

CITY OF VANCOUVER LOADING STUDY- FINAL Rev.0

City of Vancouver
Off-Street Service Vehicle Loading Study

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1 INTRODUCTION

1.1 Background

R.F. Binnie & Associates Ltd. (Binnie) has been retained by City of Vancouver (the City) through an existing Request for Service agreement to prepare this Off-street Service Vehicle Loading Study (Loading Study).

In the recent years, there have been an increase in the number of variance requests for the required number of off-street service vehicle loading spaces for new development applications. These requests sought a reduction in existing requirements for off-street loading spaces for various reasons, such as the purpose of the building was not expected to generate enough service vehicle trips to need all required number of loading spaces; concerns regarding access constraints to the loading bay such as those abutting narrow laneways; or mixed-use developments presenting opportunities for shared loading spaces. Variance requests require staff time to review, which extends the development permit application process.

1.2 Study Objectives

The **Loading Study** has been prepared to propose recommendations to update Section 5 of the City's Parking By-law which sets out the requirements for off-street service vehicle loading for new developments to reflect observed demand of the day, modernize requirements, and reduce the frequency of the variance requests. In addition, off-street passenger vehicle loading observations have been included for dwelling, office, retail, and senior supportive/assisted living buildings.

The Loading Study will review the existing loading rates and design standards. The recommended rates and design standards will be evidence based and data driven. The results from this Loading Study are expected to eliminate the need for site specific loading management plans at the studied building classifications.

2 METHODOLOGY

2.1 Data Collection

Data was collected at 14 sites throughout Vancouver and one site in Burnaby. The sites were selected through discussions with the City, and the sites were selected based on building classifications and geographic location. At each of the sites, 36 hours of footage was collected for observation from 7:00 AM to 7:00 PM of the loading bays for three days of loading activities and loading space usage from at least two viewpoints. One of the viewpoints was the loading bay, typically located in the laneway, second viewpoint was on-street view where vehicles may be using the curb lane for loading activities, and additional cameras were added when the site was located at the corner of a block or when the loading bay consisted of a large covered area where having a viewpoint of the laneway could not capture the loading activities within the covered loading bay.

Any vehicles that were observed to be loading or unloading for each site have been included. Any vehicles that were difficult to observe, accessing adjacent sites, in the laneway with no moving loads being observed, and/or temporarily stopping in the curb lane with no loading activity abutting the study site have not been included in the data.

The data for some sites was collected on weekdays only, and some sites were collected for two weekday dates and one weekend date. This was determined based days of the week when loading occurs, confirmed by the businesses at the sites. Residential sites were assumed to include possible moving activities as well and therefore included weekend dates for appropriate coverage.

Data has been collected at the locations listed in Table 2-1.

Table 2-1: Study Site Locations

Address	Category
970 Union Street	Senior Supportive / Assisted Living
5733 Alberta Street	Dw elling - Strata / Condo Apartment
5383 Cambie Street	Dw elling - Strata / Condo Apartment
1099 Richards Street	Dw elling - Non-Market Rental Apartment
1618 W 6th Avenue	Dw elling - Market Rental Apartment
2233 Columbia Street	Office - Core
2985 Virtual Way	Office - Outside Core
720 Robson Street	Retail - Large
1067 Robson Street	Retail - Small / Medium
550 W Broadw ay	Mixed - Office / Retail / Manufacturing
288 E Broadw ay	Mixed - Residential / Retail
156 W 8th Avenue	Manufacturing / Industrial (Light / Medium) - Core
88 E 1st Avenue	Manufacturing / Industrial (Heavy) - Core
8276 St. George Street	Manufacturing / Industrial (Light / Medium) - Outside Core
3888 N Fraser Way (Burnaby)	Manufacturing / Industrial (Heavy) - Outside Core

2.2 Data Processing

The data observed has been presented in Appendix A. The total number of service vehicles accessing the site has been tallied up in each hour that the vehicle arrives. In addition, the maximum number of

vehicles accessing the site at the same time within each hour has been shown; if a service vehicle continues unloading crossing into the next hour, the same service vehicle was also counted towards **the next hour's maximum number of vehicles accessing the site.**

Based on observations, the recommended rate for each site was calculated based on a few factors, including the maximum number of vehicles carrying out loading activities at the same time, and the size of the building space and/or the number of units in the building.

Any passenger (P) design vehicle was classified as a Class A vehicle. P design vehicle includes but is not limited to the following: pickup trucks, typical passenger vehicle, and minivans. Any vehicle larger than P design vehicle and up to a medium single-unit (MSU) design vehicle was classified as a Class B vehicle for the purpose of this study. Any vehicle that appeared to be a tractor-trailer (WB-20) design vehicle, as well as any vehicle larger than an MSU, was classified as a Class C vehicle. Profiles of P design vehicle, MSU design vehicle, HandyDART vehicle and WB-20 design vehicle are shown in Figure 2-1, Figure 2-2, Figure 2-3, and Figure 2-4.

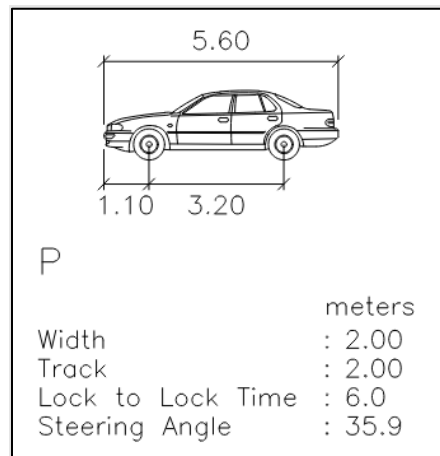


Figure 2-1: Passenger (P) Design Vehicle

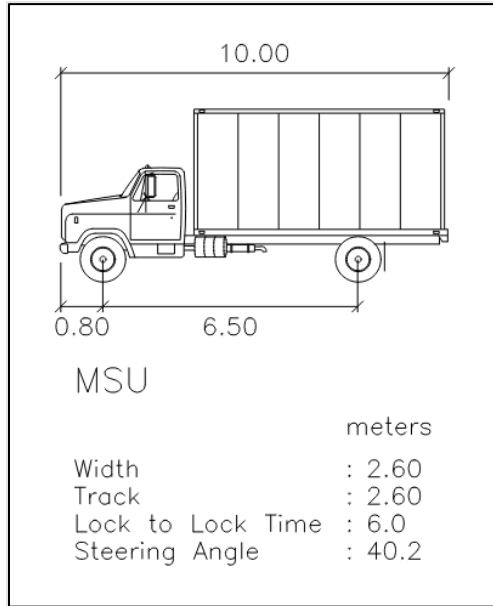


Figure 2-2: Medium Single-Unit (MSU) Design Vehicle

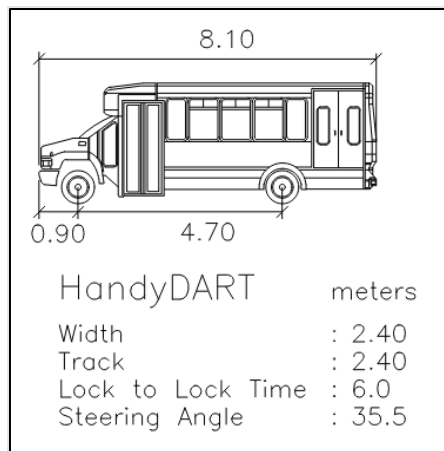


Figure 2-3: CMBC HandyDART Vehicle

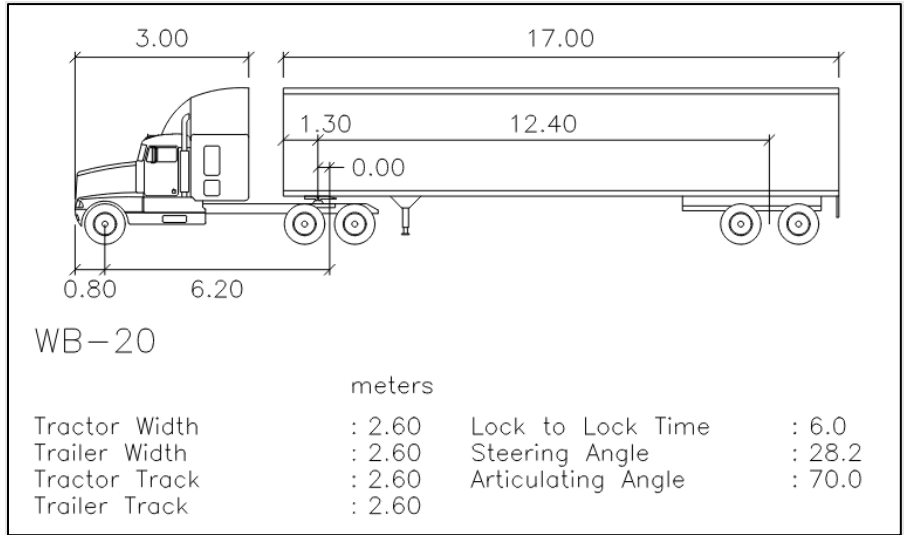


Figure 2-4: Tractor-Trailer (WB-20) Design Vehicle

3 CURRENT BY-LAW OFF-STREET LOADING AND PASSENGER LOADING REQUIREMENTS

Based on the current City's Parking By-law Section 5 and Section 7, the required number of loading and passenger loading spaces are shown in Table 3-1.

Table 3-1: Current By-law Required Off-Street Loading Spaces

Address	Category	Off-Street Service Vehicle Loading			Off-Street Passenger Loading	
		Class A	Class B	Class C	Class A	Class B
970 Union Street	Senior Supportive / Assisted Living	-	1	-	1	2
5733 Alberta Street	Dwelling - Strata / Condo Apartment	-	-	-	1	-
5383 Cambie Street	Dwelling - Strata / Condo Apartment	-	-	-	-	-
1099 Richards Street	Dwelling - Non-Market Rental Apartment	-	1	-	1	-
1618 W 6th Avenue	Dwelling - Market Rental Apartment	-	-	-	1	-
2233 Columbia Street	Office - Core	1	1	-	-	-
2985 Virtual Way	Office - Outside Core	2	3	-	1	-
720 Robson Street	Retail - Large	-	2	-	-	-
1067 Robson Street	Retail - Small / Medium	-	2	-	-	-
550 W Broadway	Mixed - Office / Retail / Manufacturing	1	4	-	-	-
288 E Broadway	Mixed - Residential / Retail	-	4	2	2	-
156 W 8th Avenue	Manufacturing / Industrial (Light / Medium) - Core	-	1	-	-	-
88 E 1st Avenue	Manufacturing / Industrial (Heavy) - Core	-	1	1	-	-
8276 St. George Street	Manufacturing / Industrial (Light / Medium) - Outside Core	-	1	-	-	-
3888 N Fraser Way	Manufacturing / Industrial (Heavy) - Outside Core	-	3	2	-	-

For the residential and retail mixed-use site, 288 E Broadway, it was assumed that the retail portion and the residential portion shared the same loading bay. In addition, it was assumed that the leasable area was entirely dedicated to the retail portion of the building.

The 88 E 1st Avenue site was selected as heavy manufacturing/industrial site within the city core. The site consists of Mario's Gelati producing gelato on site, Amato Gelato Café serving Mario's Gelati products and café beverages and foods, and Villa Amato Ballroom. The size of manufacturing/industrial portion of the building was estimated by subtracting the size of the ballroom from the total gross leasable area.

For the office and retail mixed-use site, 550 W Broadway site, it was assumed that the ground floor consisted of retail business only and all other floors consisted of offices.

All other buildings were assumed to consist only of either retail, manufacturing/industrial, office, dwelling, or senior supportive/assisted living, and the gross floor area of each building was retrieved from the BC Assessment website or the building specific website were used.

4 OFF-STREET SERVICE VEHICLE LOADING AND PASSENGER LOADING OBSERVATIONS AND RECOMMENDATIONS

This section outlines the loading activities observed for all observed sites. The recommended rates for the five building types are shown in Table 4-1 and Table 4-2. Details of observations for each location has been provided in the proceeding sections.

Table 4-1: Summary of Recommendations of Off-Street Loading Spaces - 1

Zoning	Current Bylaw Requirement	Recommended Changes	Observed Site Details
Senior Supportive / Assisted Living	<p>5.2.1. Class B: 1 space for 1 to 199 residential units +1 space for any portion of each additional 200 residential units</p> <p>7.2.2.2. Class A Passenger: 0 spaces for up to 79 residential units 1 space for 80 to 159 residential units 2 spaces for 160 to 199 residential units +1 space for any portion of each additional 80 residential units</p> <p>Class B Passenger: 0 spaces for up to 14 residential units 1 space for 15 to 119 residential units 2 spaces for 120 or more residential units</p>	Recommended to remain the same	970 Union Street
Dwelling - Strata / Condo Apt	<p>5.2.1. Class B: 0 spaces for up to 99 dwelling units 1 space for 100 to 299 dwelling units 2 spaces for 300 to 500 dwelling units</p>	Further studies are recommended.	5383 Cambie Street 5733 Alberta Street
Dwelling - Market Rental Apt	<p>+1 space for each additional 200</p> <p>7.2.1. Class A Passenger: 0 spaces for up to 49 dwelling units 1 space for 50 to 125 dwelling units</p>		1618 W 6th Avenue
Dwelling - Non-Market Rental Apt	<p>2 spaces for 126 to 275 dwelling units +1 space for each additional 150</p>		1099 Richard Street
Office - Core	<p>5.2.7. Class A: 0 spaces for up to 999 m² of gross floor area 1 space for 1,000 to 7,500 m² 2 spaces for 7501 to 15,000 m² 3 spaces for 15,001 to 20,000 m² 4 spaces for 20,001 to 28,000 m² +1 space for any portion of each additional 7,500 m²</p> <p>Class B: 0 spaces for up to 499 m² of gross floor area 1 space for 500 to 5,000 m² 2 spaces for 5,001 to 10,000 m² 3 spaces for 10,001 to 28,000 m² +1 space for any portion of each additional 15,000 m²</p>	<p>Recommended changes to Class A 1 space for 1,000 to 15,000 m² 2 spaces for 15,001 to 20,000 m² 3 spaces for 20,001 to 28,000 m² +1 space for any portion of each additional 7,500 m²</p>	2233 Columbia Street
Office - Outside Core	<p>7.2.4. Class A Passenger: +1 space for each 10,000 m² of gross floor area</p>		2985 Virtual Way

Table 4-2: Summary of Recommendations of Off-Street Loading Spaces - 2

Zoning	Current Bylaw Requirement	Recommended Changes	Observed Site Details
Retail - Small/Medium	5.2.5. Class B: 0 spaces for up to 99 m ² of gross floor area 1 space for 100 to 465 m ² 2 spaces for 466 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	Recommended changes to Class B 1 space for 100 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	1067 Robson Street
Retail - Large	Class C: 0 spaces for up to 1,999 m ² of gross floor area 1 space for 2,000 to 5,000 m ² 2 spaces for 5,001 m ² and greater 7.2.5. Class A Passenger: +1 space for each 4,000 m ² of gross floor area	Recommended changes to Class C 0 spaces for up to 1,600 m ² 1 space for 1,601 to 5,000 m ² 2 spaces for 5,001 m ² and greater	720 Robson Street
Mixed-Use - Office / Retail / Manufacturing	Sum of Office, Retail, and Manufacturing	Sum of recommended rates for Office and Retail to be used.	550 W Broadway (contains Office and Retail)
Mixed-Use - Residential / Retail	Sum of Dw elling and Retail	Further studies are recommended due to lack of updated rate for dw elling use.	288 E Broadw ay
Manufacturing/Industrial - Core (Light/Medium)	5.2.5. Class B: 0 spaces for up to 99 m ² of gross floor area 1 space for 100 to 465 m ² of	Recommended changes to Class B 0 spaces for up to 99 m ² of gross floor area 1 space for 100 to 390 m ² 2 spaces for 391 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	156 W 8th Avenue
Manufacturing/Industrial - Core (Heavy)	2 spaces for 466 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²		88 E 1st Avenue
Manufacturing/Industrial - Outside Core (Light/Medium)	Class C: 0 spaces for up to 1,999 m ² of gross floor area 1 space for 2,000 to 5,000 m ²		8276 St. George Street
Manufacturing/Industrial - Outside Core (Heavy)	2 spaces for 5,001 m ² and greater		3888 N Fraser Way (Burnaby)

4.1 Observations for Senior Supportive / Assisted Living Building

4.1.1 970 Union Street

The Villa Cathay Care Home located at 970 Union Street was selected as the observation site for senior supportive/assisted living. The site was observed on Wednesday, July 12th, Thursday, July 13th, and Saturday, July 15th. Over the three-day observation period, three to five Class A vehicle loadings, zero to three Class B vehicle loadings, 24 to 39 Class A Passenger vehicle loadings, six Class B Passenger vehicle loadings, and zero to one bicycle couriers were observed for the site per day.

At the same time, two Class B vehicles were observed to be loading from the parking lane along the east side of the property. Based on the video footage collected, it was difficult to determine where the cargo unloaded from the Class B vehicles were directed to; however, as there were no other nearby facilities **on the same block, it was assumed that these cargo shipments were moved into the study site's storage area.** Out of the three days observed, the simultaneous unloading of two Class B vehicles was only observed on one of the days at the same time.

At all other times, either one Class A or one Class B vehicles were observed to be carrying out loading activities at a single point in time. The maximum number of passenger loading vehicles observed at the same time was one Class B Passenger vehicle and two Class A Passenger vehicles.

Based on the observations of the senior supportive/assisted living building with 150 rooms, the existing By-law requirement for passenger loading spaces is expected to be sufficient. Based on the total number of Class B service vehicle loading activities observed, the existing By-law requirement for service vehicle loading spaces is also expected to be sufficient. It is recommended that the existing By-law requirements for service vehicle and passenger loading spaces is to be maintained.

4.2 Observations for Multiple-Dwelling Buildings

4.2.1 5733 Alberta Street

The residential building located at 5733 Alberta Street was selected as a strata/condo apartment dwelling site for observations. The site was observed on Wednesday, July 19th, Thursday, July 20th, and Saturday, July 22nd. Over the three-day observation period, 11 to 19 Class A vehicle loadings, 14 Class B vehicle loadings, and five to seven Class A Passenger vehicle loadings were observed per day.

At one instance, up to three vehicles were observed to be loading at the same time: 1 Class A vehicle and 2 Class A Passenger vehicles. At other times, up to two Class B vehicles were observed to be carrying out loading activities at the same time.

Based on the current By-law, the dwelling site with 57 units require one Class A Passenger vehicle loading space. Based on observations, up to two Class B loading spaces may be required.

4.2.2 5383 Cambie Street

The residential building located at 5383 Cambie Street was selected as a strata/condo apartment dwelling site for observations. The site was observed on Wednesday, July 12th, Thursday, July 13th, and Saturday, July 15th. Over the three-day observation period, one to 11 Class A vehicle loadings, two to 11 Class B vehicle loadings, and four to 15 Class A Passenger vehicle loadings were observed per day.

At the same time, up to three vehicles were observed to be carrying out loading activities for the study site. During all other hours of observation, the maximum number of vehicles carrying out loading activities for the site was two vehicles.

Based on the current By-law, the dwelling site with 45 units require no vehicle loading spaces. Based on observations, up to two Class A and one Class A Passenger loading spaces may be required.

4.2.3 1618 W 6th Avenue

The Art on 6th located at 1618 W 6th Avenue was selected as the market rental apartment dwelling site for observations. The site was observed on Wednesday, July 19th, Thursday, July 20th, and Saturday, July 22nd. Over the three-day observation period, seven to 17 Class A vehicle loadings, one to five Class B vehicle loadings, and three to eight Class A Passenger vehicle loadings were observed per day.

At the same time, up to three vehicles were observed to be carrying out loading activities for the study site: 1 Class A vehicle and 2 Class A Passenger vehicles.

Based on the current By-law, the dwelling site with 98 units require one Class A Passenger vehicle loading space. Based on observations, up to one Class A and two Class A Passenger loading spaces may be required.

4.2.4 1099 Richards Street

The New Jubilee House located at 1099 Richards Street was selected as the non-market rental apartment dwelling site for observations. The site was observed on Wednesday, July 19th, Thursday, July 20th, and Saturday, July 22nd. Over the three-day observation period, one to four Class A vehicle loadings, one to three Class B vehicle loadings, and five to six Class A Passenger vehicle loadings were observed for the site per day.

At one occurrence, there were up to two vehicles carrying out loading activities at the same time. One of the two vehicles was accessing the underground parkade to retrieve the compactor bin, and the other vehicle was a FedEx vehicle unloading from the on-street curb lane for deliveries. At all other occurrences, there was at most one Class A or Class B vehicle carrying out loading activities and there was at most one Class A Passenger loading activities taking place.

Based on observations, for a non-market rental dwelling building with 162 units, one Class B service vehicle loading space and one Class A Passenger loading space is expected to be sufficient.

4.2.5 Summary of Dwelling Building Observations

Other than the non-market rental dwelling building site, the other three dwelling buildings observed show a greater need for loading spaces than the current By-law required loading spaces for service vehicles and passengers.

Currently, there are no requirements for service vehicle loading spaces in the current By-law for dwellings with less than 100 units, and no requirement for passenger loading spaces for dwellings with less than 50 units. Based on observations and the potential need for additional loading spaces, it is recommended that further studies be completed to determine suitable loading space requirements especially with the recent increase in meal deliveries, e-commerce, and easier access to transportation services such as Uber. Additionally, based on current trends such as an increase in e-commerce activity resulting in more deliveries, and more car-free homes relying on shared vehicles requiring loading spaces, Class A loading allocation should be considered in the future.

4.3 Observations for Office Buildings

4.3.1 2233 Columbia Street

The office building located at 2233 Columbia Street was selected as the office site within the city core for observations. The site was observed on Tuesday, August 22nd, Wednesday, August 23rd, and Thursday, August 24th. Over the three-day observation period, two to four Class A vehicle loadings, two

to three Class B vehicle loadings, one Class C vehicle loading, and five to seven Class A Passenger vehicle loadings were observed per day.

Based on observations, there were up to one Class A Passenger and one Class B vehicle at the same time. The current By-law requires one Class A and one Class B vehicle spaces.

4.3.2 2985 Virtual Way

The office building located at 2985 Virtual Way was selected as the office site outside city core for observations. The site was observed on Wednesday, July 26th, Thursday, July 27th, and Saturday, July 29th. Over the three-day observation period, one to six Class A vehicle loadings, nine to 12 Class B vehicle loadings, and one Class A Passenger vehicle loadings were observed per day.

Based on observations, there were up to one Class A Passenger and three Class B vehicle at the same time. The current By-law requires two Class A, three Class B, and one Class A Passenger vehicle spaces. It is recommended for the By-law rates to be changed for there to be one less Class A vehicle loading space for a building with 10,405 m² of gross floor area.

4.3.3 Summary of Office Building Observations

Based on observations, changes to the Class A loading space requirements are recommended. The upper limit of the gross floor area for the first space of Class A vehicle is recommended to be increased, and consequently reducing the required number of Class A vehicle spaces by one space from the existing requirements for each existing gross floor area increments.

4.4 Observations for Retail Buildings

4.4.1 1067 Robson Street

The Footlocker located at 1067 Robson Steet was selected as the small retail site for the Loading Study observations. The site was observed on Tuesday, August 1st, Wednesday, August 2nd, and Thursday, August 3rd. Over the three-day observation period, a total of four to five Class B vehicles were observed per day to be accessing the laneway abutting Footlocker for loading activities for the selected site. There was no more than one Class B vehicle loading for the site at the same time.

Based on observations, for a small retail building of 1,231 m² in size, one Class B service vehicle loading space may suffice. This may warrant a decrease from the currently required two Class B loading spaces; however, sites with different building sizes may require further studies.

4.4.2 720 Robson Street

The Old Navy located at 720 Robson Steet was selected as the large retail site for the Loading Study observations. The site was observed on Wednesday, August 9th, Thursday, August 10th, and Friday, August 11th. Over the three-day observation period, a total of one Class A vehicle, one to two Class B vehicles, and one Class C vehicle were observed per day. There was no more than one vehicle loading for the site at the same time.

Based on observations, for a large retail building of 1,955 m² in size, one Class C service vehicle loading space may be needed. This may warrant for a change in the existing rates for Class C service vehicle loading requirements for a retail building to include a Class C loading space for buildings less than 2,000 m² in size.

4.4.3 *Summary of Retail Building Observations*

Based on observations, changes to Class B and Class C loading space requirements are recommended. The upper limit of the gross floor area for the first space of Class B vehicle is recommended to be increased, and the lower limit of the gross floor area for a Class C vehicle is recommended to be decreased.

4.5 Observations for Mixed-use Buildings

4.5.1 *550 W Broadway*

The mixed-use building located at 550 W Broadway was selected as the mixed-use office, retail and manufacturing site for observations. The observed site is assumed to consist of office and retail components only. The site was observed on Tuesday, August 1st, Wednesday, August 2nd, and Thursday, August 3rd. Over the three-day observation period, 10 to 12 Class A vehicle loadings, 12 to 21 Class B vehicle loadings, one Class C vehicle loading, and one to three Class A Passenger vehicle loadings were observed for the site per day. Up to five vehicles were observed to be carrying out loading activities for the study site at the same time.

4.5.2 *288 E Broadway*

The mixed-use building located at 288 E Broadway was selected as the mixed-use retail and residential site for observations. The site was observed on Tuesday, August 1st, Wednesday, August 2nd, and Thursday, August 3rd. Over the three-day observation period, four to five Class A vehicle loadings, 13 to 16 Class B vehicle loadings, and 14 to 18 Class C vehicle loadings were observed for the site per day.

At one instance, the maximum number of vehicles carrying out loading activities from the loading bay or the laneway was seven vehicles: one Class B vehicle and six Class C vehicles.

Based on the observations for the mixed-use site, one Class B vehicle and six Class C vehicle loading spaces will be needed to be able to accommodate all servicing vehicles off-street at the same time; however, further studies with additional sites of similar land-use is recommended.

4.5.3 *Summary of Mixed-use Building Observations*

The recommendations for mixed-use buildings will follow the recommendations provided for its building component classifications discussed in other sections. However, for the 288 E Broadway site, as it includes a residential component where a rate has yet to be recommended, further studies may be required. Refer to Section 4.2.5 for details for observations made for dwelling buildings.

4.6 Observations for Manufacturing / Industrial Buildings

4.6.1 156 W 8th Avenue

The Milano Coffee Roasters located at 156 W 8th Avenue was selected as the light to medium manufacturing/industrial site within core for observations. The site was observed on Wednesday, August 9th, Thursday, August 10th, and Friday, August 11th. Over the three-day observation period, a total of two to four Class A vehicle loadings and five to eight Class B vehicle loadings were observed for the site per day. Most of the loading activities were carried out from the laneway; two occurrences of loading activity from on-street were observed over the three days.

At more than one instance, there were up to two vehicles carrying out loading activities at the same time. Two vehicles loading at the same time were observed between 9:00 AM and 1:00 PM, outside of this time frame at most one vehicle was observed to be loading at a time.

This study site has what seemed to be one Class B loading space on site abutting the laneway along the west property line. Its access was restricted by large garbage bins and was also by a closed fenced. No loading activities were observed using this area. All observed loading activities from the laneway side of the building were undertaken in their paved lot abutting the laneway which was observed to be able to accommodate up to several vehicles at once.

Based on the current By-law, one Class B service vehicle loading space is required. However, it was observed that the maximum number of vehicles loading at the same time was two Class B vehicles for a light/medium manufacturing/industrial building of 395 m² in size. This may warrant an increase from the existing number of loading spaces required by the current Parking By-law.

4.6.2 88 E 1st Avenue

The Mario's Gelati located at 88 E 1st Avenue was selected as the heavy manufacturing/industrial site within the city core for observations. The site was observed on Wednesday, August 9th, Thursday, August 10th, and Friday, August 11th. Over the three-day observation period, a total of six to 14 Class A vehicle loadings, four Class B vehicle loadings, and three Class C vehicle loadings were observed for the site per day. There were up to three vehicles loading at the same time and there was no more than one Class C vehicle at a time.

Based on the current By-law, two Class B and one Class C service vehicle loading spaces are required. Based on observations, the By-law required number of loading spaces is expected to be sufficient.

4.6.3 8276 St. George Street

The Open Gate Architectural Scale Model Ltd. located at 8276 St. George Street was selected as the light to medium manufacturing/industrial site outside the city core for observations. The site was observed on Tuesday, August 22nd, Wednesday, August 23rd, and Thursday, August 24th. Over the three-day observation period, one Class A vehicle loading was observed for the site per day.

Based on the current By-law, one Class B service vehicle loading spaces are required. Based on observation, the By-law required number of loading spaces is expected to be sufficient; however, the currently required size of the Class B service vehicle loading space could be reduced to a Class A.

4.6.4 3888 North Fraser Way – Burnaby Site

Due to limitations with finding a suitable heavy manufacturing/industrial site outside the city core within the limits of Vancouver, the C&O Apparel located at 3888 N Fraser Way in Burnaby was selected as the heavy manufacturing/industrial site outside core for observations. **Given this site's proximity to the City of Vancouver** it was deemed as an acceptable alternative. The site was observed on Tuesday, September 12th, Wednesday, September 13th, and Thursday, September 14th. Over the three-day observation period, a total of one to two Class B vehicle loadings and two to four Class C vehicle loadings were observed for the site per day. There were up to two Class C vehicles loading at the same time.

The current By-law requires three Class B and two Class C service vehicle loading spaces. Based on observation, the current By-law requires far more loading spaces than what was observed to be needed.

4.6.5 Summary of Manufacturing / Industrial Building Observations

Based on overall observations, changes to Class B loading space requirement are recommended. The upper limit of the gross floor area for the first space of Class B vehicle is recommended to be decreased.

For the heavy manufacturing/industrial site outside the city core, although the observations show that the By-law requires far more than the observed number of loading vehicles, further studies should be completed before reducing the number of required Class B and Class C loading spaces for this building classification.

5 AUTOTURN ANALYSIS

The existing loading space stall sizes have been tested in AutoTURN to determine whether the dimensions are adequate. The AutoTURN analysis, including recommended dimensions are shown in Appendix B. The current loading space dimension requirements and recommended dimensions are shown in Table 5-1 and Table 5-2, respectively. In Table 5-2, dimensions that do not need any changes have been left blank.

Table 5-1: Current By-law Required Off-Street Loading Space Dimensions

	Current Stall Dimension Requirements (m)				
	Class A	Class B	Class C	Passenger Class A	Passenger Class B
Width	2.7	3.0	3.5	2.9-4.0	4.0
Length	5.5	8.5	17.0	5.5	6.0-7.5
Height	2.3	3.8	4.3	2.3	3.5

Table 5-2: Recommended Off-Street Loading Space Dimensions

	Recommended Stall Dimensions (m)				
	Class A	Class B	Class C	Passenger Class A	Passenger Class B
Width	-	3.4	3.6	-	-
Length	-	10.2	23.1	-	7.5
Height	-	-	-	-	-

Class A service vehicle loading space has been tested with a passenger (P) design vehicle and the existing dimensions are expected to be adequate. Class A passenger loading space has been tested with a P design vehicle and the existing dimensions are expected to be adequate. It is also recommended for any columns to be placed at most 5.1 m away from the end of the loading space. The distance from the end of the loading space to the adjacent property line within a laneway is recommended to be at least 10.6 m.

Class B passenger loading space has been tested with a Coast Mountain Bus Company's (CMBC) HandyDART, and is expected to be adequate; however, the required length of the stall could be increased to at least 8.1 m to accommodate the full length of the vehicle. The distance from the end of the loading space to the adjacent property line within a laneway is recommended to be at least 14.6 m.

Class B service vehicle loading space has been tested with light single-unit (LSU) and MSU design vehicles, and the existing dimensions are not expected to be adequate. Based on AutoTURN analysis, the recommended dimensions are for the width to be at least 3.4 m and length to be at least 10.2 m long. It is also recommended for any columns to be placed at most 6.9 m away from the end of the loading space, and for each loading space to be approximately 1.3 m away from the next loading space based on the turning path of a MSU design vehicle. The distance from the end of the loading space to the adjacent property line within a laneway is recommended to be at least 16.5 m.

Multiple MSU design vehicles were observed at the 550 W Broadway site with a height limit of 3.4 m, and no issues were observed; however, further studies may be needed to determine the height requirement for Class B service vehicle loading space.

Class C loading space has been tested with WB-20 design vehicle and the existing dimensions are not expected to be adequate. The recommended dimensions are for the width to be at least 3.6 m and length to be at least 23 m long. It is also recommended for any columns to be placed at most 14.5 m away from the end of the loading space, and for each loading space to be approximately 3.1 m away from the next loading space based on the turning path of a WB-20 design vehicle. The distance from the end of the loading space to the adjacent property line within a laneway is recommended to be at least 33.5 m. Further studies may be needed to determine the height requirement for Class C service vehicle loading space.

6 CONCLUSIONS AND RECOMMENDATIONS

Table 6-1 and Table 6-2 summarize the recommended rates for each type of building classifications. Some building classifications may require further studies.

Table 6-1: Summary of Recommendations of Off-Street Loading Spaces - 1

Zoning	Current Bylaw Requirement	Recommended Changes	Observed Site Details
Senior Supportive / Assisted Living	<p>5.2.1. Class B: 1 space for 1 to 199 residential units +1 space for any portion of each additional 200 residential units</p> <p>7.2.2.2. Class A Passenger: 0 spaces for up to 79 residential units 1 space for 80 to 159 residential units 2 spaces for 160 to 199 residential units +1 space for any portion of each additional 80 residential units</p> <p>Class B Passenger: 0 spaces for up to 14 residential units 1 space for 15 to 119 residential units 2 spaces for 120 or more residential units</p>	Recommended to remain the same	970 Union Street
Dwelling - Strata / Condo Apt	<p>5.2.1. Class B: 0 spaces for up to 99 dwelling units 1 space for 100 to 299 dwelling units 2 spaces for 300 to 500 dwelling units +1 space for each additional 200</p>	Further studies are recommended.	5383 Cambie Street 5733 Alberta Street
Dwelling - Market Rental Apt	<p>7.2.1. Class A Passenger: 0 spaces for up to 49 dwelling units 1 space for 50 to 125 dwelling units 2 spaces for 126 to 275 dwelling units +1 space for each additional 150</p>		1618 W 6th Avenue
Dwelling - Non-Market Rental Apt			1099 Richard Street
Office - Core	<p>5.2.7. Class A: 0 spaces for up to 999 m² of gross floor area 1 space for 1,000 to 7,500 m² 2 spaces for 7501 to 15,000 m² 3 spaces for 15,001 to 20,000 m² 4 spaces for 20,001 to 28,000 m² +1 space for any portion of each additional 7,500 m²</p> <p>Class B: 0 spaces for up to 499 m² of gross floor area 1 space for 500 to 5,000 m² 2 spaces for 5,001 to 10,000 m² 3 spaces for 10,001 to 28,000 m² +1 space for any portion of each additional 15,000 m²</p>	<p>Recommended changes to Class A 1 space for 1,000 to 15,000 m² 2 spaces for 15,001 to 20,000 m² 3 spaces for 20,001 to 28,000 m² +1 space for any portion of each additional 7,500 m²</p>	2233 Columbia Street
Office - Outside Core	<p>7.2.4. Class A Passenger: +1 space for each 10,000 m² of gross floor area</p>		2985 Virtual Way

Table 6-2: Summary of Recommendations of Off-Street Loading Spaces - 2

Zoning	Current Bylaw Requirement	Recommended Changes	Observed Site Details
Retail - Small/Medium	5.2.5. Class B: 0 spaces for up to 99 m ² of gross floor area 1 space for 100 to 465 m ² 2 spaces for 466 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	Recommended changes to Class B 1 space for 100 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	1067 Robson Street
Retail - Large	Class C: 0 spaces for up to 1,999 m ² of gross floor area 1 space for 2,000 to 5,000 m ² 2 spaces for 5,001 m ² and greater 7.2.5. Class A Passenger: +1 space for each 4,000 m ² of gross floor area	Recommended changes to Class C 0 spaces for up to 1,600 m ² 1 space for 1,601 to 5,000 m ² 2 spaces for 5,001 m ² and greater	720 Robson Street
Mixed-Use - Office / Retail / Manufacturing	Sum of Office, Retail, and Manufacturing	Sum of recommended rates for Office and Retail to be used.	550 W Broadway (contains Office and Retail)
Mixed-Use - Residential / Retail	Sum of Dwelling and Retail	Further studies are recommended due to lack of updated rate for dwelling use.	288 E Broadway
Manufacturing/Industrial - Core (Light/Medium)	5.2.5. Class B: 0 spaces for up to 99 m ² of gross floor area 1 space for 100 to 465 m ² 2 spaces for 466 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	Recommended changes to Class B 0 spaces for up to 99 m ² of gross floor area 1 space for 100 to 390 m ² 2 spaces for 391 to 2,325 m ² 2 spaces for 2,326 to 4,649 m ² 3 spaces at 4,650 m ² +1 space for each additional 2,325 m ²	156 W 8th Avenue
Manufacturing/Industrial - Core (Heavy)			88 E 1st Avenue
Manufacturing/Industrial - Outside Core (Light/Medium)	Class C: 0 spaces for up to 1,999 m ² of gross floor area 1 space for 2,000 to 5,000 m ² 2 spaces for 5,001 m ² and greater		8276 St. George Street
Manufacturing/Industrial - Outside Core (Heavy)	2 spaces for 5,001 m ² and greater		3888 N Fraser Way (Burnaby)

Table 6-3: Recommended Off-Street Loading Space Dimensions

	Recommended Stall Dimensions (m)				
	Class A	Class B	Class C	Passenger Class A	Passenger Class B
Width	2.7	3.4	3.6	2.9-4.0	4.0
Length	5.5	10.2	23.1	5.5	7.5
Height	2.3	3.8	4.3	2.3	3.5

Table 6-3 shows a summary of recommended dimensions of each loading spaces. The following is a list of additional recommendations for off-street loading space dimensions:

- For Class A service vehicle loading space and Class A passenger loading space, it is recommended for any columns to be placed at most 5.1 m away from the end of the loading space, and for the end of the loading space to be at least 10.6 m away from the edge of the adjacent property within a laneway.
- For a Class B passenger loading space, it is recommended for the end of the loading space to be at least 14.6 m away from the edge of the adjacent property within a laneway.
- For a Class B service vehicle loading space, it is recommended for any columns to be placed at most 6.9 m away from the end of the loading space, and for the end of the loading space to be

at least 16.5 m away from the edge of the adjacent property within a laneway. Additionally, the distance between each loading space for Class B service vehicles is recommended to be 1.3 m apart.

- For a Class C service vehicle loading space, it is recommended for any columns to be placed at most 14.5 m away from the end of the loading space, and for the end of the loading space to be at least 33.5 m away from the edge of the adjacent property within a laneway. Additionally, the distance between each loading space for Class C service vehicles is recommended to be 3.1 m apart.
- For residential sites, given the expected trends of increases to e-commerce deliveries and more ride hailing services, further studies should be performed to evaluate the need for Class A loading spaces.

APPENDIX A

TABLES OF DATA

4.1.1. 970 Union St

Day 1						Day 2						Day 3						
Hour	Class A	Class B	Class A Pass	Class B Pass	Obs. At Once	Hour	Class A	Class B	Class A Pass	Class B Pass	Obs. At Once	Hour	Class A	Class B	Class A Pass	Class B Pass	Bike	Obs. At Once
7:00 AM			1	1	1	7:00 AM			4		2	7:00 AM			1			1
8:00 AM		2	2		3	8:00 AM	1		2		1	8:00 AM						
9:00 AM			3		1	9:00 AM			3		1	9:00 AM			2			1
10:00 AM	1		2		2	10:00 AM	1		2		1	10:00 AM			5			1
11:00 AM	1		2	2	2	11:00 AM	1		6		3	11:00 AM	1		3		1	1
12:00 PM			3	1	2	12:00 PM			3		1	12:00 PM			3			1
1:00 PM					1	1:00 PM			2		2	1:00 PM			1			1
2:00 PM	1		4		2	2:00 PM			7		3	2:00 PM			4			1
3:00 PM			4	1	3	3:00 PM			2		3	3:00 PM	2		2			1
4:00 PM			2		1	4:00 PM			4		3	4:00 PM						1
5:00 PM	1		1		2	5:00 PM	1		2		1	5:00 PM			3			2
6:00 PM	1	1	2	1	2	6:00 PM		1	2		2	6:00 PM						

4.2.1. 5733 Alberta St

Day 1						Day 2						Day 3						
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Obs. At Once
7:00 AM	1	2		1	1	7:00 AM						7:00 AM				1	1	
8:00 AM		1			1	8:00 AM					1	8:00 AM				1	1	
9:00 AM	4	5			2	9:00 AM	1				1	9:00 AM	2			1	2	
10:00 AM	1	3			2	10:00 AM						10:00 AM	1					1
11:00 AM	1			1	1	11:00 AM	1			1	1	11:00 AM	3			2	3	
12:00 PM	4	2			2	12:00 PM	1				1	12:00 PM	1					1
1:00 PM	2	1			1	1:00 PM	4			1	2	1:00 PM	1					1
2:00 PM	1			1	1	2:00 PM						2:00 PM						1
3:00 PM	1			1	1	3:00 PM	2				2	3:00 PM						1
4:00 PM	2			1	1	4:00 PM	1			1	2	4:00 PM	2				1	1
5:00 PM	1				1	5:00 PM				2	1	5:00 PM	1			2	1	1
6:00 PM	1			1	2	6:00 PM	4				2	6:00 PM						1

4.2.2. 5383 Cambie Street

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Class B Pass
7:00 AM	2		-		1	7:00 AM	2		-		1	7:00 AM					
8:00 AM	1	1	-		2	8:00 AM	1	1	-		2	8:00 AM					
9:00 AM	-	1	-		1	9:00 AM			-		1	9:00 AM					
10:00 AM	1		-	1	1	10:00 AM			-		1	10:00 AM					
11:00 AM	-	1	-		1	11:00 AM	1	1	-		2	11:00 AM					
12:00 PM	3		-		2	12:00 PM	1	1	-	1	2	12:00 PM		1	-	1	
1:00 PM		3	-		2	1:00 PM	2	1	-	3	3	1:00 PM					3
2:00 PM		1	-		2	2:00 PM		1	-	2	1	2:00 PM					2
3:00 PM	2	1	-		2	3:00 PM	1		-		1	3:00 PM	2	1	-	4	1
4:00 PM	1		-	1	1	4:00 PM			-	1	1	4:00 PM		1	-	2	
5:00 PM			-		1	5:00 PM		1	-		1	5:00 PM	1		-	2	
6:00 PM	1		-	2	1	6:00 PM	1		-	2	1	6:00 PM			-	1	

4.2.3. 1618 W 6th Ave

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM						7:00 AM	1				1	7:00 AM					
8:00 AM	1			1	2	8:00 AM						8:00 AM					
9:00 AM				3	3	9:00 AM	1				1	9:00 AM					
10:00 AM		1		1	1	10:00 AM	1				1	10:00 AM	1				1
11:00 AM	1	2		2	2	11:00 AM	1	1		1	2	11:00 AM	2				1
12:00 PM	2			1	1	12:00 PM				1	1	12:00 PM	1				1
1:00 PM	1				2	1:00 PM						1:00 PM	1				1
2:00 PM	1				1	2:00 PM						2:00 PM	4				3
3:00 PM	1			1	1	3:00 PM	2				1	3:00 PM	2	1			3
4:00 PM	1			2	2	4:00 PM	1			1	1	4:00 PM	4				2
5:00 PM		1			1	5:00 PM		1			1	5:00 PM					
6:00 PM	1				1	6:00 PM						6:00 PM					

4.2.4. 1099 Richard St

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM				1	1	7:00 AM						7:00 AM					
8:00 AM						8:00 AM						8:00 AM	1				1
9:00 AM						9:00 AM						9:00 AM				1	1
10:00 AM	1	1			1	10:00 AM		1			1	10:00 AM		2		1	2
11:00 AM					1	11:00 AM				1	1	11:00 AM		1		1	1
12:00 PM					1	12:00 PM				1	1	12:00 PM				1	1
1:00 PM		1			1	1:00 PM						1:00 PM				1	1
2:00 PM					1	2:00 PM				2	1	2:00 PM				1	1
3:00 PM				1	1	3:00 PM	1				1	3:00 PM	1				1
4:00 PM				2	1	4:00 PM						4:00 PM					1
5:00 PM	1			1	1	5:00 PM				1	1	5:00 PM	1				1
6:00 PM	1				1	6:00 PM						6:00 PM					

4.3.1. 2233 Columbia St

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM				2	1	7:00 AM				3	2	7:00 AM				1	1
8:00 AM						8:00 AM				1	1	8:00 AM	1			1	1
9:00 AM						9:00 AM						9:00 AM				1	1
10:00 AM				1	1	10:00 AM						10:00 AM		1			1
11:00 AM						11:00 AM	1				1	11:00 AM	1				1
12:00 PM		1		2	2	12:00 PM						12:00 PM	1	1			1
1:00 PM	1				1	1:00 PM	1				1	1:00 PM		1			1
2:00 PM	1	1		1	1	2:00 PM						2:00 PM	1				1
3:00 PM						3:00 PM						3:00 PM					
4:00 PM						4:00 PM				2	1	4:00 PM				2	1
5:00 PM			1	1	1	5:00 PM				1	1	5:00 PM					
6:00 PM						6:00 PM						6:00 PM					

* Class C - garbage veh

4.3.2. 2985 Virtual Way

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM						7:00 AM						7:00 AM					
8:00 AM		3			2	8:00 AM						8:00 AM					
9:00 AM	1	2			4	9:00 AM	1	2			2	9:00 AM					
10:00 AM		2			1	10:00 AM		1			1	10:00 AM					
11:00 AM		1			1	11:00 AM		2			2	11:00 AM					
12:00 PM		1			1	12:00 PM						12:00 PM			none observed		
1:00 PM						1:00 PM		2			1	1:00 PM					
2:00 PM						2:00 PM	3	1			3	2:00 PM					
3:00 PM		3			2	3:00 PM	1	1			1	3:00 PM					
4:00 PM						4:00 PM						4:00 PM					
5:00 PM				1	1	5:00 PM	1			1	1	5:00 PM					
6:00 PM						6:00 PM						6:00 PM					

4.4.1. 1067 Robson Street

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM						7:00 AM						7:00 AM					
8:00 AM						8:00 AM						8:00 AM		1			1
9:00 AM		1			1	9:00 AM		1			1	9:00 AM					
10:00 AM						10:00 AM		1			1	10:00 AM		1			1
11:00 AM		1			1	11:00 AM						11:00 AM		1			1
12:00 PM						12:00 PM		1			1	12:00 PM		1			1
1:00 PM		1			1	1:00 PM		1			1	1:00 PM					
2:00 PM		1			1	2:00 PM		1			1	2:00 PM					
3:00 PM						3:00 PM						3:00 PM					
4:00 PM						4:00 PM						4:00 PM					
5:00 PM						5:00 PM						5:00 PM					
6:00 PM						6:00 PM						6:00 PM					

4.4.2. 720 Robson St

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM					1	7:00 AM						7:00 AM					
8:00 AM		1	1		1	8:00 AM						8:00 AM		1			1
9:00 AM						9:00 AM						9:00 AM					
10:00 AM						10:00 AM						10:00 AM					
11:00 AM						11:00 AM						11:00 AM					
12:00 PM						12:00 PM			none observed			12:00 PM					
1:00 PM						1:00 PM						1:00 PM					
2:00 PM						2:00 PM						2:00 PM					
3:00 PM						3:00 PM						3:00 PM					
4:00 PM						4:00 PM						4:00 PM					
5:00 PM						5:00 PM						5:00 PM					
6:00 PM	1				1	6:00 PM						6:00 PM					

4.5.1. 550 W Broadway

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM	1				1	7:00 AM						7:00 AM	1	1			1
8:00 AM				1	1	8:00 AM		1		1	1	8:00 AM	1			2	1
9:00 AM		3			2	9:00 AM		1			1	9:00 AM	3				2
10:00 AM		3			3	10:00 AM	2	5			5	10:00 AM		1			1
11:00 AM	2	4			3	11:00 AM	1	1			2	11:00 AM	1	6	1		4
12:00 PM	2	4			4	12:00 PM	1	6		1	4	12:00 PM					2
1:00 PM	1	2			2	1:00 PM	2	3			3	1:00 PM	2	2			2
2:00 PM	3	5			3	2:00 PM	3	1			2	2:00 PM	2	2			3
3:00 PM	1				1	3:00 PM	2				1	3:00 PM				1	2
4:00 PM						4:00 PM	1				1	4:00 PM					
5:00 PM	1				1	5:00 PM						5:00 PM					
6:00 PM						6:00 PM				1	1	6:00 PM					

4.5.2. 288 E Broadway

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM		1	5		5	7:00 AM		3	5		4	7:00 AM		1	5		4
8:00 AM					5	8:00 AM	1	2	6		7	8:00 AM		1	3		2
9:00 AM		1	2		2	9:00 AM		2	1		4	9:00 AM	1	2			3
10:00 AM	1	6	4		6	10:00 AM		2	1		3	10:00 AM		2	1		1
11:00 AM		1	1		1	11:00 AM		1	2		3	11:00 AM	1	2	2		1
12:00 PM		2	2		2	12:00 PM	2	1	1		2	12:00 PM		2			1
1:00 PM	1	1	1		1	1:00 PM			1		1	1:00 PM			1		1
2:00 PM		2	2		2	2:00 PM	2	2	1		3	2:00 PM	1	3	1		3
3:00 PM	1	2			2	3:00 PM		1			1	3:00 PM	1	1			2
4:00 PM					1	4:00 PM		2			2	4:00 PM					
5:00 PM	1				1	5:00 PM						5:00 PM			1		1
6:00 PM		2			1	6:00 PM		1			1	6:00 PM	3	1			2

4.6.1. 156 W 8th Avenue

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM						7:00 AM						7:00 AM					
8:00 AM						8:00 AM		1			1	8:00 AM	1				1
9:00 AM	1	3			2	9:00 AM						9:00 AM					1
10:00 AM	1	1			2	10:00 AM						10:00 AM	2	1			2
11:00 AM	1	1			2	11:00 AM	2	2			2	11:00 AM	1	1			2
12:00 PM					2	12:00 PM					1	12:00 PM					2
1:00 PM						1:00 PM						1:00 PM					
2:00 PM		1			1	2:00 PM		2			1	2:00 PM		1			1
3:00 PM		2			1	3:00 PM		2			1	3:00 PM		1			1
4:00 PM						4:00 PM		1			1	4:00 PM		1			1
5:00 PM						5:00 PM						5:00 PM					1
6:00 PM						6:00 PM						6:00 PM					

4.6.2. 88 E 1st

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM						7:00 AM	1				1	7:00 AM					
8:00 AM	1				1	8:00 AM					1	8:00 AM	1				1
9:00 AM		1			1	9:00 AM	2		1		1	9:00 AM					1
10:00 AM	1	1			1	10:00 AM			1		1	10:00 AM	1				1
11:00 AM	2	1			2	11:00 AM			1		1	11:00 AM	2				1
12:00 PM	1	1			1	12:00 PM	1				1	12:00 PM	2				1
1:00 PM						1:00 PM	1				1	1:00 PM					
2:00 PM	1				1	2:00 PM	1				1	2:00 PM	4				3
3:00 PM	2				1	3:00 PM						3:00 PM	2				2
4:00 PM						4:00 PM						4:00 PM	2				2
5:00 PM						5:00 PM						5:00 PM					
6:00 PM						6:00 PM						6:00 PM					

4.6.3. 8276 St. George St

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM						7:00 AM						7:00 AM					
8:00 AM						8:00 AM						8:00 AM					
9:00 AM						9:00 AM						9:00 AM					
10:00 AM						10:00 AM						10:00 AM					
11:00 AM						11:00 AM						11:00 AM					
12:00 PM						12:00 PM						12:00 PM			none observed		
1:00 PM						1:00 PM						1:00 PM					
2:00 PM						2:00 PM						2:00 PM					
3:00 PM						3:00 PM						3:00 PM					
4:00 PM						4:00 PM						4:00 PM					
5:00 PM						5:00 PM						5:00 PM					
6:00 PM	1				1	6:00 PM	1				1	6:00 PM					

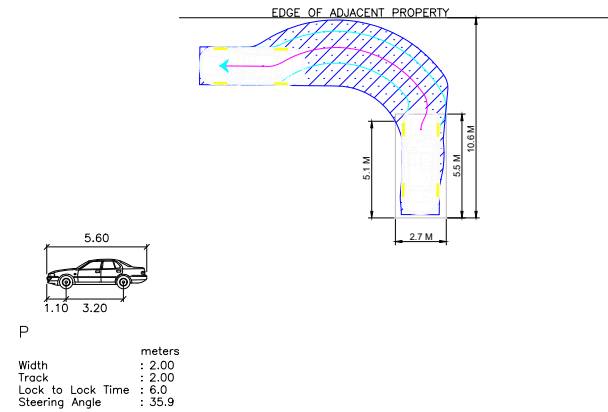
4.6.4. 3888 N Fraser Way, Burnaby

Day 1						Day 2						Day 3					
Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once	Hour	Class A	Class B	Class C	Class A Pass	Obs. At Once
7:00 AM					1	7:00 AM					2	7:00 AM					
8:00 AM			1		2	8:00 AM			1		2	8:00 AM		1	1		2
9:00 AM			1		2	9:00 AM					2	9:00 AM					2
10:00 AM		1			2	10:00 AM			1		2	10:00 AM			2		2
11:00 AM					1	11:00 AM					2	11:00 AM					2
12:00 PM		1			2	12:00 PM					1	12:00 PM		1			1
1:00 PM			1		2	1:00 PM		1			2	1:00 PM					1
2:00 PM					2	2:00 PM					1	2:00 PM			1		2
3:00 PM					1	3:00 PM					1	3:00 PM					1
4:00 PM					1	4:00 PM					1	4:00 PM					1
5:00 PM					1	5:00 PM					1	5:00 PM					1
6:00 PM					1	6:00 PM						6:00 PM					

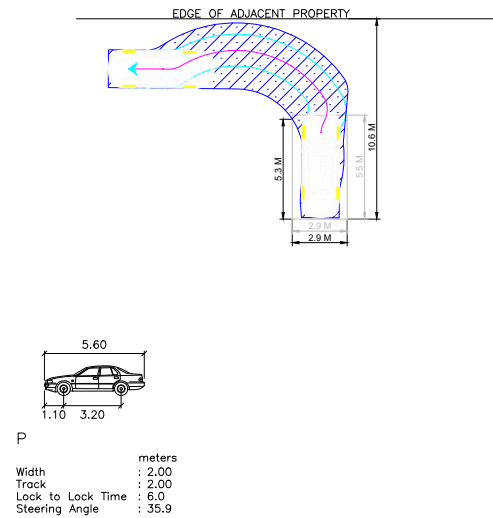
APPENDIX B

AUTOTURN ANALYSIS

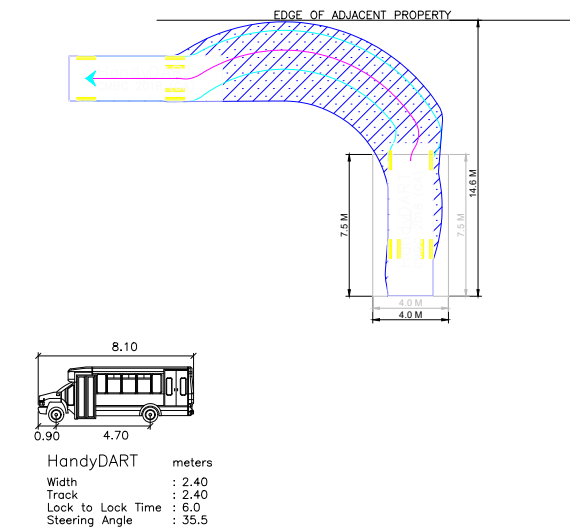
SERVICE VEHICLE LOADING - CLASS A



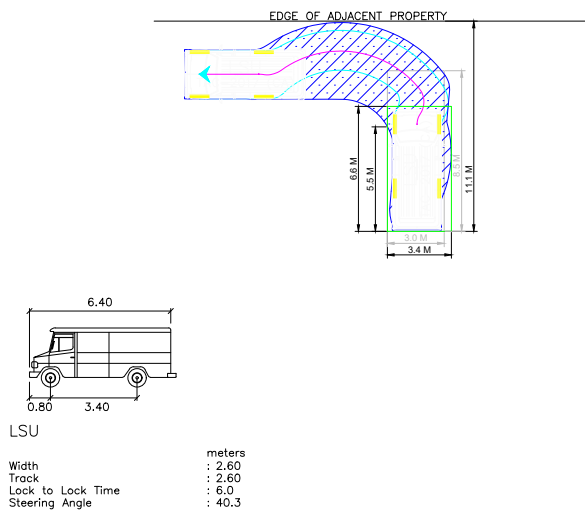
PASSENGER VEHICLE LOADING - CLASS A



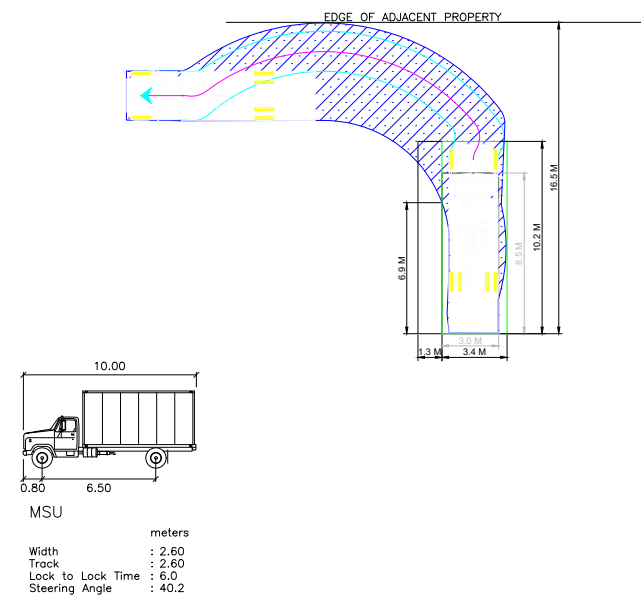
PASSENGER VEHICLE LOADING - CLASS B



SERVICE VEHICLE LOADING - CLASS B



SERVICE VEHICLE LOADING - CLASS B



SERVICE VEHICLE LOADING - CLASS C

