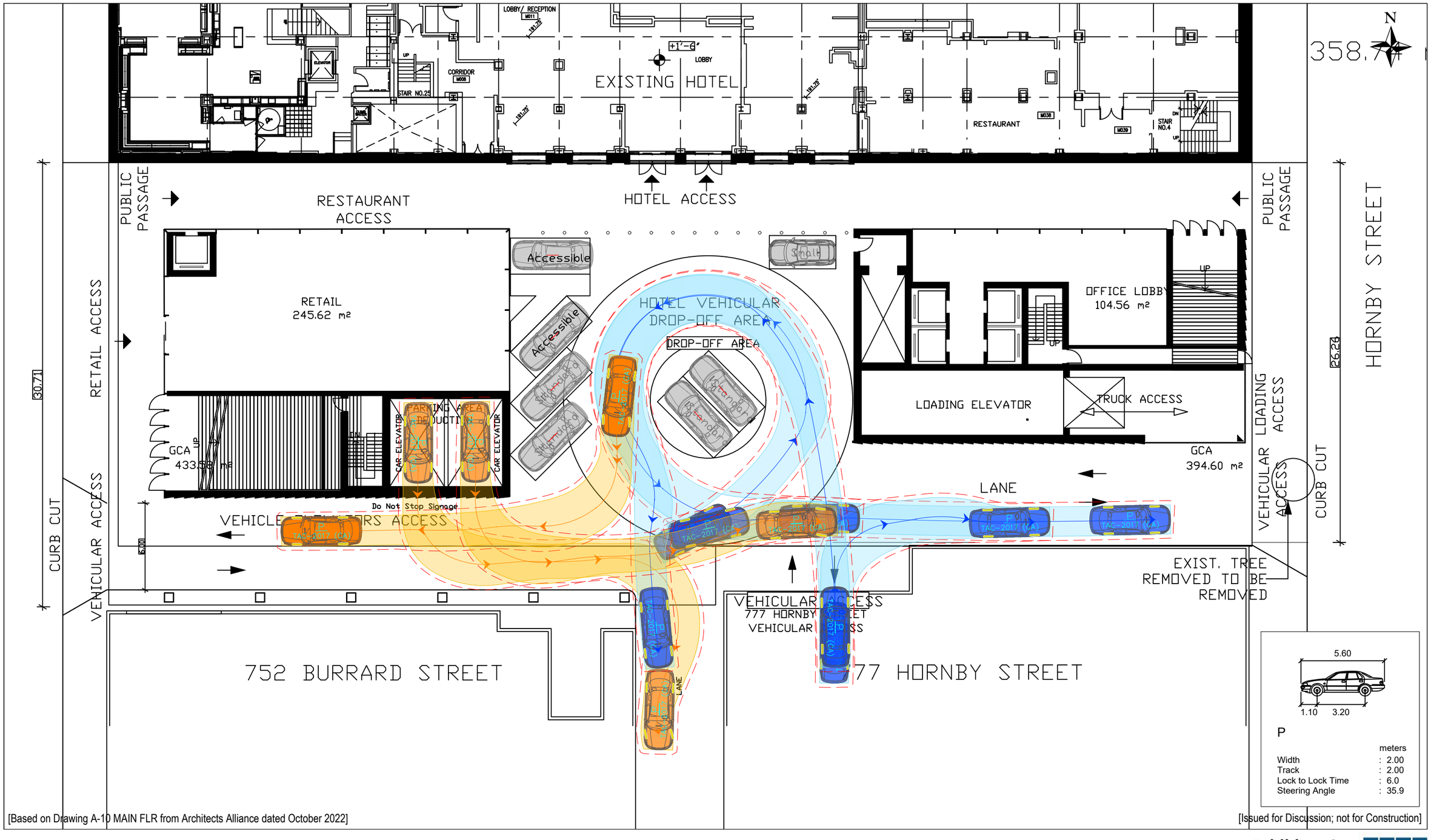
Exhibit 4.1

Passenger Vehicle (PTAC) Circulation - Inbound

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:250 on Ledger Prepared by AJC, JE

bunt & associates

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\SwptPth\04-20-0074_SwptPath_AT_V03.1.dwg
2022/11/18 12:55, Plotted by Jordan Eccles



5.60
1.10 3.20

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

[Based on Drawing A-10 MAIN FLR from Architects Alliance dated October 2022]

[Issued for Discussion; not for Construction]

Exhibit 4.2

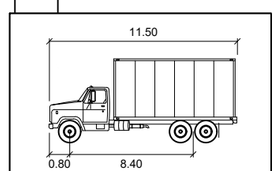
Passenger Vehicle (PTAC) Circulation - Outbound

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:250 on Ledger Prepared by AJC, JE

bunt & associates

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\SwptPth\04-20-0074_SwptPath_AT_V03.1.dwg
2022/11/18 12:55, Plotted by Jordan Eccles

LOBBY/ RECEPTION
M011
LOBBY
+1'-0"
EXISTING HOTEL
CORRIDOR
M008
STAIR NO.25
UP
ELEVATOR
SHAFT
RESTAURANT
M038
M039
STAIR NO.4
DN
UP
HOTEL ACCESS
RESTAURANT ACCESS
SC
Accessible
Small
RETAIL
245.62 m²
HOTEL VEHICULAR DROP-OFF AREA
DROP-OFF AREA
Accessible
Standard
Standard
Standard
Standard
OFFICE LOBBY
104.56 m²
UP
UP
PUBLIC PASSAGE
HSU
TAC-2017 (CA)
TRUCK ACCESS
GCA
394.60 m²
358.74 m²
HORNBY STREET
26.20
VEHICULAR LOADING ACCESS
CURB CUT
N
PARKING AREA DEDUCTION
CAR ELEVATOR
CAR ELEVATOR
DN
Do Not Stop Signage
VEHICLE ELEVATORS ACCESS
LANE
LANE
LANE
VEHICULAR ACCESS
777 HORNBY STREET
VEHICULAR ACCESS
EXIST. TREE REMOVED TO BE REMOVED
752 BURRARD STREET
LANE
777 HORNBY STREET
[Based on Drawing A-10 MAIN FLR from Architects Alliance dated October 2022]



[Issued for Discussion; not for Construction]

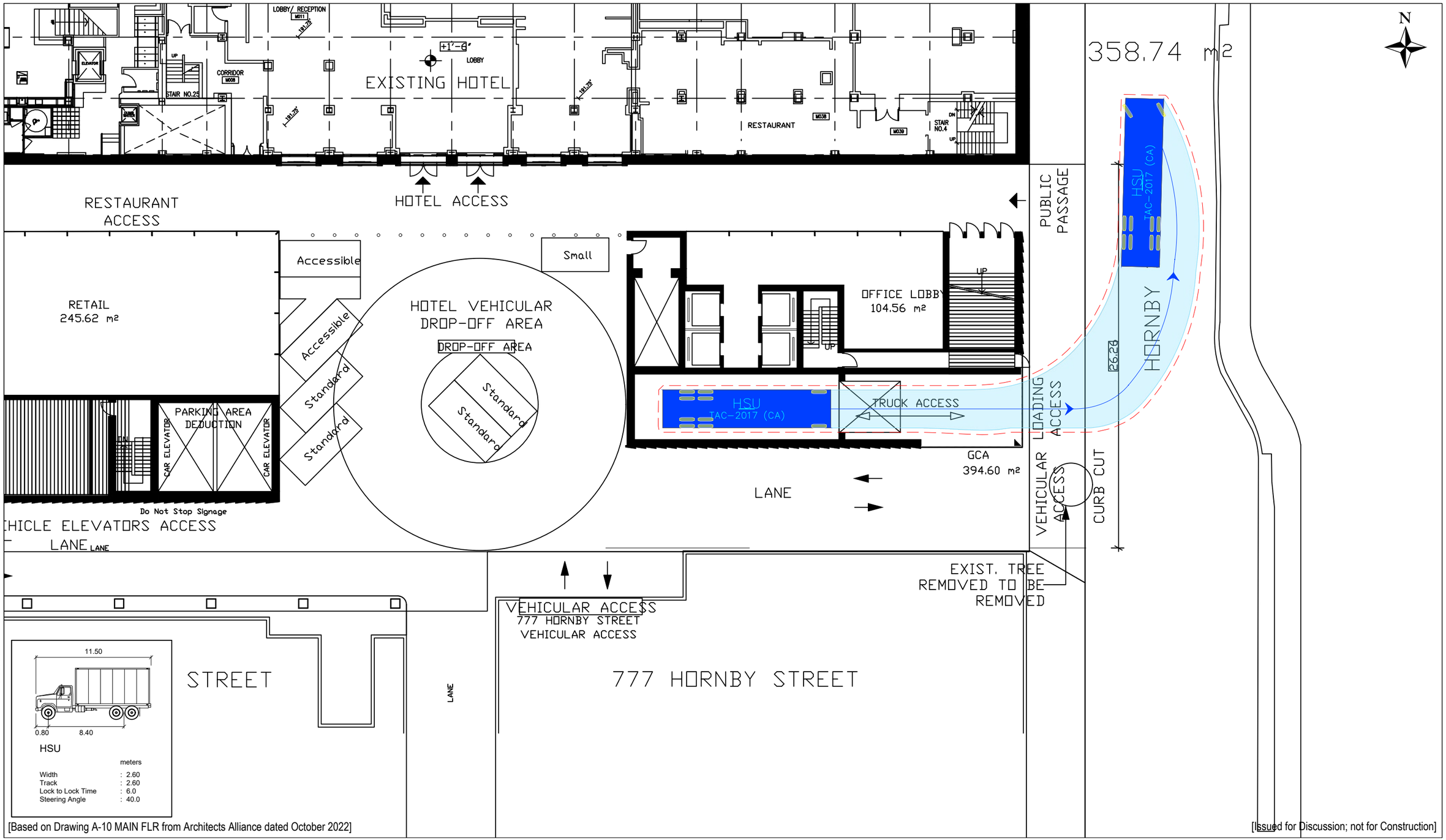
Exhibit 4.3

Loading Elevator Maneuvers (HSU) - Inbound

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:250 on Ledger Prepared by AJC, JE

bunt & associates

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\Swpt_Pth\04-20-0074_SwptPath_AT_V03.1.dwg
2022/11/18 12:56, Plotted by Jordan Eccles



[Based on Drawing A-10 MAIN FLR from Architects Alliance dated October 2022]

[Issued for Discussion; not for Construction]

Exhibit 4.4

Loading Elevator Maneuvers (HSU) - Outbound

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:250 on Ledger Prepared by AJC, JE

bunt & associates

4.3.2 Loading Area

Loading vehicles for the development will arrive on the loading basement level, travel forward out of the loading elevator and onto a loading turntable. The loading turntable will allow all loading vehicles to be oriented with their desired stall to minimize maneuvering space required on the basement level. The turntable is sized with a 11.5m diameter and a minimum 0.5m clearance. The loading turntable design is shown in **Exhibit 4.5**. All loading spaces are accessible with the loading turntable and swept path maneuvers into select loading bays are shown in **Exhibits 4.6** and **4.7** for Class A and B stalls, respectively.

The Class A design vehicle (P-TAC) can enter all Class A spaces without use of the turntable. All inbound movements for Class B design vehicles will require use of the turntable while only the Class B stall in the northeast corner would require the turntable for outbound movements.

Of the 5 Class B spaces, 2 are proposed to be 11.5m long, 3.0m longer than the bylaw minimum length of 8.5m, to provide the development flexibility to accommodate larger single unit trucks. Based on Bunt's previous loading surveys there are many single unit trucks that utilize Class B spaces within the City of Vancouver that exceed the minimum bylaw length. 2 Class B stalls can accommodate a standard SU9 single unit design vehicle (9.1m long) while the Class B stall in the northeast corner will be restricted to vehicles that are the bylaw minimum length of 8.5m and shorter given its proximity to the turntable.

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\Swept Path\04-20-0074_SweptPath_AT_V03.1.dwg
2022/11/18 12:56, Plotted by Jordan Eccles

LAUNDRY STAFF REST ROOM
FAN ROOM
FAN ROOM
AIR SHAFT ABOVE
UP
SWITCH BOARD ROOM
TRANSFORMER ROOM
RAMP DN
ENGINEER'S OFFICE
PUMPS HEATERS ETC.
N

LOADING AREA
1.50
1.80
'A' 'A' 'A' 'A' 'A' 'A'
'B'
-8.23

0.5m clearance

MECH
ELEC
B.O.H. AND STORAGE
322.19 SM
UP

B.O.H. AND STORAGE
461.98 SM
LOADING CLASS 'B'
LOADING CLASS 'B'
1.80
PARKING AREA DEDUCTION
ELEVATOR SHAFT
ELEVATOR SHAFT
UP
LOADING CLASS 'B'
LOADING CLASS 'B'
1.80

LOADING AREA DEDUCTION
LOADING TURNTABLE

LOADING AREA DEDUCTION
B.O.H.
182.26 m²
DN

GCA
1,937.05 m²

PROPERTY LINE
0.5m
[1'-0 3/4"]
PROPERTY LINE
42.52
36.52

[Based on Drawing Sub Basement_Loading Plan_Hotel Van from Architects Alliance dated October 2022]

[Issued for Discussion; not for Construction]

Exhibit 4.5

Loading Turntable Clearance

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:200 on Ledger Prepared by AJC, JE

bunt & associates

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\SwptPath\04-20-0074_SwptPath_AT_V03.1.dwg
2022/11/18 12:56, Plotted by Jordan Eccles

LAUNDRY CART STORAGE
PNEU. TUBE ROOM
UPH SHOP
VINYL STOCK ROOM
MAIN SHOP
ENG'L OFFICE
LAV.
CORRDIDOR
ELECTRICAL SHOP
OUTER OFFICE
STOCK ROOM
PUMPS HEATERS ETC.
UNDRY TAFF REST OOM
FAN ROOM
FAN ROOM
UP
AIR SHAFT ABOVE
SWITCH BOARD ROOM
TRANSFORMER ROOM
RAMP DN
ENGINEER'S OFFICE
LOADING AREA
1.50
1.80
P TAC-2017 (CA)
'A'
'A'
'A'
'A'
P TAC-2017 (CA)
'B'
MECH
B.O.H. AND STORAGE 322.19 SM
B.O.H. AND STORAGE 461.98 SM
LOADING CLASS 'B'
LOADING CLASS 'B'
LOADING AREA DEDUCTION
P TAC-2017 (CA)
P TAC-2017 (CA)
ELEC
UP
1.80
PARKING AREA DEDUCTION
CAR ELEVATOR SHAFT
CAR ELEVATOR SHAFT
LOADING CLASS 'B'
LOADING CLASS 'B'
1.80
UP
ING TURNTABLE
B.O.H. 182.26 m²
CA
,937.05 m²
PROPERTY LINE

5.60
1.10 3.20

P

	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

[Based on Drawing Sub Basement_Loading Plan_Hotel Van from Architects Alliance dated October 2022]

[Issued for Discussion; not for Construction]

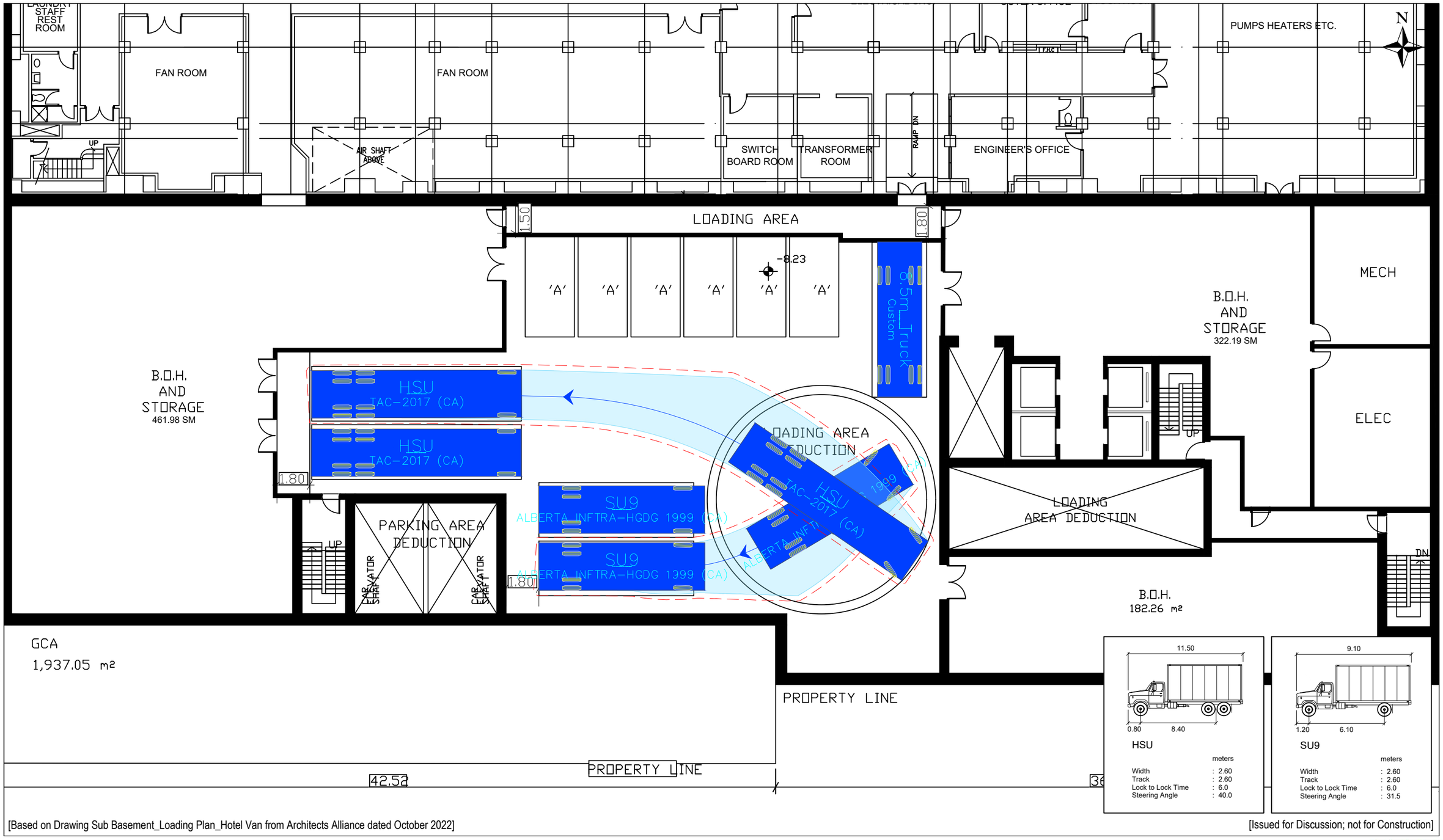
Exhibit 4.6

Class A Loading Accessibility

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:200 on Ledger Prepared by AJC, JE

bunt & associates

M:\Operations\Dept BC\Projects\2020\04-20-0074 Hotel Vancouver Rezoning\4.0 Analysis & Design\4.1 ACAD\Swpt_Pth\04-20-0074_SwptPath_AT_V03.1.dwg
2022/11/18 12:56, Plotted by Jordan Eccles



[Based on Drawing Sub Basement_Loading Plan_Hotel Van from Architects Alliance dated October 2022]

[Issued for Discussion; not for Construction]

Exhibit 4.7

Class B Loading Accessibility

Hotel Vancouver Rezoning
04-20-0074 November 2022 Scale 1:200 on Ledger Prepared by AJC, JE

bunt & associates

4.4 Car Elevator Access

The physical constraints of the site create a significant hardship for the project in physically providing access ramps to the proposed parking. To facilitate parking access to the underground levels of the new parkade, the development is proposing to provide two car elevators accessed from the east-west laneway to the south of the development, approximately 20m east of its intersection with Burrard Street. No stopping signage is proposed within the public laneway between Burrard Street and the north-south laneway to Robson Street to ensure the area in front of the car lifts remain clear for maneuvering to/from the elevators.

Use of the car elevators themselves will be limited to valet services with future hotel guests and office/retail employees with accessible needs parking their vehicles in the porte-cochere for valet services who will then operate the car elevators. 7 passenger loading spaces are proposed within the porte-cochere near the car elevators to provide space for valet vehicles to dwell and queue while waiting for an elevator.

4.4.1 Operations Analysis

To assess the ability of the proposed car elevators to accommodate the anticipated arriving and departing vehicle traffic, the trip estimates for the car elevator assessment align with the vehicle trips set out in **Table 3.6** for the new parkade.

To reiterate, it is estimated that 83 two-way vehicle trips and 78 two-way vehicle trips would use the two car lifts during the respective AM and PM peak hours. With 201 stalls proposed, this would equate to approximately 0.40 trips per stall.

The adequacy of two car lifts to service this volume of arriving and departing traffic was assessed assuming a 'worst case' scenario where a vehicle arrives to the elevator just after it has departed down to the lower P3 parking level to retrieve a departing vehicle. This scenario would involve a full up/down cycle to and from the P3 parking level during which time the arriving vehicle must wait off the lane. This analysis is provided in **Appendix E** and described below.

Based on the assumption of a 120 foot per minute (0.61 metre per second) elevator travel speed and an average car loading and unloading time in/out of the elevator of 16 seconds, this worst-case scenario would require a waiting time of 133 seconds for the arriving vehicle up at lane level.

A series of Poisson distributions and probability formulas were used to calculate the average vehicle queue lengths anticipated for the morning and afternoon peak hour conditions. Average queue estimates were calculated for full operations of 2 elevators.

Based on the projected vehicle trip generation and assumptions for service times, an average queue length of 1 vehicle per lift per direction is expected to be formed during the AM and PM peak hour. The inbound direction in the PM peak hour is expected to be critical direction with an anticipated volume-to-capacity ratio of 0.64. There is sufficient space on the parking levels and porte-cochere to accommodate the estimated typical queue.

5. TRANSPORTATION DEMAND MANAGEMENT PLAN

Based on the City of Vancouver's Parking Bylaw (Bylaw 6059), the proposed development requires a Transportation Demand Management (TDM) Plan as it is a site located Downtown and proposing over 500 m^2 of new non-residential floor area. The following section provides background context, area / site description, and the proposed TDM plan. TDM worksheets are included in **Appendix F**.

5.1 Background

The City's Parking Bylaw provides clear methodology to support reduced parking supply for all types of land uses, both in the downtown and city-wide, through the provision of a TDM Plan, which is defined by the City as:

"*a set of strategies aimed at maximizing the utility of sustainable transportation choices. TDM is used to manage traffic and parking demands and enhance the effectiveness of non-personal vehicle transportation.*"

The City requires a TDM Plan that provides measures which prioritize more sustainable forms of travel as part of this Rezoning Application process. It will also contribute to the City's Climate Emergency Response report (April 29, 2019) that contains big shifts to reduce Vancouver's carbon pollution including:

- By 2030, 90% of people live within an easy walk and roll of their daily needs;
- By 2030, two thirds of trips in Vancouver will be by active transportation and transit;
- By 2030, 50% of the kilometres driven on Vancouver's roads will be by zero emissions vehicles.

The City's Administration Bulletin *Transportation Demand Management for Developments in Vancouver* from August 2018 lays out the framework for the process to develop a TDM plan depending on the land use, location, and size of the project.

Given the development site is Downtown and is proposing over 500 m^2 in new non-residential floor area, it falls under Table 2 (TDM Point Targets for Downtown Sites outside the West End and Robson North Permit Zone). The proposed commercial-office, commercial-retail, and existing hotel would all require a minimum of 24 points.

5.2 TDM Plan Summary

Based on Worksheet A (TDM Requirements Flow Chart) from Schedule A, the development is required to provide a TDM Plan as it is located Downtown. A summary of key TDM Plan metrics for the project are presented below:

- **Site Location**: The site is located at 900 West Georgia Street in Downtown Vancouver;
- **Project Description**: 16,680 m^2 of new office GFA, 2,290 m^2 of new commercial-retail GFA, an existing 500 room heritage hotel with 2,777 m^2 of existing office GFA and 2,566 m^2 of existing

retail GFA. As the proposed new land uses will be on the same parcel as the existing hotel, share the proposed parking and loading facilities, it has been assumed the TDM requirements will extend to the existing hotel.

- **TDM Point Requirement** (Worksheet B, Table 2): 24 TDM points will be required for the commercial-retail, commercial-office, and hotel;
- **Transit Accessibility** (Worksheet C): located within 400m walking distance of a SkyTrain Station which equates to Transit Accessibility Level 'A'.

5.3 Proposed TDM Measure Details

Table 5.1 summarizes the proposed measures to achieve the 24 TDM pints.

Table 5.1: Proposed TDM Measures

CATEGORY	DESCRIPTION	POINTS CLAIMED		
		COMMERCIAL-OFFICE	COMMERCIAL-RETAIL	HOTEL
FIN-02	Public Transit Passes	-	6	6
ACT-01	Additional Class A Bicycle Parking	8	3	3
ACT-03	Enhanced Class B Bicycle Parking	2	2	2
ACT-05	Bicycle Maintenance Facilities	2	2	2
ACT-06	Improved End-Of-Trip Amenities	3	2	2
ACT-09	Walking Improvements	4	4	4
SUP-01	Transportation Marketing Service	2	2	2
SUP-03	Multimodal Wayfinding Signage	2	2	2
OTH-01	Innovative Strategy	1	1	1
	TOTAL	24	24	24

Note Hotel TDM Points are being sought under the "other" category.

The proposed measures listed would allow each site use to achieve the required 24 TDM points. Details of each proposed measure is provided in the following sections. Note, per Worksheet B – Table 2, 8 of the 24 points for commercial-office and commercial-retail are to be shared vehicle-related measures. However, the valet-only parking strategy for the site would not permit car share as a viable TDM measure and other measures have been proposed for those 8 points.

FIN 02 – Public Transit Passes

The site will provide $50 per month transit subsidies toward TransLink Compass Cards to all retail and hotel employees that request subsidies for 10 years to achieve 6 TDM points for the retail and hotel uses. Details regarding the operational plan and administration of the subsidy program are to follow at a later stage.

ACT 01 – Additional Class A Parking

The development is proposing to provide 203 Class A stalls which is equivalent to 40% more than the minimum requirement of 145 Class A Stalls. These Class A stalls are provided on the basement and sub-basement level and will be accessed through an elevator shared with the commercial and hotel loading. 8 office, 3 retail, and 3 hotel TDM points are achieved with this measure.

ACT 03 – Enhanced Class B Bicycle Parking

22 Class B bicycle stalls intended for site visitors are proposed to be enhanced through the provision of a well-lit, secure, and covered visitor bicycle room provided on the ground floor level underneath the exit stairs with access from the east-west laneway. 2 TDM points are achieved for all land uses.

ACT 05 – Bicycle Maintenance Facilities

The development is proposing to provide bicycle maintenance facilities adjacent to the bicycle parking area to achieve 2 TDM points for all land uses.

ACT 06 – Improved End of Trip Facilities

The development is proposing to provide clothes dryers, hair dryers, shower doors, secure facilities for charging, and enhanced facility finishes as part of its end of trip facilities and clothing locker area to achieve 2 points for all land uses.

In addition, to achieve 1 point for the office land use, the development is proposing to provide 12.5% above the bylaw minimum requirement for water closets, wash basins, and showers. The end-of-trip facility calculation and provision is shown below in **Table 5.2.**

Table 5.2: End of Trip Facility Requirement

LAND USE	DENSITY	END OF TRIP FACILITY REQUIREMENT		
		WATER CLOSETS	WASH BASINS	SHOWERS
Office	19,457 m²	8	5	8
Retail	4,856 m²	1	1	1
Hotel	500 rooms	2	2	2
TOTAL		11	8	11
TOTAL WITH TDM		**12**	**9**	**12**

ACT 09 – Walking Improvements

To achieve up to 4 TDM points for this measure, a development must provide a secured public pedestrian connection through the site. The development is proposing to provide a 4.6m public passage between Burrard Street and Hornby Street to achieve 4 TDM points. This public passage will provide access to the hotel, proposed office lobby, and ground floor commercial units while also providing a connection between Hornby Street and Burrard Street for the public. The pedestrian public passage is separated from the porte-cochere and vehicle access points and has no vehicle conflict points.

SUP 01 – Transportation Marketing Services

The property owner shall provide individualized, tailored marketing and communication campaigns, including incentives to encourage the use of sustainable transportation modes. Marketing services shall either be provided by an assigned TDM coordinator or a communications professional. Marketing services shall include, at a minimum, the following activities:

Promotions - The TDM coordinator shall develop and deploy promotions to encourage use of sustainable transportation modes. This includes targeted messaging and communications campaigns, incentives and contests, and other creative strategies. These campaigns may target existing and/or new residents/employees/ tenants.

Welcome Packets - New residents and employees shall be provided with tailored marketing information about sustainable transportation options associated with accessing the project site (e.g., specific transit routes and schedules; bicycle routes; carpooling programs, etc.) as part of a welcome packet. For employees, the packet should reflect options for major commute origins. New residents and employees shall also be offered the opportunity for a one-on-one consultation about their transportation options. The property owner shall proactively provide ongoing travel planning resources to residents and employees for 20 years. This shall be secured with agreements, as appropriate.

The development will provide these market services for all land uses in order to achieve 2 TDM points.

SUP 03 – Multimodal Wayfinding Signage

The property owner shall provide multimodal wayfinding signage that can withstand weather elements (e.g., wind, rain) in key locations. That is, the signs shall be located externally and/or internally so that the residents, tenants, employees and visitors are directed to transportation services and infrastructure, including transit, bicycle share, car share parking, bicycle parking and amenities (including repair stations and fleets), showers and lockers, taxi stands, and shuttle/carpool/Vanpool pick-up/drop-off locations. Wayfinding signage shall meet City standards for any on-street wayfinding signage, in particular for bicycle and car share parking, and shall meet best practices for any interior wayfinding.

The development will provide multimodal way-finding signage per City standards at strategic entrances/exits around the site to facilitate and encourage active and sustainable travel options to/from the development. This will achieve 2 TDM points.

OTH 01 – Innovative Strategy

A bike wash station is proposed alongside the bicycle maintenance facilities to achieve 1 TDM point.

5.3.1 Summary

Based on the proposed measures detailed above, the development is providing TDM measures which would achieve the required 24 points for all land uses. This is subject to review and approval by the City.

6. CONCLUSIONS & RECOMMENDATIONS

6.1 Proposed Development

- Larco Investments Ltd. (Larco) is proposing to rezone the site at 900 W Georgia Street in Vancouver, BC to retain the heritage Hotel Vancouver building and demolish the adjacent health club and pool addition to allow for construction of a new tower. The proposed tower will be adjacent to the existing heritage hotel and comprise of 16,680 m^2 of office, 929 m^2 of retail, and 1,361 m^2 of restaurant. In addition, a 469 m^2 hotel spa and 914 m^2 hotel ballroom will be provided in the new tower with direct connection to the existing heritage hotel.

6.2 Existing Conditions

- The site is located in the centre of Downtown Vancouver and has excellent access to a wide array of frequent bus and rapid transit services. W Georgia Street, Robson Street, and Burrard Street are part of TransLink's Frequent Transit Network and the site is within 200m of SkyTrain stations on both the Canada Line and Expo Lines.

- The site is within convenient walking distance of many daily amenities given its central Downtown location. In addition, the site is well-served by the existing cycling network with high quality AAA (all ages and abilities) cycle routes on Hornby Street to the east, Smithe Street to the south, and Dunsmuir Street to the north.

- Existing traffic volumes were for the main study intersections were provided to Bunt by the City of Vancouver and were completed in 2018 and 2019. These counts were supplemented with counts conducted by Bunt in 2015 for the smaller site access and laneway study intersections. The AM peak hour was found to occur between 7:45 – 8:45am while the PM peak hour was found to occur from 4:45 – 5:45pm. The existing Hotel Vancouver site was estimated to generate 109 two-way vehicle trips in the AM peak hour and 162 two-way vehicle trips in the PM peak hour.

- The study area road network is busy and characterized by a dense urban grid with high pedestrian and cyclist crossing volumes, turn restrictions, and short intersection spacing. Key existing traffic operations analysis results include:

    - **Burrard Street & W Georgia Street:** In the PM peak hour, the westbound through movement was reported to operate above performance thresholds with a v/c ratio of 0.95.

    - **Hornby Street & W Georgia Street:** The protected-permissive westbound right turn movement was reported to exceed acceptable thresholds with a v/c ratio greater than 1.0 in the AM peak hour. The protected-only northbound right turn was reported to operate at LOS 'F' and with a v/c ratio of 0.97 in the PM peak hour.

- **Burrard Street & Alberni Street:** The northbound through/left movement was reported to operate as a defacto left turn with a v/c ratio of 1.04 due the high left turning volume in the PM peak hour from the shared left through/lane. Existing left turn volumes are high at this intersection as it is the only street between Pacific Street and W Georgia Street that permits northbound left turns during peak hours.

- **Burrard Street & Robson Street:** The southbound right turn was reported to operate with a LOS 'F' and v/c ratio exceeding 1.0. The west leg crosswalk was observed to have over 1,400 pedestrians in the PM peak hour which would significantly reduce the capacity of this movement. With pedestrian volumes in this range in a downtown environment, crosswalks are effectively occupied for most or all of the crossing phase and vehicles would rely on turning during the intergreen phase which is expected to be under accounted for in HCM results.

- **Hornby Street & Robson Street:** The northbound through movement was reported to operate with a v/c ratio of 1.00.

- **Minor Accesses & Laneways:** Many minor accesses and laneways were reported to operate above performance thresholds in SimTraffic, Synchro's microsimulation module which better accounts for gaps and platoons created by nearby signalized intersections. In a dense downtown grid rely on a combination of gaps created by upstream signals, high pedestrian volumes yielding on occasion to allow vehicles to turn, and minor street vehicles entering blocked intersections/yielding from major vehicle movements when queues extend past driveways. This behaviour is difficult to replicate in SimTraffic due to software limitations.

6.3 Future Traffic Conditions

- The proposed new tower was estimated to generate 95 (87 in, 9 out) and 128 (32 in, 96 out) vehicle trips in the AM and PM peak hours, respectively. With the existing Hotel Vancouver trip generation, the entire site is estimated to generate 204 (138 in, 66 out) and 290 (123 in, 167 out) trips in the AM and PM peak hours, respectively.

- The existing northern Hotel Vancouver site driveway on Burrard Street is planned to be closed as part of the redevelopment.

- With the addition of 95 to 128 new vehicle trips from the proposed development, many of the existing traffic operations issues identified in the existing conditions were shown to worsen slightly. The built form of Downtown Vancouver means there are limited opportunities for mitigation measures beyond optimization of signal timings. The City of Vancouver has a target a goal of two thirds of all person trips to be completed by non-car modes by 2030. Providing

additional road capacity through road widening or impacts to sustainable mode infrastructure in the Downtown core would not be in accordance with these goals. The following mitigation measures were considered and demonstrated slight benefits to traffic operations given the constraints of the Downtown street network:

- **Burrard Street & W Georgia Street**: Shifting two seconds of green time from north-south phases to the east-west phases in the PM peak hour were found to improve the westbound through v/c ratio to 0.89 and bring all individual movements to within acceptable thresholds.

- **Hornby Street & W Georgia Street**: In the AM peak hour, two seconds from the protected northbound right turn phase and one second from the permissive westbound right and north leg crossing phase were added to the westbound right protected phase to increase the phase split to 13 seconds. This change in signal timing was found to improve operations for the westbound right turn to a v/c ratio of 0.90 and LOS 'D'. In the PM peak hour, one second from the protected westbound right and one second from the permissive westbound right were shifted to the protected northbound right phase. This signal timing tweak was found to improve operations for the northbound right to a v/c ratio of 0.93 and LOS 'E'.

6.4 Site Design Review

- The development is proposing to provide 201 parking spaces across 3 parking levels accessed by 2 car elevators given the site's physical constraints and difficulties in providing access ramps to the proposed parking. As the development is situated Downtown, there are no parking minimums (aside from accessible stalls) and a parking maximum of 1 space per 115 m^2. The accessible parking requirement is 35 stalls and the maximum supply allowed is 733 stalls. The underground parking will be operated by valet services only for the hotel uses and accessible stalls associated with the proposed new office and retail uses.

- The development is required to provide 11 Class A passenger loading spaces and 2 Class C spaces. The development is proposing to provide 7 Class A passenger loading spaces within the ground floor porte-cochere given the site's physical constraints. An existing 5-minute tour bus loading zone is provided on W Georgia Street fronting the Hotel Vancouver which accommodates existing Class C sized passenger loading and as the hotel use is not changing, no new Class C passengers spaces are proposed on-site and they are assumed to remain on W Georgia Street.

- The development is required to provide 145 Class A and 18 Class B bicycle parking spaces. 203 Class A and 22 Class B bicycle parking spaces are proposed, exceeding the minimum bylaw requirements and this 40% increase in Class A spaces is required to satisfy the development's Transportation Demand Management Plan.

- The development is required to provide 6 Class A loading spaces, 9 Class B loading spaces, and 1 Class C loading space per the Parking Bylaw. The development is proposing to provide 6 Class A spaces and 5 Class B spaces, where 2 of the 5 Class B spaces are proposed to be 3.0m longer than the bylaw minimum length to accommodate larger Heavy Single Unit (HSU) type trucks. A variance rationale based on shared loading between the site's many land uses and a loading management plan has been provided.

- With the site's physical constraints, loading is proposed below grade with access provided from a loading elevator and loading turntable. The unique loading access situation will require a Loading Area Manager and Loading Management Plan to ensure loading activities are scheduled, arriving vehicles are aware of the elevator and turntable access arrangement and its vehicle size restrictions, and these facilities are available for arriving and departing loading vehicles to minimize impacts to the public street network.

- The porte-cochere on the ground floor will serve an important function of accommodating both private pick-up/drop-off related to the hotel and the proposed office and retail land uses as well as valet movements for hotel guests utilizing valet-parking for the hotel and accessible parking for the office and retail uses. Vehicles will enter the porte-cochere to drop-off their vehicle and valet services will take their vehicle directly to the car elevator if available or dwell in one of the proposed passenger loading spaces. Self-parked hotel guests, office, and retail generated parking demand will be directed to the adjacent 777 Hornby Street parkade.

- 83 (40 in, 43 out) and 78 (48 in, 30 out) two-way vehicle trips are estimated to use the proposed valet-operated car elevators in the AM and PM peak hours. With the 201 stalls proposed, this would equate to approximately 0.40 trips per stall in the peak hours, slightly higher than other downtown parkades Bunt has observed. Utilizing a Poisson distribution an average queue length of 1 vehicle per elevator was estimated with v/c ratios ranging from 0.40 to 0.64 depending on direction of travel. The critical direction is anticipated to be the inbound movement in the PM peak hour and the porte-cochere and passenger loading spaces are expected to be sufficient to accommodate the typical queue.

6.5 Transportation Demand Management

- The development is required to provide a Transportation Demand Management Plan in accordance with Worksheet B – Table 2 as a Downtown site with a requirement of 24 points per land use. The key aspects of the Transportation Demand Management Plan include:

    - Public transit pass subsidies for hotel and retail employees.

    - 40% additional Class A bicycle parking.

- Enhanced Class B bicycle parking through provision of a well-lit, secure, covered, and convenient visitor bicycle parking room on the ground floor level.
- Bicycle maintenance facilities and a bike wash station.
- Improved end-of-trip facilities.
- Provision of a public passage through the site between Burrard Street and Hornby Street.
- Transportation marketing services and provision of multimodal wayfinding signage.

Under Separate Cover

APPENDIX A

Terms of Reference

Under Separate Cover

APPENDIX B

Traffic Data

Under Separate Cover

APPENDIX C

Synchro Reports

Under Separate Cover

APPENDIX D

Loading Data Locations

Under Separate Cover

APPENDIX E

Car Elevator Analysis

Under Separate Cover

APPENDIX F

TDM Worksheets