TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

Victoria Hill
Neighbourhood Parking Study

Prepared for

City of New Westminster

Date

April 01, 2019

Project No.

04-19-0073

April 01, 2019
04-19-0073

Lisa Leblanc, Manager. Transportation
City of New Westminster
511 Royal Avenue
New Westminster, BC, V3L 1H9

Dear LIsa:

Re: Victoria Hill Neighbourhood Parking Study, City of New Westminster, BC
Summary Report

Please find attached our Victoria Hill Neighbourhood Parking Study – Summary Report.

We trust that this study will assist you in advancing the project and presenting the parking study to council. Please do not hesitate to contact us should you have any questions.

Yours truly,
Bunt & Associates



Kyle Brandstaetter, MCIP RPP
Transportation Planner



Christephen Cheng, P.Eng., M.Eng,
Associate

CORPORATE AUTHORIZATION

Prepared By:	Kyle Brandstaetter, MCIP RPP	Bunt & Associates Engineering Ltd.
	Julian Cheung, P.Eng.	1550-1050 West Pender Street
		Vancouver, BC V6E 3S7
		Canada
Reviewed By:	Christephen Cheng, P.Eng, M.Eng.	Telephone: +1 604 685 6427
	Associate	Facsimile: +1 604 685 6579

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1. INTRODUCTION

1.1 Study Purpose & Objectives

Residents of the Victoria Hill neighbourhood are known to have been experiencing parking pressures on the streets surrounding the site. As such, the City has taken an acitve role in investigating the parking issues and looking for potential solutions.

Bunt & Associates Engineering Ltd. (Bunt) has been retained by the City of New Westminster (City) to conduct a neighbourhood parking study at Victoria Hill. The work provides an update to a previous parking study completed by Bunt in 2011, assessing on-street/off-street parking demand in the Victoria Hill neighbourhood. This has been included in **Appendix A** for context.

The primary objective of this parking review update is to re-assess the existing on-street and off-street parking conditions in the Victoria Hill neighbourhood, and this involved determining the existing parking supply in the area as well as observing the existing parking demand over the course of both a typical weekday and weekend day.

With this updated information the goal of this study is to support the City in looking into ways to improve current parking challenges for residents in the neighbourhood which are known to be problematic with high on-street parking occupancy on the Victoria Hill streets.

This report has been prepared to cover all the recent technical work on the project. The site location is shown in **Figure 1.1** below.

Figure 1.1: Victoria Hill Location



The neighbourhood is a mix of multi-family residential and institutional land uses which overtime, as the area has developed, have added to the parking pressures experienced by the local residents.

1.2 Study Scope & Area

The scope of Bunt's involvement has evolved as the project progressed, but has revolved around data collection, parking demand analysis, and review of potential solutions to the parking issues in the neighbourhood.

For context, the study area of the Victoria Hill parking study is presented in **Exhibit 1.1**.

On-street parking data was collected on all street frontages in the neighbourhood where parking is permitted, including the parking loctated on the east side of McBride Boulevard. Off-street parking within the study limits included the surface parking lot at the Queens Park Care Centre, run by Fraser Health Authority (FHA), and five (5) residential condo buildings, whose strata agreed to participate in the data collection program. Further details will be provided in Section 2.

1.3 Organization of Report

This report is organized in the following manner:

- Introduction;
- Existing Conditions;
- Potential Parking Solutions; and
- Conclusion.

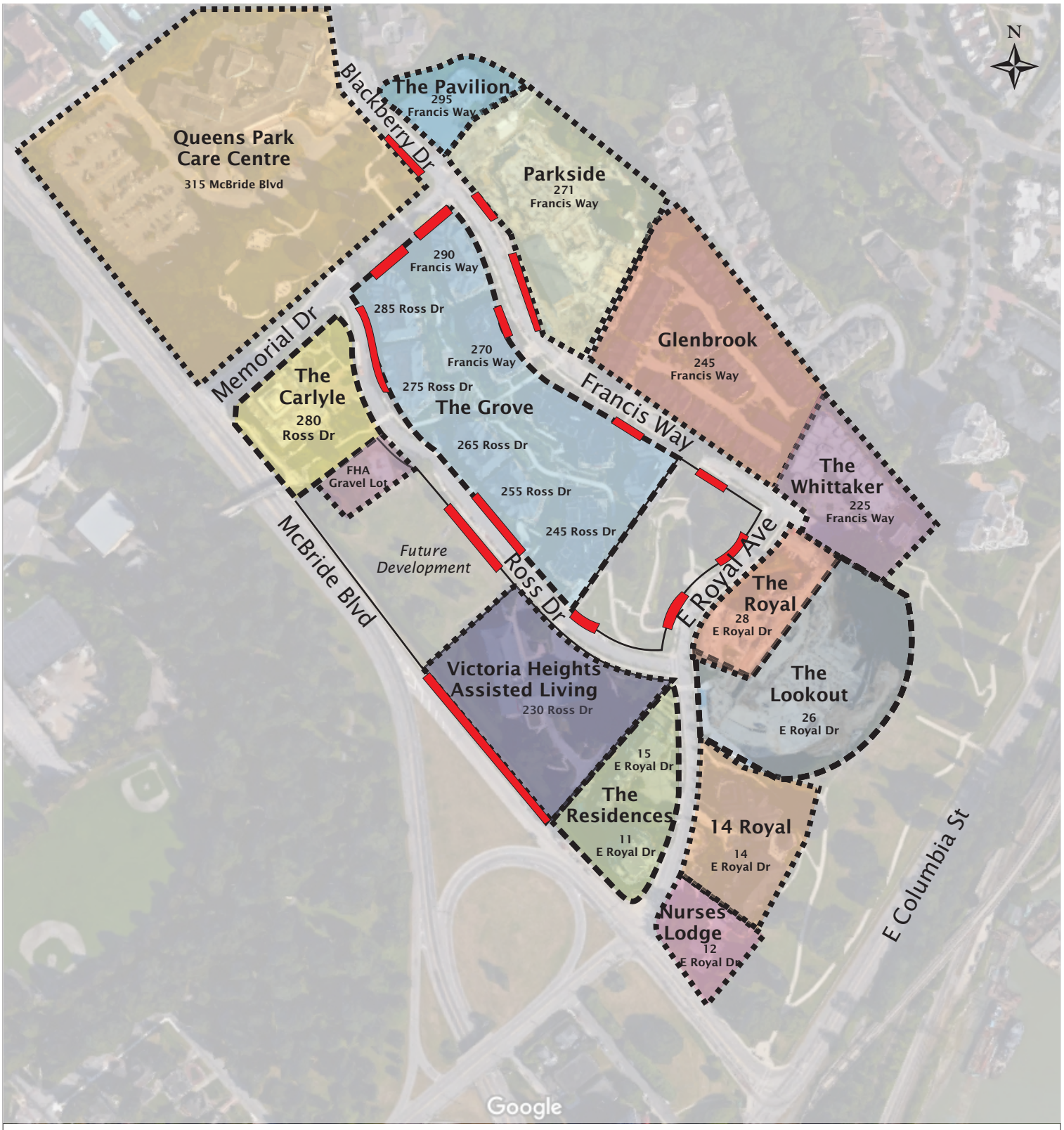

Exhibit 1

Victoria Hill Neighbourhood Study Area

Victoria Hill Parking Study Update Summary Report, New Westminster BC
04-18-0073 March 2019 Scale NTS

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2. EXISTING CONDITIONS

2.1 Study Methodology

Parking surveys were carried out on Wednesday May 22, 2018 and on Saturday May 26, 2018, representing the 'typical' parking patterns. Surveys included both on-street and off-street parking in the study area (see Exhibit 1.1). A detailed description is included below.

2.1.1 On-Street Parking

There is currently a "2-Hour Parking" time limit in effect between 8AM and 6PM on all days of the week. On-street parking was surveyed on the five main roads that make up the Victoria Hill neighbourhood:

- East Royal Drive;
- Ross Drive;
- Francis Way;
- Memorial Drive: and
- McBride Boulevard.

On-street parking demand was recorded between 2:00 PM and 2:00 AM (one hour intervals) to better understand the parking demand profile on the neighbourhood streets. The demand is expected to fall off as visitors to the area generally leave later into the evening (i.e. after midnight).

2.1.2 Off-Street Parking

In the past, residents have expressed concerns on the supply of both residential and visitor parking at their respective buildings. Given this, the parking survey has included off-street parking areas. Off-street parking occupancy was collected between 2:00 PM and 12:00 AM (one hour intervals) on the same days as on-street surveys, noted above.

To do this, access was granted to the parking garage of the residential buildings that volunteered to participate in the parking surveys. The parking garages (labelled as per the building) and the corresponding building addresses are included in the study area. These building locations include:

- The Carlyle (280 Ross Drive);
- The Residence (11 & 15 E Royal Avenue;
- The Lookout (22 & E Royal Avenue);
- The Whittaker (225 Francis Way);
- The Pavillion (245 Francis Way) – weekday only due timing of permission to access site;
- The Glenbrook (245 Francis Way)*.

* Townhouse development which has individual private parking garages, therefore only the surface level visitor parking was surveyed

The majority of these buildings have been occupied for several years, with the exception of the Pavillion Building, which has recently been occupied in the past couple years. As such it is assumed that the majority of the residential units were occupied and lived in at the time of the survey. As The Glenbrook townhouse development has a private parking garage for each unit (with little to no visibility of the vehicles in each garage), the resident parking component for this development was not included in the analysis.

In addition to the residential buildings the parking at the Queens Park Care Centre was recorded on the weekday.

2.2 Survey Results

Attached in **Appendix B** is an information package that presents summary tables of the data and time-of-day profile charts for the parking survey. Accompanying this, the following summarizes the key findings.

2.2.1 On-Street Parking

- At the time of the survey, total parking supply included space for about 87 motor vehicles to park subsequent to the survey, this number increased to about 93 after construction of E 28 Royal was complete;
- Current supply represents an increase from 2011, where 65 spaces were available, a result of new parking space along Francis Way (with new development) and the parking zone now present on McBride Boulevard north of Royal Avenue;
- Peak time on Wednesday was confirmed to be ***7:30 PM (95% occupancy***) and after 6:00 PM, parking is above 85% occupancy;
- Peak time on Saturday was confirmed to be ***7:30 PM (92% occupancy***). Between 7:00 PM and 10:30 PM parking is above 85%;
- Presence of parking demand after midnight has been inferred as most likely ***residents parking on-street overnight***. Past midnight on-street parking was confirmed to be 80-85% occupied for both survey days.

2.2.2 Off-Street Parking (Residences)

- Four residential buildings were surveyed on the Saturday and five on the Wednesday (to include the Pavilion building);
- Overall supply across the four residential buildings is 850 resident stalls and 85 visitor stalls. With the Pavilion, the total supply increased to 1,000 resident stalls and 100 visitors;
- On the Wednesday, overall resident peak occupancy occurred at ***11:30 PM (74% occupancy)***. Visitor parking peaked at 36% around 10:00 PM;

- On the Saturday, resident peak occupancy was found to be ***11:30 PM (85% occupancy)***. Visitor parking peaked at 50% around 10:00 PM;
- The Pavilion building (185 units) has a supply rate of 0.81 resident stalls and 0.10 visitor stalls. (149 resident stalls and 18 visitors). During the weekday count resident parking peaked at 77% at 11:00 PM, while visitor peaked at 67% around 10:00 PM.

2.2.3 Off-Street Parking (Queens Park Care Centre)

- Approximately 270 parking spaces supplied (hourly paid parking) ;
- Weekday parking was confirmed to peak at 75% between 2:00 PM and 3:00 PM;
- Demand substantially decreased after 3:00 PM dropping from 75% occupancy to 30% occupancy by 5:00 PM.

3. POTENTIAL PARKING SOLUTIONS

This section presents some potential measures that have been put forth following the analysis of the parking survey results. These are measures that could be considered as a response to the parking challenges observed in Victoria Hill, to improve management of available parking space.

The focus of these measures is to increase available parking supply for the neighbourhood, and alleviate parking pressures. However, some more sustainable solutions have been presented as well, which are geared towards shifting current travel behaviours and reducing private vehicle ownership, in support of the City's Master Transportation Plan goals.

3.1 Summary of Parking Mitigation Options

3.1.1 **Construction of Lay-bys**

Additional on-street parking through the construction of lay-bys. Based on a high-level review of potential lay-by locations/extensions (subject to more rigorous analysis and costing estimates), additional parking supply on-street could be increased by up to 50-60 stalls with 10-12 new lay-by's of varying lengths. Achieving this would require the removal or relocation of 35-40 street trees and 5-7 street lights. Based on recent experience City staff suggest that it would cost in the order of several hundred thousand dollars to achieve.

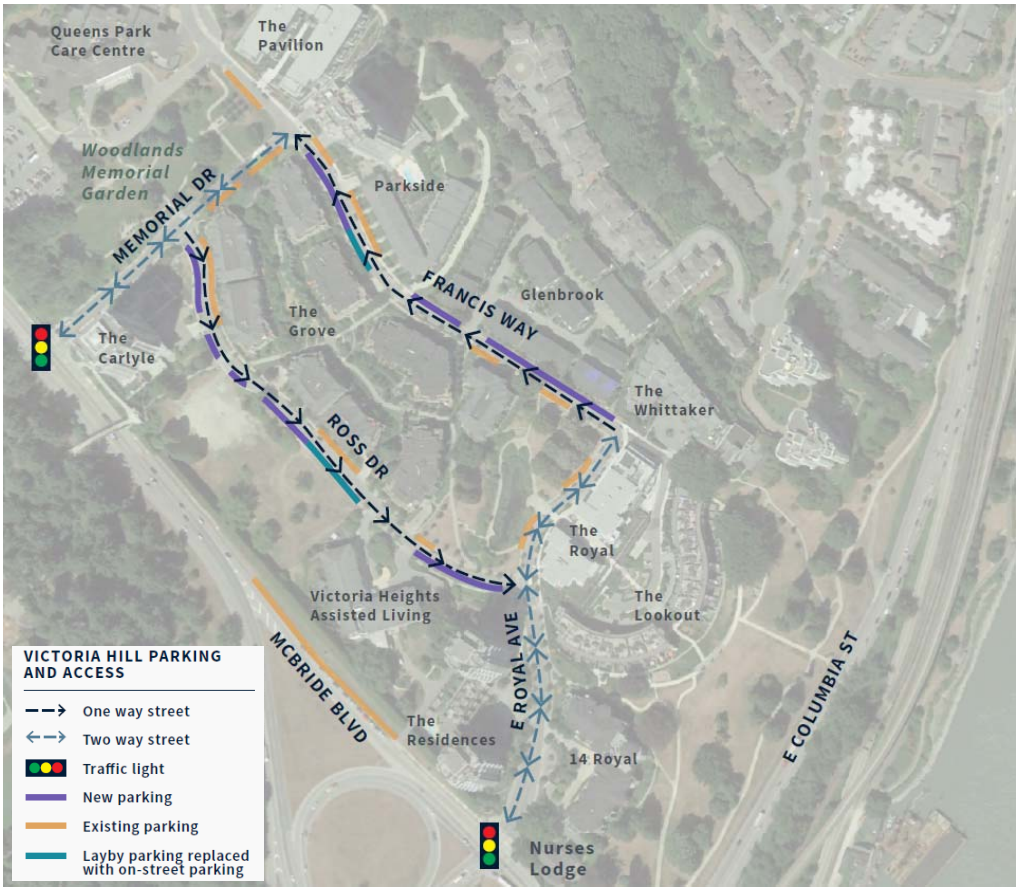
3.1.2 **New On-street Parking – One-Way Francis and/or Ross**

Increase on-street parking supply through one-way traffic circulation on Francis and Ross and introducing curbside parking where space is available. While this option was concluded to work from a traffic operations perspective for general purpose traffic, it was deemed not feasible from an emergency access perspective.

Upon review, the City of New Westminster Fire Department did not support the one-way streets due to the reduction in available street width (i.e. because it would result in less than 6m clear width) and the resulting concern over their fleet being able to properly service the neighbourhood during an emergency. Please refer to **Appendix C** for additional information.

For context, conceptual analysis of available curb-to-curb widths, one-way traffic flow along Francis could introduce space for an additional 25-30 vehicles to park on-street, while one-way along Ross would see an increase in space for approximately 20-25 vehicles. See **Figure 3.1** for an illustration of this concept (prepared by Kirk & Co.).

Figure 3.1: Contemplated One-Way Traffic Circulation and New On-Street Supply Locations



3.1.3 Fraser Health Authority – Gravel Lot

Off-street surface parking, achieved through leasing the gravel lot at 260 Ross Drive from Fraser Health Authority. This lot would require some level of improvements which would be at the City's expense. There could then be an option to sell monthly parking passes at market rates. A detailed review of this option and a feasibility assessment Bunt conducted can be found below in Sub-section 3.2.

3.1.4 Other Measures for Consideration

The following presents a suite of other measures that have been considered to address parking challenges; these do not focus on increasing available supply of parking.

- Extending on-street parking restriction times in the neighborhood, which are currently 2hrs (8am-6pm) and, look into increase the City's efforts to enforce the 2-hour parking limit. The purpose of this measure would be to deter residents who currently park on-street rather than off-street in their own buildings. If this resulted in a parking demand shift from on-street to off-street, the benefit would be to increase the on-street parking availability for visitors to the neighbourhood;

- Install signage on the neighbourhood streets to notify visitors to the area that underground visitor parking stalls are available, and encourage building managers to promote use of on-site visitor parking;
- Aimed at reducing car-ownership, increase the availability of car share vehicles. Car-share providers in New Westminster include Modo (return-trip model) and EVO (one-way trip model);
- Work with TransLink to increase transit options to/from the neighborhood (Route "103-Quayside").

3.2 FHA Gravel Lot Assessment

Bunt completed a high level feasibility evaluation with cost estimates for developing an off-street parking lot at the existing gravel lot owned by FHA, the lot is located at 260 Ross Drive just south of The Carlyle Building (illustrated in Exhibit 1.1).

As noted above, the purpose of investigating the gravel lot was to address current parking challenges in the neighbourhood by increasing available parking supply. Therefore the City wanted to assess the implications of redeveloping the gravel lot site into either a temporary or long-term parking lot (3-6 years), depending on various factors and on how negotiations with FHA proceed.

At the time of preparing the assessment, FHA was leasing the lot on a temporary basis for Onni, during the construction of their sites (i.e. construction staff parking and staging).

The objective of Bunt's work was to provide the City with a desktop feasibility assessment, to determine whether the gravel lot parking option should be considered further as a solution to relieve on-street parking pressure in Victoria Hill. In doing so, the assessment presented three (3) layout options for the gravel lot.

Parking layout design and capacity was reviewed conceptually and is included in **Appendix D**. **Table 3.1** provides a summary of the three (3) parking layout options explored.

Table 3.1: Parking Layout Options Summary

ITEM	MINIMUM LEVEL	HIGHER LEVEL	'IDEAL' LEVEL
Number of Parking Stalls (Normal / Accessible)	47 / 0	43 / 2	41 / 2
Surface Material	Gravel	Asphalt	Asphalt
Pedestrian Connections	1	2	2

Note, these layouts would need further detailed design review as this exercise was a high-level review and was based on aerial orthographic measurements and site observations.

In order to limit any contamination of soils below, the parking layout options were designed to use most of the existing gravel surface without protruding into the undisturbed grass area and without removal of trees or any significant plants.

Based on these criteria, the usable area is measured at approximately 40m x 55m, or 2,200 square metres.

Other notes on the layout design and evaluation include:

- All parking space and aisle dimensions are based on information outlined in the City of New Westminster's Zoning By-law;
- No ground (soil) condition assessment was conducted as part of this evaluation process. However, given the existing grades along Ross Drive, the location of the driveway is placed within close proximity of a raised crosswalk. Although not ideal, there is no other suitable location for the driveway without significant re-grading;
- The 'minimum' design option does not provide accessible stalls as the gravel may be too difficult for use of assistive devices. In addition, a paved connection would be required to connect the adjacent sidewalk onto the surface lot;
- Fence and/or curbs would need to be provided to prevent vehicles from parking out of bounds; and
- Drainage and Electrical design are outside of Bunt & Associates' areas of practices, as such any drainage and lighting design is for planning and discussion only.

3.2.1 FHA Gravel Lot Summary

City staff reviewed the layout options presented and recommended not pursuing any of the options at this time, as it has been deemed unlikely that the capital investment could be recovered through parking revenue.

4. CONCLUSION

This report has provided a compiled summary of all recent (2018) technical work for the Victoria Hill Parking Study, the following highlights the key findings:

Existing Conditions:

- *Data Collection* - On- and off-street parking surveys were carried out on Wednesday May 22, 2018 and on Saturday May 26, 2018 to represent 'typical' parking patterns. This was done as an update to Bunt's original 2011 parking study;
- *Data Collection* - On-street parking demand was recorded between 2:00 PM and 2:00 AM (one hour intervals) and off-street parking (4-5 residential strata complexes and Queens Park Care Centre) was collected between 2:00 PM and 12:00 AM;
- *Parking Restrictions* - On-street parking in the neighbourhood is "2-Hour Parking" time limit in effect between 8AM and 6PM on all days of the week;
- *On-street parking survey supply* - total parking supply is 87 stalls (to increase to 93 after construction of E 28 Royal is complete);
- *On-street parking survey results* - weekday peak demand was observed to start at 7:30PM at 95% capacity, similarly, the weekend peaked at 7:30PM and 92% occupancy. Past midnight on-street parking was confirmed to be 80-85% occupied for both survey days, which was inferred to be reflective of residential parking demand on-street.
- *Off-street parking survey supply* - overall supply across the four residential buildings is 850 resident stalls and 85 visitor stalls. With the Pavilion, the total supply increased to 1,000 resident stalls and 100 visitors;
- *Off-street resident parking survey results* – overall weekday peak demand was observed to start at 11:30PM at 74% occupancy. The weekend peaked at 11:30PM and 85% occupancy. The Pavilion building weekday survey observed a peak of 77% occupancy at 11:00 PM,
- *Off-street resident visitor parking survey results* – overall weekday visitor peak demand was 36% at approximately 10:00PM, while the weekend peak was 50% at 10:00PM. The Pavillion visitor parking was observed at 67% occupied, also at 10:00 PM; and
- *Queens Park Care Centre survey results* – parking supply at the care centre is approximately 270 stalls (hourly paid parking), and the peak weekday demand was recorded between 2:00 to 3:00PM at 75% occupied. However after this peak the demand was observed to decrease to 30% by 5:00PM, representative of employee, or shift, parking patterns.

Potential Parking Solutions:

- *Lay-Bys* - On-street parking supply could increase in the order of 50-60 spaces with 10-12 new lay-by's of varying lengths; this would require the removal or relocation of approximately 35-40 street trees and 5-7 street lights. The cost and feasibility of this option would require more rigorous analysis, but based on recent experience City staff suggest that it would cost in the order of several hundred thousand dollars to achieve;

- *One-Way Francis and/or Ross* - One-way traffic flow along Frances could introduce an additional 25-30 on-street parking spaces, while one-way along Ross would see an increase in approximately 20-25 spaces. This option was deemed not feasible from a emergency access standpoint based on feedback from the City's Fire department, due to restricted travel lane widths and the potential negative impacts to fire truck access;

- *FHA Gravel Lot* – located at 260 Ross Drive, this lot was assessed for feasibility as a location that could be used for temporary or long-term (3-6 years) surface parking lot, depending on various factors and on how negotiations with FHA proceed. Bunt assessed three (3) layout options (Minimum, Higher Level, 'Ideal Level') for the gravel lot and evaluated these options based on a criteria matrix. The lot was confirmed to be able to accommodate 41 to 47 stalls and the recommended layout was the 'Minimum' layout (47 stalls), gravel and designed for temporary use. This option was the least cost and achieved the most parking. Ultimately City staff reviewed the layout options and recommended to not pursue any of the options at this time, as they have deemed it unlikely that the capital investment in the gravel lot will be recovered through parking revenue;

- *On-Street Parking Restrictions* – Extending on-street parking restriction times in the neighborhood, currently 2hrs (8am-6pm) and, look into increase the City's efforts to enforce the 2-hour parking limit. The purpose of this measure would be to deter residents who currently park on-street rather than parking off-street at their own buildings. If this resulted in a parking demand shift from on-street to off-street, the benefit would be to increase on-street parking availability;

- *Wayfinding Signage* – Install signage on the neighbourhood streets to notify visitors to the area that underground visitor parking stalls are available and do not have time limits;

- *Neighbourhood Car Share* – Aimed at reducing car-ownership: increase the availability of car share vehicles or introduce neighbourhood-specific car-share programs and incentives. Car-share providers in New Westminster include Modo (return-trip model) and Evo (one-way trip model);

- *Increased Transit* – Work with TransLink to increase transit options to/from the neighborhood (Route "C3-Quayside; and

- *Liaison with Developers* - Negotiate with developers/strata of recently, or soon to be, completed buildings (i.e. Onni's Pavilion and Royal buildings) to lease vacant underground spaces at competitive rates.

APPENDIX A

Bunt 2011 Victoria Hill Parking Study

TRANSPORTATION PLANNERS AND ENGINEERS

Victoria Hill
Parking Review

Prepared for

City of New Westminster

Date

September 16th, 2011

Prepared by

Bunt & Associates

Project No.

4259.13

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1. INTRODUCTION

1.1 Background

Bunt & Associates has been engaged by the City of New Westminster to conduct a Parking Review of the newly constructed Victoria Hill neighbourhood located in New Westminster, BC. The site location is shown on **Exhibit 1.1**.

This parking review has been undertaken in response to several complaints made to the City by some residents of the Victoria Hill neighbourhood involving residential and visitor parking. The residents have expressed concerns regarding both the on-street and off-street parking supply in the neighbourhood.

As such, in order to gain an up-to-date understanding of the parking supply and demand in Victoria Hill, Bunt & Associates has conducted a thorough parking review of the neighbourhood. Our findings and conclusions are presented in this report.

1.2 Aims and Objectives

The primary objective of this parking review was to gain a thorough understanding of the existing on-street and off-street parking situation in the Victoria Hill neighbourhood. This involved determining the existing parking supply in the area, as well as observing the existing parking demand over the course of both a typical weekday and weekend day.

Once an understanding of the existing parking situation was established, it was then identified what the parking issues were, as well as where and when they were occurring. Once this was done, the causes of these problems could be investigated and potential mitigation measures could be identified.

1.3 Study Methodology

In order to gain an understanding of the parking behaviour in the area, it was important to conduct a parking survey of the Victoria Hill neighbourhood on both a typical weekday and weekend day. The parking surveys took place on Wednesday, August 17, 2011 and Saturday, August 20, 2011. Furthermore, a condensed "follow-up" survey was also conducted a few weeks after the initial surveys to study parking patterns later into the evening.

Our parking surveys included both an on-street and off-street parking component. A detailed description of each component is included in the following sections.

1.3.1 On-Street Parking

As the on-street visitor parking supply is one of the primary concerns of the neighbourhood, the on-street parking occupancy throughout the course of a day needed to be determined. As such, the on-street

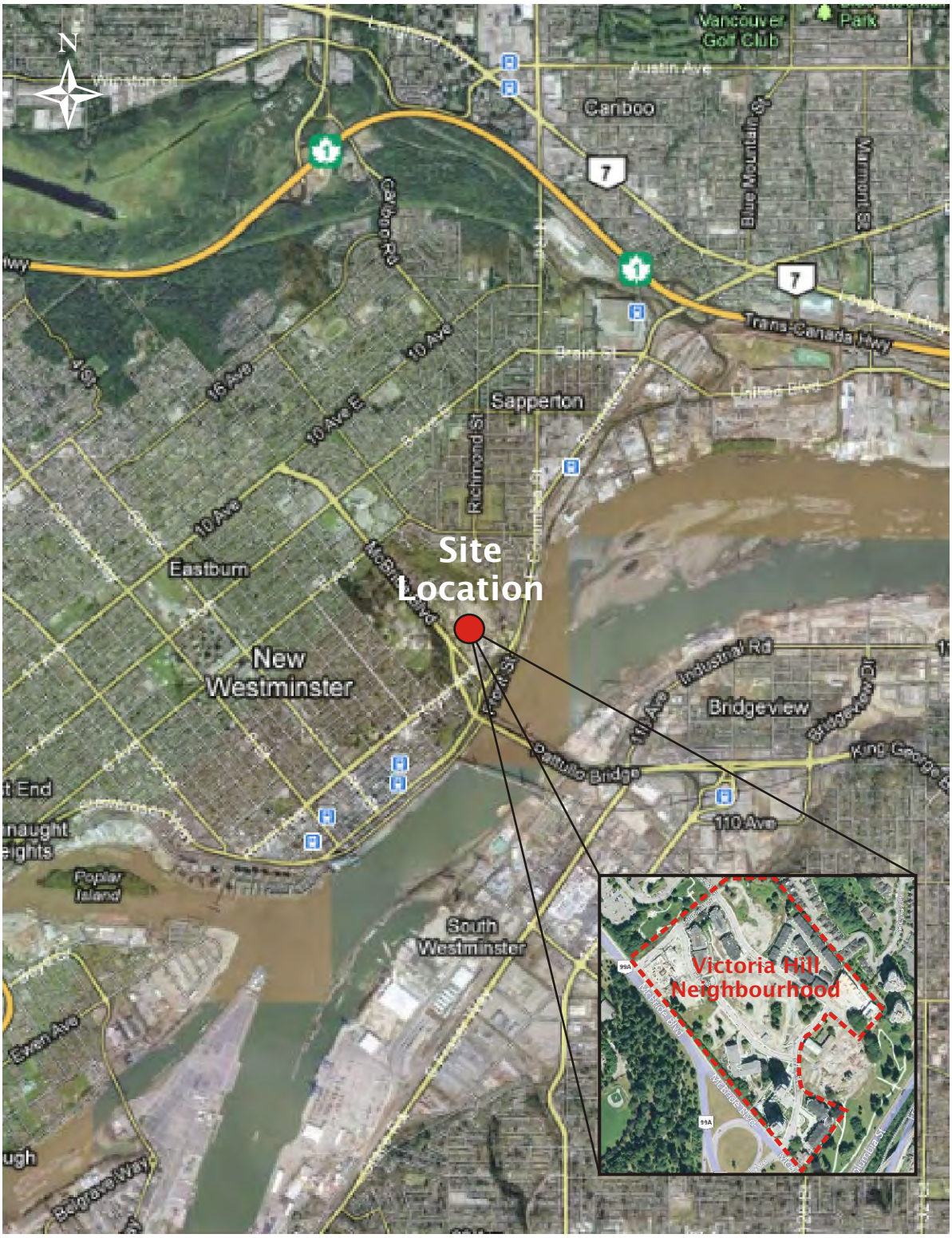

Exhibit 1.1
Site Location

Victoria Hill Parking Review, New Westminster BC
4259.13 September, 2011 Scale NTS

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parking component of our survey was conducted with the first count taking place at 10AM and the last count taking place at 9PM on both survey days. Moreover, as there is currently a "2-Hour Parking" time limit in effect between 8AM and 6PM on all days of the week, understanding the duration that vehicles are parking in the on-street areas was also required.

In order to obtain this information, each on-street parking "pocket" in the neighbourhood was assigned a section label and the parking supply in each section was counted. The on-street parking sections included those located on the four main roads that make up the Victoria Hill neighbourhood; E Royal Drive, Ross Drive, Francis Way and Memorial Drive. The on-street parking sections, as well as the buildings included in the off-street parking survey, are shown on **Exhibit 1.2**.

Next, the parking demand (the number of parked vehicles) in each section was recorded in one-hour intervals, starting at 10AM and ending at 9PM. Moreover, the license plate numbers of each of the vehicles parked in the on-street sections were recorded for each count interval.

By recording the parking demand throughout the entire day, we were able to establish the parking occupancy profile over the course that day. In addition, by recording the license plate numbers of the parked vehicles, we were able to determine approximately how long each vehicle was parked on-street in comparison to the 2-hour limit.

1.3.2 Off-Street Parking

In this study, off-street parking refers to the residential, residential visitor, and commercial parking areas located within the parking garages of the various residential developments in Victoria Hill. As residents have expressed concerns over the supply of both residential and visitor parking at their respective buildings, our parking survey included an analysis of these off-street areas. To do this, access was granted to each parking garage of the residential buildings in Victoria Hill during our parking surveys. The parking garages (labelled as per the building) and the corresponding building addresses included in the study are listed below. Note that these building locations have been shown earlier in Exhibit 1.2.

- The Carlyle (280 Ross Drive)
- The Grove – Parkade A (285 & 275 Ross Drive)
- The Grove – Parkade B (265 & 255 Ross Drive)
- The Grove – Parkade C (245 Ross Drive)
- The Grove – Parkade D (290 & 270 Francis Way)
- The Residences (11 & 15 E Royal Drive)
- The Nurses Lodge (12 E Royal Drive)
- 14 Royal (14 E Royal Drive)
- The Whittaker (225 Francis Way)
- The Glenbrook (245 Francis Way) *

* As the Glenbrook townhouse development has individual private parking garages for each unit, only the surface level visitor parking was surveyed.

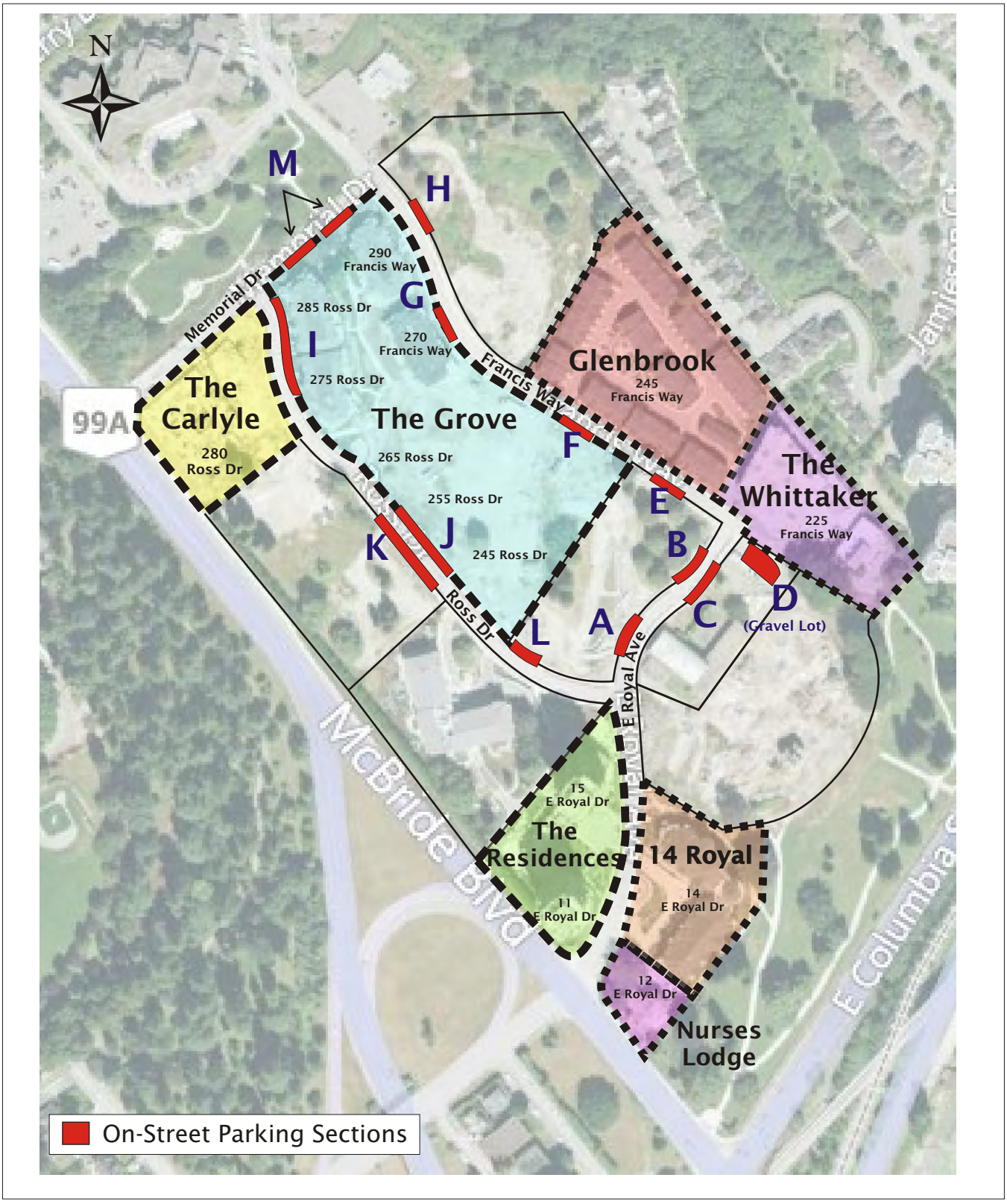

Exhibit 1.2

Survey Area Map

Victoria Hill Parking Review, New Westminster BC
4259.13 September, 2011 Scale NTS

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The majority of these buildings have been occupied for well over a year, and some have been occupied for several years. The vast majority of units in each of the buildings have been sold, with the number of sold units estimated at over 90% across the development.

On each survey day, starting at 4PM, the parking demand in each of the parking garages was recorded in one-hour intervals, categorized into residential, residential visitor and commercial parking. The last parking count interval was started at 9PM. Conducting our parking surveys from 4PM to 9PM was done in order to capture some of the busiest parking times in each parking garage. It is between these times when residents typically arrive home from work, as well when as visitors come to visit the residents of the buildings.

Obtaining this parking demand information allowed us to determine the parking occupancy of both the residential and residential visitor parking areas for each development over the busiest times of the day.

1.3.3 Follow-Up Survey

In addition to the two initial surveys previously discussed, a condensed "follow-up" survey was also conducted a few weeks later on Thursday, September 8, 2011. As the final count interval for the two initial surveys was at 9PM, Bunt felt that it was important to conduct a "follow-up" survey that went later into the night. This survey would provide information on how the parking occupancy changed after 9PM.

As such, the follow-up survey included the off-street parking demand at one representative building (the Carlyle), as well as the entire on-street parking demand. The survey count intervals started at 7PM and ended at 12AM.

1.3.4 Summer Factor

It was necessary to conduct these counts during the summer due to the deadline required for the project. Although there is no specific evidence to suggest it, it is possible that during August, when our surveys were conducted, residential occupancy levels could be slightly decreased as families are away on vacation. As a conservative measure therefore, we would suggest factoring up the survey data results by 10% in order to represent a non-summer period. This factoring is mentioned in our results and conclusions.

2. PARKING SURVEY RESULTS

2.1 Introduction

A summary of the collected parking survey results is included in the following sections. Note that sections 2.2 to 2.4 present the results of the two initial surveys conducted on Wednesday, August 17th and Saturday, August 20th. The findings from the minor follow-up survey are discussed later in section 2.7.

The sections have been categorized by the various parking types; residential, off-street visitor, and on-street visitor. Moreover, a section summarizing the distribution of parking durations in the on-street parking sections has also been included.

It is also worth noting that while there is a small commercial parking component, it is only nine stalls in size (located within one parking garage) and has not been identified as an issue by the City. As such, it has not been included in the parking summaries below.

A more detailed breakdown of the survey data is located in **Appendix A.**

2.2 Residential Parking

With regard to residential parking, the overall peak period of parking demand for the entire neighbourhood, during the initial survey times, was identified to be at 9PM for both the Wednesday and Saturday. This is to be expected, as it is later in the evening when residents are most likely to be home from work or back from an evening out. **Table 2.1** summarizes the parking occupancy for each parking garage surveyed, as well as the combined overall occupancy, during the peak hour of parking demand. The peak hour results are also presented in **Exhibit 2.1**.

It should be noted that because the Glenbrook townhouse development has a private parking garage for each unit (with little to no visibility of the vehicles in each garage), the resident parking component for this development was not included in the analysis. As Bunt was informed that the main concern from this development is in regards to the supply of visitor parking, both within the complex and on the nearby street (Francis Way), the resident parking was not considered to be a critical issue.

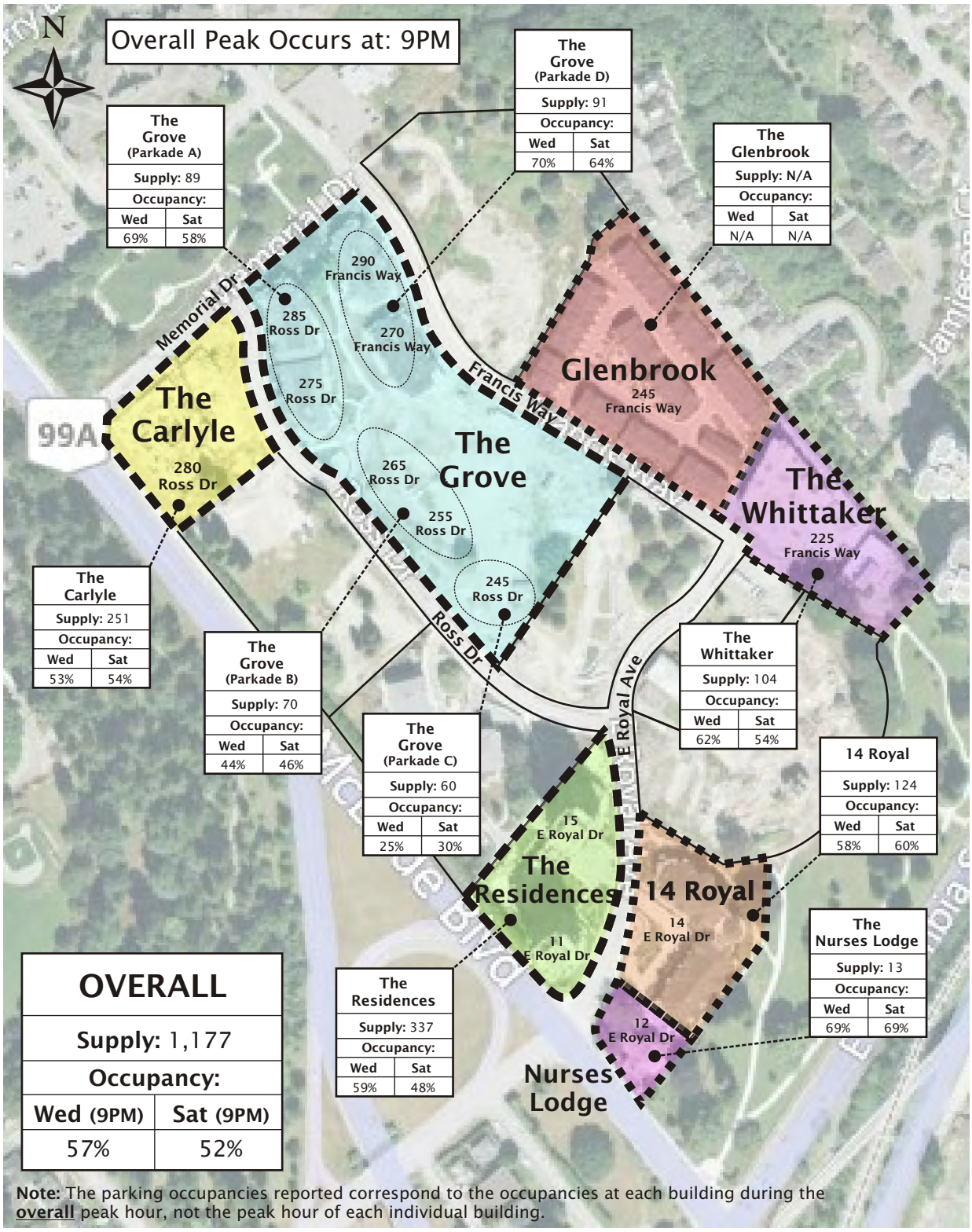

Exhibit 2.1
Resident Parking Occupancy during Overall Peak Hour

Victoria Hill Parking Review, New Westminster BC
4259.13 September, 2011 Scale NTS

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Table 2.1 Residential Parking Survey Results

Parking Garage (Building Address)	Residential Parking Supply (Stalls)	Wednesday		Saturday	
		Parking Demand During Overall Peak Hour (9PM)	% Occupied	Parking Demand During Overall Peak Hour (9PM)	% Occupied
The Carlyle (280 Ross Drive)	251	134	53%	135	54%
The Grove – Parkade A (285 & 275 Ross Drive)	89	61	69%	52	58%
The Grove – Parkade B (265 & 255 Ross Drive)	70	31	44%	32	46%
The Grove – Parkade C (245 Ross Drive)	60	15	25%	18	30%
The Grove – Parkade D (290 & 270 Francis Drive)	91	64	70%	58	64%
The Residences (11 & 15 E Royal Drive)	337	200	59%	161	48%
The Nurses Lodge (12 E Royal Drive)	13	9	69%	9	69%
14 Royal (14 E Royal Drive)	124	72	58%	74	60%
The Whittaker (225 Francis Way)	104	64	62%	56	54%
The Glenbrook (245 Francis Way)	N/A (Individual parking garages not counted)	N/A	N/A	N/A	N/A
Total	**1,177**	**650**	**57%**	**595**	**52%**

As Table 2.1 indicates, during the overall peak hour of observed parking demand for the residential parking, the total parking occupancy is 57% and 52% on Wednesday and Saturday, respectively. Moreover, during the peak hour, the highest individual occupancy for a parking garage was 70% at the Grove Parkade D on Wednesday and 69% at the Nurses Lodge on Saturday.

2.3 Off-Street Visitor Parking

Similar to the residential parking, the overall peak period of parking demand for the off-street visitor parking occurred at 9PM for both the Wednesday and Saturday. This peak may represent the actual visitor demand peaking, but it may also represent some residents parking in this area overnight.

The results during the peak hour of the off-street visitor parking survey are summarized in **Table 2.2**. The peak hour results are also presented in **Exhibit 2.2**.

Table 2.2 Off-Street Visitor Parking Survey Results

Parking Garage (Building Address)	Parking Supply (Stalls)	Wednesday		Saturday	
		Parking Demand During Overall Peak Hour (9PM)	% Occupied	Parking Demand During Overall Peak Hour (9PM)	% Occupied
The Carlyle (280 Ross Drive)	38	11	29%	21	55%
The Grove – Parkade A (285 & 275 Ross Drive)	13	1	8%	5	38%
The Grove – Parkade B (265 & 255 Ross Drive)	10	5	50%	7	70%
The Grove – Parkade C (245 Ross Drive)	8	3	38%	2	25%
The Grove – Parkade D (290 & 270 Francis Drive)	14	3	21%	2	14%
The Residences (11 & 15 E Royal Drive)	10	4	40%	3	30%
The Nurses Lodge (12 E Royal Drive)	2 (On surface level)	0	0%	0	0%
14 Royal (14 E Royal Drive)	7	0	0%	0	0%
The Whittaker (225 Francis Way)	14	0	0%	3	21%
The Glenbrook (245 Francis Way)	11 (On surface level)	4	36%	3	27%
Total	**127**	**31**	**24%**	**46**	**37%**

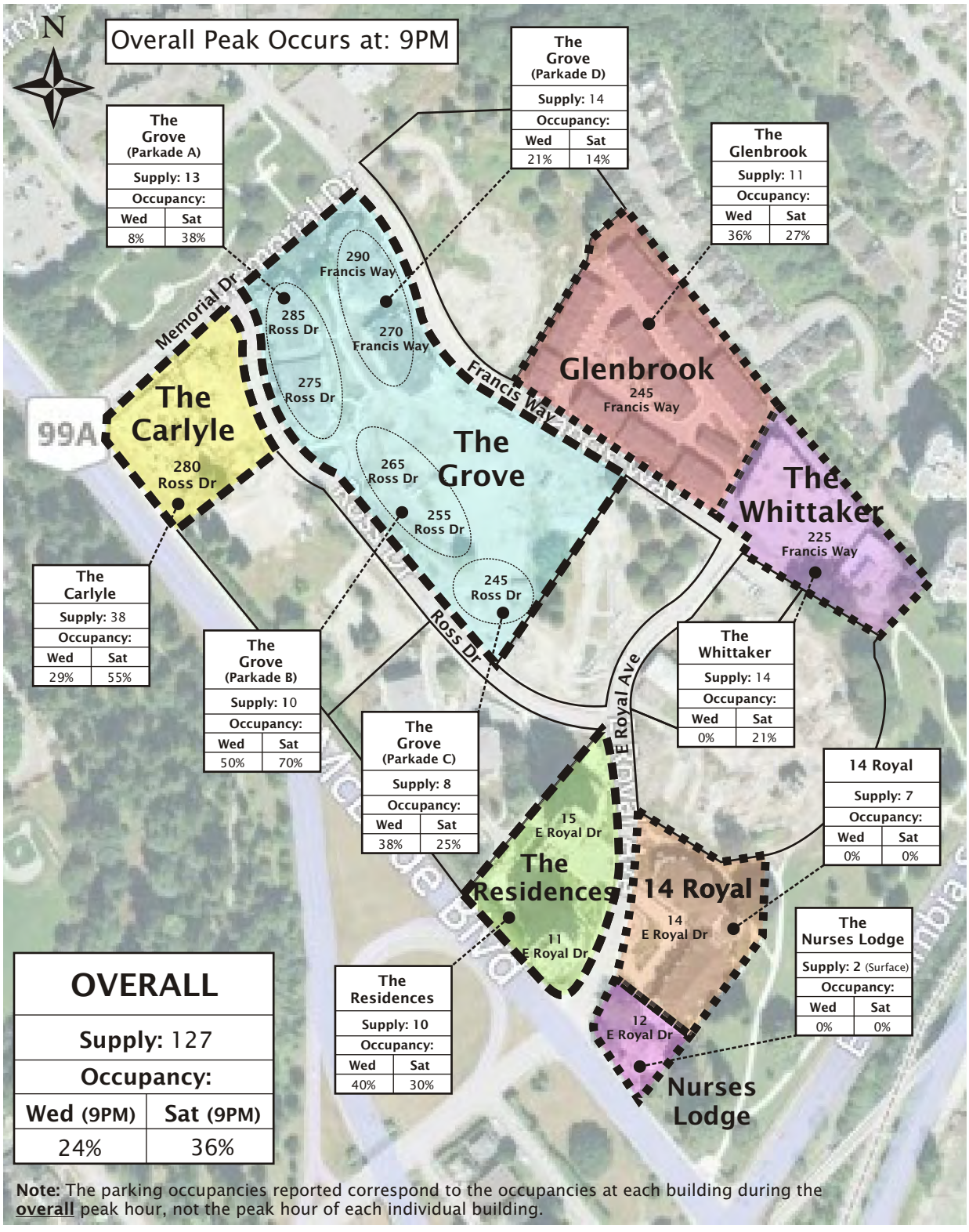

Exhibit 2.2
Off-Street Visitor Parking Occupancy during Overall Peak Hour

Victoria Hill Parking Review, New Westminster BC
4259.13 September, 2011 Scale NTS

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Table 2.2 shows that during the overall off-street visitor peak hour of parking demand, the total parking occupancy is 24% and 37% on Wednesday and Saturday, respectively. The Grove – Parkade B had the highest individual occupancy of any parking garage for both days at 50% on Wednesday and 70% on Saturday. However, this figure is somewhat misleading, given that the Grove – Parkade B has only 10 visitor stalls, and thus the difference of one vehicle can make a significant impact on the occupancy percentage.

2.4 On-Street Visitor Parking

Based on the survey results, the overall peak hour of parking demand for the on-street visitor parking was 8PM on the Wednesday and 9PM on the Saturday. However, it is worth noting that the difference in demand between 8PM and 9PM for both days was only two vehicles.

Similar to the off-street visitor parking, it is not clear whether this represents actual visitor demand or whether there is some residential demand within this peak.

A summary of the on-street visitor parking peak hour results is included in **Table 2.3**. For simplicity, the parking occupancy has been summarized by street, as opposed to each individual section that was presented earlier in Exhibit 1.2. In addition, the parking demand by location during the peak hour is also presented in **Exhibit 2.3**.

Table 2.3 On-Street Visitor Parking Survey Results

On-Street Parking Location	Residential Parking Supply (Stalls)	Wednesday		Saturday	
		Parking Demand During Overall Peak Hour (8PM)	% Occupied	Parking Demand During Overall Peak Hour (9PM)	% Occupied
E Royal Avenue (Sections A, B & C)	15	9	60%	9	60%
Francis Way (Sections E, F, G & H)	14	12	86%	7	50%
Memorial Drive (Section M)	7	7	100%	3	43%
Ross Drive (Section I, J, K & L)	29	25	86%	24	83%
Gravel Lot (Section D)	16	12	75%	13	81%
Total	**81**	**65**	**80%**	**56**	**69%**

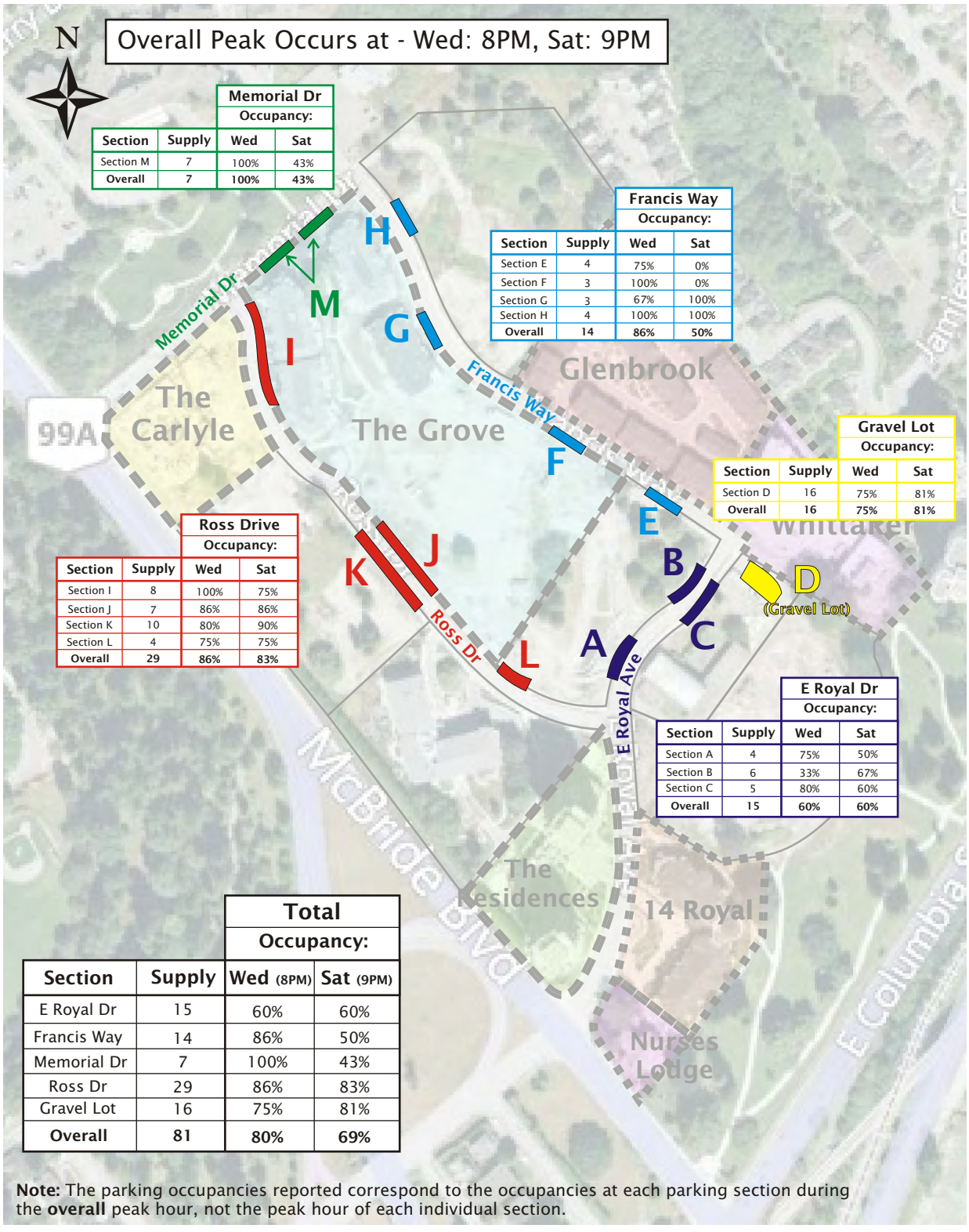

Exhibit 2.3

On-Street Parking Occupancy during Overall Peak Hour

Victoria Hill Parking Review, New Westminster BC
4259.13 September, 2011 Scale NTS

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Table 2.3 indicates that during the peak hour on Wednesday and Saturday, the maximum occupancy of the on-street parking is 80% and 69%, respectively. This translates to 16 available stalls during the Wednesday peak hour and 25 available stalls during the Saturday peak hour.

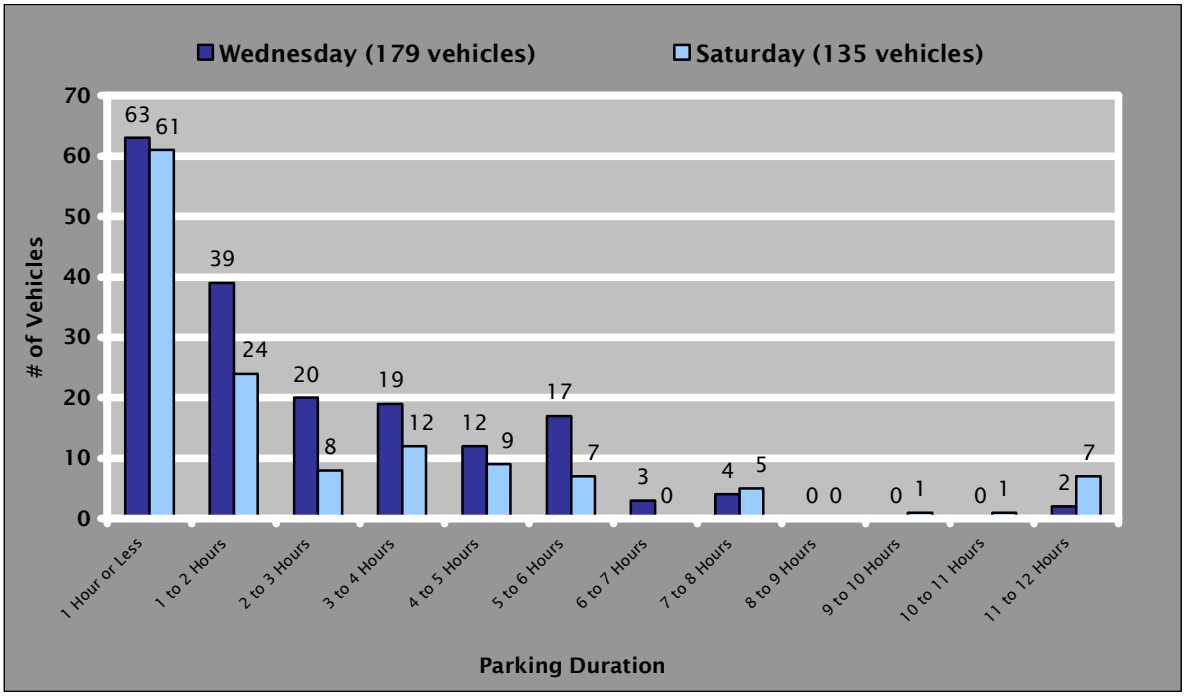
2.5 On-Street Duration of Stay

A common concern that has been expressed by the residents of Victoria Hill is that the 2-hour parking limit between 8AM and 6PM for the on-street visitor parking is being abused, and vehicles are staying much longer than the allowed duration. According to the residents, this is done by many different users, including construction vehicles, visitors and even residents of the neighbourhood.

To monitor this situation, the duration of stay of vehicles in the on-street visitor stalls was analyzed. This was done using the license plate data collected during the parking surveys. Recording the license plate numbers of each parked vehicle allowed us to identify which vehicles remained parked in each section from hour to hour, therefore allowing us to estimate their parking duration.

The overall distribution of parking durations from 10AM to 9PM is presented in **Exhibit 2.4**.

Exhibit 2.4 On-Street Parking Duration Distribution (10AM to 9PM)

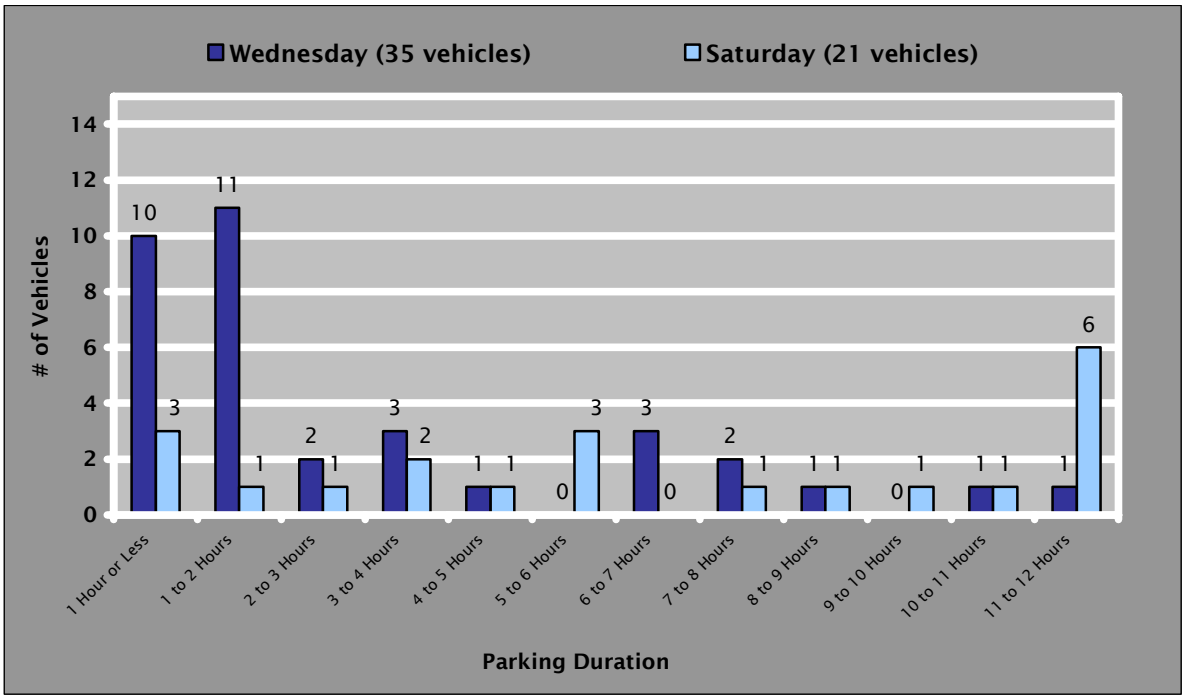


As Exhibit 2.4 indicates, out of the 179 and 135 total vehicles parked on-street over the course of an entire day (10AM to 9PM) on Wednesday and Saturday, respectively, the majority of vehicles parked for 2 hours of less. However, it is worth noting that there were 2 and 7 vehicles on the Wednesday and

Saturday survey days respectively, shown to park on-street for the entire course of the survey (11+ hours). Moreover, on average, longer durations of stay were observed on the Saturday compared to the Wednesday.

It should also be noted that these durations exclude the Gravel Lot located across from the Whittaker on the south end of Francis Way. The Gravel Lot is only temporary and was originally built for construction purposes. It has a capacity of approximately 16 vehicles and has no parking time limits. The overall distribution of parking durations at the gravel lot is presented in **Exhibit 2.5**.

Exhibit 2.5 Gravel Lot Parking Duration Distribution (10AM to 9PM)



As Exhibit 2.5 indicates, although a significant numbers of vehicles still park in the gravel lot for 2-hours or less, there are many more vehicles parking in this lot for extended periods of time (3 to 12 hours) than there are in the other time-restricted sections.

As for the regular on-street parking sections, which have a 2-hour parking limit between 8AM and 6PM seven days a week, it is worthwhile to summarize the portion of vehicles that are exceeding this limit during the restricted times.

Exhibit 2.6 summarizes the distribution of parking durations for vehicles between the hours of 10AM (start of the survey) and 6PM. Note that this summary presents the parking duration of vehicles between

10AM and 6PM only, therefore, additional parking duration of vehicles before or after these times has not been included.

Exhibit 2.6 On-Street Parking Duration Distribution (10AM to 6PM)

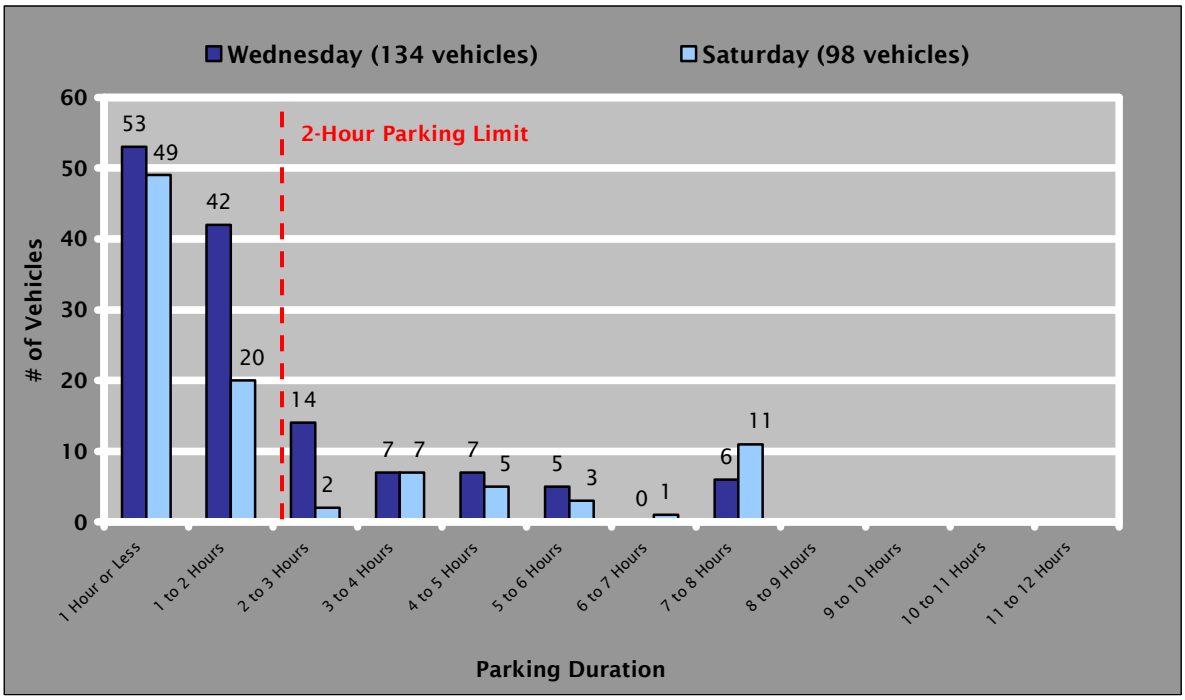


Exhibit 2.6 shows that on Wednesday, 39 out the 134 vehicles parked between 10AM and 6PM parked for over 2-hours. On the Saturday, 29 out of the 98 vehicles parked longer than the 2-hour limit. Coincidently, the results for both days translate to approximately 30% of the vehicles parking between 10AM and 6PM exceed the 2-hour limit.

2.6 Occupancy

As mentioned previously, based on discussions with the strata managers of the developments included in this study, it is our understanding that the buildings in the neighbourhood are 90% to 100% sold. The exceptions to this are three of the smaller Grove buildings, which opened earlier this year, which are about 80% sold. Moreover, out of the units sold, Bunt has also been informed that almost all of these units are also physically occupied.

Based on the fact that a high percentage of the units in the neighbourhood are not only sold, but are also currently occupied, the residential parking demand, and subsequently the residential visitor demand, is not expected to experience a significant increase at these buildings in the future.

2.7 Follow-Up Survey

As mentioned previously, a condensed "follow-up" survey was conducted a few weeks after the initial surveys took place. This survey was conducted on Thursday, September 8, 2011.

As the final count interval for the two initial surveys was at 9PM, Bunt felt that it was important to conduct a condensed "follow-up" survey that went later into the night. The reason for this survey was to observe how the parking occupancy changed after 9PM. As such, the follow-up survey included the off-street parking demand at one representative building of significant size (the Carlyle), as well as the entire on-street parking demand. The count intervals for the survey started at 7PM and ended at 12AM.

Results of the survey indicated that:

- The off-street resident parking occupancy was approximately 10% higher at 12AM than it was at 9PM;
- The off-street visitor parking occupancy was also approximately 10% higher at 12AM than it was at 9PM. However, this percentage is somewhat misleading as the survey was only conducted at one building, and thus the sample size of visitor stalls is quite small. The actual increase in the visitor demand was 5 vehicles between 9PM and 12AM.
- The on-street parking demand was approximately 10% lower at 12AM than it was at 9PM.

Based on the results of the survey, the parking occupancy continues to increase after 9PM until it peaks at 12AM. Although this data is based on only one building, it is reasonable to expect that a similar parking pattern is experienced at the other buildings in Victoria Hill.

As such, taking the 57% (Wednesday) and 52% (Saturday) peak parking occupancies observed during the initial parking surveys and then adding 10% to account for non-summer periods and another 10% to account for an increase in demand after 9PM, this results in an estimated 77% and 72% peak resident parking occupancy.

Similarly, adding a 10% increase to the off-street visitor parking, in addition to the 10% non-summer uplift, still only results in peak off-street visitor parking occupancies of 44% and 57% on the Wednesday and Saturday, respectively. This is a conservative estimate, as it is likely that a large proportion of any increase in off-street visitor parking after 9PM is due to residents parking in these stalls, rather than visitors.

2.8 ICBC Vehicle Ownership Data

In addition to the parking survey data that Bunt collected, vehicle ownership data was also obtained from the Insurance Corporation of British Columbia (ICBC). This data summarized the number of vehicles registered to each of the building addresses in the Victoria Hill Neighbourhood according to ICBC records.

However, because many of the buildings within the neighbourhood have only been open for one year or less, ICBC's vehicle insurance records for such buildings may incomplete or unreliable. This is due to the

fact that there may be delays to when ICBC updates their own records, and also due to the fact that residents often take time to transfer their vehicle insurance to their new address.

As such, in order to minimize the margin for error, only data for buildings that are two years or older was obtained. **Table 2.4** summarizes the ICBC data for the buildings included in this analysis.

Table 2.4 ICBC Vehicle Ownership Data

Parking Garage (Address)	Units	Resident Parking Supply (Stalls)	# of Vehicles Registered to Address - ICBC Data	Insured Vehicles/Unit	% of Parking Stalls Registered in relation to Supply
The Residences (11 & 15 E Royal Drive)	188	337	219	1.16	65%
14 Royal Ave (14 E Royal Drive)	72	124	102	1.42	82%
The Grove Parkade A (285 & 275 Ross Drive)	70	89	86	1.23	97%
The Grove Parkade D (290 & 270 Francis Drive)	74	91	93	1.26	102%
Total	**404**	**641**	**500**	**1.24**	**78%**

As the table indicates, the number of vehicles registered to a building in relation to the available stalls ranges from 65% of the stalls (The Residences) to 102% of the stalls (the Grove Parkade D). The average is 78%, which is a relatively close match to the survey data that Bunt collected (once summer and late-night peak uplifts are accounted for).

Bunt & Associates' experience with ICBC data is that it, while it provides a guide to vehicle demand at a building, there are several factors that result in discrepancies between ICBC data and observed vehicle demand. These factors include lease vehicles registered at another address, students registering a vehicle at their parents' address while living elsewhere, and, delays in transferring vehicle address information to

ICBC. It is noted that ICBC records a vehicle ownership level slightly higher than the number of stalls available in The Grove Parkade D. This does raise questions regarding the ICBC data, as our observations did not show demand to be nearly this high, even with the additional factors taken into account.

2.9 Parking Survey Results Summary

Taking the overall results from the parking surveys for all usage types, there are distinct parking patterns and key points that that should be noted. These findings are listed below:

- For both residential and on-street/off-street visitor parking, the overall peak hours of demand during our initial surveys occurred later in the day, at either 8PM or 9PM. However, a follow-up survey showed that the off-street parking demand actually peaks later at 12AM.
- During our initial surveys, the overall resident parking occupancy for the area reached 57% and 52% on the Wednesday and Saturday, respectively. Adding on 10% to these numbers to account for non-summer periods and another 10% to account for a later peak, results in an occupancy of 77% and 72% respectively, still well within capacity.
- The overall off-street visitor parking occupancy for the area reached 24% and 37% on the Wednesday and Saturday, respectively. Adding 20% onto these percentages to account for both the non-summer period and a later peak still results in numbers significantly below capacity (44% and 57%).
- The overall on-street visitor parking occupancy for the area reached 80% and 69% on the Wednesday and Saturday, respectively. Adding 10% to these percentages to account for the non-summer period results in 90% and 79% occupancy levels outside of the summer months.
- The discrepancy between the peak occupancy of the on-street and off-street visitor parking suggests that the on-street visitor parking is being used considerably more than the off-street visitor parking, in terms of both actual numbers and percentage occupied.
- In terms of location, the on-street parking areas on Ross Drive and Memorial Drive are consistently the busiest. These parking sections are located near the Carlyle and the seven buildings that make up the Grove.
- There is a 2-hour limit for on-street parking between 8AM and 6PM. This 2-hour limit was surveyed from 10AM until 6PM. During this time, 70% of vehicles were found to park for 2 hours or less while 30% parked for more than 2 hours.
- On average, longer parking durations were observed on the Saturday compared to on the Wednesday.
- On the Wednesday and Saturday, a total of 35 and 21 vehicles, respectively, were observed to park at the temporary gravel lot located on the south end of Francis Way.
- Although there is no parking time limit for the gravel lot, on the Wednesday, 60% of vehicles were still observed to park for 2 hours or less. However, on the Saturday, only 20% of vehicles park for less than 2 hours, with the rest exceeding this time. On the Saturday, 6 of the 21 vehicles were shown to remain parked for the entire duration of the survey (11+ hours).
- As the buildings surveyed are currently 90% to 100% occupied, the residential and visitor parking demand associated with each of the buildings is not expected to significantly increase in the future.

- The collected ICBC data is largely consistent with the above analysis with vehicle registrations occupying 78% of available residential stalls, on average. There are variations within this data however, which is typical of ICBC data collected for previous projects.

3. EXISTING PARKING COMPLAINTS

3.1 Introduction

Based on information received from the City, as well as the strata managers of Victoria Hill, the residents' primary parking complaint in the area is in regards to a perceived shortage of both on-street and off-street parking in the area for residents and visitors.

In addition, building managers and residents have also expressed other specific parking concerns related to their buildings. Although this study is meant to focus on issues regarding parking supply and demand, all of the concerns voiced by the residents have been listed in the following sections.

3.2 Residential Parking Issues

Some residents of Victoria Hill have expressed various concerns relating to the residential parking areas. The concerns that we have been made aware of are as follows:

- Parking stalls in some of the parking garages are too small.
- Some buildings do not have any bicycle parking facilities in their parking garage. Moreover, strata bylaws often forbid them from alternatively storing their bicycles on their patios.
- Residents are parking their vehicles in the off-street visitor stalls, in the on-street visitor sections, or in the temporary gravel lot due to:
  i. A lack of additional residential parking stalls available to purchase at some of the buildings. The stalls that are not being used at these buildings are still not available as they have often been reserved for future tenants of unsold units.
  ii. A reluctance to purchase an additional parking stall, even when there are stalls available, because of the high cost of a stall ($15,000).
  iii. Over-height vehicles do not fit into the underground parking garages.
  iv. A resident being assigned a parking stall that is too small; therefore, making it difficult or impossible to park their vehicle into their own stall.

As the list above indicates, the issues where residents do not have enough residential stalls to park their additional vehicle(s) or when they have difficulty parking their vehicle(s) into their assigned stalls result in them using the visitor parking areas to park their own vehicles. As such, these issues contribute to the perceived visitor parking supply and demand problem.

3.3 Visitor Parking Issues

In addition to complaints of a shortage of visitor parking, some residents in Victoria Hill have also expressed various other concerns regarding the visitor parking, which may be contributing to the perceived shortage of supply. These visitor parking concerns include:

- Constructions workers and patients/patient visitors of the Geriatric Assessment Clinic park in the on-street parking sections for longer than the 2-hour limit.
- The 2-hour on-street parking limit is shorter the average stay of their visitors.
- Residents are parking their vehicles in the off-street visitor stalls, in the on-street visitor sections or in the temporary gravel lot, as outlined above, which decreases the number of stalls available for visitors.

As the list shows, the primary concern with the on-street visitor parking is regarding the 2-hour time limit, and people abusing this restriction. In addition, issues regarding residents parking in the visitor stalls are also noted.

4. PARKING MANAGEMENT

4.1 Introduction

Although the primary concern expressed by the Victoria Hill neighbourhood relates to a perceived shortage of both on-street and off-street parking in the area for residents and visitors, the results of the parking survey suggest that the parking supply is actually more than adequate for the current demand.

Based on the survey results, during the peak parking hours, the parking occupancy for each parking type remains relatively low, particularly for the off-street residential and off-street visitor areas (see Section 2.7 for the parking survey results summary).

Moreover, the survey data also suggests that the perceived shortage of parking, particularly for visitors, may be due to poor parking management, as opposed to an actual shortage of stalls.

For example, during the peak parking hour on the Wednesday, the on-street visitor parking occupancy was 80%; on the other hand, the off-street visitor parking occupancy during the same time was only 24%. This discrepancy between the occupancy of the on-street and off-street visitor parking areas suggests that if the existing visitor parking supply was managed more efficiently, the perceived problem of a shortage of stalls could be improved.

The following sections discuss how some of the existing parking regulations could be modified in order to improve the current parking situation.

4.2 Enforcement of On-Street Parking Time Limit

Currently, there is a 2-hour parking time limit for the on-street visitor parking areas from 8AM to 6PM, seven days a week. However, the residents claim that some users are abusing the 2-hour parking limit, which has been confirmed by the results of our parking survey.

The survey data indicated that on both the Wednesday and Saturday, approximately 30% of the vehicles parked on-street between 10AM (start of our survey) and 6PM exceeded the 2-hour limit, with some vehicles parking for the entire length of the survey (11+ hours).

The residents claim that the on-street parking is being abused by many different users, including construction workers, visitors of the residents and even residents themselves, who park their own vehicles on-street.

This behaviour may be occurring for many reasons, but no matter the case, it has been allowed to continue because the 2-hour time limit has not been strongly enforced. According to our data collectors, over the course of the two survey days, there were no parking enforcement officers observed on-site.

As such, it is suggested that in order to prevent this abuse of the on-street parking, the City must increase their efforts to enforce the 2-hour parking limit. The additional benefit of this enforcement is that it will encourage visitors to use the off-street visitor parking areas if they intend to stay for longer than 2-hours, reducing the existing on-street demand. Although the off-street visitor parking stalls require a greater effort to access, they are not restricted to a 2-hour time limit.

Taking vehicles out of the on-street visitor areas and into the off-street parking will help balance out the discrepancy between the number of vehicles using the on-street and off-street stalls, resulting in a more efficient use of the existing parking supply.

4.3 Improved Signage

On the existing neighbourhood streets today, there is very little parking-related signage, other than the 2-hour time limit signs. As such, it is suggested that additional signage be installed on the streets in Victoria Hill that notify visitors that off-street visitor parking is available inside the building parking garages which is not restricted to a 2-hour limit.

4.4 Visitor Parking Passes

Based on conversations with the building managers of the Victoria Hill developments, it is our understanding that the majority of the buildings have a "visitor pass" system, where each residential unit is given one visitor pass.

When a visitor comes to visit a resident of a building, he/she must display this pass on their vehicle's dashboard. This current system ensures that a vehicle parked in the visitor stall is a legitimate visitor to the building and it enforces that each unit uses only one of the visitor stalls for their own use.

This current arrangement is useful when the occupancy of the off-street visitor parking is an issue. However, the parking survey results suggest that these off-street visitor stalls are being underutilized in comparison to the on-street visitor areas. This may be happening for a variety of reasons, which likely includes the ease of access of the on-street stalls compared to the off-street, the lack of enforcement of the 2-hour parking time limit, and the fact that when a resident has more than one guest over, that resident can only accommodate one visitor in the off-street visitor area.

As such, one way to promote the usage of the off-street visitor parking, while helping to reduce the parking demand of the on-street visitor parking areas, is to provide each residential unit with an additional visitor parking pass. An additional pass will allow a resident to have two guests park in the off-street visitor parking area at the same time. Assuming that the guests of a resident, with the exception of one, are currently parking in the on-street areas, being able to accommodate a second guest off-street will help remove vehicles from the on-street areas. This could be implemented on a trial basis to see how effective it would be.

It is our belief that providing an additional visitor parking pass, in conjunction with an increased effort by the City to enforce the 2-hour parking time limit and an installation of signage notifying visitors of

available off-street visitor parking, will improve the usage and turnover of the existing off-street visitor parking supply.

4.5 On-Street Time Restrictions

Currently, residents complain that the on-street parking 2-hour time limit is not long enough for their guests. However, our survey results show that while these complaints are being made, the off-street visitor parking areas, which are not restricted to 2-hour visits, are currently being underutilized.

As such, providing two visitor parking passes, while improving the enforcement of the 2-hour parking limit, should help promote the usage of the long-term off-street visitor parking.

However, if these two measures are implemented and they result in an increase of the off-street visitor parking occupancy (making it more balanced with the on-street parking occupancy) and residents are still finding that the 2-hour parking time limit is too short for their guests, then the length of this parking time limit may have to be re-visited.

4.6 Construction Vehicles

A complaint by many of the residents has been that construction-related vehicles are parking in the on-street parking sections and abusing the 2-hour time limit.

Although it was difficult to identify a construction vehicle during our surveys unless it had an identifying logo on it or it was parked adjacent to a work site and remained there for the entire day, we were able to observe some construction-related vehicles parking in the on-street areas for extended periods of time.

In particular, on the Wednesday, we recorded a construction vehicle trailer occupying an entire on-street parking "pocket", taking the space of about three vehicles. This trailer remained parked from mid-afternoon until the end of our survey.

However, although this construction trailer, as well as some other construction vehicles were recorded to park in the on-street parking areas, based on the survey data, the parking occupancy was still never higher than 80% (16 stalls still available), which was on the Wednesday at 8PM. Moreover, during typical work hours (7AM to 5PM), when the highest number of construction vehicles were likely to be on-site, the maximum on-street parking occupancy was 70% (24 stalls still available) at 1PM.

4.7 Size of Residents' Stalls

Another common concern expressed by many residents has been in regards to the size of their assigned parking stalls. Many residents have complained that their parking stall is too small, making it difficult, or even impossible, to park their vehicle into their assigned stall. As a result, we have been told that some residents are parking their own vehicles into their own off-street visitor stalls or in the on-street visitor parking areas.

As this study is meant to focus primarily on parking supply and demand issues, a detailed assessment of the parking stall size issues has not been included as part of this report. However, it is suggested that those who have issues with the size of their parking stall should consult the City of New Westminster Off-Street Parking Bylaw, which outlines the minimum allowable size for parking stalls. If their stall size does not conform to the minimum bylaw size requirements, then it may be an issue to address with the City and the developer of the building.

Although it is not expected that a significant number of residents are parking in their visitor parking or on-street due to their small stall size, residents could be offered a different stall, if practical, if that encouraged them to use it over an on-street space.

5. ADDITIONAL ON-STREET SUPPLY

5.1 Introduction

As mentioned in the previous sections, the on-street parking supply has been shown to be adequate for the current development. However, as future development is planned in the neighbourhood, particularly at the north end of the neighbourhood where on-street parking is already the most heavily used, there may be increased pressure on the on-street parking in the future.

As such, as part of our study, the City has asked that Bunt & Associates identify any areas where additional on-street parking pockets could potentially be provided.

5.2 Locations of Possible New On-Street Parking Supply

Based on observations from recent site visits to the area, Bunt & Associates has identified several locations where additional parking could be added to increase the supply of on-street parking. These locations have been shown on **Exhibit 5.1**.

As Exhibit 5.1 illustrates, approximately 15 – 20 additional on-street parking stalls could be constructed, as either extensions of existing parking pockets, or as additions of new pockets in locations that seem most logical. Typically, these locations are nearby an existing parking pocket located either across the street or just down the road.

The possible locations identified in Exhibit 5.1 are just a few of the possible locations where additional on-street parking could be added. In the future, if the City attempts to maximize the on-street parking supply in the neighbourhood, it is suggested that a more thorough analysis is undertaken in order to determine the most efficient way to add additional stalls.

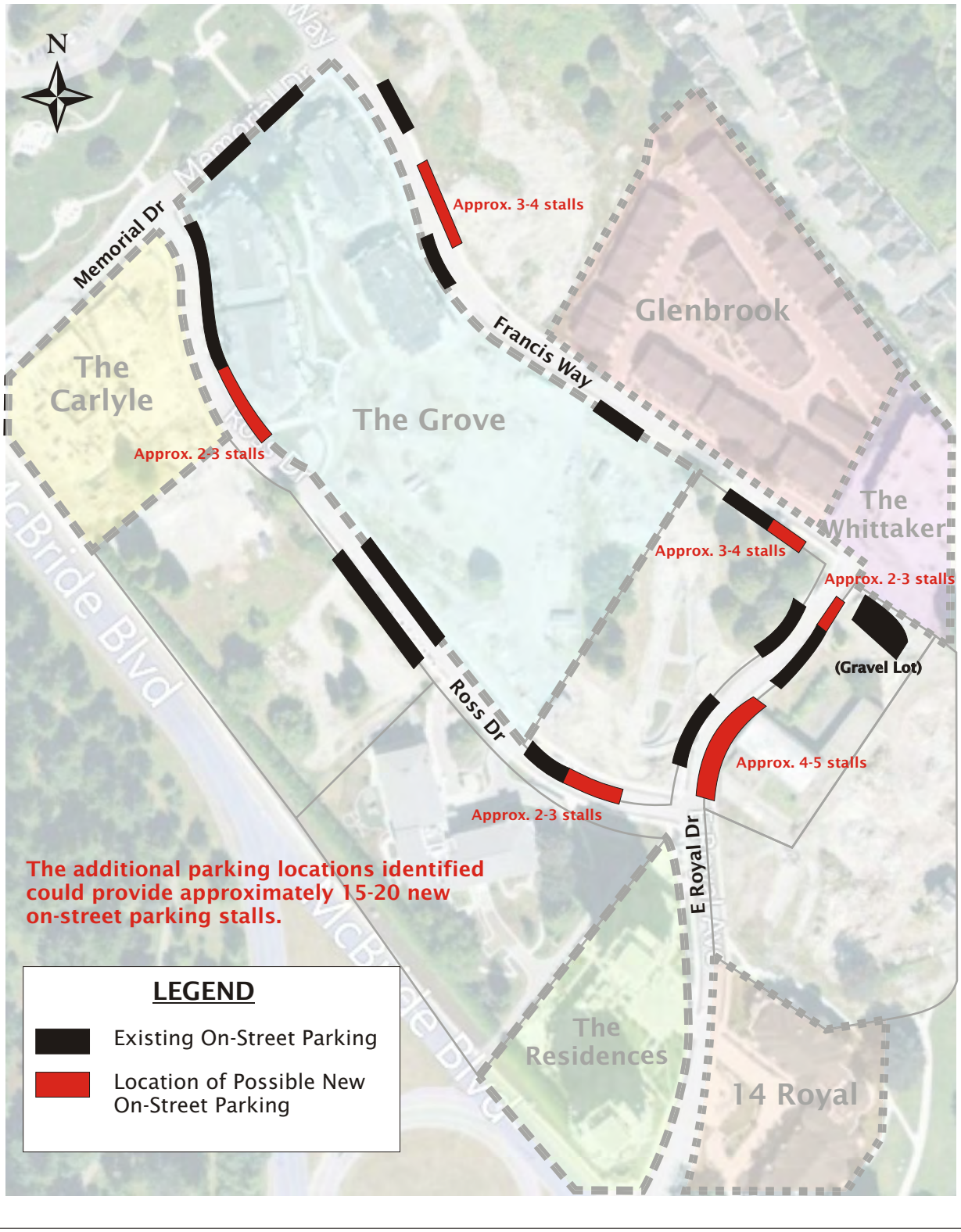


Exhibit 5.1

Locations of Possible New On-Street Parking Supply

Victoria Hill Parking Review, New Westminster BC
4259.13 September, 2011 Scale NTS

bunt & associates

6. PARKING SUPPLY PER UNIT

This section is provided for information and summarizes the residential and off-street visitor parking supply per unit for the different buildings in the Victoria Hill development. This data is summarized in **Table 6.1.**

Table 6.1: Parking Supply Rates per Unit

Building Name	Unit Count	Residential		Off-Street Visitor	
		Stalls	Stalls per unit	Stalls	Stalls per unit
The Carlyle	194	251	1.29	38	0.20
The Grove (overall)	244	310	1.27	45	0.18
The Residences	188	337	1.79	10	0.05
Nurses Lodge	9	13	1.44	2	0.22
14 Royal	72	124	1.72	7	0.10
The Whittaker	72	104	1.44	14	0.19
Total	**779**	**1,139**	**1.46**	**116**	**0.15**

Table 6.1 shows that the overall residential parking supply for Victoria Hill is 1.46 stalls per unit. Of most interest is the number of off-street visitor stalls per unit, which averages at 0.15 per unit. The supply for individual buildings however varies significantly. For example, the Carlyle has 0.2 visitor stall per unit while The Residences has only 0.05.

The City of New Westminster Zoning Bylaw now requires 0.2 visitor stalls per unit. However, this requirement was not present when this area was originally planned. Research undertaken by Bunt & Associates in recent years on residential visitor parking rates indicates a top demand rate of 0.1 stalls per unit. This suggests a supply rate slightly in excess of this, perhaps 0.12, would be sufficient.

Therefore, the overall supply of off-street residential visitor parking should be sufficient based on Bunt & Associates experience with previous developments. Individual buildings, such as The Residences and 14 Royal, have perhaps less visitor parking than would ideally be supplied. However, the surveys suggest that even the supply in these buildings is not approaching capacity (40% peak for The Residences and 0% for 14 Royal). Possible reasons for this are discussed in the previous sections.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The Victoria Hill neighbourhood in New Westminster has been designed in a much different manner than the typical suburban area. Unlike the usual suburban neighbourhood, composed of single-family homes with unrestricted on-street parking, Victoria Hill has been planned as a higher-density, stand-alone community, with managed parking and pedestrian-friendly facilities, closer to that which is found in an urban setting.

However, with this type of neighbourhood, there is a different expectation in terms of the availability and location of parking than from what is typical of a suburban location. The numerous complaints and concerns regarding the parking in the neighbourhood suggest that an adjustment to this style of neighbourhood is still occurring.

The results of our study indicate that the existing on-street and off-street parking supply in Victoria Hill is adequate to accommodate the existing demand. While there are areas of the neighbourhood, particularly on the northern end, which do experience higher on-street parking demand during the peak hours, even at these busier times, there was still shown to be a number of on-street parking stalls available at other locations within the neighbourhood. Although parking stalls may not always be available adjacent to the building that guests are intending to visit, even if they are forced to park on the other side of the neighbourhood, this is still only a 5-minute walk away.

From a theoretical standpoint, the ratio of off-street visitor parking stalls to residential units should be sufficient to cater to the estimated demand. While the development's overall rate is 0.15 stalls per unit, there is variation between buildings with rates ranging from 0.2 stalls per unit to 0.05 stalls per unit.

Based on our analysis of the Victoria Hill neighbourhood, which included a thorough parking survey and several site observations, the following conclusions have been drawn:

<u>Residential Parking:</u>

- During Bunt's initial surveys, the peak hour of residential parking demand occurred at 9PM on both Wednesday and Saturday. However, a follow-up survey suggests that the peak actually occurs later in the evening around midnight.
- As the overall residential parking occupancy for the neighbourhood reached only 57% and 52% on the Wednesday and Saturday, respectively, residential parking supply is not considered a major issue. When factored up by 10% to compensate for the summer survey, as well as another 10% to account for a later peak, this still only increases the occupancy to 77% and 72% respectively.
- Other residential parking problems have been reported (which may be having a small impact on existing residential and visitor parking demand), such as small vehicle stall sizes, low parking garage

heights, lack of bicycle parking facilities, etc, which may need to be addressed in a separate investigation.

- As we have been informed that the buildings surveyed are currently 90% to 100% occupied, the residential and visitor parking demand associated with each of the buildings is not expected to significantly increase in the future.
- Collected ICBC data showed vehicle registrations to each building to be largely consistent with the observed data (once non-summer and later peak factors had been accounted for).

Off-Street Visitor Parking:

- During Bunt's initial surveys, the peak hour of off-street visitor parking demand occurred at 9PM on both Wednesday and Saturday. However, a follow-up survey suggests that the peak actually occurs later in the evening around midnight. A peak visitor parking demand occurring so late in the evening suggests that some residents may be being using the visitor stalls for their own use.
- As the overall off-street visitor parking occupancy for the area reached 24% and 37% during the peak hours on the Wednesday and Saturday, respectively, off-street visitor parking is not considered a problem. Factoring up these numbers by 20% to account for non-summer conditions and a later peak still indicates significant spare capacity.
- The low parking occupancy of the off-street visitor parking compared to the on-street visitor parking suggests that the off-street visitor parking is not being efficiently used.

On-Street Visitor Parking:

- The peak hour of on-street visitor parking demand occurred at 8PM on Wednesday and 9PM on Saturday. However, the difference in demand between 8PM and 9PM for both days was only two vehicles.
- A follow-up survey indicated that the on-street parking demand decreases after 9PM.
- During the busiest times surveyed on both the Wednesday and Saturday, there are still 16 and 25 stalls available. This translates to a parking occupancy for the area of 80% and 69%, respectively. Adding 10% to these numbers to conservatively account for non-summer periods gives parking occupancy percentages of 90% and 79%. This still indicates a small amount of capacity on-street; however, measures to free up some space and increase turn over could make finding a stall easier.
- In terms of location, the on-street parking areas on Ross Drive and Memorial Drive are consistently the busiest and sometimes approach or reach capacity. These parking sections are located near the Carlyle and the seven buildings that make up the Grove. In order to find on-street parking, visitors to these buildings may need to park elsewhere in the development and walk to their destination.
- Over the course of both survey days (from 10AM to 9PM), the majority of vehicles parked for 2 hours or less in the on-street parking sections. However, when analyzing only the parking durations when the 2-hour parking limit is in effect (8AM to 6PM), the data indicated that on both days, approximately 30% of vehicles parking on-street exceed the 2-hour limit.

- Residents feel that the 2-hour parking time limit is too short for their guests to visit, particularly on the weekend. If this complaint continues to exist, even after Bunt's recommendations are implemented (see following section), this issue may have to be re-visited.

7.2 Recommendations

Although our survey data suggests that the existing on-street and off-street parking supply in Victoria Hill is adequate to accommodate the existing demand, there are additional measures that could be implemented and actions that could be taken in order to better manage the existing parking supply. This will also help accommodate parking demand associated with the future residential buildings constructed in the neighbourhood.

These recommendations are listed below:

- Increase the City's efforts to enforce the 2-hour parking limit. This will encourage visitors to use the underutilized off-street visitor parking areas if they intend to stay for longer than 2-hours, reducing the existing on-street demand. Although the off-street visitor parking stalls require a greater effort to access, they are not restricted to a 2-hour time limit. This will free up the on-street stalls for shorter visits where the extra effort to use the off-street parking is more significant.
- Install signage on the neighbourhood streets to notify visitors of underground visitor parking areas.
- Provide each residential unit with an additional visitor parking pass. An additional pass will allow a resident to have two guests park in the off-street visitor parking area at the same time. Assuming that the guests of a resident, with the exception of one, are currently parking in the on-street areas, being able to accommodate a second guest off-street will help remove vehicles from the on-street areas. This could initially be implemented on a trial basis.
- If the usage of the off-street visitor parking is increased and it becomes more balanced with the on-street parking occupancy once Bunt's recommendations are implemented, and visitors are still finding that the 2-hour parking time limit is too short, the length of this parking time limit may have to be re-visited.
- If complaints continue to exist in regards to other residential parking issues, such as small vehicle stall sizes, low parking garage heights, lack of bicycle parking facilities, etc, these problems may need to be addressed in a separate investigation.
- As more residential developments are constructed in the neighbourhood, additional on-street parking pockets or extensions to existing pockets could be implemented in order to help accommodate the additional demand if needed.

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APPENDIX A

Survey Data

4259-13 Victoria Hill Parking Study
Wednesday, August 17, 2011

Off-street Parking Count Summary
Time: 4:00PM to 9:00PM

Visitor
Residential
Commercial
Total

Peak Demand

Building	Supply	Description		Time of Count: 4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	Peak for Lot
The Carlyle										
	38	(incl. 8 Small, 1 handicap)	**Demand:**	11	11	12	13	12	11	13
VISITOR			**Occupancy:**	29%	29%	32%	34%	32%	29%	**34%**
	251	(incl. 35 small, 3 handicap)	**Demand:**	71	84	110	118	122	134	134
RESIDENTIAL			**Occupancy:**	28%	33%	44%	47%	49%	53%	**53%**
	289		**Demand:**	82	95	122	131	134	145	145
TOTAL			**Occupancy:**	28%	33%	42%	45%	46%	50%	**50%**
The Grove - Parkade A (285 & 275 Ross Drive)										
	13	(incl. 4 small, 1 handicap)	**Demand:**			1	1	1	1	1
VISITOR			**Occupancy:**			8%	8%	8%	8%	**8%**
	89	(incl. 5 small)	**Demand:**	32	45	51	53	57	61	61
RESIDENTIAL			**Occupancy:**	36%	51%	57%	60%	64%	69%	**69%**
	102		**Demand:**	32	45	52	54	58	62	62
TOTAL			**Occupancy:**	31%	44%	51%	53%	57%	61%	**61%**
The Grove - Parkade B (265 & 255 Ross Drive										
	10	(incl. 1 handicap, 2 small)	**Demand:**	6	6	4	3	4	5	6
VISITOR			**Occupancy:**	60%	60%	40%	30%	40%	50%	**60%**
	70	(incl. 15 small, 2 handicap)	**Demand:**	21	26	27	24	29	31	31
RESIDENTIAL			**Occupancy:**	30%	37%	39%	34%	41%	44%	**44%**
	80		**Demand:**	27	32	31	27	33	36	36
TOTAL			**Occupancy:**	34%	40%	39%	34%	41%	45%	**45%**
The Grove - Parkade C (245 Ross Drive)										
	8	(incl. 1 handicap, stalls not labelled as visitor)	**Demand:**		1	3	3	2	3	3
VISITOR			**Occupancy:**		13%	38%	38%	25%	38%	**38%**
	60	(incl. 20 small, 4 "Tandem", 1 handicap)	**Demand:**	10	11	11	12	14	15	15
RESIDENTIAL			**Occupancy:**	17%	18%	18%	20%	23%	25%	**25%**
	68		**Demand:**	10	12	14	15	16	18	18
TOTAL			**Occupancy:**	15%	18%	21%	22%	24%	26%	**26%**
The Grove - Parkade D (290 & 270 Francis Way)										
	14	(incl. 3 small, 1 handicap)	**Demand:**	4	4	5	5	3	3	5
VISITOR			**Occupancy:**	29%	29%	36%	36%	21%	21%	**36%**
	91	(incl. 28 small, 4 handicap)	**Demand:**	42	44	49	54	58	64	64
RESIDENTIAL			**Occupancy:**	46%	48%	54%	59%	64%	70%	**70%**
	105		**Demand:**	46	48	54	59	61	67	67
TOTAL			**Occupancy:**	44%	46%	51%	56%	58%	64%	**64%**
The Residences (11 & 15 Royal Dr)										
	10	(incl. 6 small)	**Demand:**	1			1	3	4	4
VISITOR			**Occupancy:**	10%			10%	30%	40%	**40%**
	9	(incl. 1 handicap, 2 small) and 1 bike	**Demand:**	2	2	4	6	6	1	6
COMMERCIAL			**Occupancy:**	22%	22%	44%	67%	67%	11%	**67%**
	337	(incl. 67 small, 6 handicap, 1 Telus)	**Demand:**	127	156	166	180	184	200	200
RESIDENTIAL			**Occupancy:**	38%	46%	49%	53%	55%	59%	**59%**
	356		**Demand:**	130	158	170	187	193	205	205
TOTAL			**Occupancy:**	37%	44%	48%	53%	54%	58%	**58%**
The Nurses Lodge										
	2	Visitor Stalls on Surface Level	**Demand:**	2	1					2
VISITOR			**Occupancy:**	100%	50%					**100%**
	13	incl. 1 small	**Demand:**	5	5	7	7	7	9	9
RESIDENTIAL			**Occupancy:**	38%	38%	54%	54%	54%	69%	**69%**
	15		**Demand:**	7	6	7	7	7	9	9
TOTAL			**Occupancy:**	47%	40%	47%	47%	47%	60%	**60%**

14 Royal										
	7		**Demand:**					1		1
VISITOR			**Occupancy:**					14%		**14%**
	124	(incl. 33 small, 2 handicap)	**Demand:**	48	55	67	58	68	72	72
RESIDENTIAL			**Occupancy:**	39%	44%	54%	47%	55%	58%	**58%**
	131		**Demand:**	48	55	67	58	69	72	72
TOTAL			**Occupancy:**	37%	42%	51%	44%	53%	55%	**55%**
The Whittaker										
	14		**Demand:**							
VISITOR			**Occupancy:**							
	104	incl. 2 Handicap, 5 "tandem" stalls	**Demand:**	33	43	49	49	58	64	64
RESIDENTIAL			**Occupancy:**	32%	41%	47%	47%	56%	62%	**62%**
	118		**Demand:**	33	43	49	49	58	64	64
TOTAL			**Occupancy:**	28%	36%	42%	42%	49%	54%	**54%**
The Glenbrook										
	11	incl. 1 handicap	**Demand:**	2	2	1	2	4	4	4
VISITOR			**Occupancy:**	18%	18%	9%	18%	36%	36%	**36%**
		Individual Garages (Not Counted)	**Demand:**							
RESIDENTIAL			**Occupancy:**							
	11		**Demand:**	2	2	1	2	4	4	4
TOTAL			**Occupancy:**	18%	18%	9%	18%	36%	36%	**36%**
OVERALL										
	127		**Demand:**	26	25	26	28	30	31	31
VISITOR			**Occupancy:**	20%	20%	20%	22%	24%	24%	**24%**
	9	Only "the Residences" Parkade has Commercial Parking	**Demand:**	2	2	4	6	6	1	6
COMMERCIAL			**Occupancy:**	22%	22%	44%	67%	67%	11%	**67%**
	1139	The Glenbrook Residential Parking NOT included	**Demand:**	389	469	537	555	597	650	650
RESIDENTIAL			**Occupancy:**	34%	41%	47%	49%	52%	57%	**57%**
	1275	The Glenbrook Residential Parking NOT included	**Demand:**	417	496	567	589	633	682	682
TOTAL			**Occupancy:**	33%	39%	44%	46%	50%	53%	**53%**

4259-13 Victoria Hill Parking Study
Saturday, August 20, 2011

Off-street Parking Count Summary
Time: 4:00PM to 9:00PM

Visitor
Residential
Commercial
Total

Peak Demand

Building	Supply	Description		Time of Count: 4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	Peak for Lot
The Carlyle										
	38	(incl. 8 Small, 1 handicap)	**Demand:**	19	19	18	19	21	21	21
VISITOR			**Occupancy:**	50%	50%	47%	50%	55%	55%	**55%**
	251	(incl. 35 small, 3 handicap)	**Demand:**	111	121	120	126	124	135	135
RESIDENTIAL			**Occupancy:**	44%	48%	48%	50%	49%	54%	**54%**
	289		**Demand:**	130	140	138	145	145	156	156
TOTAL			**Occupancy:**	45%	48%	48%	50%	50%	54%	**54%**
The Grove - Parkade A (285 & 275 Ross Drive)										
	13	(incl. 4 small, 1 handicap)	**Demand:**	3	3	3	3	4	5	5
VISITOR			**Occupancy:**	23%	23%	23%	23%	31%	38%	**38%**
	89	(incl. 5 small)	**Demand:**	33	42	43	43	44	52	52
RESIDENTIAL			**Occupancy:**	37%	47%	48%	48%	49%	58%	**58%**
	102		**Demand:**	36	45	46	46	48	57	57
TOTAL			**Occupancy:**	35%	44%	45%	45%	47%	56%	**56%**
The Grove - Parkade B (265 & 255 Ross Drive										
	10	(incl. 1 handicap, 2 small)	**Demand:**	9	9	6	6	6	7	9
VISITOR			**Occupancy:**	90%	90%	60%	60%	60%	70%	**90%**
	70	(incl. 15 small, 2 handicap)	**Demand:**	29	27	29	29	32	32	32
RESIDENTIAL			**Occupancy:**	41%	39%	41%	41%	46%	46%	**46%**
	80		**Demand:**	38	36	35	35	38	39	39
TOTAL			**Occupancy:**	48%	45%	44%	44%	48%	49%	**49%**
The Grove - Parkade C (245 Ross Drive)										
	8	(incl. 1 handicap, stalls not labelled as visitor)	**Demand:**	1	1	1	2	2	2	2
VISITOR			**Occupancy:**	13%	13%	13%	25%	25%	25%	**25%**
	60	(incl. 20 small, 4 "Tandem", 1 handicap)	**Demand:**	11	13	14	17	17	18	18
RESIDENTIAL			**Occupancy:**	18%	22%	23%	28%	28%	30%	**30%**
	68		**Demand:**	12	14	15	19	19	20	20
TOTAL			**Occupancy:**	18%	21%	22%	28%	28%	29%	**29%**
The Grove - Parkade D (290 & 270 Francis Way)										
	14	(incl. 3 small, 1 handicap)	**Demand:**	2	4	4	2	2	2	4
VISITOR			**Occupancy:**	14%	29%	29%	14%	14%	14%	**29%**
	91	(incl. 28 small, 4 handicap)	**Demand:**	44	48	49	50	54	58	58
RESIDENTIAL			**Occupancy:**	48%	53%	54%	55%	59%	64%	**64%**
	105		**Demand:**	46	52	53	52	56	60	60
TOTAL			**Occupancy:**	44%	50%	50%	50%	53%	57%	**57%**
The Residences (11 & 15 Royal Dr)										
	10	(incl. 6 small)	**Demand:**	4	3	3	3	3	3	4
VISITOR			**Occupancy:**	40%	30%	30%	30%	30%	30%	**40%**
	9	(incl. 1 handicap, 2 small) and 1 bike	**Demand:**	4	5	8	9	9	9	9
COMMERCIAL			**Occupancy:**	44%	56%	89%	100%	100%	100%	**100%**
	337	(incl. 67 small, 6 handicap, 1 Telus)	**Demand:**	137	149	155	154	160	161	161
RESIDENTIAL			**Occupancy:**	41%	44%	46%	46%	47%	48%	**48%**
	356		**Demand:**	145	157	166	166	172	173	173
TOTAL			**Occupancy:**	41%	44%	47%	47%	48%	49%	**49%**
The Nurses Lodge										
	2	Visitor Stalls on Surface Level	**Demand:**							
VISITOR			**Occupancy:**							
	13	incl. 1 small	**Demand:**	4	6	7	7	8	9	9
RESIDENTIAL			**Occupancy:**	31%	46%	54%	54%	62%	69%	**69%**
	15		**Demand:**	4	6	7	7	8	9	9
TOTAL			**Occupancy:**	27%	40%	47%	47%	53%	60%	**60%**

14 Royal										
	7		**Demand:**	2	2	1				2
VISITOR			**Occupancy:**	29%	29%	14%				**29%**
	124	(incl. 33 small, 2 handicap)	**Demand:**	55	58	62	68	66	74	74
RESIDENTIAL			**Occupancy:**	44%	47%	50%	55%	53%	60%	**60%**
	131		**Demand:**	57	60	63	68	66	74	74
TOTAL			**Occupancy:**	44%	46%	48%	52%	50%	56%	**56%**
The Whittaker										
	14		**Demand:**	1	1	1	3	3	3	3
VISITOR			**Occupancy:**	7%	7%	7%	21%	21%	21%	**21%**
	104	incl. 2 Handicap, 5 "tandem" stalls	**Demand:**	45	46	45	46	45	56	56
RESIDENTIAL			**Occupancy:**	43%	44%	43%	44%	43%	54%	**54%**
	118		**Demand:**	46	47	46	49	48	59	59
TOTAL			**Occupancy:**	39%	40%	39%	42%	41%	50%	**50%**
The Glenbrook										
	11	incl. 1 handicap	**Demand:**	3	2		3	5	3	5
VISITOR			**Occupancy:**	27%	18%		27%	45%	27%	**45%**
		Individual Garages (Not Counted)	**Demand:**							
RESIDENTIAL			**Occupancy:**							
	11		**Demand:**	3	2		3	5	3	5
TOTAL			**Occupancy:**	27%	18%		27%	45%	27%	**45%**
OVERALL										
	127		**Demand:**	44	44	37	41	46	46	46
VISITOR			**Occupancy:**	35%	35%	29%	32%	36%	36%	**36%**
	9	Only "the Residences" Parkade has Commercial Parking	**Demand:**	4	5	8	9	9	9	9
COMMERCIAL			**Occupancy:**	44%	56%	89%	100%	100%	100%	**100%**
	1139	The Glenbrook Residential Parking NOT included	**Demand:**	469	510	524	540	550	595	595
RESIDENTIAL			**Occupancy:**	41%	45%	46%	47%	48%	52%	**52%**
	1275	The Glenbrook Residential Parking NOT included	**Demand:**	517	559	569	590	605	650	650
TOTAL			**Occupancy:**	41%	44%	45%	46%	47%	51%	**51%**

4259-13 Victoria Hill Parking Study
Wednesday, August 17, 2011

On-street Parking Count Summary
Time: 10:00AM to 9:00PM

			Time of Count:												
Lot	**Supply**		**10:00 AM**	**11:00 AM**	**12:00 PM**	**1:00 PM**	**2:00 PM**	**3:00 PM**	**4:00 PM**	**5:00 PM**	**6:00 PM**	**7:00 PM**	**8:00 PM**	**9:00 PM**	**Peak for Lot**
A	4	**Demand:**	2	2	1	2	1	2	1	1	3	3	3	3	3
		Occupancy:	50%	50%	25%	50%	25%	50%	25%	25%	75%	75%	75%	75%	**75%**
B	6	**Demand:**	2	2	2	2	3	3	3	3	2	4	2	3	4
		Occupancy:	33%	33%	33%	33%	50%	50%	50%	50%	33%	67%	33%	50%	**67%**
C	5	**Demand:**	1	0	0	1	1	1	1	2	2	4	4	3	4
		Occupancy:	20%	0%	0%	20%	20%	20%	20%	40%	40%	80%	80%	60%	**80%**
D	16	**Demand:**	12	10	9	15	12	9	14	13	11	11	12	12	15
		Occupancy:	75%	63%	56%	94%	75%	56%	88%	81%	69%	69%	75%	75%	**94%**
E	4	**Demand:**	1	3	2	3	3	3	2	0	0	0	3	2	3
		Occupancy:	25%	75%	50%	75%	75%	75%	50%	0%	0%	0%	75%	50%	**75%**
F	3	**Demand:**	1	0	0	0	0	0	3	3	3	3	3	3	3
		Occupancy:	33%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	**100%**
G	3	**Demand:**	0	2	2	1	2	2	2	2	1	2	2	2	2
		Occupancy:	0%	67%	67%	33%	67%	67%	67%	67%	33%	67%	67%	67%	**67%**
H	4	**Demand:**	2	1	2	2	3	1	1	4	4	4	4	4	4
		Occupancy:	50%	25%	50%	50%	75%	25%	25%	100%	100%	100%	100%	100%	**100%**
I	8	**Demand:**	7	6	5	6	8	7	8	8	8	8	8	8	8
		Occupancy:	88%	75%	63%	75%	100%	88%	100%	100%	100%	100%	100%	100%	**100%**
J	7	**Demand:**	6	7	7	7	6	6	6	5	6	5	6	6	7
		Occupancy:	86%	100%	100%	100%	86%	86%	86%	71%	86%	71%	86%	86%	**100%**
K	10	**Demand:**	10	7	8	8	7	8	7	5	8	8	8	7	**0%**
		Occupancy:	100%	70%	80%	80%	70%	80%	70%	50%	80%	80%	80%	70%	**100%**
L	4	**Demand:**	3	3	3	4	4	4	3	2	1	2	3	3	4
		Occupancy:	75%	75%	75%	100%	100%	100%	75%	50%	25%	50%	75%	75%	**100%**
M	7	**Demand:**	6	3	2	6	6	4	5	5	6	5	7	7	7
		Occupancy:	86%	43%	29%	86%	86%	57%	71%	71%	86%	71%	100%	100%	**100%**
Overall	**81**	**Demand:**	**53**	**46**	**43**	**57**	**56**	**50**	**56**	**53**	**55**	**59**	**65**	**63**	**65**
		Occupancy:	**65%**	**57%**	**53%**	**70%**	**69%**	**62%**	**69%**	**65%**	**68%**	**73%**	**80%**	**78%**	**80%**

By Street (during overall peak): 8PM

Street	**Sections**	**Supply**	**Demand**	**Occupancy**
E Royal Ave	A, B, C	15	9	60%
Francis Way	E, F, G, H	14	12	86%
Memorial Drive	M	7	7	100%
Ross Drive	I, J, K, L	29	25	86%
Gravel Lot (East end of Francis Way)	D	16	12	75%
Total		**81**	**65**	**80%**

4259-13 Victoria Hill Parking Study
Saturday, August 20, 2011

On-Street Parking Count Summary
Time: 10:00AM to 9:00PM

			Time of Count:												
Lot	**Supply**		**10:00 AM**	**11:00 AM**	**12:00 PM**	**1:00 PM**	**2:00 PM**	**3:00 PM**	**4:00 PM**	**5:00 PM**	**6:00 PM**	**7:00 PM**	**8:00 PM**	**9:00 PM**	**Peak for Lot**
A	4	**Demand:**	0	1	1	1	3	2	3	3	2	1	3	2	3
		Occupancy:	0%	25%	25%	25%	75%	50%	75%	75%	50%	25%	75%	50%	**75%**
B	6	**Demand:**	1	1	0	0	2	1	3	3	3	4	4	4	4
		Occupancy:	17%	17%	0%	0%	33%	17%	50%	50%	50%	67%	67%	67%	**67%**
C	5	**Demand:**	0	1	1	0	1	1	1	0	0	1	4	3	4
		Occupancy:	0%	20%	20%	0%	20%	20%	20%	0%	0%	20%	80%	60%	**80%**
D	16	**Demand:**	11	11	11	11	11	12	11	13	13	13	11	13	13
		Occupancy:	69%	69%	69%	69%	69%	75%	69%	81%	81%	81%	69%	81%	**81%**
E	4	**Demand:**	2	2	2	2	2	1	1	1	0	0	0	0	2
		Occupancy:	50%	50%	50%	50%	50%	25%	25%	25%	0%	0%	0%	0%	**50%**
F	3	**Demand:**	1	1	2	1	1	0	0	0	0	0	0	0	2
		Occupancy:	33%	33%	67%	33%	33%	0%	0%	0%	0%	0%	0%	0%	**67%**
G	3	**Demand:**	2	2	2	2	2	2	3	3	3	2	2	3	3
		Occupancy:	67%	67%	67%	67%	67%	67%	100%	100%	100%	67%	67%	100%	**100%**
H	4	**Demand:**	3	3	3	3	3	2	2	4	4	4	4	4	4
		Occupancy:	75%	75%	75%	75%	75%	50%	50%	100%	100%	100%	100%	100%	**100%**
I	8	**Demand:**	8	6	8	8	7	8	8	8	8	7	7	6	8
		Occupancy:	100%	75%	100%	100%	88%	100%	100%	100%	100%	88%	88%	75%	**100%**
J	7	**Demand:**	0	0	0	3	3	2	3	3	4	2	4	6	6
		Occupancy:	0%	0%	0%	43%	43%	29%	43%	43%	57%	29%	57%	86%	**86%**
K	10	**Demand:**	7	4	4	6	5	6	7	9	7	6	7	9	**0%**
		Occupancy:	70%	40%	40%	60%	50%	60%	70%	90%	70%	60%	70%	90%	**90%**
L	4	**Demand:**	1	1	1	3	3	2	0	1	0	0	3	3	3
		Occupancy:	25%	25%	25%	75%	75%	50%	0%	25%	0%	0%	75%	75%	**75%**
M	7	**Demand:**	4	2	4	6	5	3	2	6	4	4	5	3	6
		Occupancy:	57%	29%	57%	86%	71%	43%	29%	86%	57%	57%	71%	43%	**86%**
Overall	**81**	**Demand:**	**40**	**35**	**39**	**46**	**48**	**42**	**44**	**54**	**48**	**44**	**54**	**56**	**56**
		Occupancy:	**49%**	**43%**	**48%**	**57%**	**59%**	**52%**	**54%**	**67%**	**59%**	**54%**	**67%**	**69%**	**69%**

By Street (during overall peak): 9PM

Street	**Sections**	**Supply**	**Demand**	**Occupancy**
E Royal Ave	A, B, C	15	9	60%
Francis Way	E, F, G, H	14	7	50%
Memorial Drive	M	7	3	43%
Ross Drive	I, J, K, L	29	24	83%
Gravel Lot (East end of Francis Way)	D	16	13	81%
Total		**81**	**56**	**69%**

4259-13 Victoria Hill Parking Study

Wednesday, August 17, 2011
On-Street Parking Duration Summary

On-Street Parking

Scenario	Description	Total Vehicles	1 Hour or Less	1 to 2 Hours	2 to 3 Hours	3 to 4 Hours	4 to 5 Hours	5 to 6 Hours	6 to 7 Hours	7 to 8 Hours	8 to 9 Hours	9 to 10 Hours	10 to 11 Hours	11 to 12 Hours	
A) Overall (10AM to 9PM)	Overall parking duration summary between 10AM and 9PM	**179**	63	39	20	19	12	17	3	4	0	0	0	2	
															Exceeds 2hr Parking Limit
B) Between 10AM to 6PM	Indicates the parking duration of vehicles AFTER 10AM and UP TO 6PM only. The additional parking duration of vehicles prior to 10AM or after 6PM has not been included.	**134**	53	42	14	7	7	5	0	6					**29%**
C) Between 6PM to 9PM	Indicates the parking duration of vehicles AFTER 6PM and UP TO 9PM only. The additional parking duration of vehicles prior to 6PM or after 9PM has not been included.	**70**	17	12	9	32									

Note: As the parking duration summaries for scenarios B and C do not consider additional parking durations outside of their time ranges, the sum of "Total Vehicles" for B and C do not add up to the scenario A "Total" due to vehicles which overlap between the B and C scenarios.

Gravel Parking Lot (Across from the Whittaker)

	Description	Total Vehicles	1 Hour or Less	1 to 2 Hours	2 to 3 Hours	3 to 4 Hours	4 to 5 Hours	5 to 6 Hours	6 to 7 Hours	7 to 8 Hours	8 to 9 Hours	9 to 10 Hours	10 to 11 Hours	11 to 12 Hours
A) Overall (10AM to 9PM)	Overall parking duration summary between 10AM and 9PM	**35**	10	11	2	3	1	0	3	2	1	0	1	1
B) Between 10AM to 6PM	Indicates the parking duration of vehicles AFTER 10AM and UP TO 6PM only. The continued parking duration of vehicles prior to 10AM or after 6PM has not been included.	**24**	6	7	0	2	2	0	3	4				
C) Between 6PM to 9PM	Indicates the parking duration of vehicles AFTER 6PM and UP TO 9PM only. The continued parking duration of vehicles prior to 6PM or after 9PM has not been included.	**15**	4	6	3	2								

Note: As the parking duration summaries for scenarios B and C do not consider additional parking durations outside of their time ranges, the sum of "Total Vehicles" for B and C do not add up to the scenario A "Total" due to vehicles which overlap between the B and C scenarios.

Saturday, August 20, 2011

On-Street Parking

Scenario	Description	Total Vehicles	1 Hour or Less	1 to 2 Hours	2 to 3 Hours	3 to 4 Hours	4 to 5 Hours	5 to 6 Hours	6 to 7 Hours	7 to 8 Hours	8 to 9 Hours	9 to 10 Hours	10 to 11 Hours	11 to 12 Hours	
A) Overall (10AM to 9PM)	Overall parking duration summary between 10AM and 9PM	**135**	61	24	8	12	9	7	0	5	0	1	1	7	
															Exceeds 2hr Parking Limit
B) Between 10AM to 6PM	Indicates the parking duration of vehicles AFTER 10AM and UP TO 6PM only. The additional parking duration of vehicles prior to 10AM or after 6PM has not been included.	**98**	49	20	2	7	5	3	1	11					**30%**
C) Between 6PM to 9PM	Indicates the parking duration of vehicles AFTER 6PM and UP TO 9PM only. The additional parking duration of vehicles prior to 6PM or after 9PM has not been included.	**62**	23	12	3	24									

Note: As the parking duration summaries for scenarios B and C do not consider additional parking durations outside of their time ranges, the sum of "Total Vehicles" for B and C do not add up to the scenario A "Total" due to vehicles which overlap between the B and C scenarios.

Gravel Parking Lot (Across from the Whittaker)

	Description	Total Vehicles	1 Hour or Less	1 to 2 Hours	2 to 3 Hours	3 to 4 Hours	4 to 5 Hours	5 to 6 Hours	6 to 7 Hours	7 to 8 Hours	8 to 9 Hours	9 to 10 Hours	10 to 11 Hours	11 to 12 Hours
A) Overall (10AM to 9PM)	Overall parking duration summary between 10AM and 9PM	**21**	3	1	1	2	1	3	0	1	1	1	1	6
B) Between 10AM to 6PM	Indicates the parking duration of vehicles AFTER 10AM and UP TO 6PM only. The continued parking duration of vehicles prior to 10AM or after 6PM has not been included.	**17**	4	1	1	0	1	2	1	7				
C) Between 6PM to 9PM	Indicates the parking duration of vehicles AFTER 6PM and UP TO 9PM only. The continued parking duration of vehicles prior to 6PM or after 9PM has not been included.	**17**	2	0	6	9								

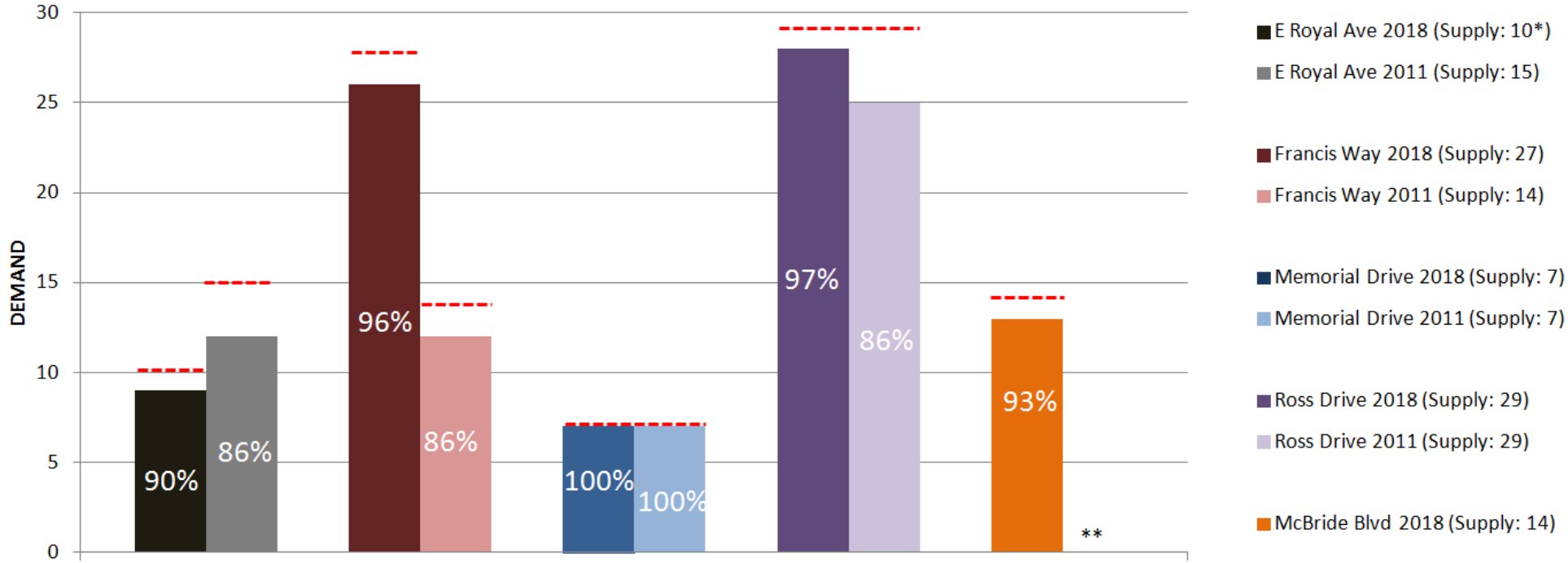
Note: As the parking duration summaries for scenarios B and C do not consider additional parking durations outside of their time ranges, the sum of "Total Vehicles" for B and C do not add up to the scenario A "Total" due to vehicles which overlap between the B and C scenarios.

APPENDIX B

Existing Conditions – Parking Demand Summary Package

OVERALL PEAK PERIOD:
7:30PM (2018)
8:00PM (2011)

VICTORIA HILL ON-STREET
PEAK DEMAND: 2018 vs 2011 WED



2018 Total Supply: 87
2011 Total Supply: 65

2018 Total Demand: 83
2011 Total Demand: 53

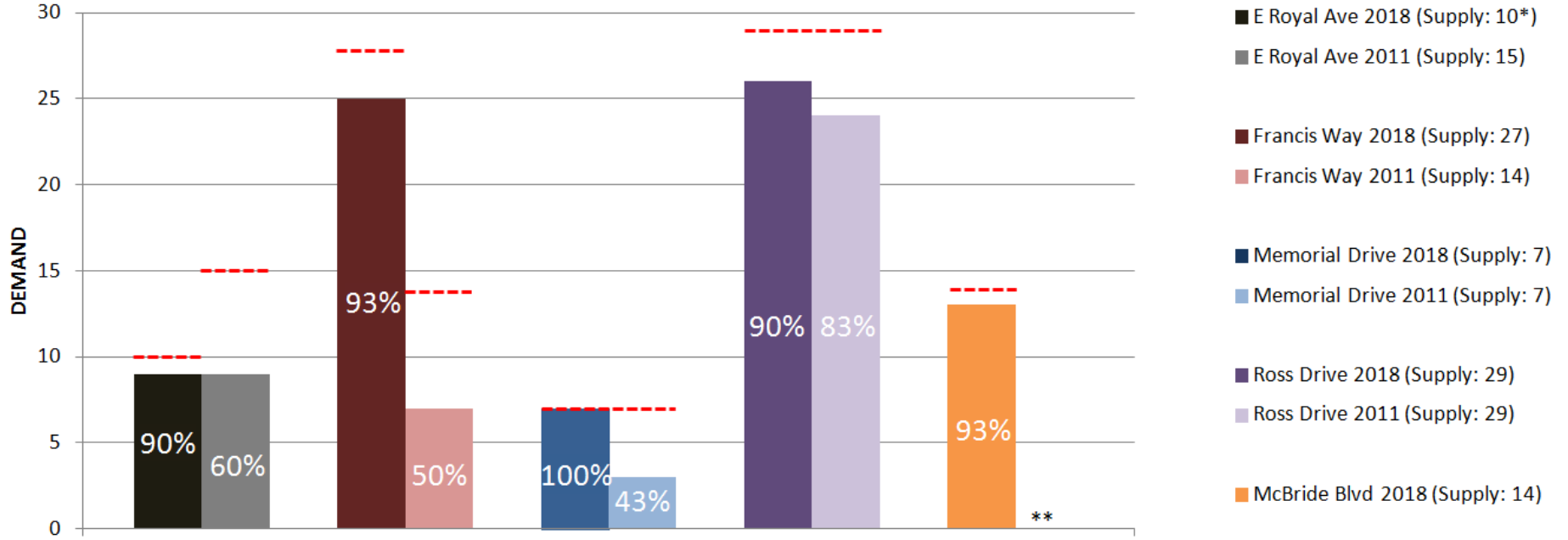
2018 Occupancy: 95%
2011 Occupancy: 82%

* Supply lower by 5 stalls due to construction activity (Future supply will equal 8)

** Parking on-street on McBride was added after 2011

OVERALL PEAK PERIOD:
7:30PM (2018)
9:00PM (2011)

VICTORIA HILL ON-STREET
PEAK DEMAND: 2018 vs 2011 SAT



2018 Total Supply: 87
2011 Total Supply: 65

2018 Total Demand: 80
2011 Total Demand: 43

2018 Occupancy: 92%
2011 Occupancy: 66%

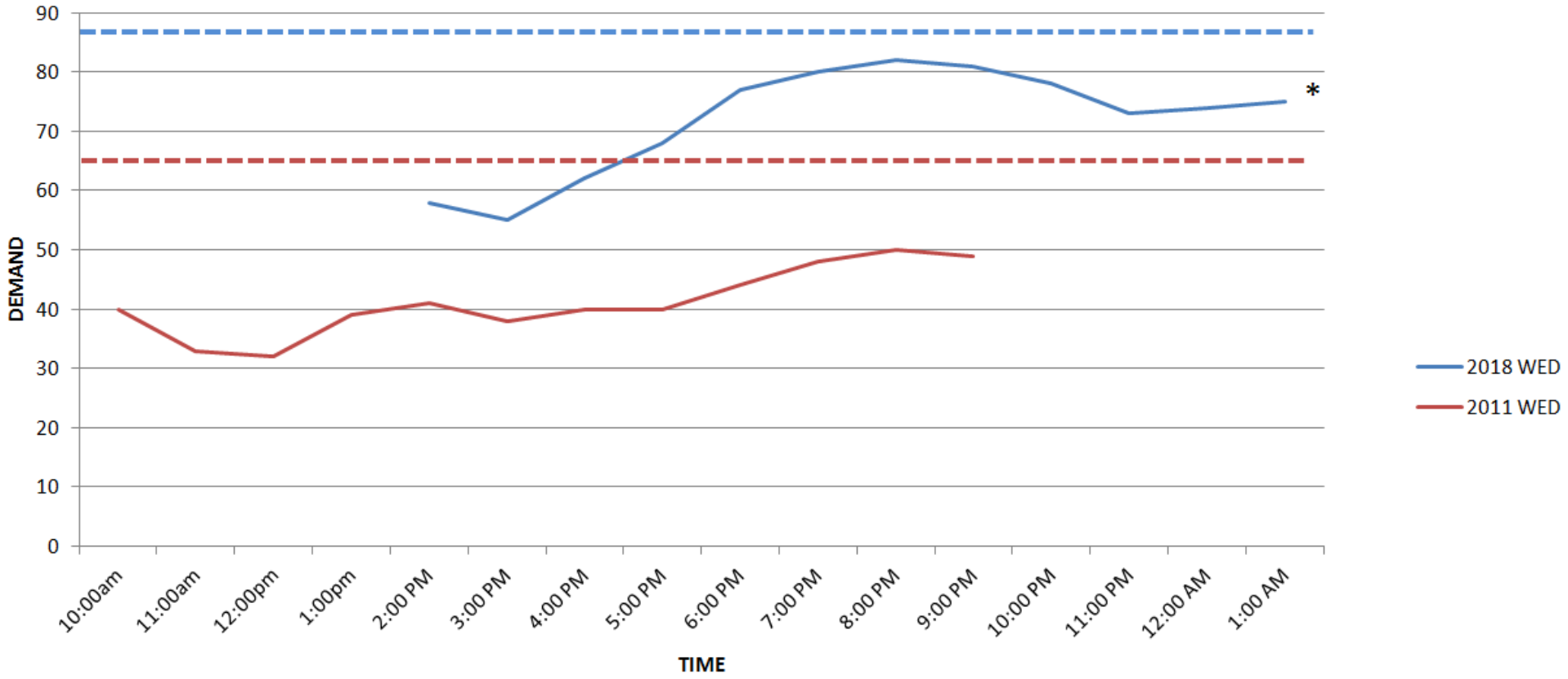
* Supply lower by 5 stalls due to construction activity (Future supply will equal 8)

** Parking on-street on McBride was added after 2011

2018 Occupancy: 95%
2011 Occupancy: 82%

VICTORIA HILL ON-STREET
WED Overall Daily Profile

2018 Total Supply: 87
2011 Total Supply: 65

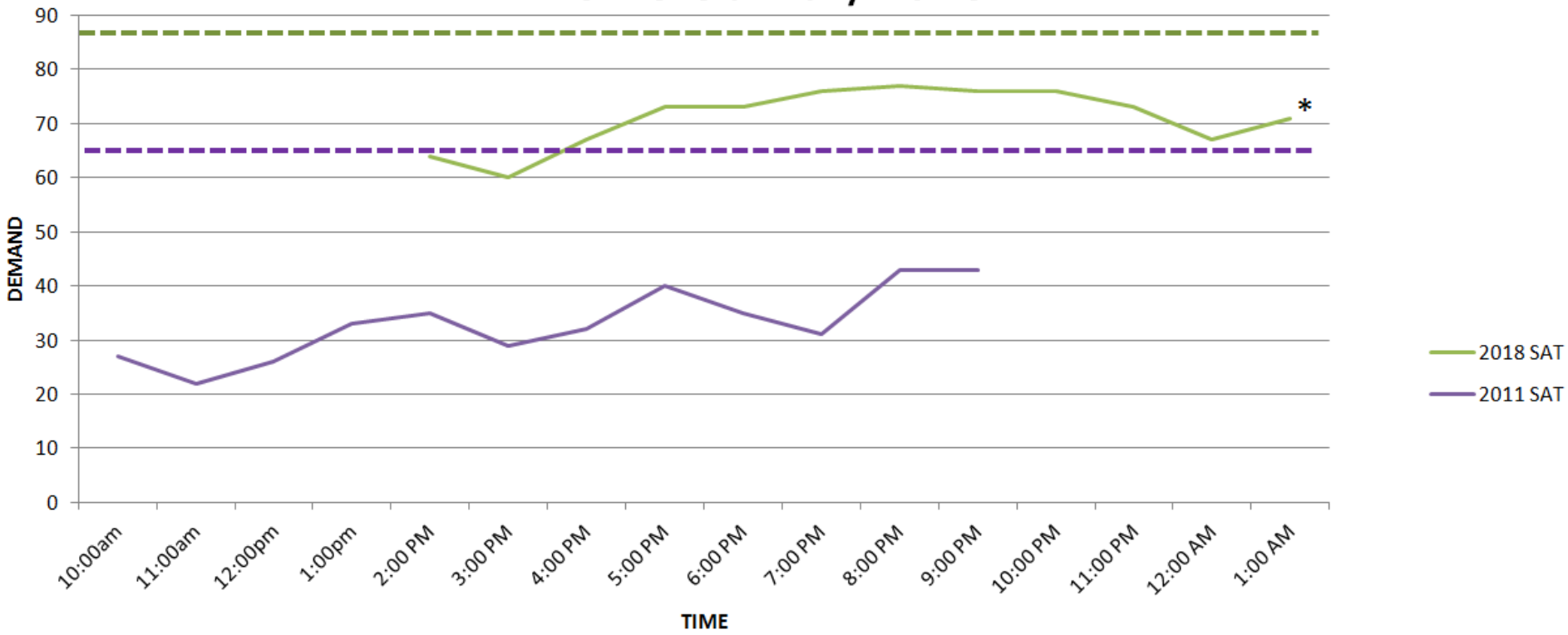


* This demand after midnight is interpreted as overnight parking, where a proportion could be attributed to residential parking demand

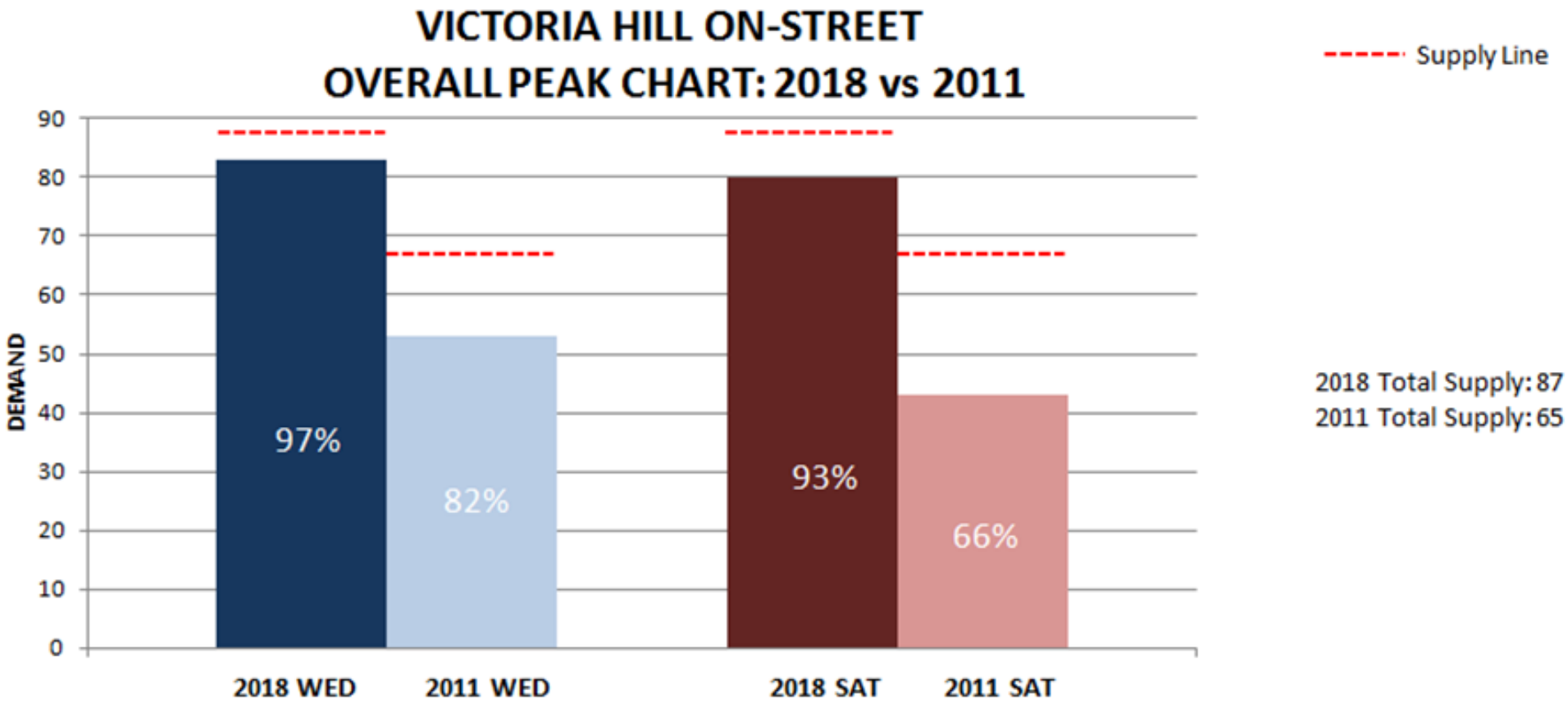
2018 Occupancy: 92%
2011 Occupancy: 66%

VICTORIA HILL ON-STREET
SAT Overall Daily Profile

2018 Total Supply: 87
2011 Total Supply: 65



* This demand after midnight is interpreted as overnight parking, where a proportion could be attributed to residential parking demand


VICTORIA HILL ON-STREET
OVERALL PEAK CHART: 2018 vs 2011
DEMAND
90
80
70
60
50
40
30
20
10
0
97%
82%
93%
66%
2018 WED
2011 WED
2018 SAT
2011 SAT
Supply Line
2018 Total Supply: 87
2011 Total Supply: 65

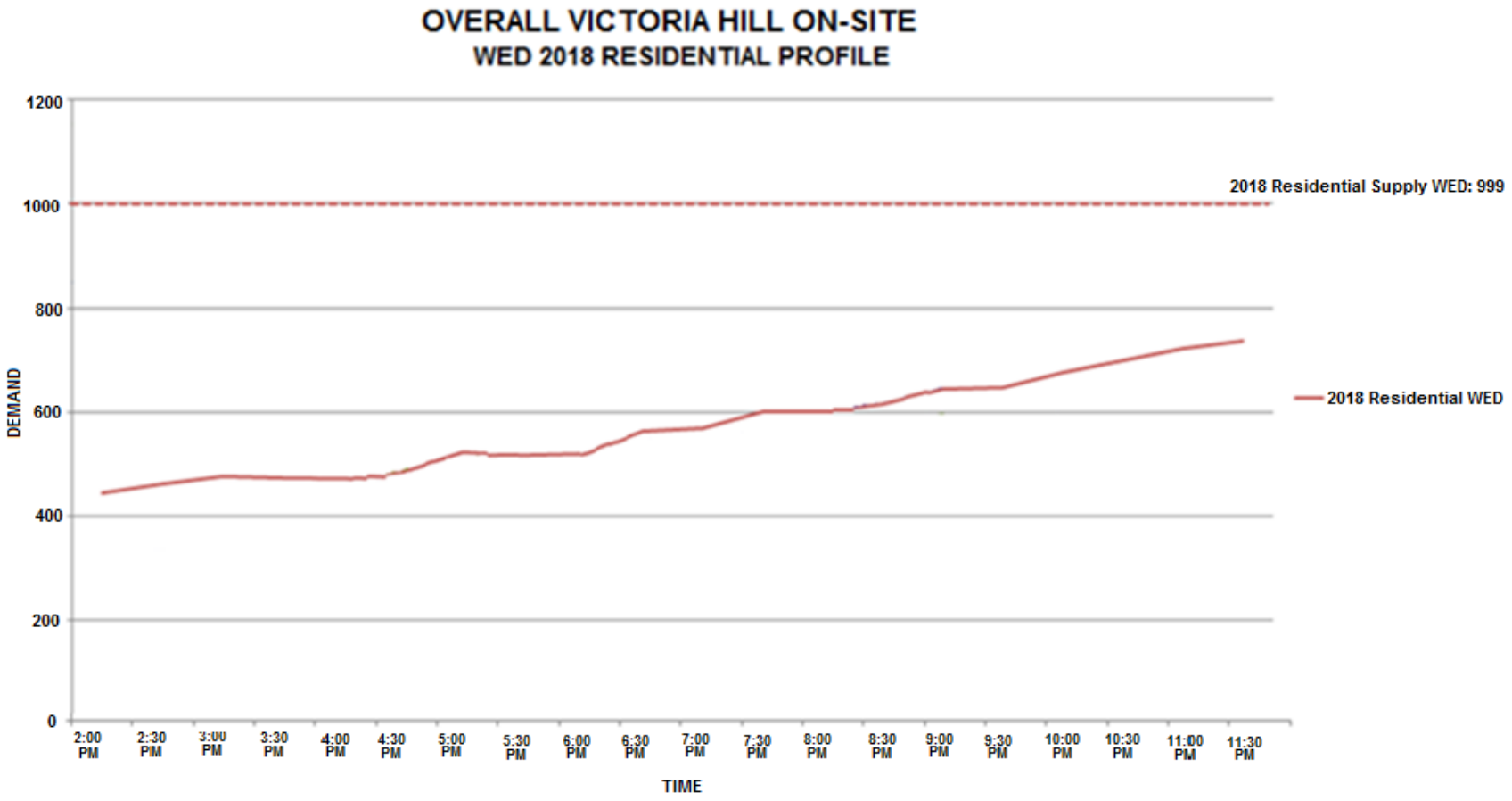
2018 On-Site Parking Summary

					2018 WED:				2018 SAT:			
Building	**Units**	**Type**	**Supply**	**Supply Rate**	**Peak Time**	**Peak Demand**	**Peak Occupancy**	**Peak Duration**	**Peak Time**	**Peak Demand**	**Peak Occupancy**	**Peak Duration**
The Carlyle	194	Visitor	30	0.15	4:30 PM	14	47%	4:30 PM - 6:00 PM	3:00 PM	8	27%	2:00 PM - 4:30 PM
		Residential	251	1.29	11:30 PM	185	74%	10:30 PM - 12:00 AM	11:30 PM	199	79%	10:30 PM - 12:00 AM
The Residence	188	Visitor	10	0.05	4:00 PM	8	80%	Various	5:00 PM	7	70%	Various
		Residential	334	1.78	11:30 PM	238	71%	11:00 PM - 12:00 AM	11:30 PM	238	71%	11:00 PM - 12:00 AM
The Lookout	109	Visitor	30	0.28	8:30 PM	14	47%	8:30 PM - 9:30 PM	10:00 PM	10	33%	9:00 PM - 12:00 AM
		Residential	185	1.70	11:00 PM	136	74%	10:30 PM - 12:00 AM	11:00 PM	128	69%	10:30 PM - 12:00 AM
The Whittaker	72	Visitor	14	0.19	11:00 PM	5	36%	11:00 PM - 11:30 PM	8:00 PM	8	57%	8:00 PM - 8:30 PM
		Residential	80	1.11	11:30 PM	64	80%	10:30 PM - 12:00 AM	10:30 PM	70	88%	9:30 PM - 12:00 AM
Glenbrook	55	Visitor	11	0.20	9:30 PM	8	73%	9:30 PM - 10:30 PM	5:30 PM	9	82%	5:30 PM - 7:30 PM
		Driveways	55	-	9:30 PM	10	18%	6:00 PM - 12:00 AM	10:30 PM	9	16%	9:00 PM - 12:00 AM
The Pavilion	185	Visitor	18	0.10	10:00 PM	12	67%	10:00 PM - 11:00 PM				
		Residential	149	0.81	11:00 PM	115	77%	10:30 PM - 12:00 AM				
Queens Park Centre	-	Parking	271	-	2:00 PM	204	75%	2:00 PM - 2:30 PM				

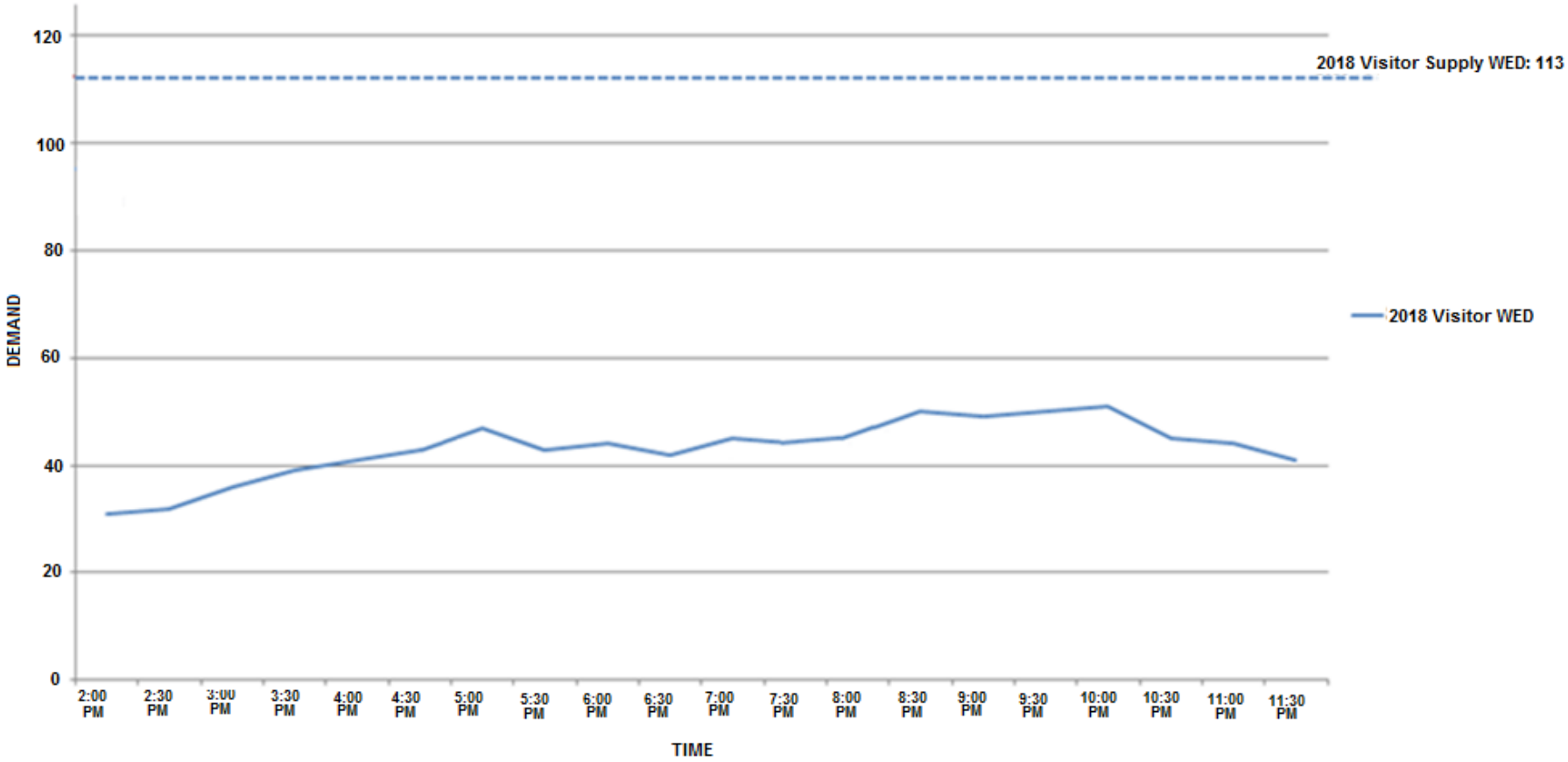
*Peak Duration is the duration where the occupancy is within 5% of the peak occupancy

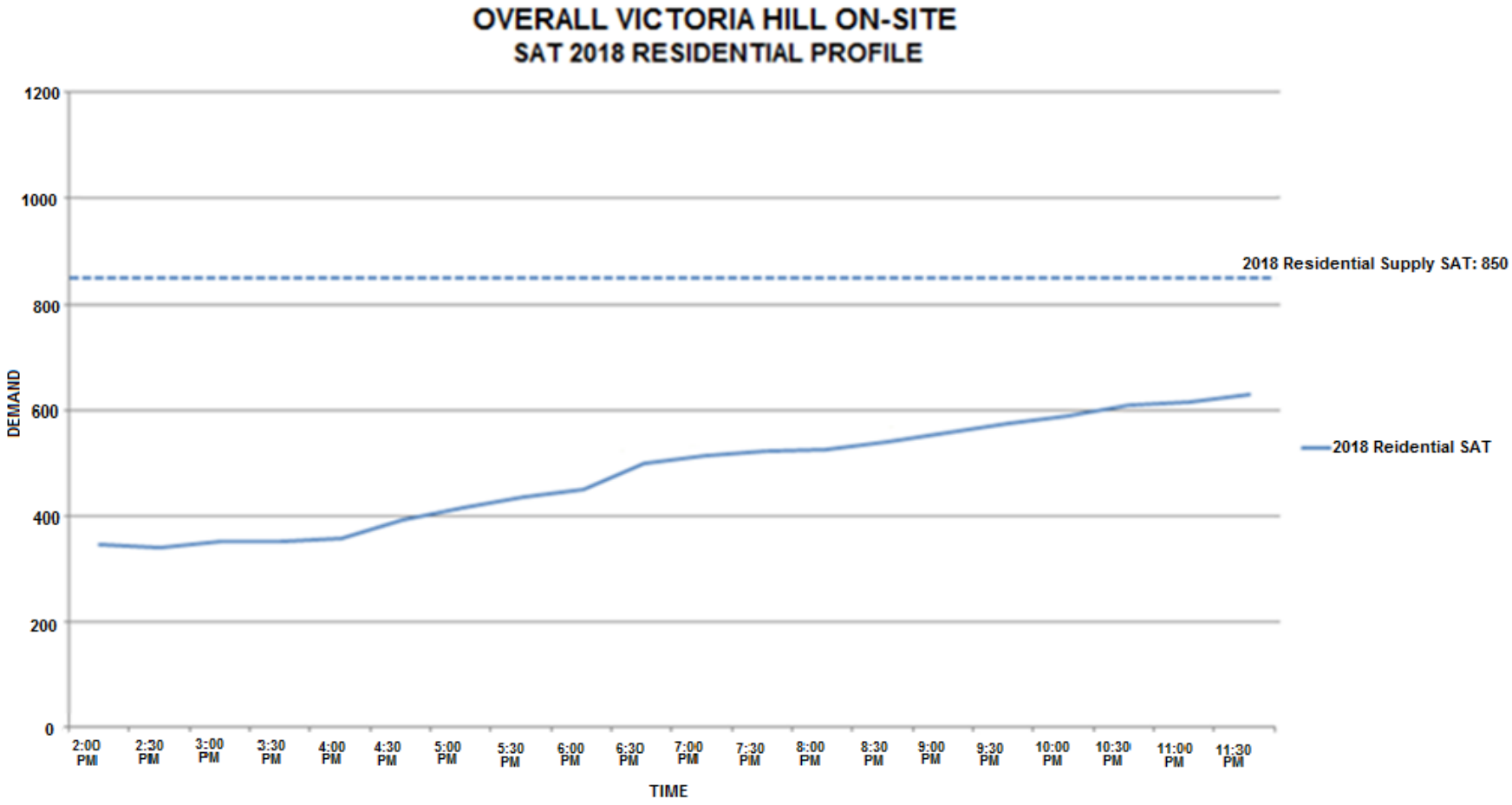
2018 vs 2011 Overall On-Site Parking Summary

	WED 2018 (5 Buildings)					SAT 2018 (4 Buildings)				
TOTAL 2018 (2PM-12AM)	**Supply**	**Peak Time**	**Peak Demand**	**Peak Occupancy**	**Peak Duration**	**Supply**	**Peak Time**	**Peak Demand**	**Peak Occupancy**	**Peak Duration**
Visitor	102	10:00 PM	37	36%	7:00 PM - 12:00 AM	84	10:00 PM	42	50%	8:30 PM - 10:30 PM
Residential	999	11:30 PM	736	74%	10:30 PM - 12:00 AM	850	11:30 PM	721	85%	10:30 PM - 12:00 AM
	WED 2011 (6 Buildings)					SAT 2011 (6 Buildings)				
TOTAL 2011 (4PM-10PM)	**Supply**	**Peak Time**	**Peak Demand**	**Peak Occupancy**	**Peak Duration**	**Supply**	**Peak Time**	**Peak Demand**	**Peak Occupancy**	**Peak Duration**
Visitor	127	9:00 PM	31	24%	4PM - 10 PM	127	10:00 PM	46	36%	4:00 PM - 10:00 PM
Residential	1139	9:00 PM	650	57%	8:00 PM - 10:00 PM	1139	11:30 PM	595	52%	7:00 PM - 10:00 PM

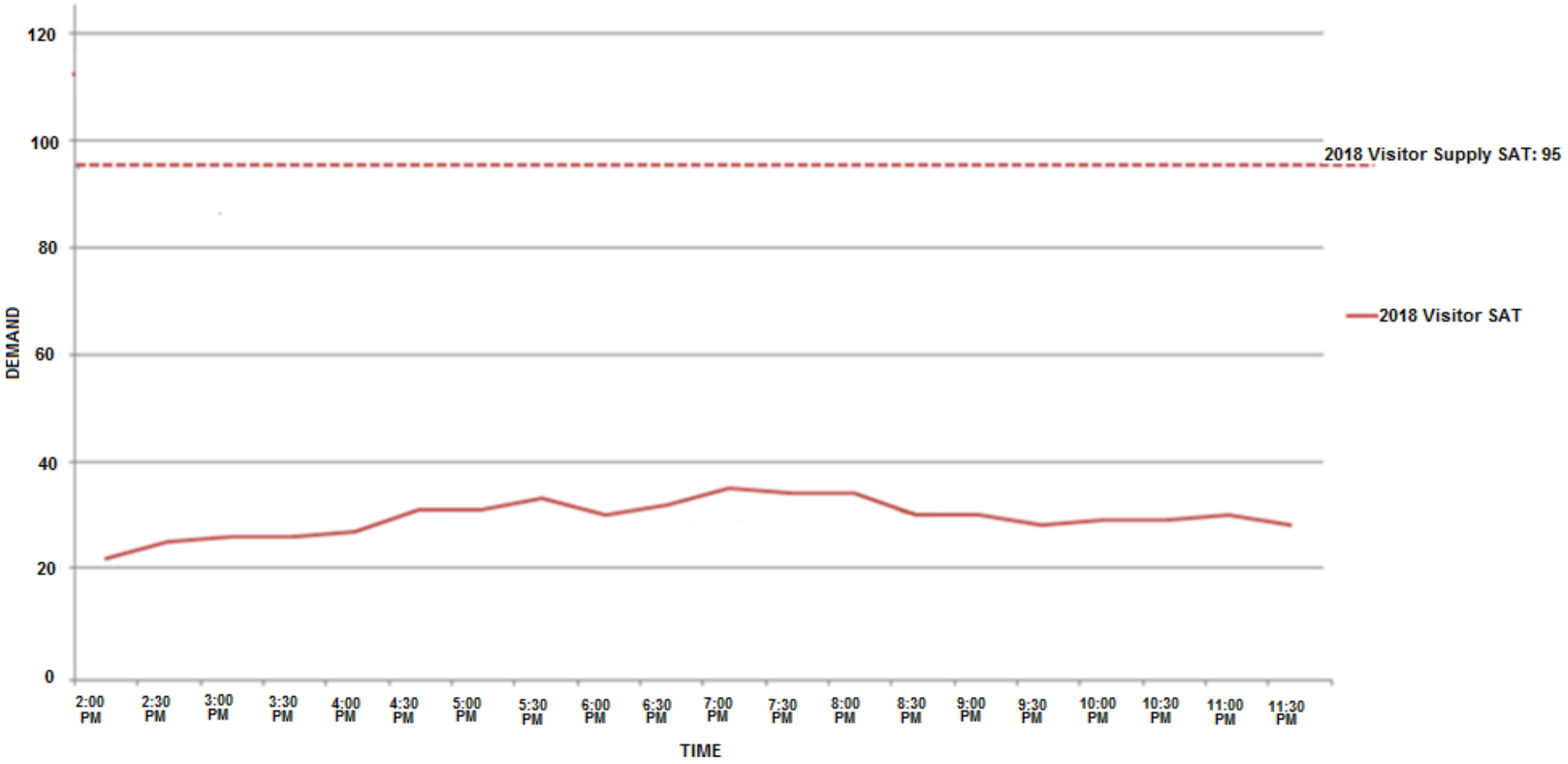

OVERALL VICTORIA HILL ON-SITE
WED 2018 RESIDENTIAL PROFILE
1200
1000
800
600
400
200
0
DEMAND
2018 Residential Supply WED: 999
2018 Residential WED
2:00 PM
2:30 PM
3:00 PM
3:30 PM
4:00 PM
4:30 PM
5:00 PM
5:30 PM
6:00 PM
6:30 PM
7:00 PM
7:30 PM
8:00 PM
8:30 PM
9:00 PM
9:30 PM
10:00 PM
10:30 PM
11:00 PM
11:30 PM
TIME

OVERALL VICTORIA HILL ON-SITE
WED 2018 VISITOR PROFILE




OVERALL VICTORIA HILL ON-SITE
SAT 2018 RESIDENTIAL PROFILE
1200
1000
800
600
400
200
0
DEMAND
2:00 PM
2:30 PM
3:00 PM
3:30 PM
4:00 PM
4:30 PM
5:00 PM
5:30 PM
6:00 PM
6:30 PM
7:00 PM
7:30 PM
8:00 PM
8:30 PM
9:00 PM
9:30 PM
10:00 PM
10:30 PM
11:00 PM
11:30 PM
TIME
2018 Residential Supply SAT: 850
2018 Reidential SAT

OVERALL VICTORIA HILL ON-SITE
SAT 2018 VISITOR PROFILE



APPENDIX C

City Fire Department Response – One-Way Ross/Francis

From:	Rob Dick
To:	Kyle Brandstaetter
Cc:	Lisa Leblanc; Tim Armstrong
Subject:	RE: Parking Study Phase 2 Engagement
Date:	November 2, 2018 3:17:32 PM
Attachments:	image001.png image002.png image003.png image004.png IMG_0501.mov
Importance:	High

Good afternoon Kyle,

I have reviewed the map that you provided which showed the one way flow of traffic on Francis Way and Ross Drive and their estimated roadway widths the additional parking.

When reviewing the aerial map, I identified issues regarding the ability of New Westminster Fire & Rescue Services (NWFRS) apparatus to navigate left hand turns from E. Royal Ave onto Francis Way with only 3.5 metres of proposed roadway width.

As you noted in a previous email the B.C. Building Code requires that the access route for fire department use shall have a clear width not less than 6m, and the City of New Westminster Bulletin which requires a width of 7.3m to accommodate the outriggers for our Ladder Truck.

To further illustrate the potential difficulty NWFRS may have navigating the narrow roadways I have included in this email the attached video and a photograph below of our Engine 3 passing between a pumper and pick-up truck parked 3.5 metres apart.

I have included the following observations:

1. The vehicles shown are 3.5 meters apart from door panel to door panel.
2. **Engine #3** (shown driving through) and NWFRS Tower 1 share the same chassis design and have a 100 inch wide cab plus mirrors (roughly another 24 inches in width)and are the widest vehicles in our fleet. **Total width with mirrors is 124 inches or 3.1496 Metre**
3. The approach is from taking a straight line and does not incorporate any approach coming from a turn as in turning onto a roadway width of 3.5 meters where front chassis swing out would compound the lack of clearance available.
4. **The vehicles selected to do the pass through would reflect a passenger vehicle and a cube van parked on a street.**

Kyle please feel free to contact me if you have any questions or require clarification.

Thank-you,

Rob

Assistant Deputy Chief Rob Dick
New Westminster Fire & Rescue Services

#1 Sixth Avenue East
New Westminster B.C. V3L-4G6
rdick@newwestcity.ca
604-519-1013 Bus
778-228-7935 Cell
604-520-7602 Fax

From: Joe Laing
Sent: Friday, November 02, 2018 1:28 PM
To: Rob Dick
Cc: Erin Williams
Subject: Victoria Hill Lane Width at 3.5 metres
Importance: High

Assistant Deputy Chief Rob Dick;
Please find attached a video and photographs of Engine 3 passing between a pumper and a pickup truck sparked 3.5 meters apart.
The following details should be noted-

1. The vehicles shown are 3.5 meters apart from door panel to door panel.
2. **Engine #3** (shown driving through) and Tower 1 share the same chassis design and have a 100 inch wide cab plus mirrors (roughly another 24 inches in width)and are the widest vehicles in our fleet. **Total width with mirrors is 124 inches or 3.1496 Metre**
3. The approach is from taking a straight line and does not incorporate any approach coming from a turn as in turning onto a roadway width of 3.5 meters where front chassis swing out would compound the lack of clearance available.
4. **The vehicles selected to do the pass through would reflect a passenger vehicle and a cube van parked on a street.**

Hope this information meets your needs and can provide a realistic visual aid.




NEW WESTMINSTER
E3


NEW
E3



Joe Laing | Training Captain
Cell 604-679-1339 | jlaing@newwestcity.ca

New Westminster Fire and Rescue Services | Training Division
1 East 6th Avenue, New Westminster, BC V3L 4G6
www.newwestcity.ca

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APPENDIX D

FHA Gravel Lot Feasibility Review

\\Bunt.local\data\Shared\PROJECTS\KB\04-18-0073 Victoria Hill Parking Study\4.0 Analysis & Design\4.1 ACAD\Gravel Lot\04-18-0073_CAD_Gravel_Lot_V02.dwg
2019/03/19 14:51, Plotted by Julian Cheung

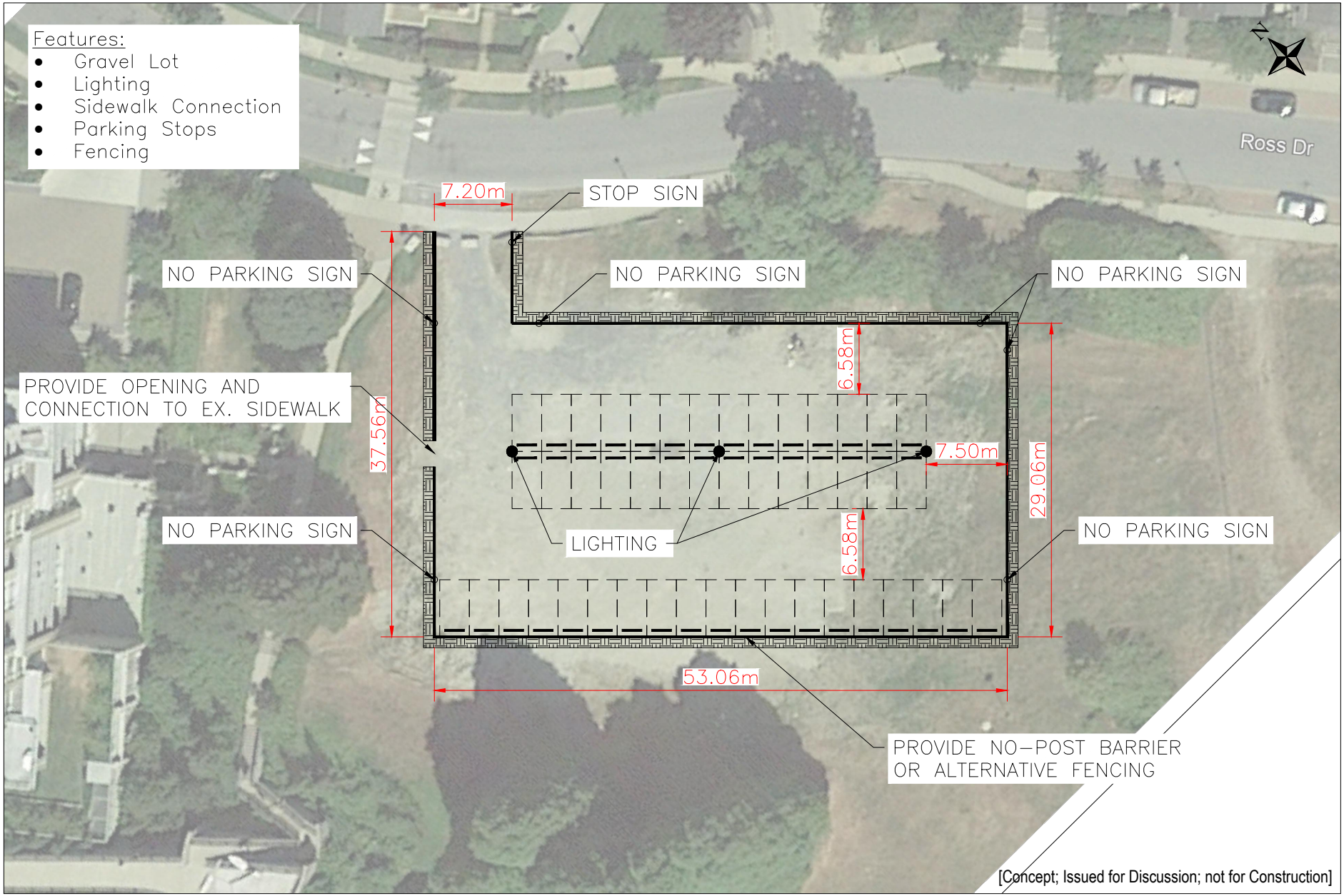

Exhibit 1

Option 1 - Minimum Requirement (47 Stalls)

Victoria Hill Parking Study - Gravel Lot
04-18-0073 October 2018 Scale 1:500 on Letter Prepared by JCC

bunt & associates

\\Bunt.local\data\Shared\PROJECTS\KB\04-18-0073 Victoria Hill Parking Study\4.0 Analysis & Design\4.1 ACAD\Gravel Lot\04-18-0073_CAD_Gravel_Lot_V02.dwg
2019/03/19 14:51, Plotted by Julian Cheung

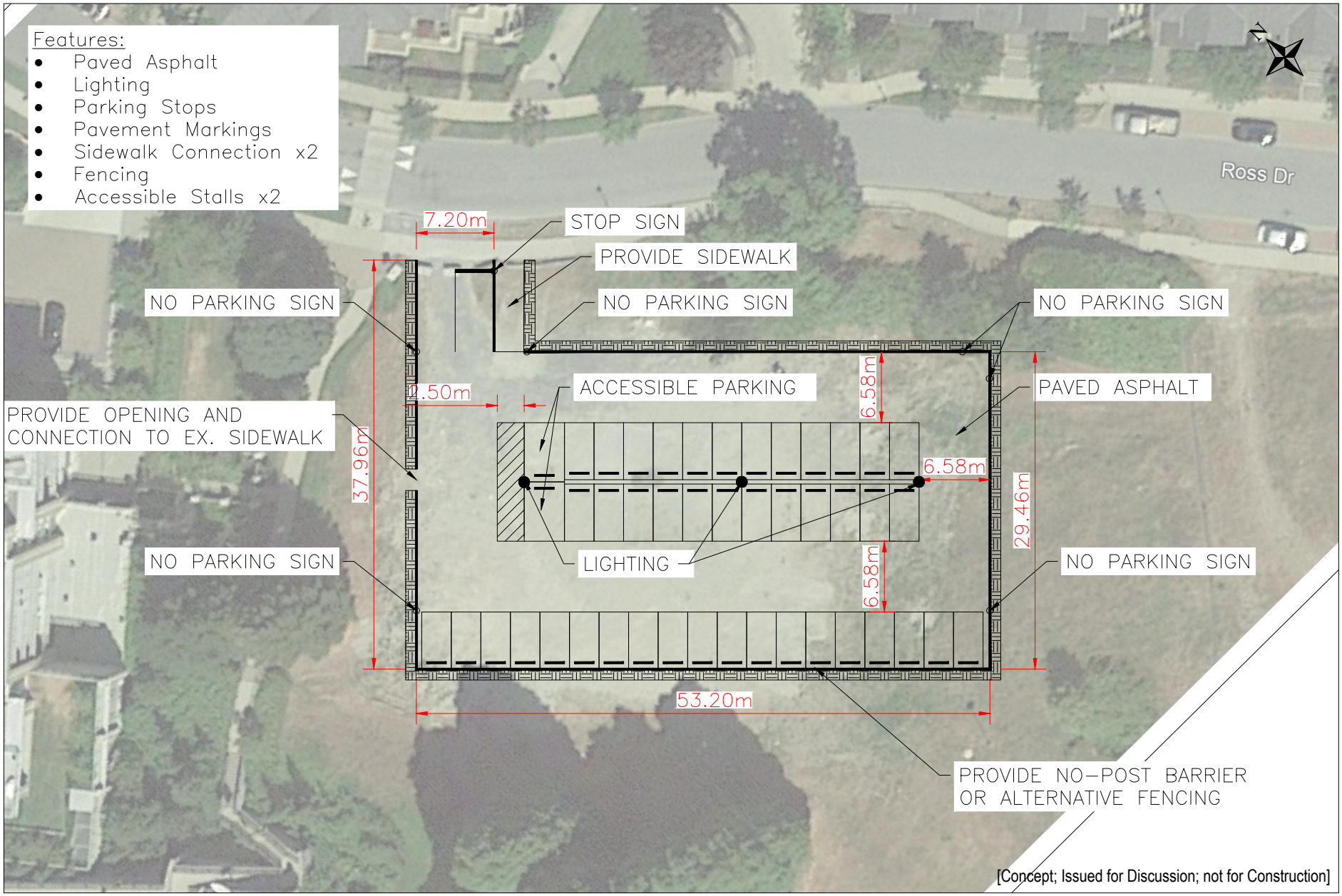

Exhibit 2

Option 2 - Higher Level (45 Stalls)

Victoria Hill Parking Study - Gravel Lot
04-18-0073 October 2018 Scale 1:500 on Letter Prepared by JCC

bunt & associates

\\Bunt.local\data\Shared\PROJECTS\KB\04-18-0073 Victoria Hill Parking Study\4.0 Analysis & Design\4.1 ACAD\Gravel Lot\04-18-0073_CAD_Gravel_Lot_V02.dwg
2019/03/19 14:51, Plotted by Julian Cheung

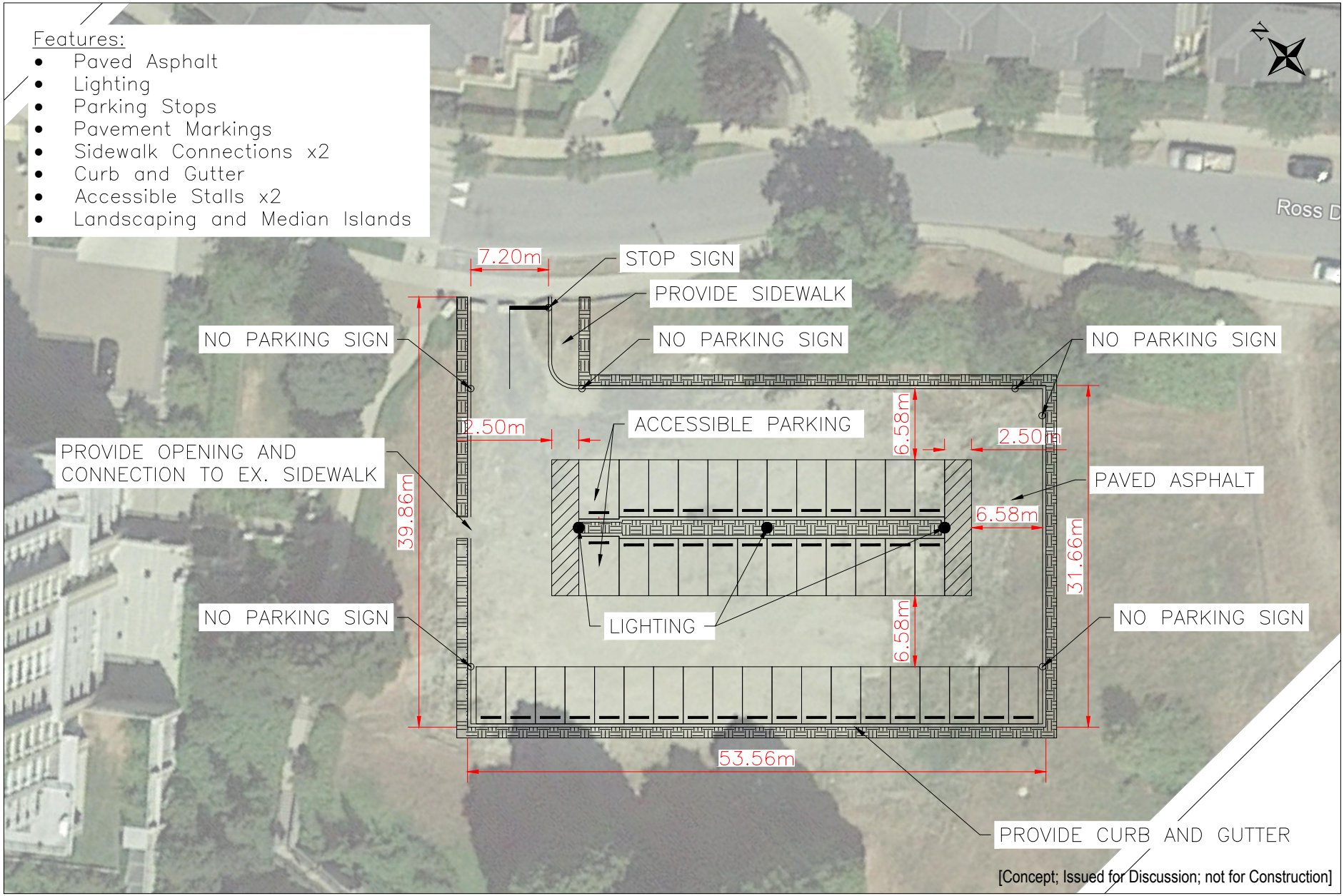

Exhibit 3

Option 3 - 'Ideal' Level (43 Stalls)

Victoria Hill Parking Study - Gravel Lot
04-18-0073 October 2018 Scale 1:500 on Letter Prepared by JCC

bunt & associates

			Option 1		Option 2		Option 3	
Item	Price	Per	Quantity	Cost	Quantity	Cost	Quantity	Cost
Parking Stop	$50	Unit	47	$2,350	45	$2,250	43	$2,150
Stop Sign (including post)	$350	Unit	1	$350	1	$350	1	$350
Pavement Marking	$1	ft.		$0	348	$348	541	$541
No Parking Sign (including post)	$350	Unit	6	$2,100	6	$2,100	6	$2,100
Gravel (assume 6" thickness)	$210	Cu.yard	184	$38,653	186	$39,014	196	$41,061
Asphalt (assume 4" thickness)	$4	sq.ft	0	$0	17438	$69,751	18353	$73,410
Concrete (Sidewalk)	$10	sq.ft	240	$2,400	560	$5,600	560	$5,600
Fencing	$17	ft.	561	$9,535	558	$9,479	0	$0
Lighting	$5,200	Unit	3	$15,600	3	$15,600	3	$15,600
Curb and Gutter	$12	ft.		$0		$0	827	$9,919
Landscaping	$5,000	Unit		$0		$0	1	$5,000
Drainage???								
Subtotal				*$70,987*		*$144,491*		*$155,731*
Labour (100%)				*$70,987*		*$144,491*		*$155,731*
Contingency (+/- 30%)				*$42,592*		*$86,695*		*$93,439*
Total (Excluding Tax)				**$184,567**		**$375,677**		**$404,901**
Cost Per Stall				$3,926.97		$8,348.39		$9,416.29