Oak Street and West 41 Avenue Traffic Assessment and Management Study Update

Prepared for:

Wesgroup Properties

Prepared by:

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BY EMAIL

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Dear Mr. Patillo,

Re: Oak Street and West 41st Avenue, Vancouver - Transportation Assessment and Management Study Update

Creative Transportation Solutions Ltd. (CTS) is pleased to submit this Transportation Assessment and Management Study (TAMS) Update for a proposed mixed-use development located at Oak Street and West 41st Avenue in the City of Vancouver. The primary objectives of this assignment were:

1. To conduct a TAMS for a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at the southwest corner of Oak Street and West 41st Avenue in Vancouver; and
2. To document the site conditions, data, analyses, conclusions and recommendations (if any) in a report that meets the requirements of the City of Vancouver.

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1.0 INTRODUCTION

1.1 Acknowledgement

The following Transportation Assessment and Management Study (TAMS) was initially prepared by Bunt and Associates Engineering Ltd. (Bunt). Further, CTS was retained by Wesgroup Properties (Wesgroup) to update Bunt's report with the latest project information as provided by Wesgroup.

To that end, CTS has maintained much of Bunt's layout and text with CTS updating the necessary text, figures and tables where appropriately informed by the latest project information.

CTS therefore acknowledges BUNT's initial contribution to the report, including specifically where their text, figures and tables were maintained.

1.2 Background

Wesgroup Properties (Wesgroup) is proposing to construct a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at the southwest corner of Oak Street and W 41st Avenue in Vancouver, BC. Copies of the architectural plans are included as **APPENDIX A**.

As part of the project approvals process, the City of Vancouver has requested that a TAMS be prepared in support of the application. In response to this request, Wesgroup retained Bunt and Associates Engineering Ltd. (Bunt) to conduct the TAMS, which includes an assessment of the development's traffic impact, a parking and loading supply analysis, a Transportation Demand Management (TDM) overview, and a site design review related to vehicle maneuvering in and around the site.

The key findings and recommendations from this assessment are documented in the following report.

1.2 Study Scope and Area

1.2.1 Study Scope

To determine the study scope, Bunt consulted with the City's Engineering Department. Bunt first issued a proposed Terms of Reference (ToR) document on June 19, 2020 and issued a subsequent update to the ToR, which sought to amend the extent of the traffic operations assessment, on July 22, 2020.

A formal response regarding the ToR was received from the City on July 30, 2020. The key item agreed with the City was that a simplified TAMS with limited traffic analysis would be generally acceptable and a detailed operational assessment would not be required.

1.2.2 Site Location and Study Area

The development site is located at 1008 West 41st Avenue in Vancouver, BC, at the southwest corner of the West 41st Avenue and Oak Street intersection. The site is bounded by West 41st Avenue to the north, West 42nd Avenue to the south, Oak Street to the east and a lane to the west. The subject site is located along the western edge of the City of Vancouver's Cambie Corridor study area boundary.

Today, this site is occupied by a community garden and a 2-storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

The study area is consistent with other similar-scale projects undertaken in the area by Bunt, focusing on the weekday morning and afternoon peak hours at the following locations:

- W 41st Avenue and Oak Street
- W 42nd Avenue and Oak Street
- W 43rd Avenue and Oak Street
- W 41st Avenue and N-S Lane
- W 42nd Avenue and N-S Lane
- W 43rd Avenue and N-S Lane

The site location and the study area are illustrated by **FIGURE 1**.

FIGURE 1
SITE LOCATION AND STUDY AREA



1.3 Organization of Report

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

- **Section 1** presents the study background, study area, study scope, existing area context, relevant municipal policies, and details of the proposed development.
- **Section 2** estimates the site trip generation for the proposed development and discusses its effect on the adjacent road network.
- **Section 3** includes a parking assessment for the development, comparing the proposed supply to the supply required by the City of Vancouver.
- **Section 4** provides a design review of the transportation-related components of the development including the site access driveways, parkade access, loading access, and waste collection facilities.
- **Section 5** provides the summary and recommendations of the study based on Bunt's analysis.

1.4 Existing Conditions

Ample pedestrian amenities are located nearby including numerous restaurants, retail services, and parks i.e. Montgomery Park. The site is also well served by cycling connections such as painted on-street cycle lanes along West 41st Avenue to the east of Oak Street and a designated east-west cycling corridor along West 37th Avenue to the north.

The development site is also well-connected to transit with frequent bus routes located along both West 41st Avenue and Oak Street, and the Oakridge - 41st Street Canada Line SkyTrain station located approximately 800m to the east.

In January 2020, the R4 RapidBus was introduced to the 41st Avenue corridor. The 41st Avenue R4 RapidBus service connects UBC, the Canada Line, and the Expo Line with fast, frequent, and reliable transit service. The 41st Avenue corridor is the second busiest bus corridor in the region after Broadway, serving more than 11 million trips per year. During the weekday peak periods, the R4 RapidBus serves stops within the vicinity of the site with a frequency of 3-6 minutes, providing regular connections to the Oakridge -41st Street Canada Line SkyTrain station.

1.5 Cambie Corridor Plan

The Cambie Corridor has been undergoing major transformation since the Canada Line opened in 2009. Phases 1 and 2 have led to significant residential development along Cambie Street and connecting arterials. Phase 3 of the Plan is now included (2018) and addresses areas off the arterials and a new Municipal Town Centre. The plan extends from Oak Street to the west and Ontario Street to the east and is therefore a consideration in this report.

The site is located within the Oakridge Municipal Town Centre neighbourhood of the Cambie Corridor and is discussed within Section 4.3 of the plan. The following comments set out the plan for the 41st Avenue arterial:

"*Along 41st Avenue, new residential and mixed-use buildings will offer opportunities for enhancing the public realm with wide green setbacks and additional landscaping."*

Section 8 sets out plans for "*Transportation and Mobility"* along the corridor. Along Oak Street, crossing improvements are planned at regular intervals along the north-south corridor, while "*complete street improvements*" are planned to span the length of 41st Avenue, including improvements to all transportation modes.

As highlighted within the plan, the City has plans to signalize (pedestrian activated or full traffic signal) the existing West 43rd Avenue and Oak Street intersection to the south of the site. This is shown in Figure 8.3 of the plan and is discussed later within this report.

In addition to the "*complete street improvements*," and beyond the scope of the Cambie Corridor Plan, Figure 8.3 identifies proposed walking and cycling improvements along West 41st Avenue, west of its intersection with Oak Street. These include the R4 RapidBus service and cycling infrastructure improvements that have already been implemented, as discussed above.

Section 8.7 of the plan discusses the Parking Strategy for the Oakridge Municipal Town Centre neighbourhood, as well as Transportation Demand Management (TDM) programs. With regards to TDM, the following guidance is provided:

"*[TDM] programs encourage reduced driving, and thus parking demand. They employ multiple strategies that are complementary and coordinated, and typically include initiatives to expand travel choice as well as incentives to reduce vehicle travel. Programming should be reviewed on a regular basis to ensure implementation tools are effective and are responsive to dynamic local conditions*."

Shared parking is also discussed as a strategy:

"Given the amount and variety of vehicle parking demand in the area, an overarching parking strategy for the MTC is to approach parking as a shared resource […] To help minimize the amount of parking required for the entire area, the shared use of parking spaces should be considered in a manner that does not encourage or require increased vehicle use. Sharing parking between different developments will require further work from the City and the development community to implement in the shorter term but offers the opportunity to make the best use of an expensive resource."

1.6 Proposed Development

The proposed development includes the construction of a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at the southwest corner of Oak Street and West 41st Avenue. The proposed land uses are summarized by **TABLE 1**.

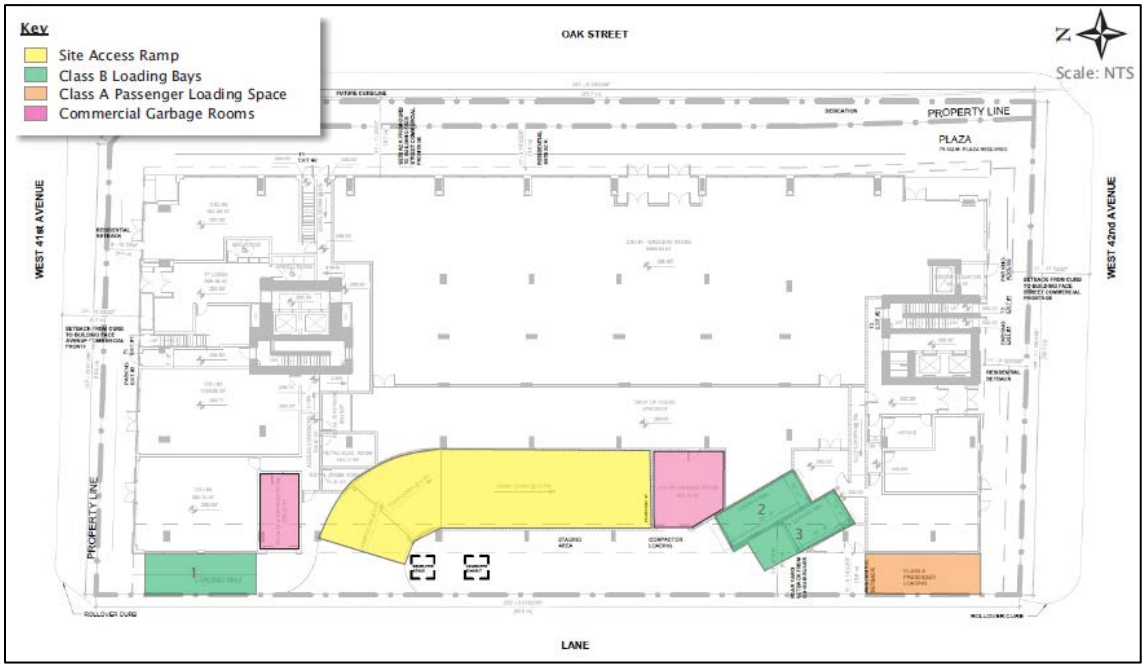
TABLE 1
PROPOSED LAND USES

Land Use	Density (m2)	Units
Residential (Rental)	15,451	222
Commercial (Standard Retail)	292	-
Commercial (Grocery Retail)	1,317	-

Currently, this site is occupied by a community garden and a 2 -storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

Vehicle access to the development is proposed to be from the rear lane which runs parallel to Oak Street, connecting to West 41st Avenue to the north and West 42nd Avenue to the south. The proposed site plan is illustrated by **FIGURE 2**.

FIGURE 2
SITE PLAN



1.7 Vehicular Access

Vehicle access to the site is planned from the lane at the rear of the site. In order for vehicles to travel to/from the lane via Oak Street, drivers are restricted to right-in/out movements at the West 42nd Avenue and Oak Street intersection, which is enforced by a median in the centre of the Oak Street roadway. The West 41st Avenue and rear lane intersection to the north is also restricted to right-in/out movements. Given the location and angled alignment of the proposed loading bays, Wesgroup intends to route all servicing and private garbage collection vehicles in a northbound direction along the lane, entering from either West 42nd Avenue or West 43rd Avenue and exiting onto West 41st Avenue.

Drivers intending to perform left-in/out movements to and from Oak Street would have to travel via West 43rd Avenue, which is currently a two-way stop-controlled intersection.

As mentioned previously, the City has future plans to install a pedestrian-actuated traffic signal at the West 43rd Avenue and Oak Street intersection as part of the Cambie Corridor Plan.

Although not forming part of the Rezoning Application at this time, Bunt previously explored opportunities for providing a left-in movement at the West 42nd Avenue and Oak Street intersection.

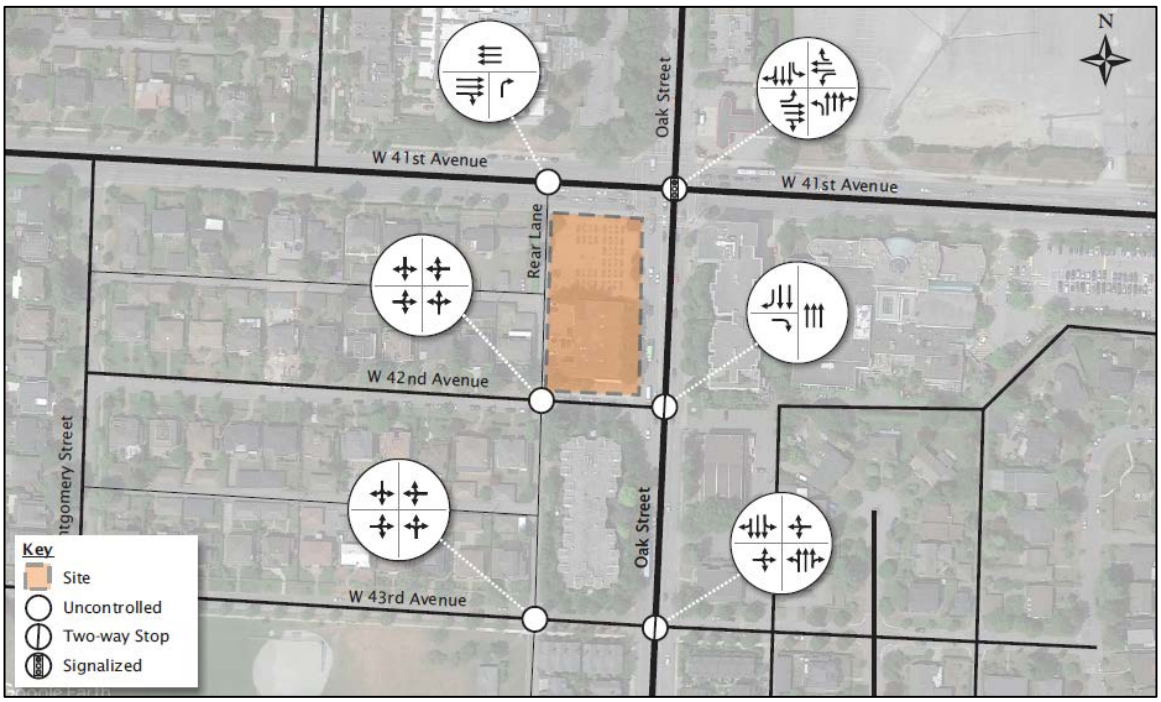
The merits of this option were previously considered by Bunt and include the creation of additional routing choices that would be made available to both site traffic and nearby residents, the introduction of a second controlled pedestrian crossing in the area, and the enabling of easier truck turning movements.

However, from a transportation perspective, there are also several challenges associated with this option including breaking the existing median and creating a left-turn storage lane, which would require additional road width which may not be readily available.

Wesgroup would be open to exploring the option of providing a left -in from Oak Street should the City find this to be an acceptable arrangement.

FIGURE 3 illustrates the existing laning and traffic control for the agreed study area road network.

FIGURE 3
LANING CONFIGURATION AND TRAFFIC CONTROL



2.0 TRAFFIC IMPACT ASSESSMENT

2.1 Traffic Forcasts

2.1.1 Trip Generation and Net Traffic Impact

As part of this simplified TAMS report, the effects of the proposed development on the transportation system have been analyzed in order to determine if adequate transportation infrastructure exist to serve the proposed development and to clearly identify any capital improvements required to mitigate the impacts on the transportation system.

As there are existing uses operating on the site today and the site is being redeveloped, this assessment compares vehicle trips estimated to be generated by both the existing uses and the proposed development to approximate the net new trips generated as a result of redeveloping the site. The critical time periods for the existing (commercial) and proposed uses (residential and commercial) would typically follow the standard commuter periods, i.e. the weekday AM and PM peak hours.

Existing Vehicle Trip Generation

For previous work conducted on the subject site, Bunt collected count data of on-site and on-street parking associated with the exiting commercial premises. This data was collected on September 28, 2017 (Thursday) at two locations during the weekday AM and PM peak hour. The count locations included on-street parking along Oak Street immediately adjacent to the commercial site frontage, which can accommodate approximately 5-6 vehicles, as well as the rear parking lot accessed from the north-south lane, which has 16 parking spaces.

While the lane parking lot is reserved for patrons of the commercial premises, it is acknowledged that the on-street parking is available to all users. However, it is assumed that the majority of users are visiting the various uses located within the existing site that include a BMO bank, pharmacy, delicatessen, and insurance broker.

The inbound and outbound vehicle trips recorded at these two locations during the weekday peak hours are summarized below in **TABLE 2**.

TABLE 2
OBSERVED EXISTING SITE GENERATED VEHICLE TRIPS

COUNT LOCATIONS	AM PEAK			PM PEAK		
	INBOUND	OUTBOUND	TWO-WAY	INBOUND	OUTBOUND	TWO-WAY
On-street	3	4	7	27	24	51
Rear Parking Lot	4	1	5	20	16	36
TOTAL	7	5	12	47	40	87

The surveys indicate that the existing commercial premises generate approximately 12 two-way vehicle trips and 87 two-way vehicle trips during the AM and PM peak hours, respectively.

Even if it is considered that a portion of the observed on-street parking was not associated with the commercial premises but was instead parking to visit other local destinations, it should be acknowledged that the existing site would not generate an insignificant volume of vehicular traffic.

Proposed Vehicle Trip Generation

A trip generation analysis for the proposed development was conducted to determine the net increase in vehicle trips. **TABLE 3** presents the vehicle trip rates and the corresponding future site- generated vehicle trips. The trips rates used were taken from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*.

TABLE 3
FUTURE SITE GENERATED TRIP RATES AND VEHICLE TRIPS

Land Use		Peak Hour	Trip Generation Variable	Scope of Development	Vehicle Trip Generation Rate	Trip Rate Source	Directional Split		Peak Hour Volumes (vph)		
							% in	% out	in	out	total
Residential	Mid-Rise Residential with 1st-Floor Commercial	Weekday Morning	Dwelling Units	222	0.3	ITE 10th Edition Code 231	28%	72%	19	48	67
		Weekday Afternoon			0.36		70%	30%	56	24	80

The key findings from **TABLE 3** are that the proposed development will contribute a total of 67 vehicle trip during the weekday AM Peak Hour and 80 vehicle trips during the weekday PM Peak Hour. This translates to approximately 1 and 1.3 vehicles per minute during the weekday morning and afternoon peak hour respectively.

An ITE best practice is that a Transportation Impact Study be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the adjacent roadway peak hours or the development's peak hour. This site trip generation threshold is appropriate for the following reasons:

- 100 vehicles per hour (vph) is a magnitude that can change the level of service of an intersection approach; and
- Left- or right-turn lanes may be needed to satisfactorily accommodate site traffic without adversely impacting through (non-site) traffic.

The net (new) vehicle trips are set out in **TABLE 4** below and have been calculated by subtracting the existing trip generation of the site from the estimated trip generation for the proposed development.

TABLE 4
NET (NEW) VEHICLE TRIP GENERATION COMPARISON

	AM PEAK			PM PEAK		
	INBOUND	OUTBOUND	TWO-WAY	INBOUND	OUTBOUND	TWO-WAY
Existing Uses	7	5	12	47	40	87
Proposed Uses	19	48	67	56	24	80
Net Difference	**+12**	**+43**	**+55**	**+9**	**-16**	**-7**

It can be seen that the potential net vehicle trip generation of the site is well below the generally accepted threshold of 100 or more added (new) peak direction trips. In fact, the proposed development results in a net decrease in vehicle trips during the PM Peak Hour.

To further support this, it is acknowledged that “internal capture” trips associated with a mixed-use development would result in a further reduction of the trip generation of the proposed uses. Internal capture trips are those that occur at mixed-use sites given the interaction among the multiple land uses, particularly where there the trips can be made by walking. The occurrence of these shared trips result in the total generation of external vehicle trips (that is, those entering and exiting the overall site) to be less than the simple sum of the trips generated by each discrete land use.

Consequently, a capacity analysis is not warranted and has therefore not been included in the TAMS.

3.0 PARKING AND LOADING SUPPLY REVIEW

3.1 Vehicle Parking Supply

The required off-street parking supply was calculated based on the City of Vancouver Parking Bylaw. When calculating the total requirement, reductions to the base requirement were applied based on Transit Accessibility reductions only.

3.1.1 Transit Accessibility

As outlined in the City of Vancouver's *Transportation Demand Management for Developments in Vancouver* document, a development can obtain a scaled parking reduction based on the site's proximity to transit. The proposed development is located within Level "A" Transit Accessibility as summarized below:

Level A Definition:

Within:

- 100m walking distance of any one existing FTN route, including B-line stops, or,
- 200m walking distance of any intersection of two existing FTN routes, including B-line stops only; or,
- 400m walking distance of a SkyTrain station.

Given that the site is located within 100m of bus stops at the Oak Street and West 41st Avenue intersection which are served by a number of FTN services, including the R4 RapidBus (introduced as a replacement for the previous B-line services), the site qualifies for Level "A" Transit Accessibility reductions from the base parking rates. These reductions include a 20% reduction for the rental residential use and a 10% reduction for the commercial uses.

Further to the above, the City provides additional guidelines on transit accessibility reductions for developments that satisfy the criteria outlined within the Moderate Income Rental Household Pilot Program (MIRHPP) document. For developments where 100% of the residential floor area is secured rental housing and at least 20% of the residential floor area that is counted in the calculation of floor space ratio is made available to moderate income households, additional parking bylaw reductions can be applied.

The proposed development will satisfy this requirement, ensuring that a minimum of 20% of the residential floor area is available to moderate income households. On this basis, Section 3d of the MIRHPP document states that, "*For sites with Transit Accessibility Level A, the minimum parking requirement can be reduced by an additional 10%*".

It is understood that this additional reduction is applicable only to the portion of the building available to moderate income households (20%) and has therefore been applied in this manner in the calculations below.

3.1.2 Transportation Demand Management

In 2019, the City of Vancouver developed a TDM policy using a framework modelled on a "points menu". As the site is not located Downtown and is not defined as a 'large site' (total site size of 8,000 m2 or 45,000 m2 of new floor area) a TDM Plan is not mandatory. No TDM reductions have been applied in the following calculations.

3.1.3 Accessible Parking Spaces

According to the City of Vancouver's Parking Bylaw, the number of required accessible parking spaces is based on the following:

- Multiple dwelling or live-work use: there must be at least one accessible parking space for each building that contains at least seven residential units and an additional 0.034 space for each additional dwelling unit.
- Non-residential uses, there must be at least one accessible parking space for each building that contains at least 500 m2 of gross floor area and an additional 0.4 parking space for each 1,000 m2 of gross floor area.

With 222 residential units and 1,609 m2 of commercial GFA, 8 residential accessible spaces and 1 commercial accessible space would be required.

3.1.4 Adjusted Parking Supply Requirement

Applying the Transit Accessibility reduction to the base off-street parking requirements, the adjusted total parking requirement is summarized in **TABLE 5**.

TABLE 5
PARKING SUPPLY REQUIREMENT

TYPE	UNIT TYPE	QTY	REF.	BYLAW RATE	REQ'D (STALLS)	TOTAL REDUCTION % APPLIED	ADJ'D REQ'D (STALLS)	ACC. (STALLS)	PHYSICAL REQ. (STALLS)
Residential (Market Rental)	ALL	12361 sqm (FSR)	Bylaw 4.5.B1	1 space per 125 sqm	19	20%	79	8	89
Residential (MIRHPP)	ALL	3090 sqm (FSR)	Bylaw 4.5.B1	1 space per 125 sqm	25	30%	18		
Residential (Visitor)	ALL	222 Units	Bylaw 4.1.16	0.05 spaces per unit	11	-	11	0	11
Residental Sub-Total					135		108	8	100
Commercial (Standard)	N/A	292 sqm (FSR)	Bylaw 4.2.5.1	1 per 100sqm up to 300sqm, 1 per each additional 50sqm of GFA	3	10%	3	1	51
Commercial (Grocery)	N/A	1317 sqm (FSR)	Bylaw 4.2.5.3	1 per 100sqm up to 300sqm, 1 per each additional 20sqm of GFA	54	10%	49		
Commercial Sub-Total					57		52	1	51
Total					**192**		**160**	**9**	**151**

After applying the Transit Accessibility reduction, the total off-street parking requirement for the development is 160 parking spaces, including 108 residential spaces and 52 commercial spaces.

The parking provision for the development is 151 parking spaces, including 100 residential spaces and 51 commercial spaces. Accounting for accessible parking space incentives i.e. each accessible space counts as two spaces, the parking provision is 151 parking spaces. The developer intends to provide 203 parking spaces, which would exceed the minimum requirement.

3.1.5 Vehicle Parking Summary

The proposed vehicle parking provision will exceed the minimum requirement by providing a total of 203 parking spaces, as outlined in **TABLE 6** below.

TABLE 6
PROPOSED PARKING SUPPLY BY PARKING SPACE TYPE

Land Use	Standard	Small	Accessible	Total (Physical)	Total (Equivalent)
Residential	118	16	8	141	149
Residential Visitor	6	5	0	11	11
Commercial	43	7	1	51	52
Total	**167**	**28**	**9**	**203**	**212**

A maximum of 25% of the total parking required may be allocated as small car spaces. With a requirement of 151 spaces (after adjustments) from **TABLE 5**, a maximum of 38 small car spaces could be provided. The developer proposes to provide 28 small car spaces which falls within the maximum allowance.

3.2 Passenger Vehicle Space

TABLE 7 summarizes the Class A passenger vehicle space requirement and proposed supply for the development. As defined in the City's Parking Bylaw, a Class A passenger vehicle space is a designated space, clear of any driving or maneuvering aisles or means or emergency egress, for loading passengers to or from an automobile.

TABLE 7
PASSENGER VEHICLE SPACE BYLAW REQUIREMENT AND PROVISION

Land Use	Size	Bylaw Rate	Bylaw Supply Req'd (Spaces)	Provided (Spaces)	Difference (Spaces)
Residential	222 Units	Class A: A minimum of one spacefor any development with 50 to 125 dwelling units, plus onespace for every additional 150 dwelling units.	Class A: 2	Class A: 2	Class A: 0
Commercial	1609 sqm	Class A: A minimum of one spacefor each 4000 sqm of GFA	Class A: 0	Class A: 0	Class A: 0
		Total	**Class A: 2**	**Class A: 2**	**Class A: 0**

The City's Parking Bylaw requires that two Class A passenger spaces be provided for the residential use. The developer proposes to provide two Class A passenger spaces, meeting the City's bylaw requirement. Of these spaces, one will be provided at-grade to the east of the lane as a parallel space, just north of the West 42nd Avenue and rear lane intersection, and the second passenger space will be provided on Level P1.

The passenger loading space provided at Level P1 is proposed with a length of 5.5m and a width of 4m, meeting the Bylaw requirements for the first passenger space to meet these dimensions i.e. a wider width. The parallel passenger space provided at-grade meets the requirement for a minimum length of 6m and has a width of 3.6m.

3.3 Bicycle Parking

Well managed, secure, accessible and covered bicycle parking will be provided as part of the development plan. **TABLE 8** summarizes the Class A and Class B bicycle parking requirement for the development.

Note that Class A spaces are secure long-term parking that protect against and from inclement weather, whereas Class B spaces are for short-term "visitor" parking.

TABLE 8
BICYCLE PARKING SUPPLY REQUIREMENT

Land Use	Unit Size	Quantity	Bylaw Rate		Bylaw Requirement		Proposed	
			Long Term (Class A)	Short Term (Class B)	Long Term (Class A)	Short Term (Class B)	Long Term (Class A)	Short Term (Class B)
Residential	Less than 65 sqm	136 units	1.5 spaces per unit for unit < 65 sqm	2 spaces for 20 units, plus 1 space for each additional 20 units	204	12	468	13
	Between 65 sqm and 105 sqm	86 units	2.5 spaces per unit for unit between 65 sqm and 105 sqm		215			
	Greater than 105 sqm	0 units	3 spaces per unit for unit > 105 sqm		0			
Commercial	-	1609 sqm (FSR)	1 space per 340 sqm	A min. of 6 spaces	5	6	5	6
Total					**424**	**18**	**473**	**19**

As the table indicates, the development requires 442 bicycle spaces, including 424 Class A spaces and 18 Class B spaces. The proposed bicycle parking supply exceeds these requirements by providing 473 Class A spaces (+49 spaces) and 19 Class B spaces (+1 space).

3.4 Loading

TABLE 9 summarizes the proposed off-street loading supply for the development in comparison to the City of Vancouver's Parking Bylaw minimum requirement.

TABLE 9
LOADING SPACE BYLAW REQUIREMENT AND PROVISION

Land Use	Size	Bylaw Rate	Bylaw Supply Req'd (Spaces)	Provided (Spaces)	Difference (Spaces)
Residential	222 Units	Class B: At least ones pace for 100 to 299 dwelling units	Class B: 1	Class B: 3	Class B: 0
Commercial	1609 sqm	Class B: No requirement for less than 100 sqm of GFA. A minimum of one space for the first 465 sqm of GFA plus one space for any portion of the next 1,860 sqm and one additional space for each additional 2,325 sqm.	Class B: 2		
		Total	**Class B: 3**	**Class B: 3**	**Class B: 0**

The City's Bylaw requires that three Class B loading spaces be provided to support the proposed development. The developer plans to provide a total of three Class B loading spaces, meeting the minimum bylaw requirement.

All loading bays will be accessed at-grade from the rear lane. One of the loading bays will provided as a layby at the northern end of the lane, while the remaining two bays will be angled with vehicles backing up to a dedicated loading area to the rear.

Manoeuvring for loading access will be discussed within Section 4 of this report.

3.4.1 Loading Management Plan

Wesgroup intends to share the use of the proposed loading bays between the commercial and residential uses as appropriate. Of the angled loading bays, the one adjacent to the CRU#1 garbage room will be for dedicated commercial use, while the remaining two will be shared by the residential and commercial uses. This is considered an appropriate arrangement given the separation of the site into two distinct cores, with each core occupied by both residential and commercial components. This arrangement will also

prevent the need for trolleying goods across the length of the lane, reducing the risk of conflict with passenger vehicles and pedestrians/cyclists.

To facilitate management for the use of the on-site loading facilities, an online scheduling tool will be made available to the future residents/tenants to book loading facilities for their deliveries. This online scheduling tool will be managed by the designated (building operator) and they will also use it to manage any scheduling changes or conflicts that may arise.

The designated operator will be responsible for entering and managing all loading activities for the building and the only one who can edit the calendar which would be made available in view format only to residents/tenants. Tenants who wish to schedule deliveries would make their request through the online scheduling tool of which the designated building operator staff would then confirm if the timeslot is available.

Residents/tenants should notify of any changes to the loading schedule immediately to the designated operator in advance of the schedule for the upcoming week if possible. If scheduling conflicts arise, these must be addressed in advance with the designated staff member to avoid issues "on the ground." Any other issues related to loading or scheduling e.g. unscheduled deliveries, schedule delays, are to be brought to the attention of the designated operator via the contact information noted on the web site. Contact information of the designated operator will also be posted and updated regularly at visible locations within the loading facility.

Compliance to the loading management and communication protocol will be mandatory to all residents/tenants of the building. The designated operator will make every effort to record any person who violates the procedures, outlined in the Loading Management Plan, and notify them of the violation.

Vehicles loading illegally on the City's property will be outside of the scope of the building operator's responsibilities. The designated operator will take a note of the information and share with residents/tenants. This information may also be shared with the appropriate authorities, who regulate curb space and/or lane use, for them to take further action such as issuing tickets as appropriate.

4.0 SITE PLAN DESIGN REVIEW

This section provides a design review of the transportation-related components of the development including the site access driveways, parkade access, loading access, and waste collection facilities. Given the high number of vehicle swept path diagrams required for the analysis, all exhibits described in this section are contained within **APPENDIX B** in order to keep the report within a reasonable length.

4.1 On-Site Vehicle Circulation

4.1.1 Site Access

As **DRAWING 1** indicates, residents and visitors of the site would enter and exit the site via the lane driveway to the west of the site. This driveway connects with the parkade ramp, which has a slope of 12.5% leading down to Level P1.

As shown, the site access design allows for concurrent passenger vehicle movements at the ramp entrance as well as along the ramp itself.

4.1.2 Parkade Circulation

DRAWING 2 demonstrates passenger vehicle circulation at the key corners within Level P1 where the most vehicle interaction is likely to occur. A corner cut enables concurrent vehicle paths at the first turn, while a convex mirror is recommended at the second corner to assist with simultaneous inbound/outbound manoeuvring. This analysis shows that no manoeuvring issues are anticipated.

4.2 Passenger Loading

DRAWING 3 demonstrates the use of the at-grade passenger loading space provided to the east of the lane. As the exhibits indicates, no manoeuvring issues are anticipated.

4.3 Service Vehicle Operations

4.3.1 Loading

Explained in further detail within Section 3 of this report, the City's Bylaw requires that three Class B loading spaces be provided for the development; two for the commercial uses and one for the residential use. The developer plans to provide a total of three loading bays, meeting the requirement.

Given the location and angled alignment of the proposed loading bays, the developer intends to route all servicing and private waste collection vehicles in a northbound direction along the lane, entering from either West 42nd Avenue or West 43rd Avenue and exiting with a right-turn onto West 41st Avenue.

DRAWING 4 illustrates a standard SU9 design vehicle entering the lane from the south and departing to the north. To accommodate turning manoeuvres for an SU9 vehicle, it is recommended that alterations are made to the existing curb northeast of the West 42nd Avenue and rear lane intersection and also east of the lane at its intersection with West 41st Avenue. The AutoTURN analysis shows that the SU9 design vehicle would roll over the existing curbs and it is recommended that these are converted to rollover curbs.

DRAWING 5A and **DRAWING 5B** show the SU9 design vehicle manoeuvring in and out of the three Class B loading bays. As the exhibits indicate, the SU9 design vehicle would be able to successfully enter and exit the loading bays without any manoeuvring issues.

4.3.2 Waste Collection

Commercial Waste Collection

The garbage and recycling bins for the commercial component of the development are planned to be located in two garbage rooms located at-grade off the rear lane, with the first situated adjacent to the northern Class B loading space and the second provided immediately north of the angled Class B loading bays.

For CRUs #2-4 (north garbage room), the development plans to use traditional full-size waste bins and totes. For collection, a waste collection vehicle would enter the lane from the south and then momentarily stop in the lane adjacent to the garbage room. The waste containers would then be wheeled out from the garbage room and their contents dumped into the waste collection vehicle. Once the containers have been emptied, they would be wheeled back to the garbage room and the waste collection vehicle would then exit via West 41st Avenue.

For CRU #1 (south garbage room), the recycling and organic waste would be collected in the same manner as for the other CRUs, i.e. using traditional bins and totes. However, for garbage collection, the development plans to use a low-profile compactor. For collection, a garbage compactor truck would enter the lane, reverse itself in line with the compactor, attach the compactor onto its back, and then take the compactor off-site to be emptied. Once emptied, the compactor truck would return to the site to drop off the empty compactor to the garbage room.

DRAWING 6 and **DRAWING 7** show the vehicle swept paths of an MSU design vehicle entering the lane from the south and departing to the north, as well as the collection manoeuvres. The MSU is intended to simulate a garbage or recycling truck.

DRAWING 8 shows the entering and exiting movements of the compactor truck. The analysis shows the manoeuvring for both vehicles would occur without any issues.

Residential Waste Collection

The garbage and recycling for the residential component of the development are planned to be located in a garbage room situated at the bottom of the ramp access on Level P1.

Garbage Collection

Similar to CRU #1, for residential garbage, the development plans to use a low-profile compactor rather than a traditional garbage container. For collection, a garbage compactor truck would enter the underground parking, attach the compactor onto its back, and then take the compactor off-site to be emptied. Once emptied, the garbage compactor truck would return to the site to drop off the empty compactor to the garbage room.

DRAWING 9 shows the entering and exiting manoeuvres of the garbage compactor truck. As the exhibits indicate, no manoeuvring issues are anticipated.

Recycling and Organic Waste Collection

In terms of residential recycling and organic waste, the development plans to use traditional full-size waste bins and totes. In terms of collection, a small jitney truck would access the parkade, attach the bins or totes to its back, and then leave the containers at the surface level in the staging area located north of the south garbage room. Within the P1 garbage room, the containers would be situated immediately next to the compactor, and therefore a very similar turning path for the garbage pickup would be followed.

The full set of manoeuvres at Levels L1 and P1 can be seen in **DRAWING 10** and **DRAWING 11**. As such, no manoeuvring issues are anticipated for the recycling container collection.

5.0 SUMMARY AND RECOMMENDATIONS

5.1 Summary

Wesgroup is proposing to construct a 16-storey and 8-storey secured market rental building with 222 units and ground floor retail at 1008 West 41st Avenue situated in the southwest corner of Oak Street and West 41st Avenue in Vancouver, BC.

The site is bounded by West 41st Avenue to the north, West 42nd Avenue to the south, Oak Street to the east and a lane to the west. The subject site is located along the western edge of the City of Vancouver's Cambie Corridor study area boundary.

Today, this site is occupied by community garden and a 2-storey commercial building that comprises a variety of uses including a pharmacy, delicatessen, and insurance broker on the ground floor and office space above. These uses would be demolished prior to construction.

The development site is also well-connected to transit with frequent bus routes, including the R4 RapidBus introduced in early 2020, located along both West 41st Avenue and Oak Street, and the Oakridge – 41st Street Canada Line SkyTrain station located approximately 800m to the east. The site is also well served by pedestrian and cycling connections.

Vehicle access to the site is planned from the lane at the rear of the site. In order for vehicles to travel to/from the lane via Oak Street, drivers are restricted to right-in/out movements at the West 42nd Avenue and Oak Street intersection, which is enforced by a median to the centre of the Oak Street road way. The West 41st Avenue and rear lane intersection to the north is also restricted to right -in/out movements. Given the location and angled alignment of the proposed loading bays, Wesgroup intends to route all servicing and private garbage collection vehicles in a northbound direction along the lane, entering from either W 42nd Avenue or W 43rd Avenue and exiting onto W 41st Avenue.

Drivers intending to perform left-in/out movements to and from Oak Street would have to travel via West 43rd Avenue, which is currently a two-way stop-controlled intersection. Noting the location of the site within the Oakridge Municipal Town Centre neighbourhood of the Cambie Corridor, it is understood that the City has future plans to signalize (pedestrian activated or full) the existing West 43rd Avenue and Oak Street intersection to the south of the site.

Although not forming part of the Rezoning Application at this time, Bunt has previously explored opportunities for providing a left-in movement at the West 42nd Avenue and Oak Street intersection. Wesgroup would be open to exploring the option of providing a left-in from Oak Street should the City find this to be an acceptable arrangement.

The net (new) vehicle trip generation of the site is anticipated to be an increase of 55 vehicle trips (+12 entering, +43 exiting) during the weekday AM peak hour and a decrease of 7 vehicle trips (+9 entering, -16 exiting) during the weekday PM peak hour, neither of which break the generally accepted threshold of 100 or more added (new) peak direction

trips. Consequently, a capacity analysis is not warranted and has therefore not been included in the TAMS. This was agreed with the City as part of the ToR.

Three levels of underground parking are proposed, accessed via a single two-way ramp on the north-south back lane. CoV bylaw requirements have been calculated at a minimum of 160 parking spaces, inclusive of 11 visitor parking spaces. When taking into account the "2 for 1" accessible space credit, this translates to 151 physical spaces. The developer intends to provide 203 parking spaces, which would exceed the minimum requirement.

A further two Class A passenger spaces are also required in addition to 424 Class A (long-term) and 18 Class B (short-term) bicycle parking spaces. The passenger space requirements will be met, while the bicycle parking requirements will be exceeded with a provision of 473 Class A and 19 Class B bicycle parking spaces proposed.

The City's Bylaw requires that three Class B loading spaces be provided to support the proposed development. The developer plans meet this requirement.

All three loading bays will be accessed at-grade from the rear lane. One Class B loading bay will be provided in the form of a layby, while the remaining two bays will be angled with vehicles backing up to a dedicated loading area to the rear.

Wesgroup intends to share the use of the proposed loading bays between the commercial and residential uses as appropriate. Of the angled loading bays, the one adjacent to the garbage room will be for dedicated commercial use, while the remaining two will be shared by the residential and commercial uses. This is considered an appropriate arrangement given the separation of the site into two distinct cores, both with a mix of residential and commercial components.

The site design review shows that mountable curbs or a change to the curb radii would be required at both the West 41st Avenue and rear lane and West 42nd Avenue and rear lane intersections to accommodate manoeuvres associated with larger servicing/delivery and garbage collection vehicles. The analysis indicated that all other loading and waste collection vehicle manoeuvres could be achieved without any operational issues.

6.0 RECOMMENDATIONS

Based on the preceding study, the following is recommended:

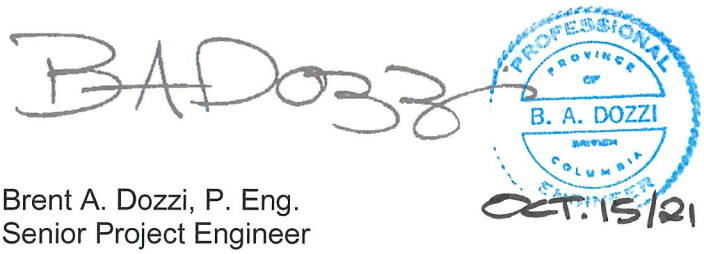
1. Given both sites modest contribution to vehicle traffic at the six study area intersections and that the developments do not cause the intersections to exceed performance thresholds, no operational improvements are recommended to facilitate the proposed development.

2. Install rollover curbs at both the West 41st Avenue and rear lane and West 42nd Avenue and rear lane intersections to accommodate maneuvers associated with larger servicing/delivery and garbage collection vehicles.

Please call the undersigned should there be questions and/or comments relating to this letter and its contents.

Yours truly,

CREATIVE TRANSPORTATION SOLUTIONS LTD.
PERMIT TO PRACTICE NO: 1000697

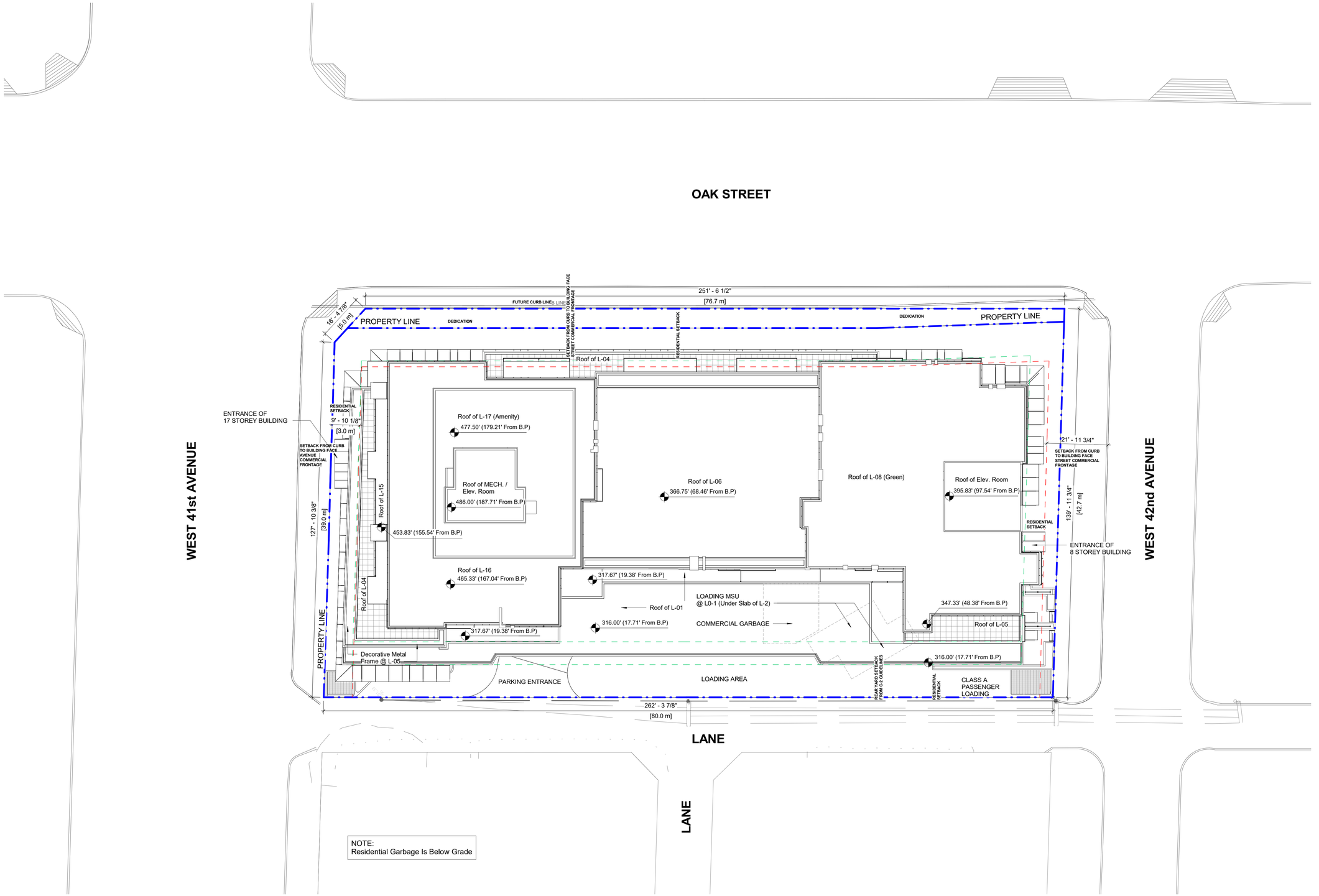


Brent A. Dozzi, P. Eng.
Senior Project Engineer

Phone: (604) 936-6190 x237
Email: bdozzi@cts-bc.com

APPENDICES

APPENDIX A
Site Plan



1 / A-1.00 SITE PLAN
SCALE: 1/16" = 1'-0"

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wesgroup

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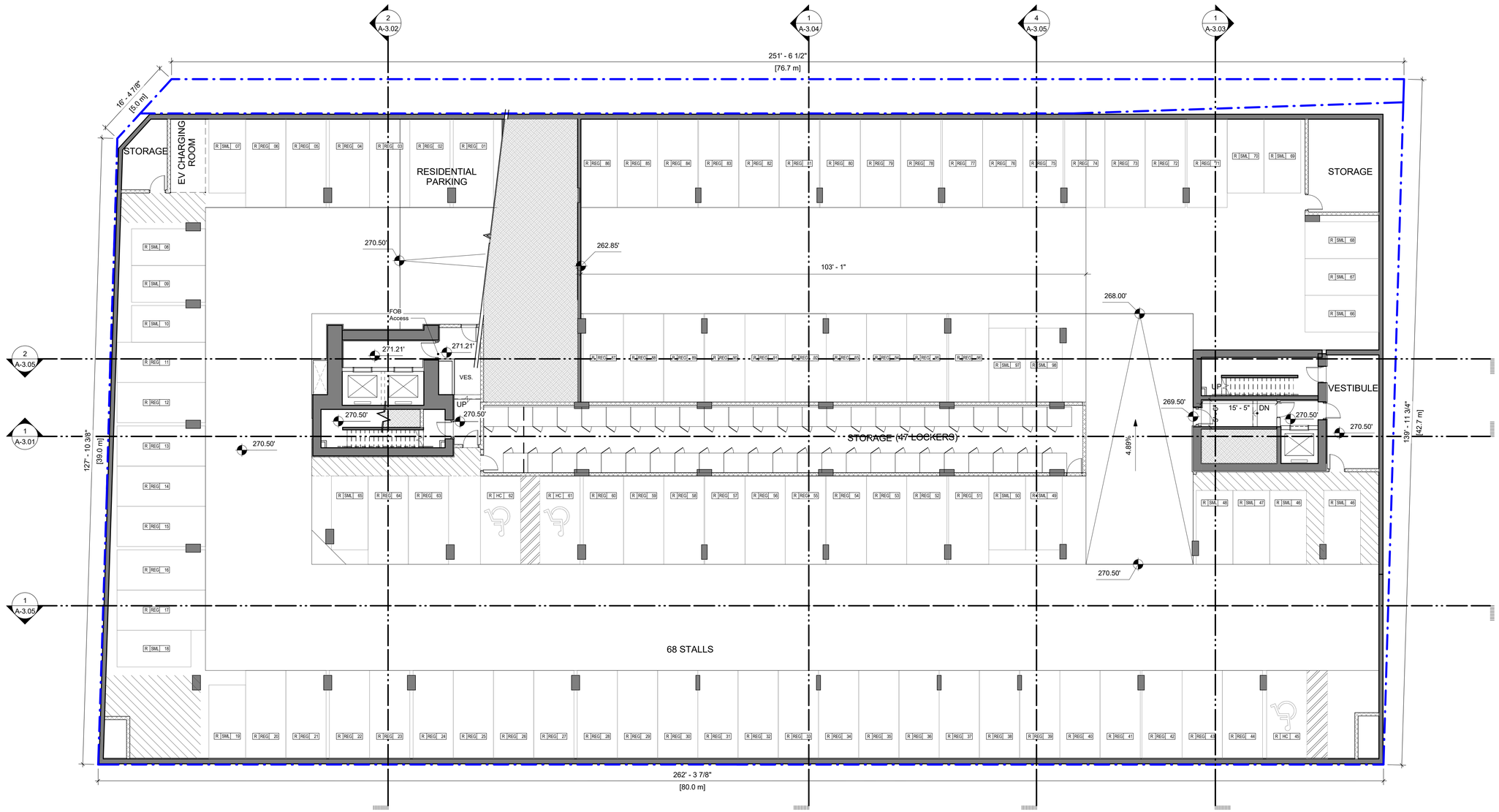
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A-1.00

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1 A-1.01 OVERALL PLAN- LEVEL P3

SCALE: 3/32" = 1'-0"

True North | Project North

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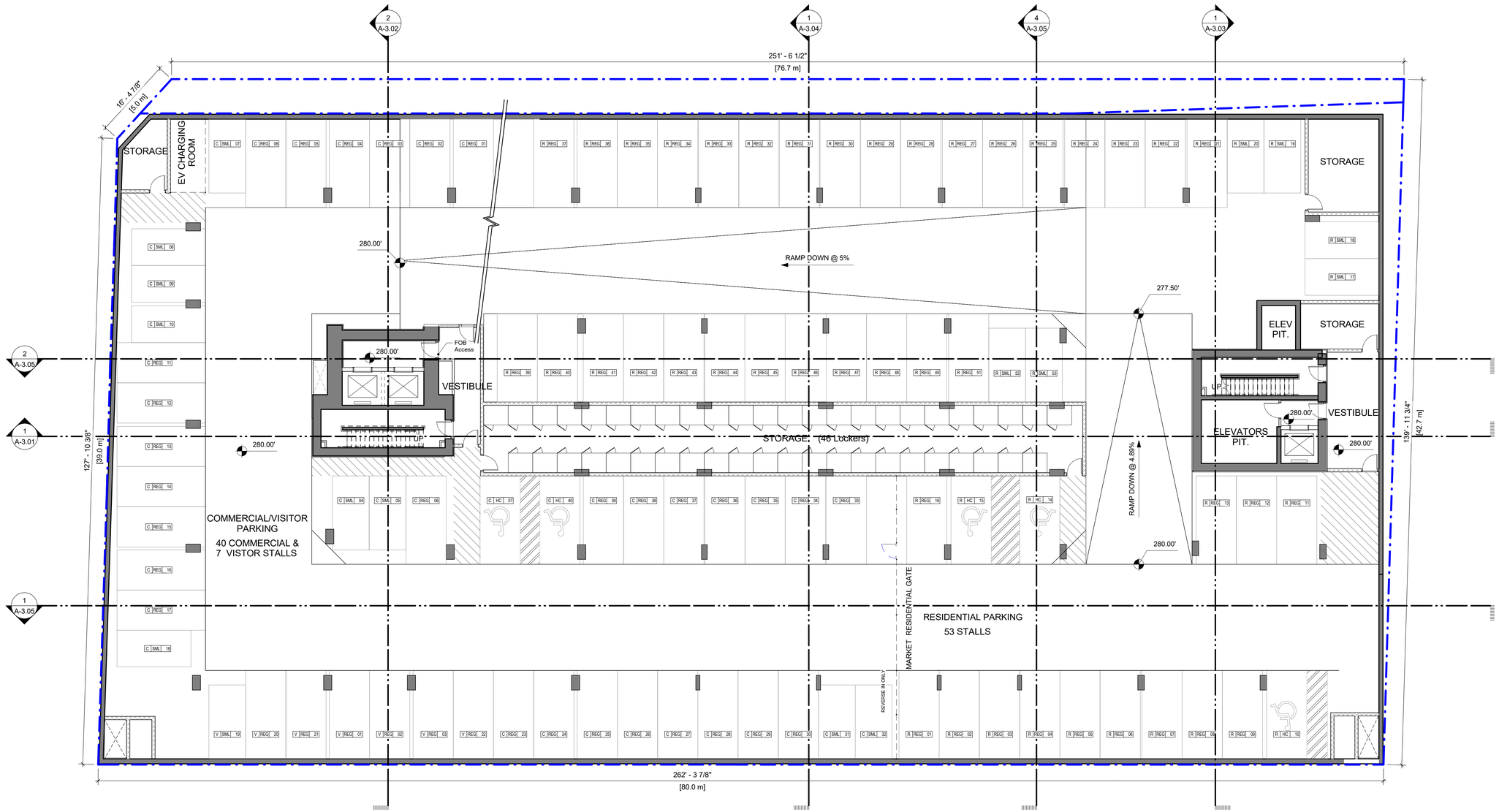
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1 A-1.02 OVERALL PLAN- LEVEL P2
SCALE: 3/32" = 1'-0"

True North | Project North

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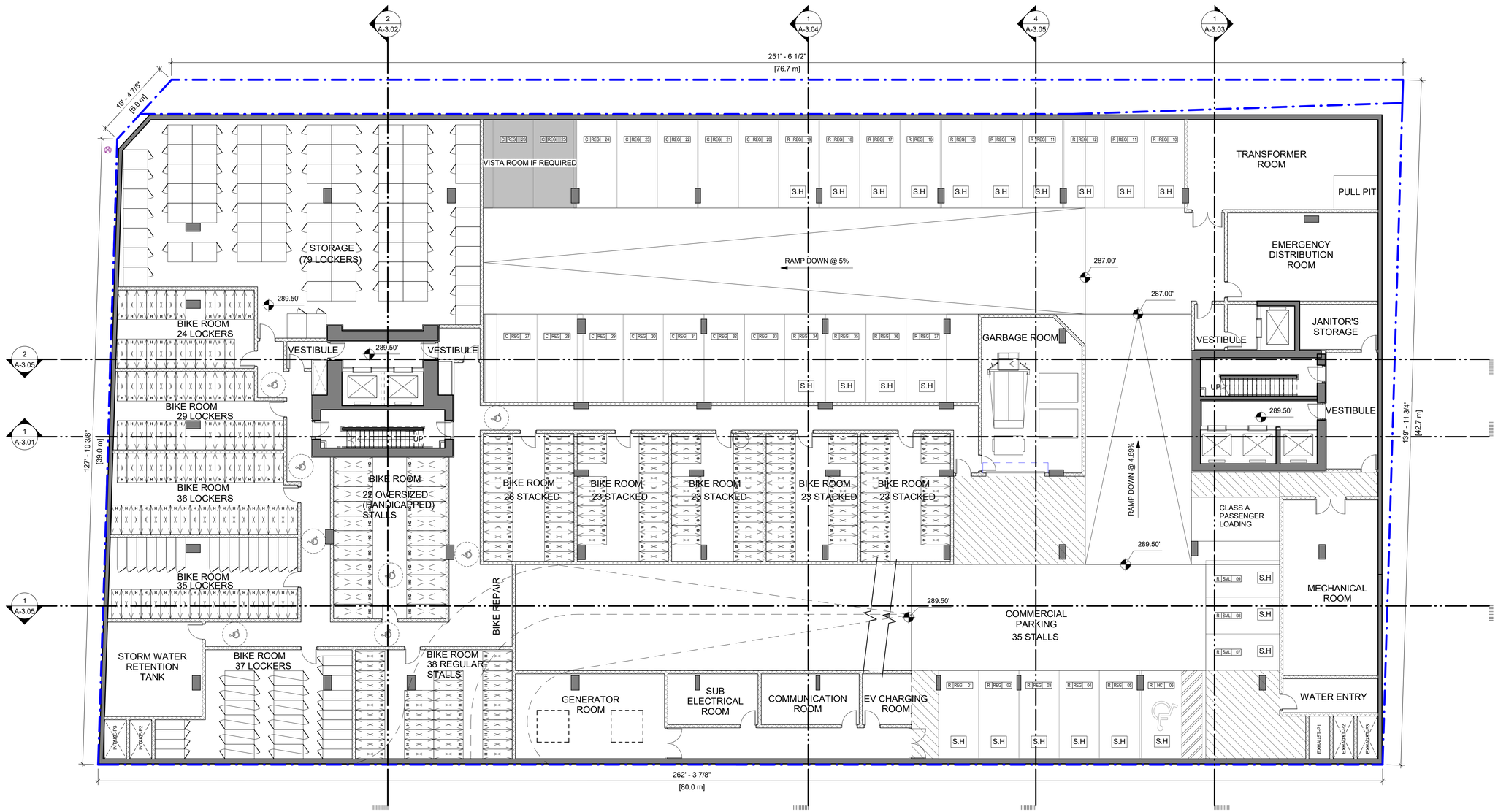
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1 A-1.03 OVERALL PLAN- LEVEL P1

SCALE: 3/32" = 1'-0"

True North

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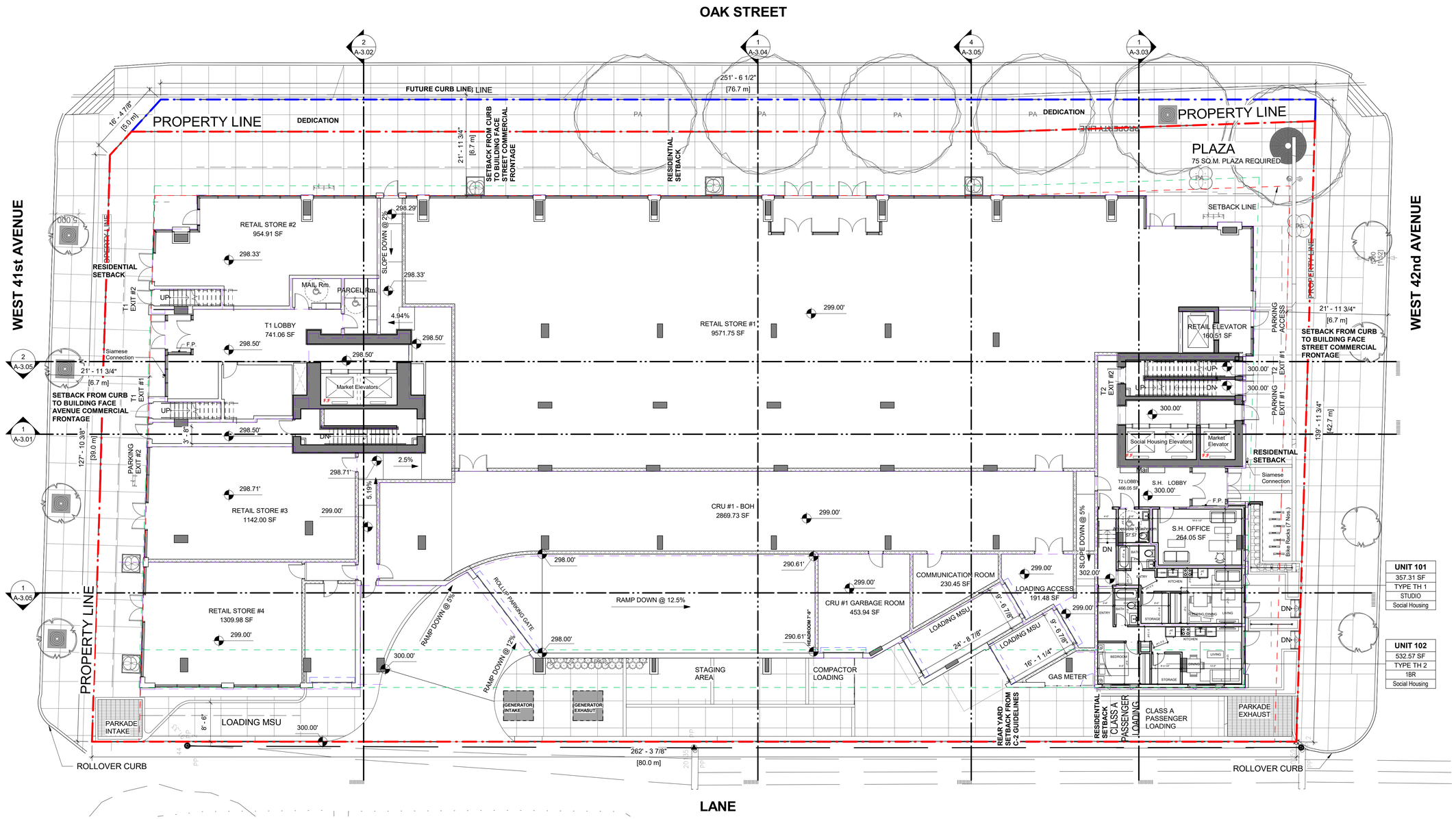
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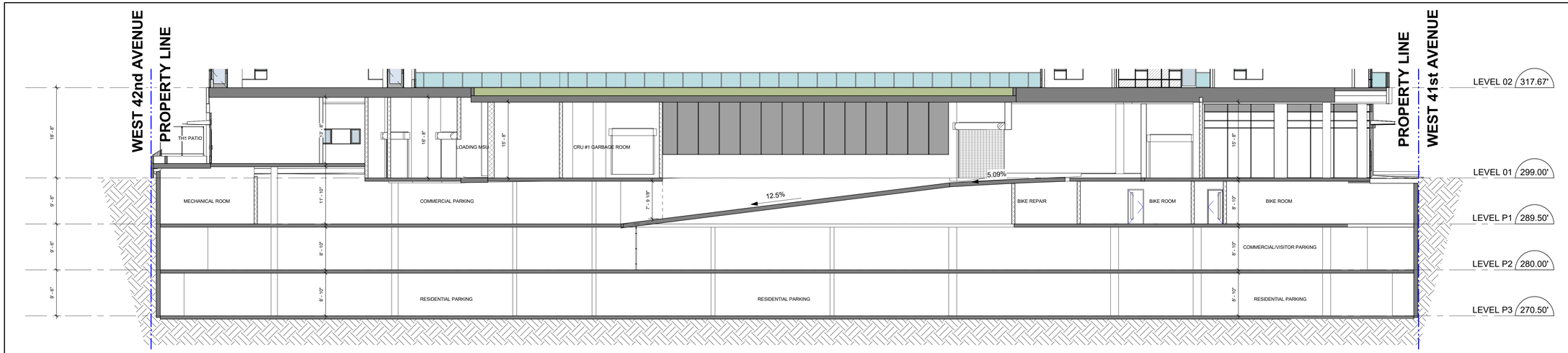
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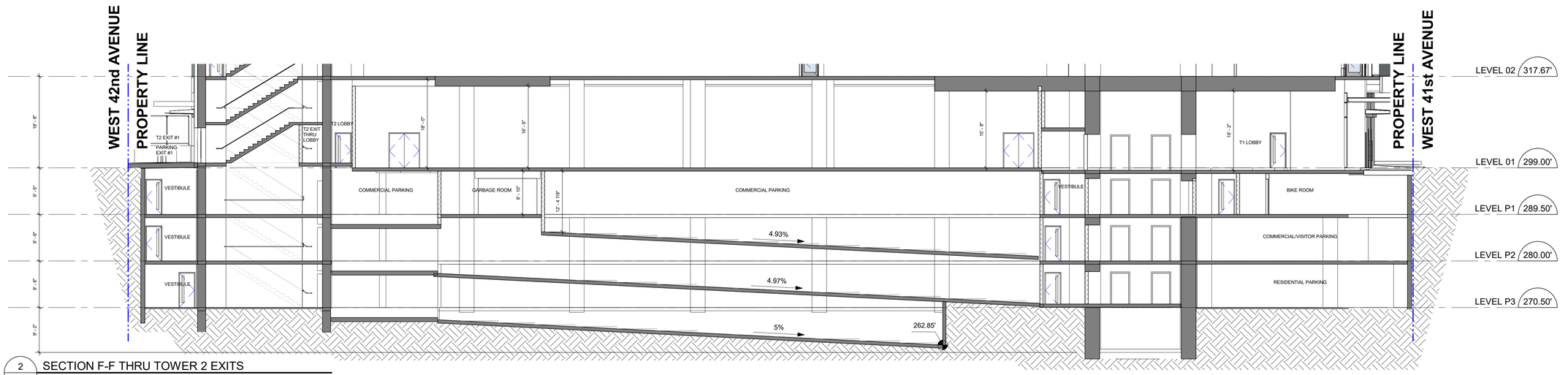
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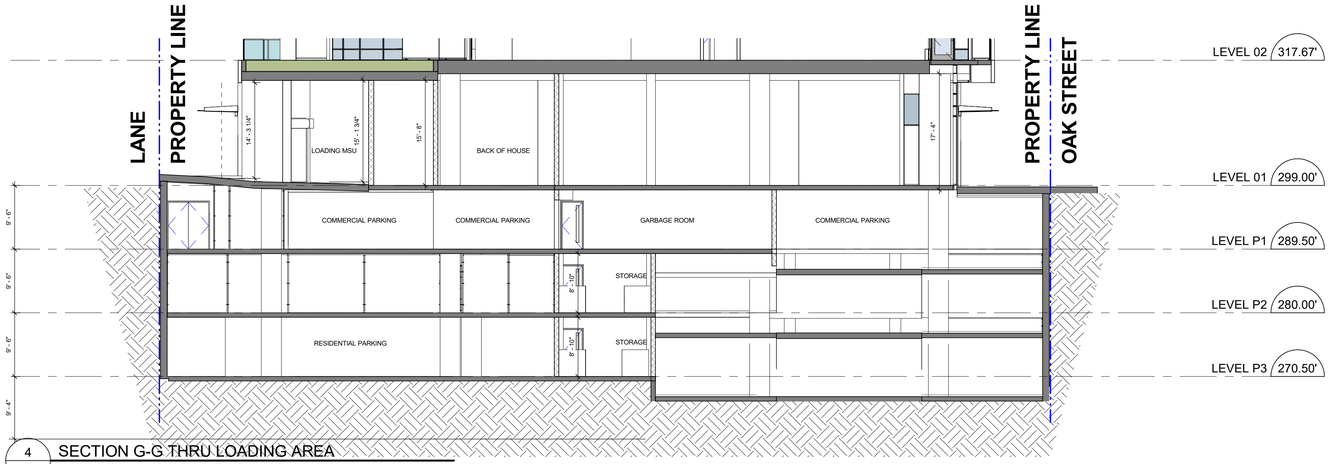
1 A-3.05 SECTION E-E THRU RAMP AT PARKING ENTRANCE

SCALE: 3/32" = 1'-0"



2 A-3.05 SECTION F-F THRU TOWER 2 EXITS

SCALE: 3/32" = 1'-0"



4 A-3.05 SECTION G-G THRU LOADING AREA

SCALE: 3/32" = 1'-0"

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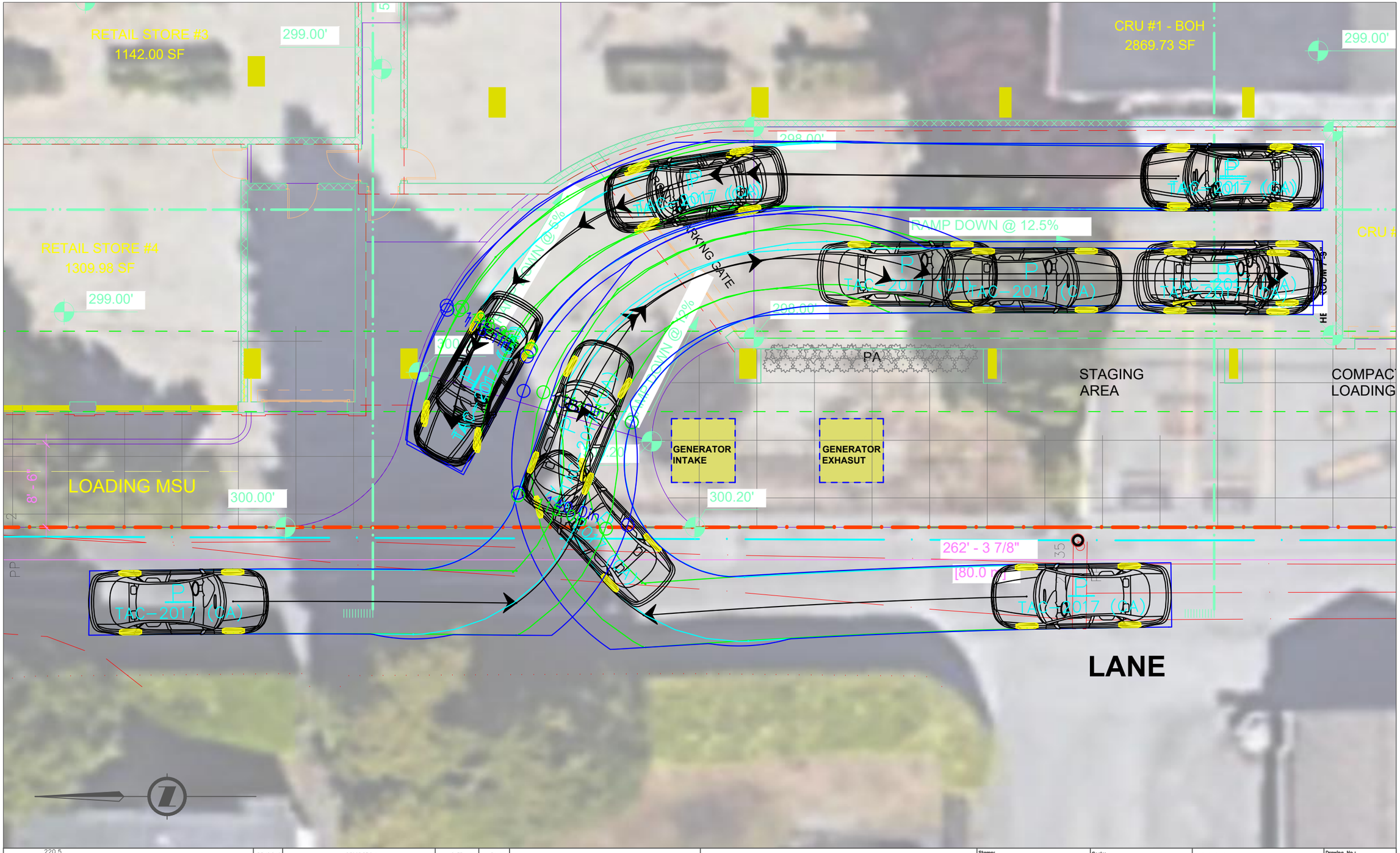
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APPENDIX B
Swept Path Analysis



220.5

43.3 126.0

P

	inches
Width	: 78.7
Track	: 78.7
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

CTS Traffic Engineering Specialists

101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604–936–6190
Fax: 604–936–6175

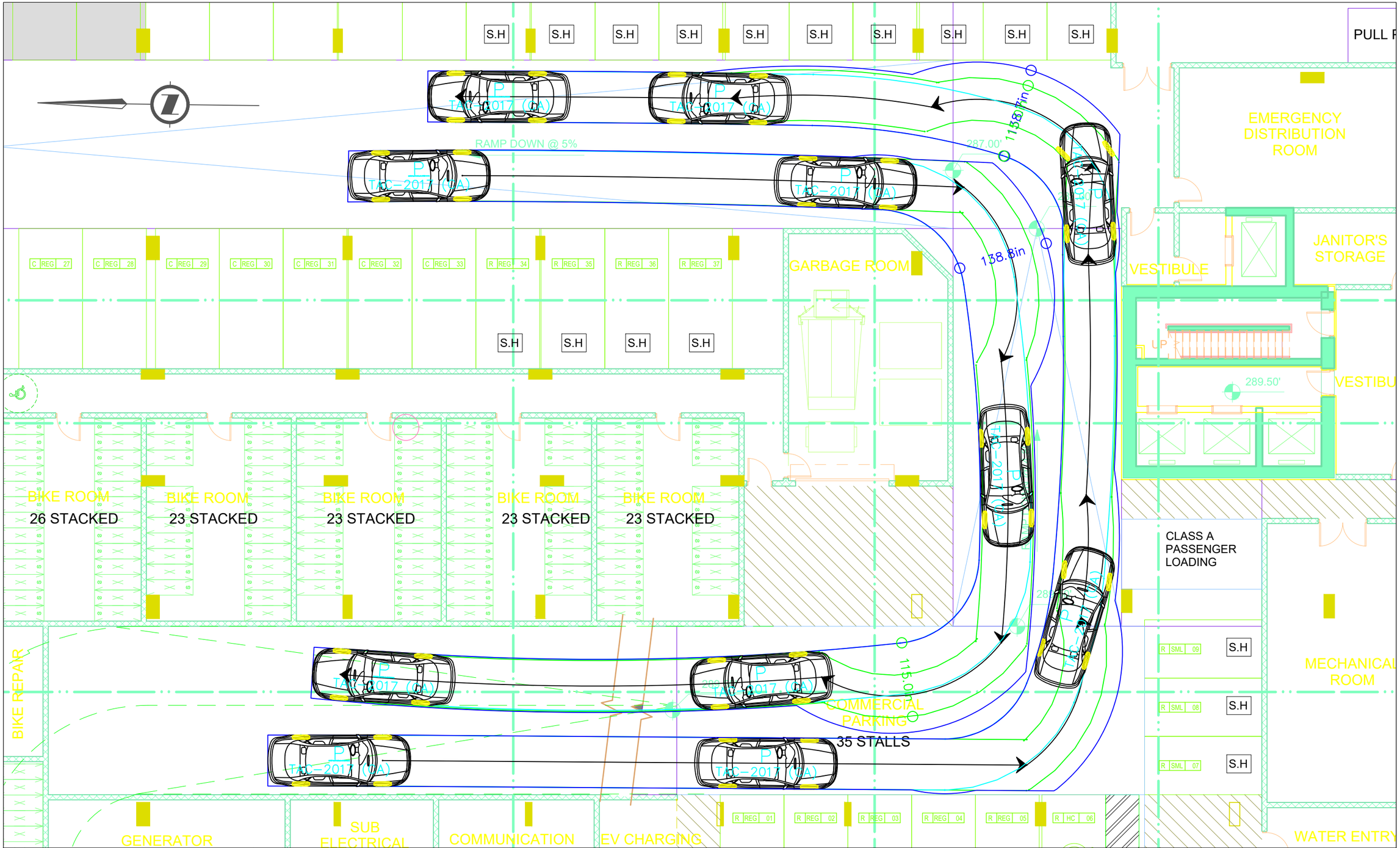
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – PASSENGER VEHICLE ENTERING/EXITING PARKADE ON RAMP

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

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Scale: NTS	Project Number:	Drawing No.: 1	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	



220.5

43.3 126.0

P

	inches
Width	: 78.7
Track	: 78.7
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

Traffic Engineering Specialists

101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604-936-6190
Fax: 604-936-6175

CTS PERMIT TO PRACTICE: 1000697

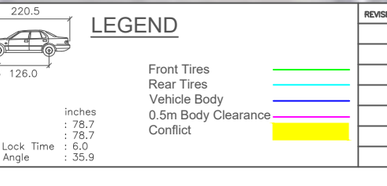
SWEPT PATH ANALYSIS – PASSENGER VEHICLE TRACKING IN/OUT OF LEVEL P1 (UNDERGROUND)

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 2	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	





LEGEND

	inches
Width	: 78.7
Track	: 78.7
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

CTS Traffic Engineering Specialists
101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604-936-6190
Fax: 604-936-6175
CTS PERMIT TO PRACTICE: 1000697

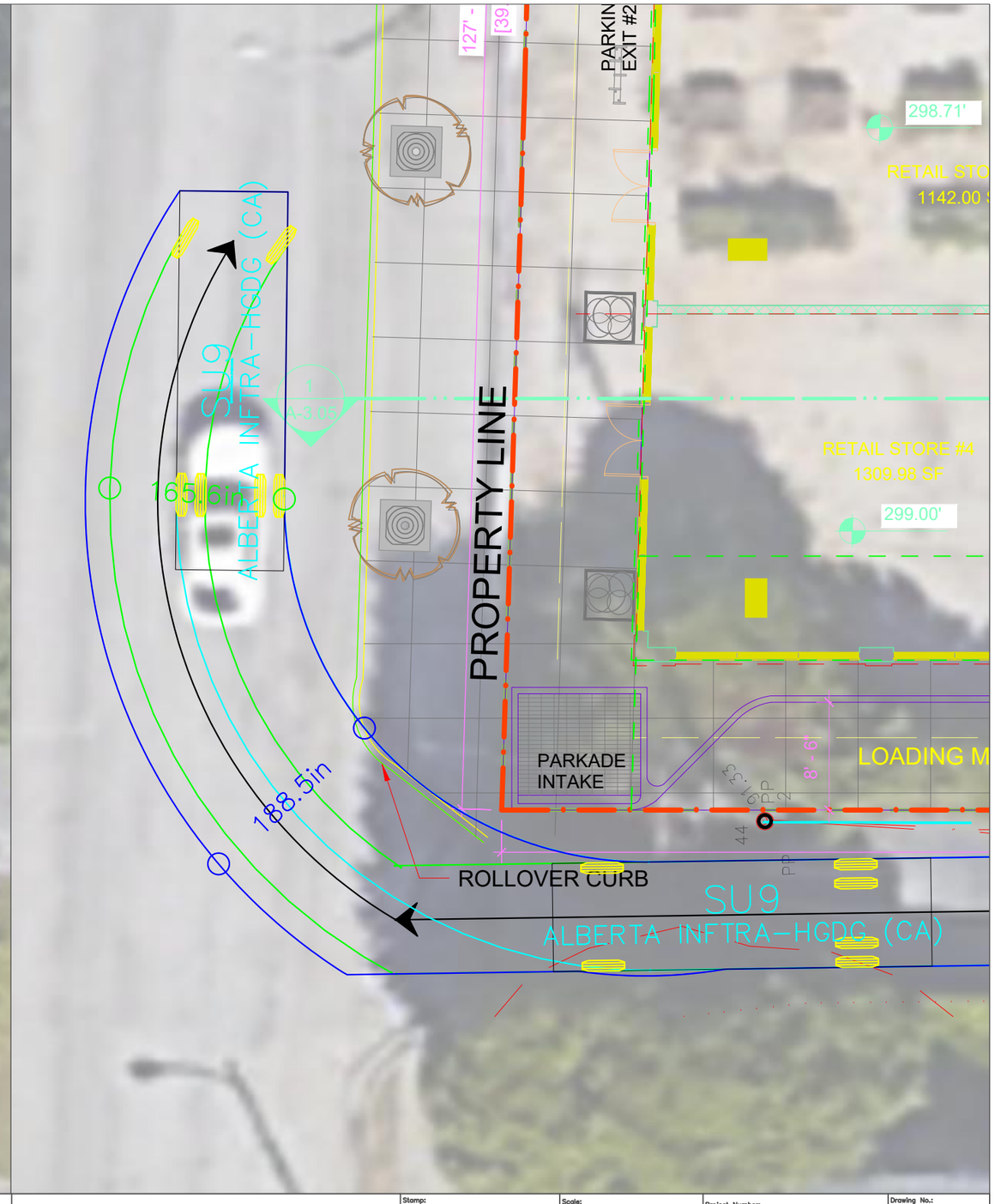
SWEPT PATH ANALYSIS – PASSENGER VEHICLE ENTERING/EXITING PASSENGER LOADING AREA

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 3	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	





358.3

47.2 240.2

SU9

	inches
Width	: 102.4
Track	: 102.4
Lock to Lock Time	: 6.0
Steering Angle	: 31.7

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

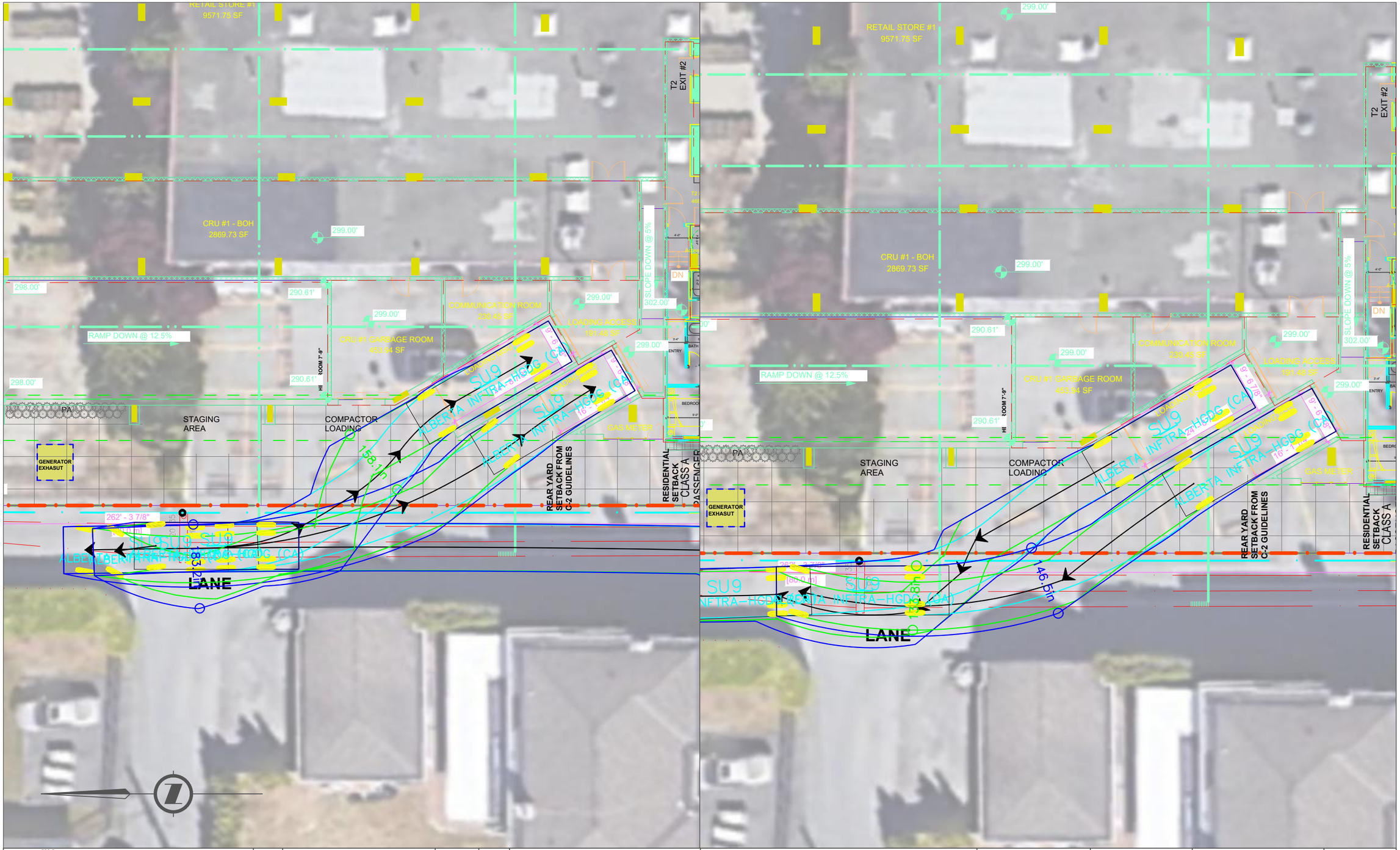
Traffic Engineering Specialists
101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604–936–6190
Fax: 604–936–6175
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – SU9 VEHICLE ENTERING/EXITING LANEWAY SOUTH OF SITE

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 4	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	



358.3

47.2 240.2

SU9

inches

Width	: 102.4
Track	: 102.4
Lock to Lock Time	: 6.0
Steering Angle	: 31.7

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

CTS Traffic Engineering Specialists

101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604–936–6190
Fax: 604–936–6175

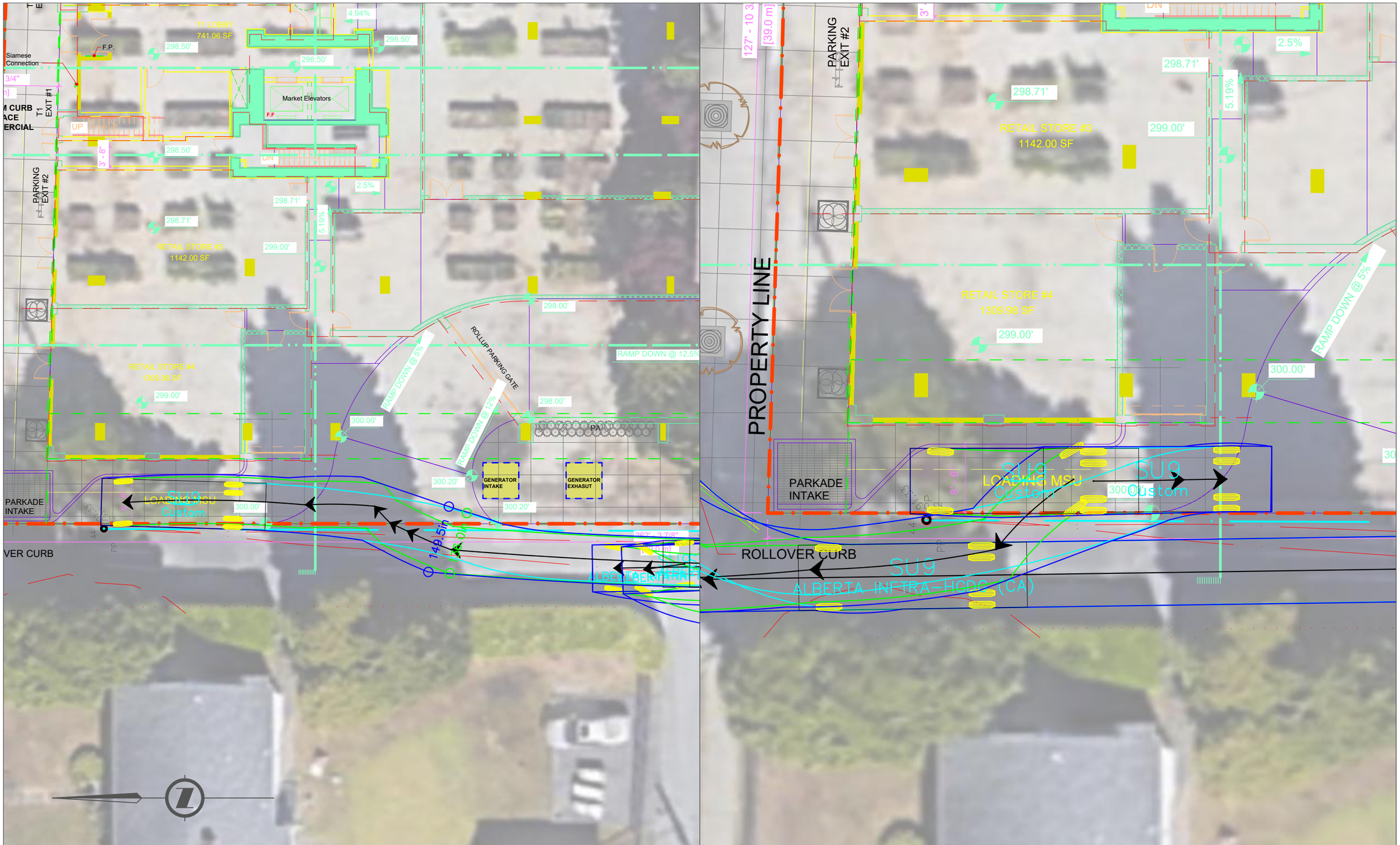
CTS PERMIT TO PRACTICE: 1000697

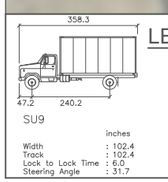
SWEPT PATH ANALYSIS – SU9 VEHICLE
ENTERING/EXITING SOUTH TWO LOADING BAYS

OAK STREET & WEST 41ST AVENUE –
TRAFFIC ASSESSMENT & MANAGEMENT
STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 5A	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	





LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

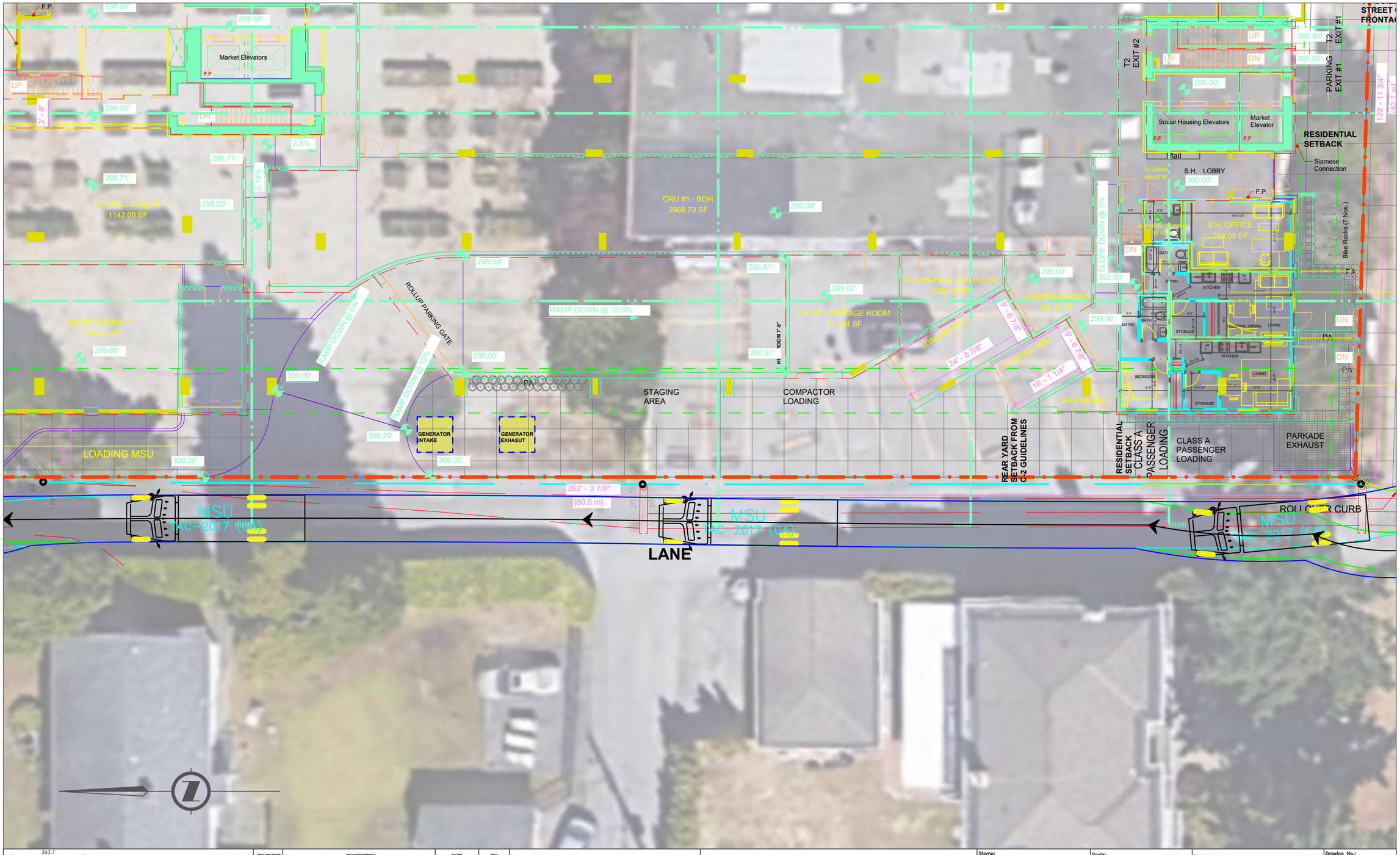
CTS Traffic Engineering Specialists
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Tel: 604-936-6190
Fax: 604-936-6175
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – SU9 VEHICLE ENTERING/EXITING NORTH LOADING BAY

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 5B	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	



393.7

31.5 255.9

MSU

	inches
Width	: 102.4
Track	: 102.4
Lock to Lock Time	: 6.0
Steering Angle	: 40.2

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

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Fax: 604-936-6175

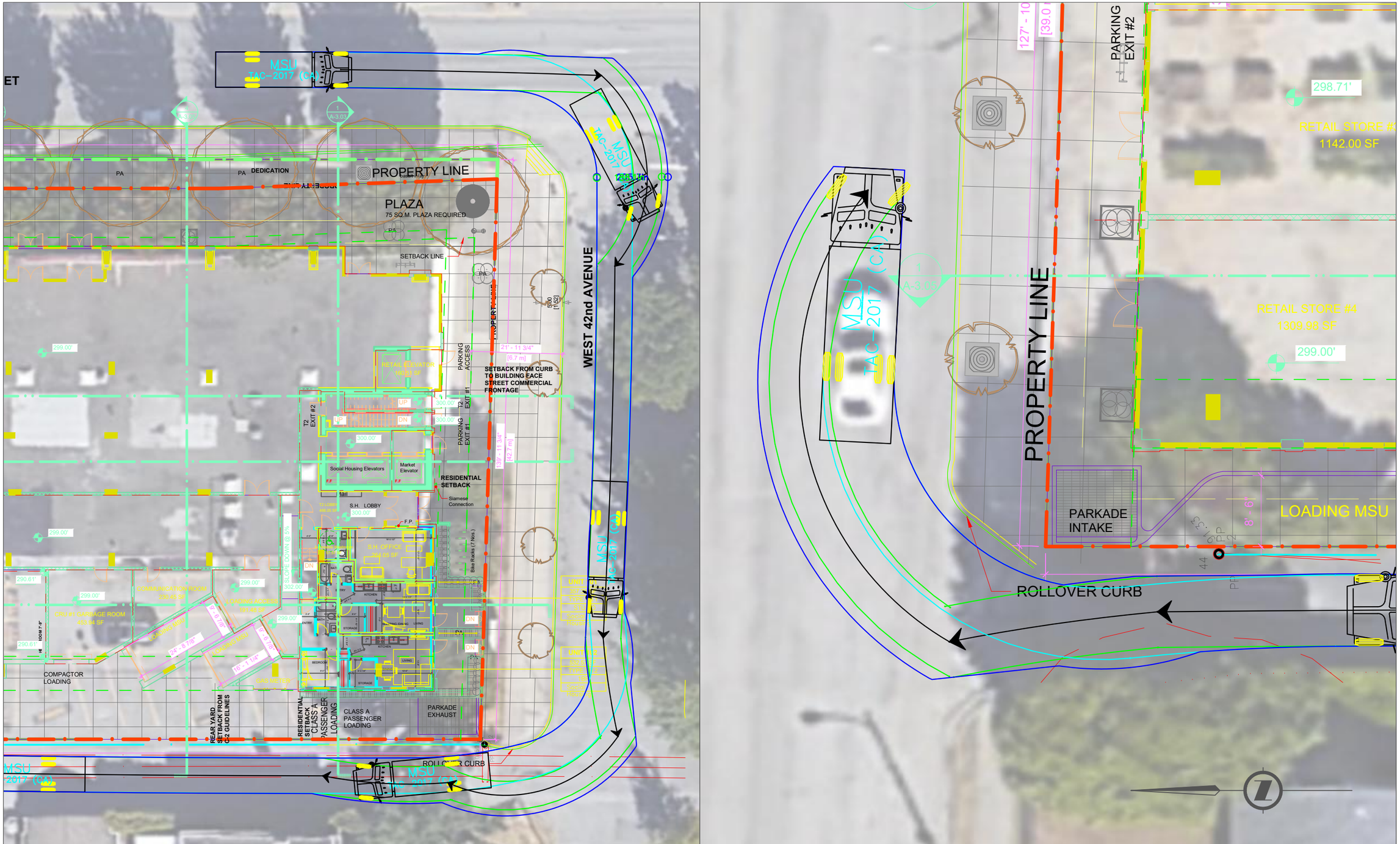
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – MSU VEHICLE TRACKING THROUGH LANEWAY

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale:	NTS
Designed:	A.M.
Drawn:	A.M.
Reviewed:	B.D.
Project Number:	
Drawing Number:	
CTS Project Number:	7597
Date:	OCTOBER 2021
Drawing No.:	6
Revision No.:	0



393.7

31.5 255.9

MSU

	inches
Width	: 102.4
Track	: 102.4
Lock to Lock Time	: 6.0
Steering Angle	: 40.2

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

CTS Traffic Engineering Specialists

101A – 1952 Kingsway Avenue
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Tel: 604-936-6190
Fax: 604-936-6175

CTS PERMIT TO PRACTICE: 1000697

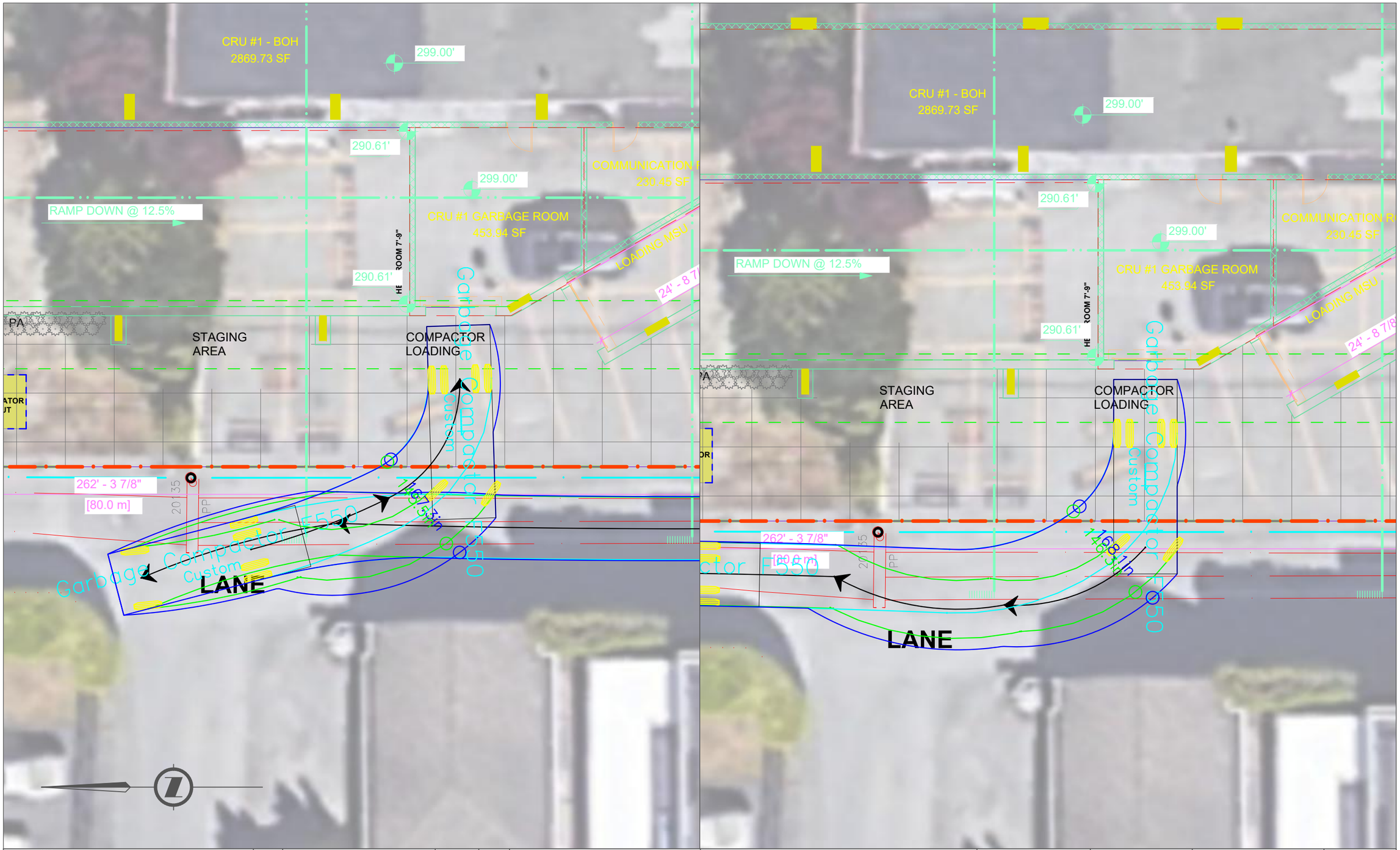
SWEPT PATH ANALYSIS – MSU VEHICLE ENTERING/EXITING LANEWAY

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 7	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	

CRU #1 - BOH
2869.73 SF
299.00'
290.61'
299.00'
COMMUNICATION
230.45 SF
RAMP DOWN @ 12.5%
CRU #1 GARBAGE ROOM
453.94 SF
290.61'
LOADING MSU
24' - 8 7/
PA
STAGING
AREA
COMPACTOR
LOADING
262' - 3 7/8"
[80.0 m]
LANE



279.5

38.2 163.8

Garbage Compactor F550

	inches
Width	: 91.3
Track	: 91.3
Lock to Lock Time	: 6.0
Steering Angle	: 41.5

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

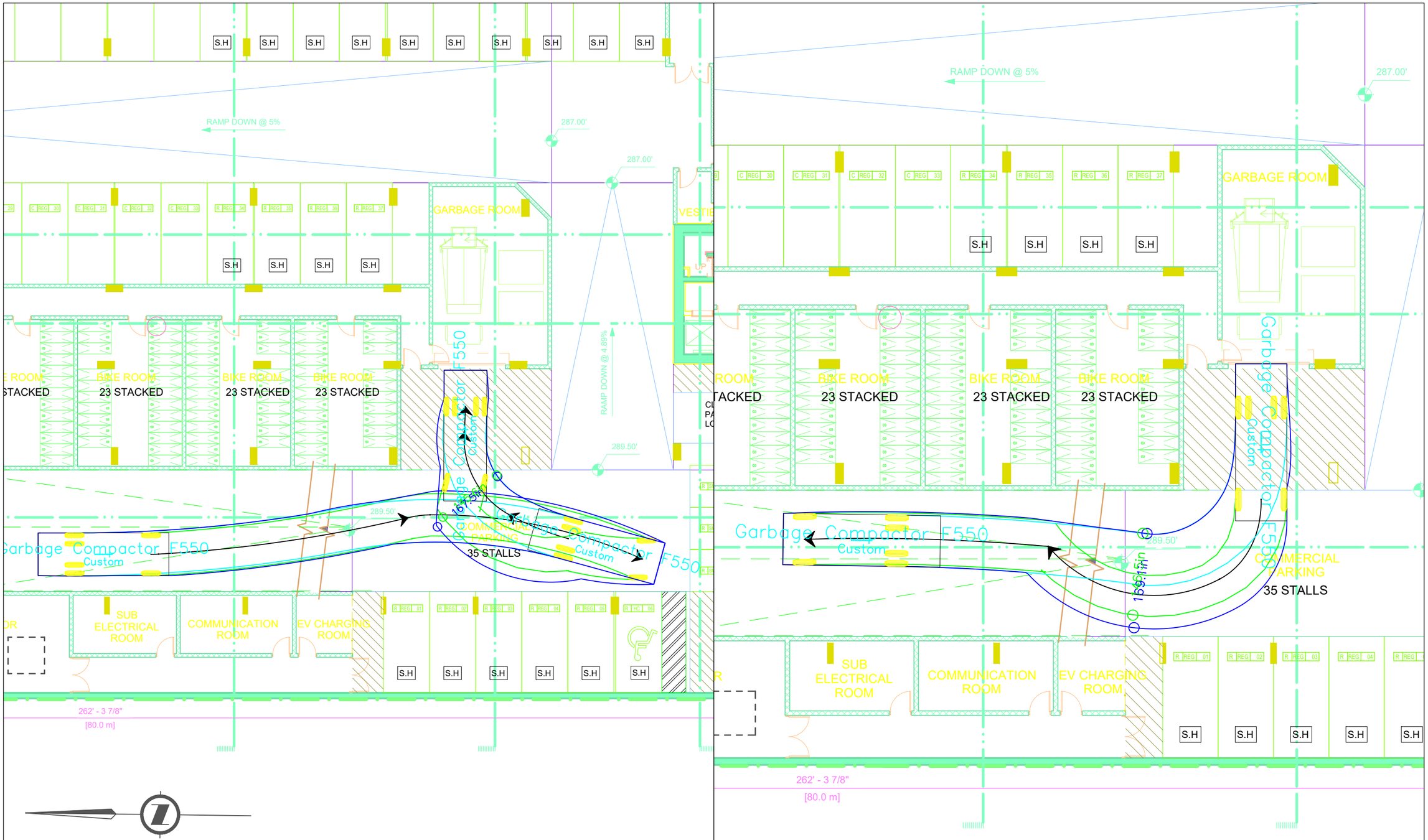
CTS Traffic Engineering Specialists
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Port Coquitlam, BC, Canada V3C 6C2
Tel: 604-936-6190
Fax: 604-936-6175
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – COMPACTOR GARBAGE COLLECTION VEHICLE ENTERING/EXITING GROUND LEVEL STAGING AREA

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 8	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	



279.5

38.2 163.8

Garbage Compactor F550

Inches

Width	: 91.3
Track	: 91.3
Lock to Lock Time	: 6.0
Steering Angle	: 41.5

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

CTS Traffic Engineering Specialists

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Port Coquitlam, BC, Canada V3C 6C2
Tel: 604-936-6190
Fax: 604-936-6175

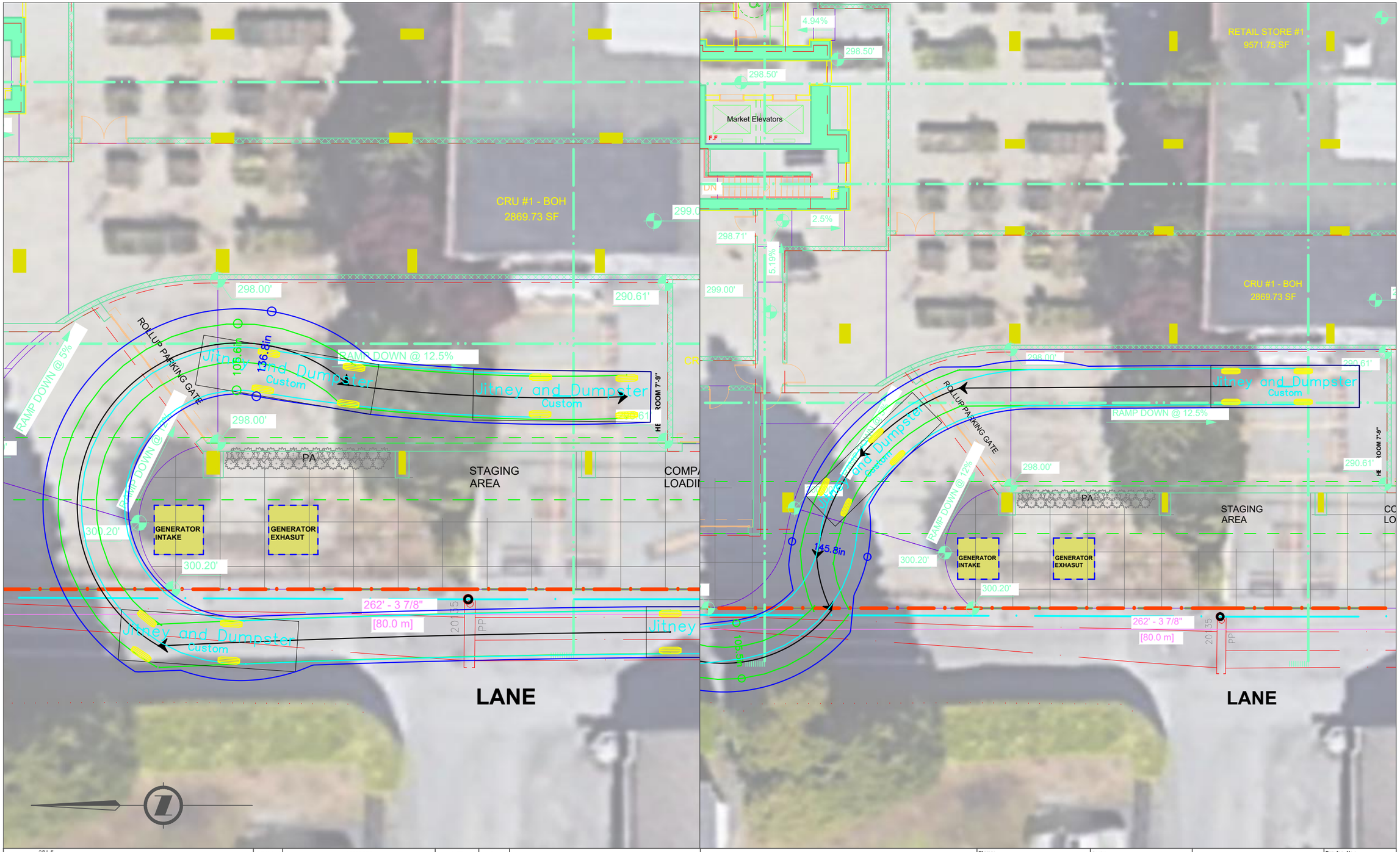
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – COMPACTOR GARBAGE VEHICLE ENTERING/EXITING GARBAGE STAGING AREA OF LEVEL P1 (UNDERGROUND)

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 9	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	



281.5

38.0 137.0

Jitney and Dumpster

	inches
Width	: 79.9
Track	: 68.5
Lock to Lock Time	: 6.0
Steering Angle	: 32.2

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

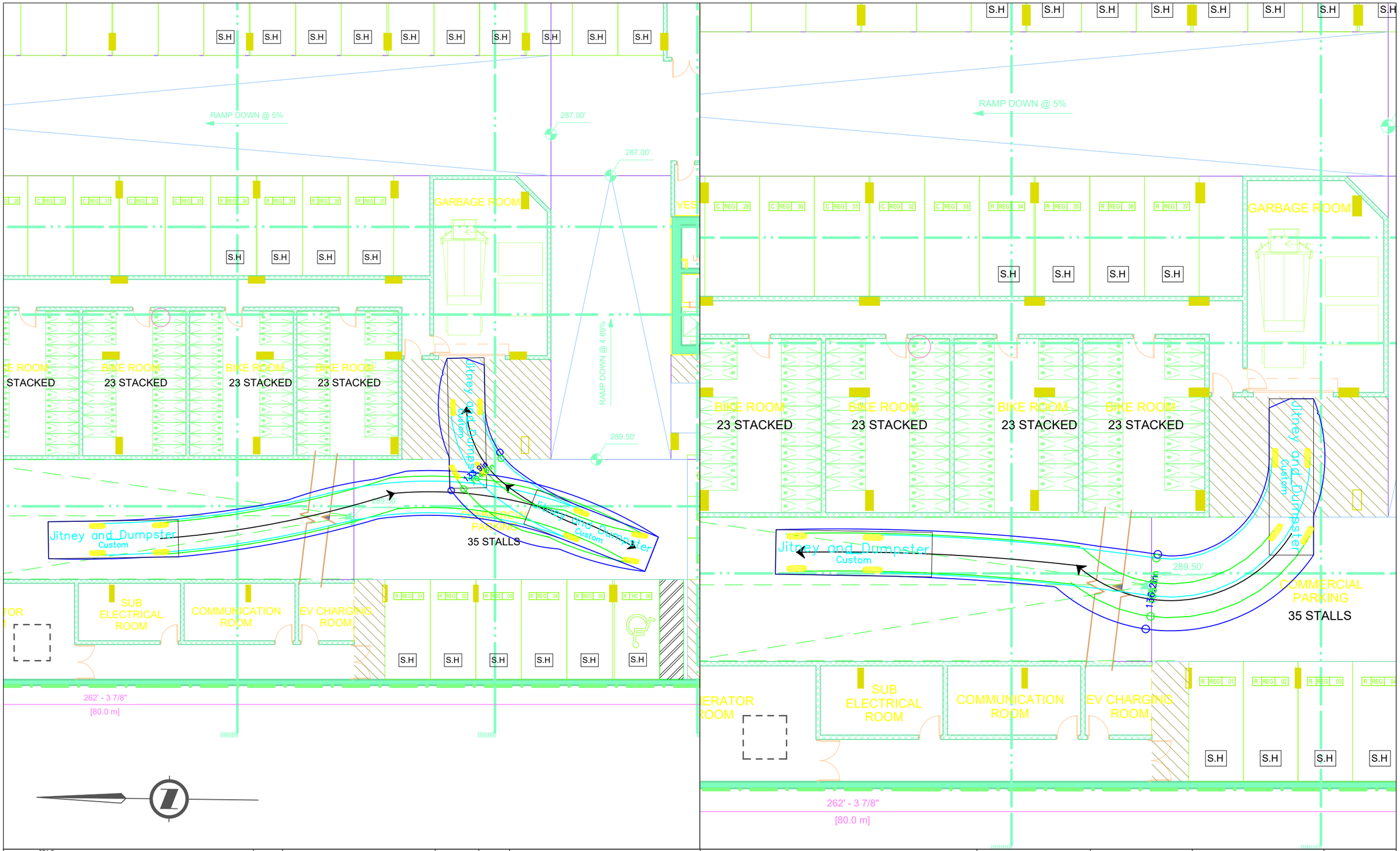
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101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604–936–6190
Fax: 604–936–6175
CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – JITNEY TRUCK WITH ATTACHED DUMPSTER ENTERING/EXITING RAMP TO UNDERGROUND LEVEL

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:	Drawing No.: 10	
Designed: A.M.	Drawing Number:		
Drawn: A.M.	CTS Project Number: 7597		
Reviewed: B.D.	Date: OCTOBER 2021	Revision No.: 0	



281.5

38.0 137.0

Jitney and Dumpster

	inches
Width	: 79.9
Track	: 68.5
Lock to Lock Time	: 6.0
Steering Angle	: 32.2

LEGEND

- Front Tires
- Rear Tires
- Vehicle Body
- 0.5m Body Clearance
- Conflict

REVISIONS	DESCRIPTION	DATE	BY

CTS Traffic Engineering Specialists

101A – 1952 Kingsway Avenue
Port Coquitlam, BC, Canada V3C 6C2
Tel: 604–936–6190
Fax: 604–936–6175

CTS PERMIT TO PRACTICE: 1000697

SWEPT PATH ANALYSIS – JITNEY TRUCK WITH ATTACHED DUMPSTER ENTERING/EXITING GARBAGE STAGING AREA OF LEVEL P1 (UNDERGROUND)

OAK STREET & WEST 41ST AVENUE – TRAFFIC ASSESSMENT & MANAGEMENT STUDY UPDATE

Stamp:

Scale: NTS	Project Number:
Designed: A.M.	Drawing Number:
Drawn: A.M.	CTS Project Number: 7597
Reviewed: B.D.	Date: OCTOBER 2021

Drawing No.: 11

Revision No.: 0