1516 2nd Avenue

SDCI Project No. 3033162

Updated Transportation Impact Analysis

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Prepared for:

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FINDINGS/CONCLUSIONS

This transportation impact analysis (TIA) has been prepared for the proposed 1516 2nd Avenue project located in the commercial core of downtown Seattle, Washington. This is an update to our previous traffic analysis dated July 29, 2019 and addresses traffic comments in the City's Correction Notice #1 Transportation DPD dated November 26, 2019.

Project Proposal. The project proposes up to 524 condominium units and 3,502 square feet (SF) of retail space. Access to the project's parking garage and a porte-cohere are proposed off the existing alley on the east side of the site between Pine Street and Pike Street. The proposed parking garage access would provide access to 269 parking stalls for the residential units. Full project buildout is expected by 2023.

Existing Uses. The existing site includes approximately 48,600 SF of office space, 11,000 SF of retail space, and a public pay surface parking lot all of which would be removed as part of the proposed project. The curb cut on 2nd Avenue which provides access to a 26 stall public pay parking lot on the site would also be removed as part of the proposed project.

Vehicular Trip Generation. The proposed development is anticipated to generate 982 net new weekday daily trips, with 81 net new weekday AM peak hour trips (13 entering, 68 exiting), and 64 net new weekday PM peak hour trips (40 entering, 24 exiting).

Level of Service (LOS) Analysis. Weekday AM and PM peak hour LOS analyses were conducted at four signalized at two alley driveway study locations. The four signalized study intersections are anticipated to operate at LOS C or better during the weekday AM and PM peak hours without and with the proposed project. The two stop controlled alley driveways are anticipated to include LOS E movements during the weekday PM peak hour with the proposed project. LOS E operations at alley driveways in a downtown area are not uncommon, especially with heavy pedestrian volumes that exist at this location. It should be noted that, LOS is not typically used as a regulatory tool for addressing entering and exiting traffic at alleys.

Alley Loading. Four separate design functions are proposed along the alley to facilitate deliveries and service vehicles, loading for commercial uses, vehicle drop-off/pick-up, and access to the below-grade garage.

Transportation Concurrency. Transportation concurrency was evaluated for the proposed 1516 2nd Avenue project based on City guidelines outlined in the Director's Rule 2009-5. The evaluated screen-lines would continue to operate below the concurrency threshold with construction of the project. As a result, no concurrency-related mitigation is warranted or required for the project.

Parking Analysis

Parking Supply. On-site parking would be provided by a 269 stall parking garage, all of which will be dedicated for homeowners in the building.

Parking Code Requirements. Since the proposed project is located in the Downton Commercial Core, no parking (either long-term or short-term) is required per Seattle Municipal Code.

Residential Parking Demand. Based on the current project statistics and ITE *Parking Generation* rates, the estimated weekday peak parking demand for the proposed condominium units is 241 parking stalls. Therefore, the 269 proposed on-site parking stalls for the residential use would meet the estimated weekday peak residential parking demand.

Commercial Parking Demand. Parking demand for the proposed retail was based on a 3,502 square feet of general retail space. Based on ITE parking demand rates, the estimated weekday peak parking demand for the proposed retail use is estimated to be 5 parking stalls occurring between 12:00 PM – 3:00 PM. It is anticipated that on-street parking and public parking garages/lots in the project vicinity would accommodate the retail parking demand.

Project Mitigation

The traffic and parking impacts of the proposed 1561 2nd Avenue project are not expected to create a significant adverse impact to the local vehicular, pedestrian, bicycle, and transit networks. To mitigate the project impacts to the adjacent alley, the following measures are proposed:

- Provide an on-site loading bay for deliveries, commercial vendor use, and repair vehicles for the residential units.
- Dedicate 2 feet of property along the alley project frontage, and allocate an additional 5 feet of property area to accommodate a new proposed loading zone on the alley.
- Stripe a new 8-foot x 50-foot designated loading zone on the east side of the alley adjacent to the project to accommodate short-term delivery vehicles for parcels and mail.

  This will allow the improved access for loading and delivery vehicles to use the on-site loading bay and a new delivery parking zone in the alley, as well as help facilitate vehicle pick-up and drop-off in the porte-cochere.
- Develop a Loading and Delivery Plan which will be implemented as part of the City's Loading Dock Management Plan (LDMP) process.

INTRODUCTION

This transportation impact analysis has been prepared for the proposed 1516 2nd Avenue project located at 1516 2nd Avenue in the commercial core of downtown Seattle, Washington as shown in the Figure 1 vicinity map. This is an update to our previous traffic analysis dated July 29, 2019 and addresses traffic comments in the City's Correction Notice #1 Transportation DPD dated November 26, 2019.

Project Description

The project proposes up to 524 condominium units and 3,502 square feet (SF) of retail space. The existing site includes approximately 48,600 SF of office space and 11,000 SF of retail space which would be removed as part of the proposed project. Access to the project's parking garage and a porte-cohere are proposed off the existing alley on the east side of the site between Pine Street and Pike Street. The proposed parking garage access would provide access to 269 parking stalls for the residential units. Full project buildout is expected by 2023. A preliminary site plan is provided in Figure 2.

Existing Uses

The existing site includes approximately 48,600 SF of office space, 11,000 SF of retail space, and a public pay parking lot all of which would be removed as part of the proposed project. The curb cut on 2nd Avenue which provides access to the public pay parking lot on the site would also be removed as part of the proposed project.

Project Approach

Based on discussions with the City of Seattle Department of Construction and Inspections (SDCI), the following tasks were undertaken to evaluate and disclose the traffic impacts associated with the 1516 2nd Avenue project:

- Assessed existing conditions through field reconnaissance and review of existing planning documents;
- Described existing roads, transit service, and non-motorized facilities in the study area;
- Analyzed existing AM and PM peak hour Levels of Service (LOS) at the following 4 off-site signalized study intersections and 2 alley driveway locations:
    1. 2nd Avenue / Pine Street (signal)
    2. 3rd Avenue / Pine Street (signal)
    3. 2nd Avenue / Pike Street (signal)
    4. 3rd Avenue / Pike Street (signal)
    5. Alley / Pine Street (stop-controlled)
    6. Alley / Pike Street (stop-controlled)
- Documented collision history in the project vicinity;

- Documented planned transportation improvements in the site vicinity;
- Estimated weekday daily, AM, and PM peak hour trip generation for the project;
- Assigned weekday project-generated AM and PM peak hour trips to the street network;
- Documented traffic forecasts and assumptions for year 2023 AM and PM peak hour conditions without and with the proposed development;
- Analyzed year 2023 AM and PM peak hour LOS at the off-site study intersections and driveways;
- Evaluated transportation concurrency based on the guidelines outlined in the Director's Rule 2009-5;
- Evaluated alley operations with respect to deliveries and trucks;
- Assessed potential project impacts to non-motorized transportation facilities;
- Estimated weekday peak parking demand compared to proposed on-site parking supply;
- Identified mitigation to City of Seattle.

Primary Data and Information Sources

- Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017.
- ITE *Trip Generation* Handbook, 3rd Edition, 2017.
- *Highway Capacity Manual (HCM),* 6th Edition, Transportation Research Board.
- AM and PM Peak Hour traffic counts by All Traffic Data, April 2019.
- Metro/King County Website, June 2019.
- Signal Timing Data from City of Seattle Department of Transportation (SDOT).
- Seattle Department of Construction and Inspection (SDCI) Director's Rule 2009-5 *Transportation Concurrency Project Review System*, effective April 13, 2009.
- ITE *Parking Generation*, 5th Edition, 2019.
- American FactFinder (US Census Bureau), American Community Survey 5-Year Estimates 2013-2017, Tenure by Vehicles Available (Report B25044).

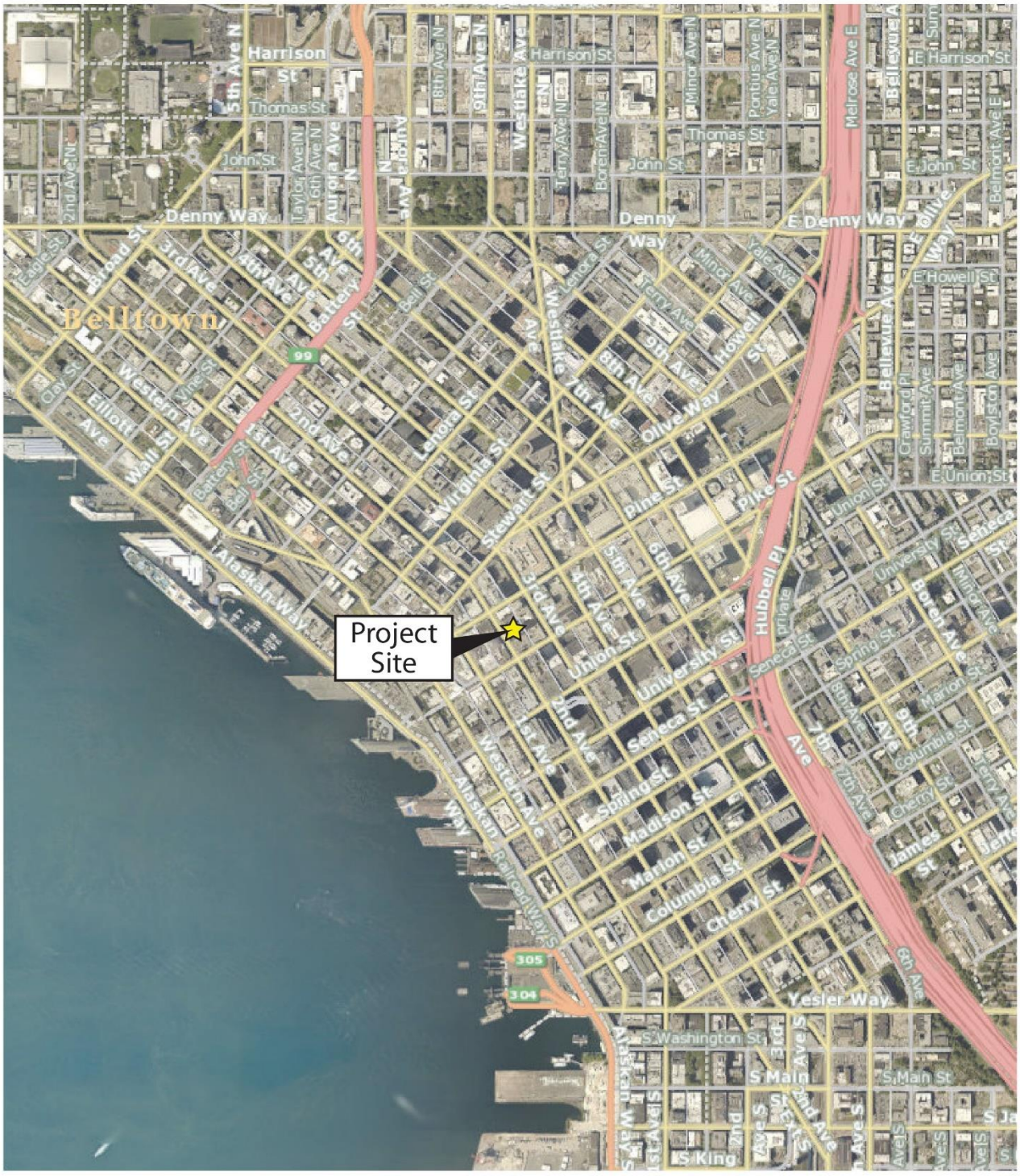

Figure 1: Project Site Vicinity

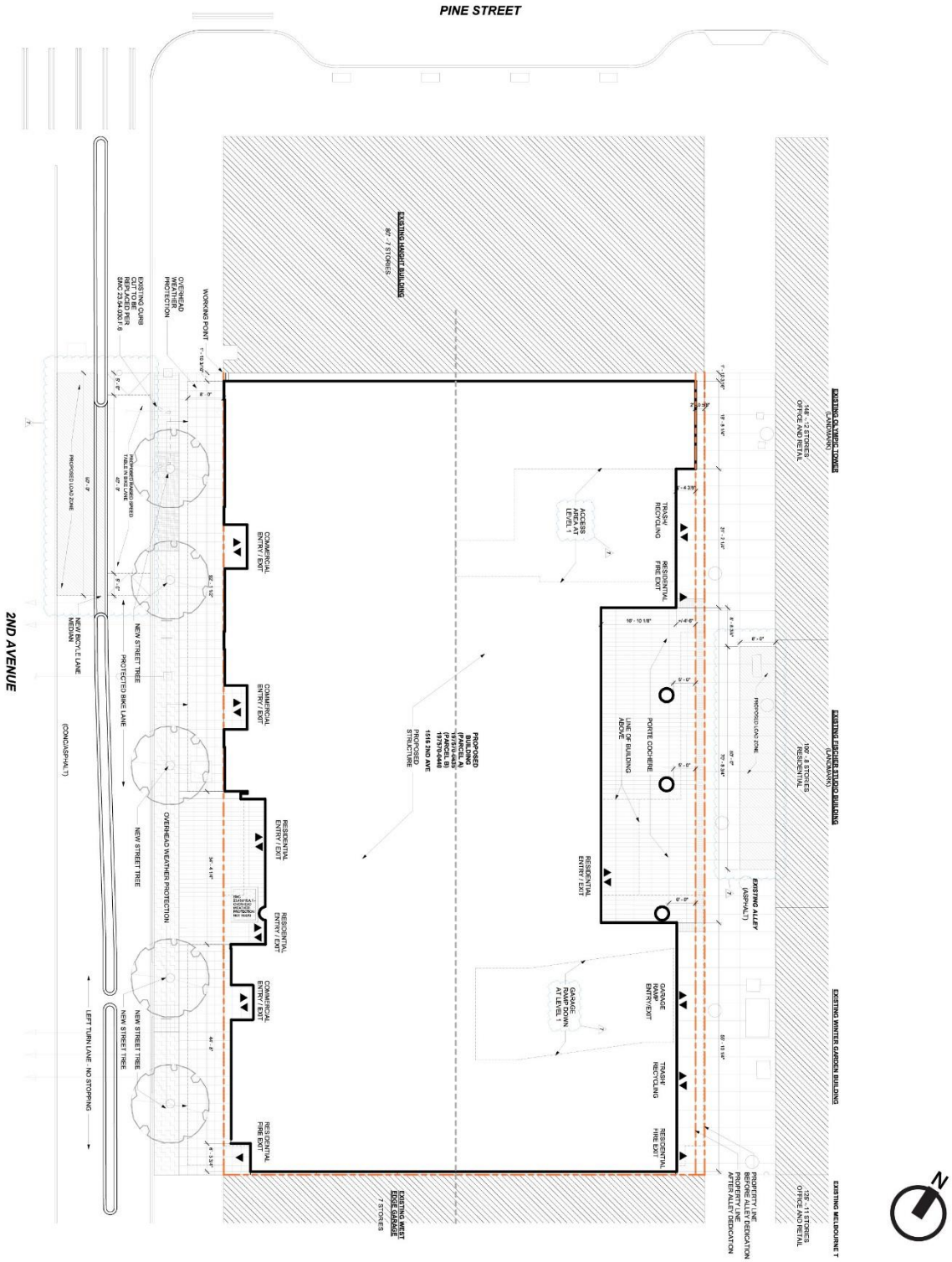

Figure 2: Preliminary Site Plan

EXISTING CONDITIONS

This section describes existing transportation system conditions in the study area. Existing conditions include an inventory of existing roadways, existing traffic volumes, levels of service (LOS), public transportation services, and non-motorized transportation facilities.

Roadway Network

Table 1 describes the existing characteristics of the streets that would be used as primary routes to and from the site. Roadway characteristics are described in terms of orientation, arterial classification, number of lanes, speed limits, parking, pedestrian facilities, and bicycle facilities.

Table 1
Existing Study Area Roadway Network

Roadway	General Orientation	Arterial Classification	# of Travel Lanes	Speed Limit (mph)	On-Street Parking	Sidewalks	Bicycle Facilities
Pine Street	One-Way WB	Principal Arterial	1-2	25	Yes	Yes	Yes
Pike Street	One-Way EB	Principal Arterial	1-2	25	No	Yes	Yes
2nd Avenue	One-Way SB	Principal Arterial	3	25	Yes	Yes	Yes
3rd Avenue*	North-South	Minor Arterial	4	25	No	Yes	No

* 3rd Avenue has been classified as a bus only road and is closed to passenger car through traffic.

Non-motorized Transportation Facilities

Non-motorized transportation facilities in the project vicinity include sidewalks on all streets and crosswalks at signalized intersections. Protected bicycle lanes within the study area exist on the south side of Pine Street, north side of Pike Street, and on the east side of 2nd Avenue. The protected bicycle lane on 2nd Avenue currently extends between Belltown and Pioneer Square.

Transit Services

Transit service to and from the project vicinity is provided by King County Metro and Sound Transit. Within the study area, Pine Street and 2nd Avenue are classified as "Principal Transit Routes," Pike Street is classified as a "Minor Transit Route," and 3rd Avenue is a bus only road and is closed to passenger car through traffic.

In general, the site is well served by public transit. Transit stops are located on Pine Street, 2nd Avenue, and 3rd Avenue. In addition, access to the underground Westlake Station is located on Pine Street between 3rd Avenue and 4th Avenue approximately 0.10 miles from the site.

Peak-Hour Traffic Volumes

Year 2019 existing weekday AM and PM peak hour traffic volumes at the 4 off-site signalized study intersections and 2 alley driveway locations were based on peak period counts conducted in April 2019 by All Traffic Data. The weekday AM peak hour represents the highest one-hour time period between 7:00 and 9:00 AM and the weekday PM peak hour represents the highest one-hour time period between 4:00 and 6:00 PM. Figures 3 and 4 illustrate the 2019 existing AM and PM peak hour traffic volumes at the 4 off-site signalized study intersections and 2 alley driveway locations. The existing traffic count worksheets are included in Appendix A.

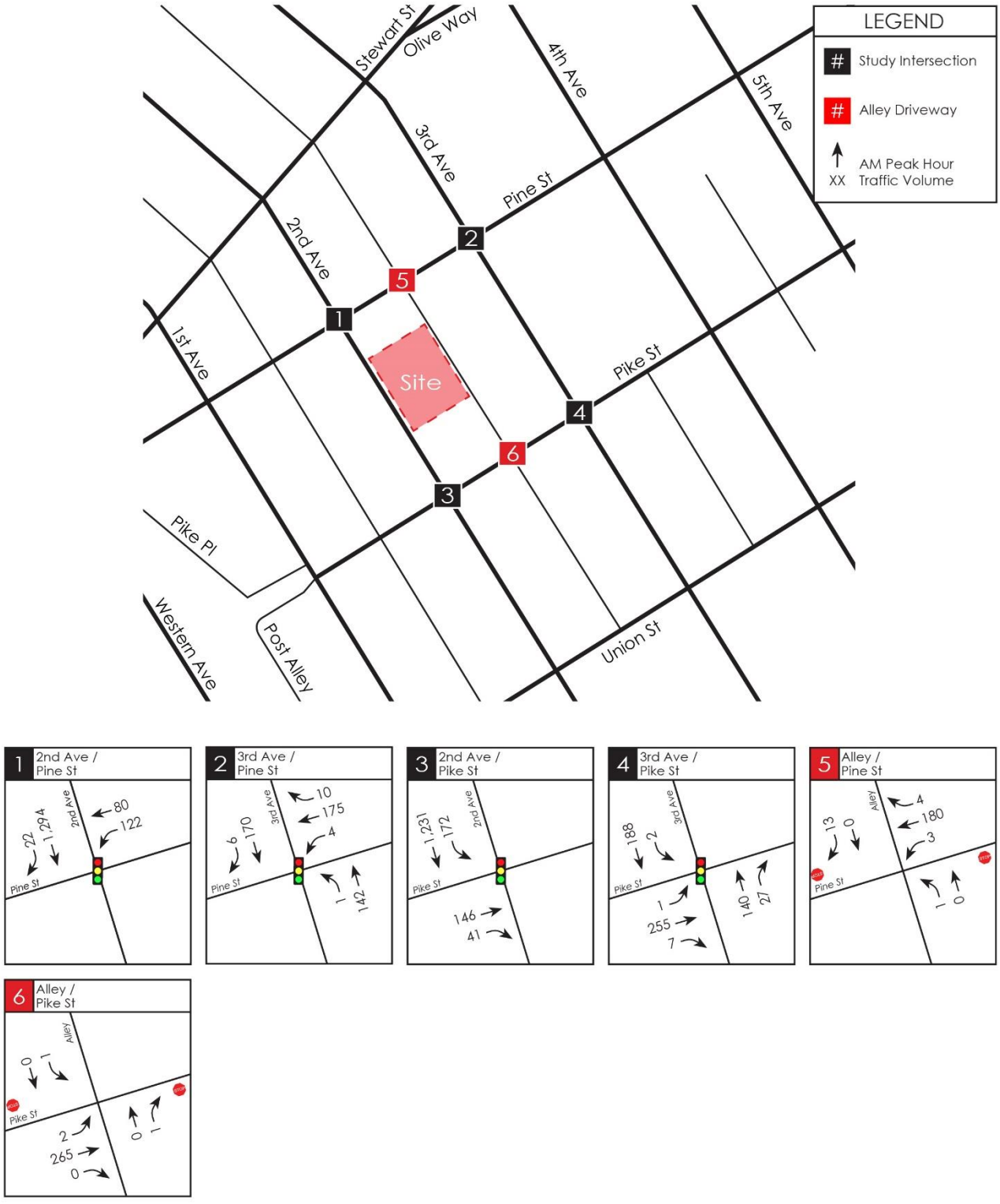

Figure 3: 2019 Existing Weekday AM Peak Hour Traffic Volumes

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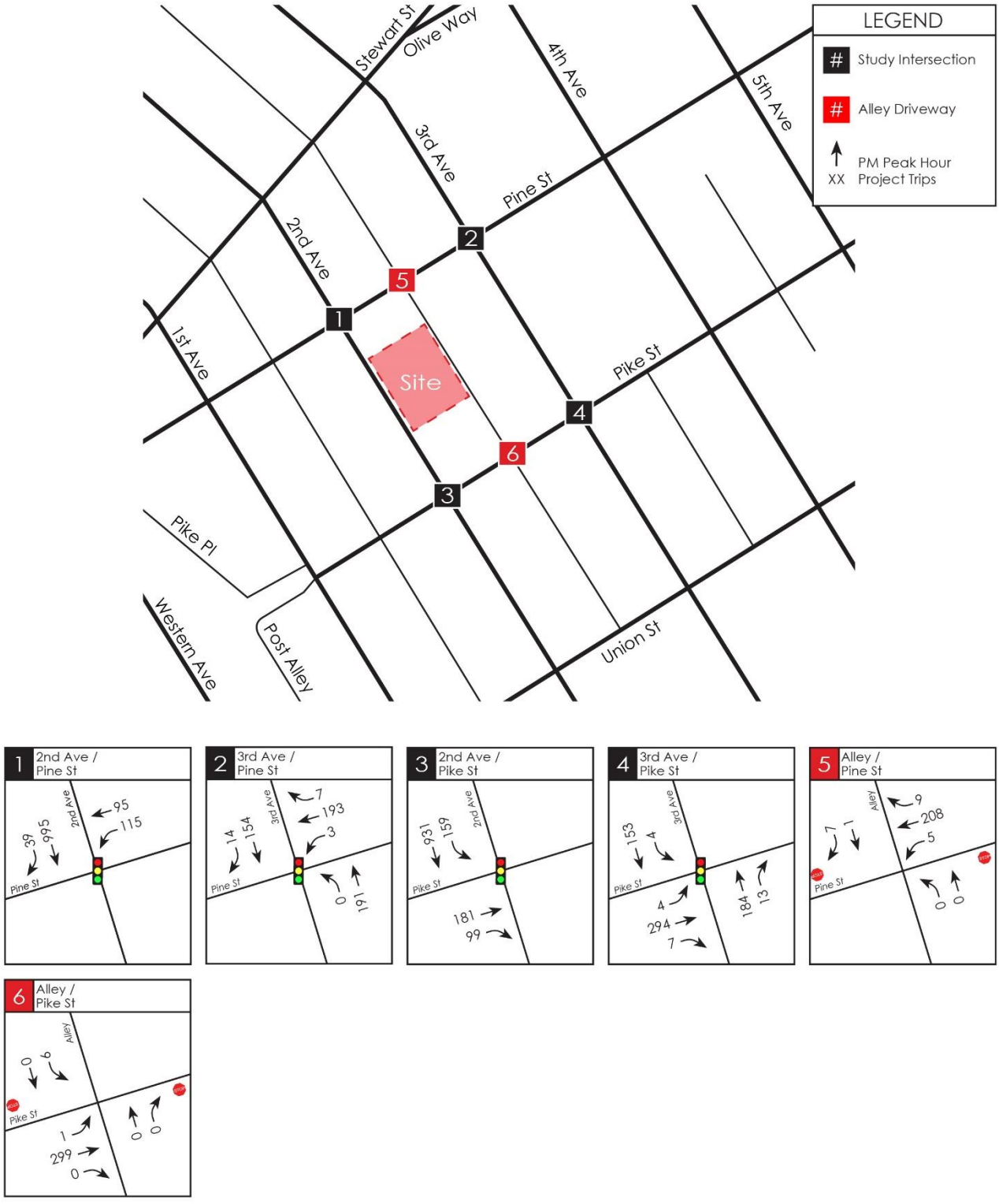

Figure 4: 2019 Existing Weekday PM Peak Hour Traffic Volumes

Level of Service

Based on scoping confirmation with the City of Seattle, level of service (LOS) analyses were conducted at the following 4 off-site signalized study intersections and 2 alley driveway locations for the weekday AM and PM peak hours:

1. 2nd Avenue / Pine Street (signal)
2. 3rd Avenue / Pine Street (signal)
3. 2nd Avenue / Pike Street (signal)
4. 3rd Avenue / Pike Street (signal)
5. Alley / Pine Street (stop-controlled)
6. Alley / Pike Street (stop-controlled)

LOS generally refers to the degree of congestion on a roadway or intersection. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. A letter scale from A to F generally describes intersection LOS. At signalized intersections, LOS A represents free-flow conditions (motorists experience little or no delays), and LOS F represents forced-flow conditions where motorists experience an average delay in excess of 80 seconds per vehicle.

The LOS reported for signalized intersections represents the average control delay (sec/veh) and can be reported for the overall intersection, for each approach, and for each lane group (additional v/c ratio criteria apply to lane group LOS only).

The LOS reported at stop-controlled intersections is based on the average control delay and can be reported for each controlled minor approach, controlled minor lane group, and controlled major-street movement (and for the overall intersection at all-way stop controlled intersections. Additional v/c ratio criteria apply to lane group or movement LOS only). Table 2 outlines the current HCM 6th Edition LOS criteria for signalized and stop-controlled intersections based on these methodologies.

Table 2
LOS Criteria for Signalized and Stop-Controlled Intersections[1]

SIGNALIZED INTERSECTIONS			STOP-CONTROLLED INTERSECTIONS		
	LOS by Volume-to Capacity (V/C) Ratio[2]			LOS by Volume-to Capacity (V/C) Ratio[3]	
Control Delay (sec/veh)	≤ 1.0	> 1.0	Control Delay (sec/veh)	≤ 1.0	> 1.0
≤ 10	A	F	≤ 10	A	F
> 10 to ≤ 20	B	F	> 10 to ≤ 15	B	F
> 20 to ≤ 35	C	F	> 15 to ≤ 25	C	F
> 35 to ≤ 55	D	F	> 25 to ≤ 35	D	F
> 55 to ≤ 80	E	F	> 35 to ≤ 50	E	F
> 80	F	F	> 50	F	F

[1] Source: Highway Capacity Manual (6th Edition), Transportation Research Board, 2016.

[2] For approach-based and intersection-wide assessments at signals, LOS is defined solely by control delay.

[3] For two-way stop controlled intersections, the LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole at two-way stop controlled intersections. For approach-based and intersection-wide assessments at all-way stop controlled intersections, LOS is solely defined by control delay.

Intersection LOS were calculated using the methodology and procedures outlined in the latest edition of the *Highway Capacity Manual* (HCM 6th Edition), Transportation Research Board (TRB), using the *Synchro 10.3* software program. Existing signal timing used in the analysis was provided by the City of Seattle DOT. Delay results using the *SimTraffic* traffic model were used to assess operations of the alley driveway locations. The 2019 existing AM and PM peak hour LOS analysis results for the study intersections are summarized in Table 3. The 2019 existing LOS worksheets are included in Appendix B.

Table 3
2019 Existing AM and PM Peak Hour LOS Summary

	AM Peak Hour		PM Peak Hour	
Location	LOS [1]	Delay (sec) [2]	LOS [1]	Delay (sec) [2]
Signalized Intersections				
1. 2nd Avenue/Pine Street	C	20.1	B	19.1
2. 3rd Avenue/Pine Street	C	21.6	C	22.2
3. 2nd Avenue/Pike Street	B	12.5	B	15.3
4. 3rd Avenue/Pike Street	B	19.0	C	24.8
Stop-Controlled Driveways[3]				
5. Alley/Pine Street				
Northbound Left-Thru[4]	A	7.4	-	-
6. Alley/Pike Street				
Southbound Left-Thru	A	0.2	D	33.6

1. LOS = Level of Service
2. Delay refers to average control delay expressed in seconds per vehicle.
3. Reported delays per *Simtraffic* results.
4. No existing NB exiting trips were observed during the PM peak hour. Therefore, no LOS delay reported.

As shown in Table 3, the four signalized study intersections currently operate at LOS C or better during the weekday AM and PM peak hours without and with the proposed project.

The southbound movement at the Alley/Pike Street driveway currently operates at LOS D during the weekday PM peak hour. It should be noted that on the day the traffic counts were conducted at the Alley/Pine Street driveway, no exiting northbound trips were recorded exiting the alley during the weekday PM peak hour.

Collision History

Historic collisions at the 4 off-site signalized study intersections and 2 alley driveway locations were analyzed for the five-year period from 2014 to 2018. Collision data was provided by WSDOT. Summaries of the total and yearly average collisions during this period are provided in Table 4. Summaries of collisions by type over the five-year period are provided in Table 5.

Table 4
Collision Data Summary by Year, January 1, 2014 to December 31, 2018

Location	2014	2015	2016	2017	2018	Five-Year Total Collisions	Average Annual Collisions
1. 2nd Avenue/Pine Street	6	4	3	2	3	18	3.60
2. 3rd Avenue/Pine Street	0	6	1	3	3	13	2.60
3. 2nd Avenue/Pike Street	8	5	0	1	5	19	3.80
4. 3rd Avenue/Pike Street	5	2	3	4	2	16	3.20
5. Alley/Pine Street	0	0	0	0	0	0	0.00
6. Alley/Pike Street	0	1	0	0	0	1	0.20

Source: WSDOT Crash Data.

Table 5
Collision Data Summary by Type, January 1, 2014 to December 31, 2018

			Collision Type						
Location	5-Year Total Collisions	Average Annual Collision Rate	Right Angle	Rear-End	Side Swipe	Approach Turn	Ped/Cycle	Parked Veh / Fixed	Other
1. 2nd Avenue/Pine Street	18	3.60	10	2	1	0	4	1	0
2. 3rd Avenue/Pine Street	13	2.60	1	3	0	3	6	0	0
3. 2nd Avenue/Pike Street	19	3.80	1	4	3	2	6	2	1
4. 3rd Avenue/Pike Street	16	3.20	0	3	0	2	10	0	1
5. Alley/Pine Street	0	0.00	0	0	0	0	0	0	0
6. Alley/Pike Street	1	0.20	1	0	0	0	0	0	0

Source: WSDOT Crash Data.

As shown in the tables above, over the past five years, only one collision occurred at the Pine Street and Pike Street alley driveways. The one collision involved a right turning truck exiting the alley on the south side of Pike Street and colliding with an eastbound vehicle on Pike Street. It should noted that no pedestrian/bicycle collisions were reported at the alley driveways over the five year time period.

FUTURE CONDITIONS AND PROJECT IMPACT ANALYSIS

Project Trip Generation

The weekday AM peak hour, PM peak hour, and daily trip generation estimates for the proposed and existing uses associated with the 1516 2nd Avenue project were based on methodology documented in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition. The trip generation estimates were adjusted to account for urban/infill mode splits, and pass-by trips consistent with the methodology included in the ITE Trip Generation Handbook, 3rd edition, September 2017.

Mode split and average vehicle occupancy (AVO) data used in the trip generation estimates was based on data included in Chapter 7 (Trip Generation for Urban Infill/Redevelopment) of the ITE Trip Generation Handbook, 3rd edition, September 2017. In addition, local mode split and AVO data from the US Census Bureau *2017 American Community Survey* for Census Tract 81 was used in the trip generation estimates for the proposed residential land use.

Table 6 summarizes the net new weekday daily, AM peak hour, and PM peak hour trip generation estimates for the proposed project. Detailed trip generation calculations are included in Appendix C.

Table 6
Trip Generation Summary

	Net New Trips Generated		
Weekday Time Period	In	Out	Total
Daily	491	491	982
AM Peak Hour	13	68	81
PM Peak Hour	40	24	64

As shown in Table 6, the proposed project is estimated to generate 982 new weekday daily trips, with 81 new trips occurring during the weekday AM peak hour (13 in, 68 out) and 64 new trips occurring during the weekday PM peak hour (40 in, 24 out). These trip generation estimates include credit for the uses to be removed.

Project Trip Distribution and Assignment

The distribution of the vehicle trips generated by the proposed project onto the street system was estimated based on Director's Rule 2009-5 and general traffic patterns in the site vicinity. Based on the Director's Rule methodology, vehicle trips generated by a development are distributed to the street network based on trip distribution tables established by the City's traffic forecasting model. Once the number of trips between the proposed development and other areas of the City are determined, the trips are assigned to the arterial network using the most likely routes to minimize travel time and distance. Appendix D includes figures that illustrate the anticipated entering and exiting trip distribution patterns for the Residential and Commercial trips for the proposed 1516 2nd Avenue project.

The resulting AM and PM peak hour project trip assignment at the 4 off-site signalized study intersections and 2 alley driveway locations are illustrated in Figures 5 and 6. All residential trips were assumed to use the garage access on the alley. The proposed retail trips were assumed to utilize on-street parking on 2nd Avenue. Given the site is currently underutilized, gross project trips were assigned through the study intersections and alley driveways.

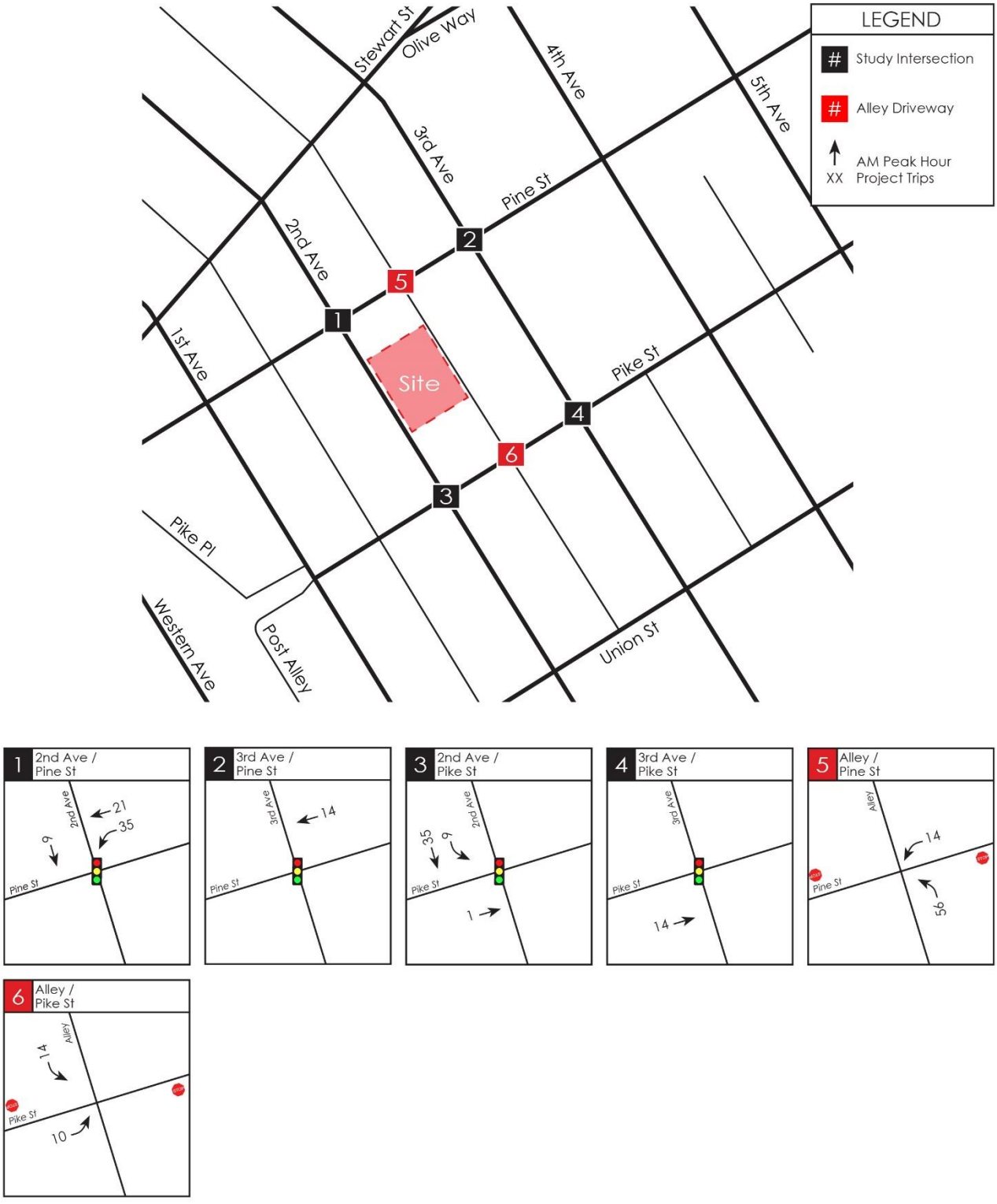

Figure 5: Weekday AM Peak Hour Project Trip Assignment

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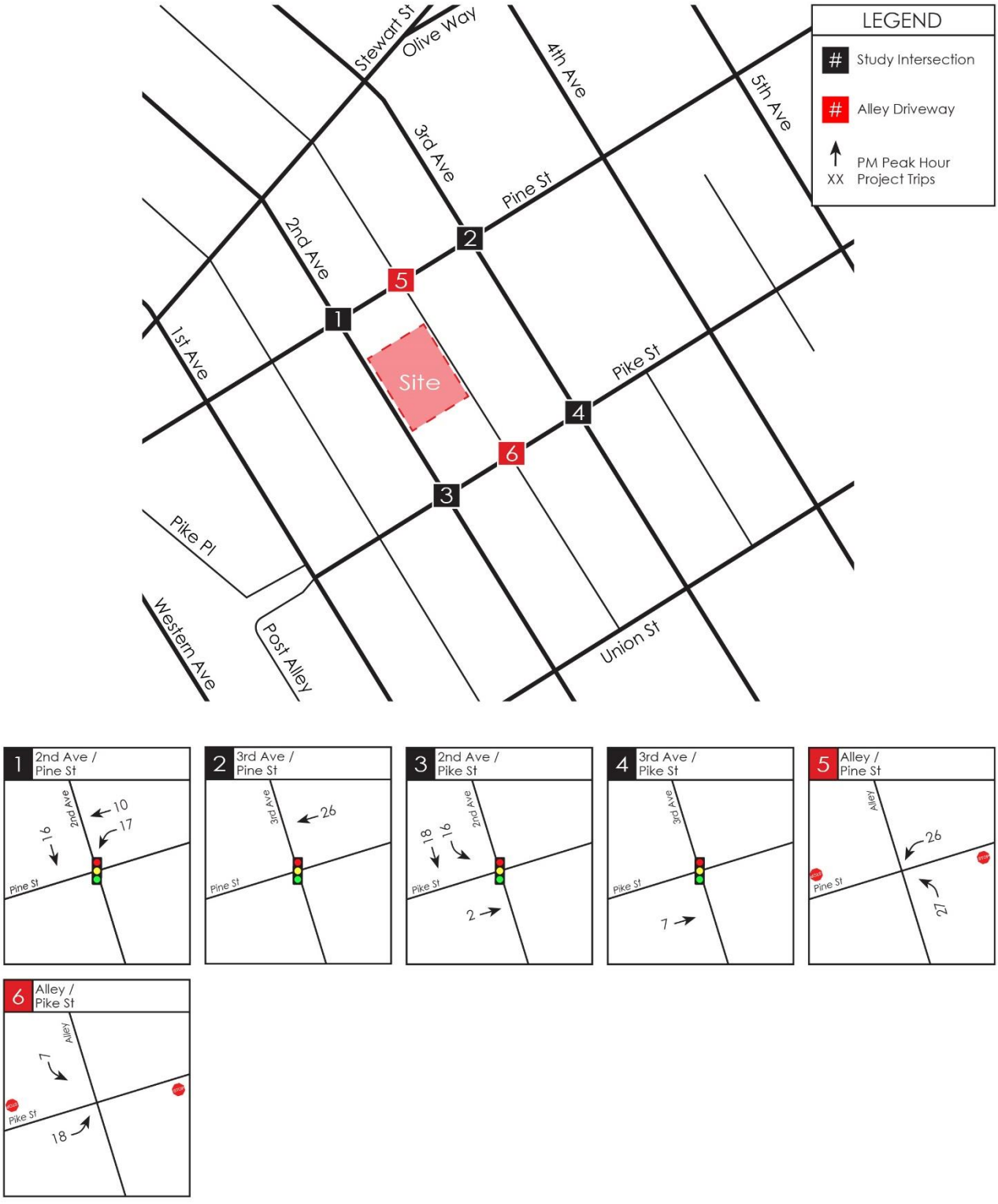

Figure 6: Weekday PM Peak Hour Project Trip Assignment

Future Traffic Volumes

To estimate future year 2023 without project traffic volumes at the 4 off-site signalized study intersections and 2 alley driveway locations, a 1 percent annual growth rate was applied to the existing traffic volumes. This growth factor is used to account for background growth in Downtown as recommended by the City. In addition to the background growth rate, per discussions with SDCI staff, trips from the following 5 future pipeline development projects were included in the future baseline traffic volumes:

1. 103 Pike Street (#3028428)
2. 1931 2nd Avenue (#3007606)
3. 1931 3rd Avenue (#3023678)
4. 204 Pine Street (#3014773)
5. 1613 2nd Avenue (#3025998)

The future 2023 without project AM and PM peak hour traffic volumes at the 4 off-site signalized study intersections and 2 alley driveway locations are shown in Figures 7 and 8. Adding the trip assignment from the proposed development (shown in Figures 5 and 6) to the future 2023 without project traffic volumes results in the 2023 with project AM and PM traffic volumes at the 4 off-site signalized study intersections and 2 alley driveway locations (shown in Figures 9 and 10).

Level of Service

Weekday peak hour Level of Service (LOS) analyses were conducted at the 4 off-site signalized study intersections and 2 alley driveway locations for future 2023 without project and with project conditions. The roadway network and traffic signal timing assumed in the future year LOS analysis was based on existing conditions. The future analysis at the study intersections and the alley driveway locations also accounts for the estimated increase in pedestrian volumes associated with the proposed 1516 2nd Avenue project. The increase in pedestrian volumes from the project were estimated based on the walk and transit mode splits from census data, which are provided in Appendix C.

Study Intersection LOS

The 2023 weekday AM and PM peak hour LOS results at the 4 off-site signalized study intersections and 2 alley driveway locations for 2023 without project and with project conditions are summarized in Table 7. The LOS worksheets are included in Appendix B.

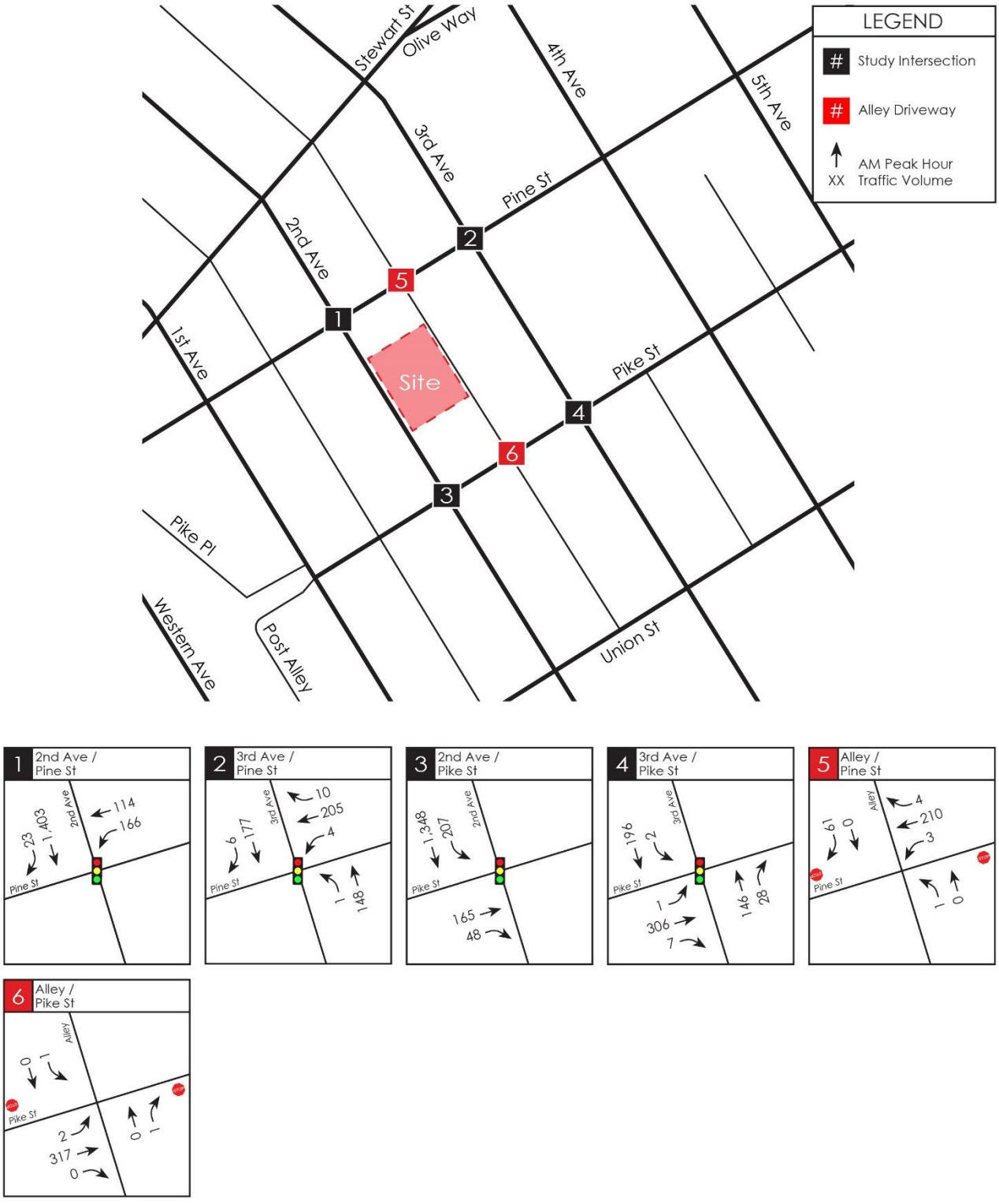

Figure 7: 2023 Without Project Weekday AM Peak Hour Traffic Volumes

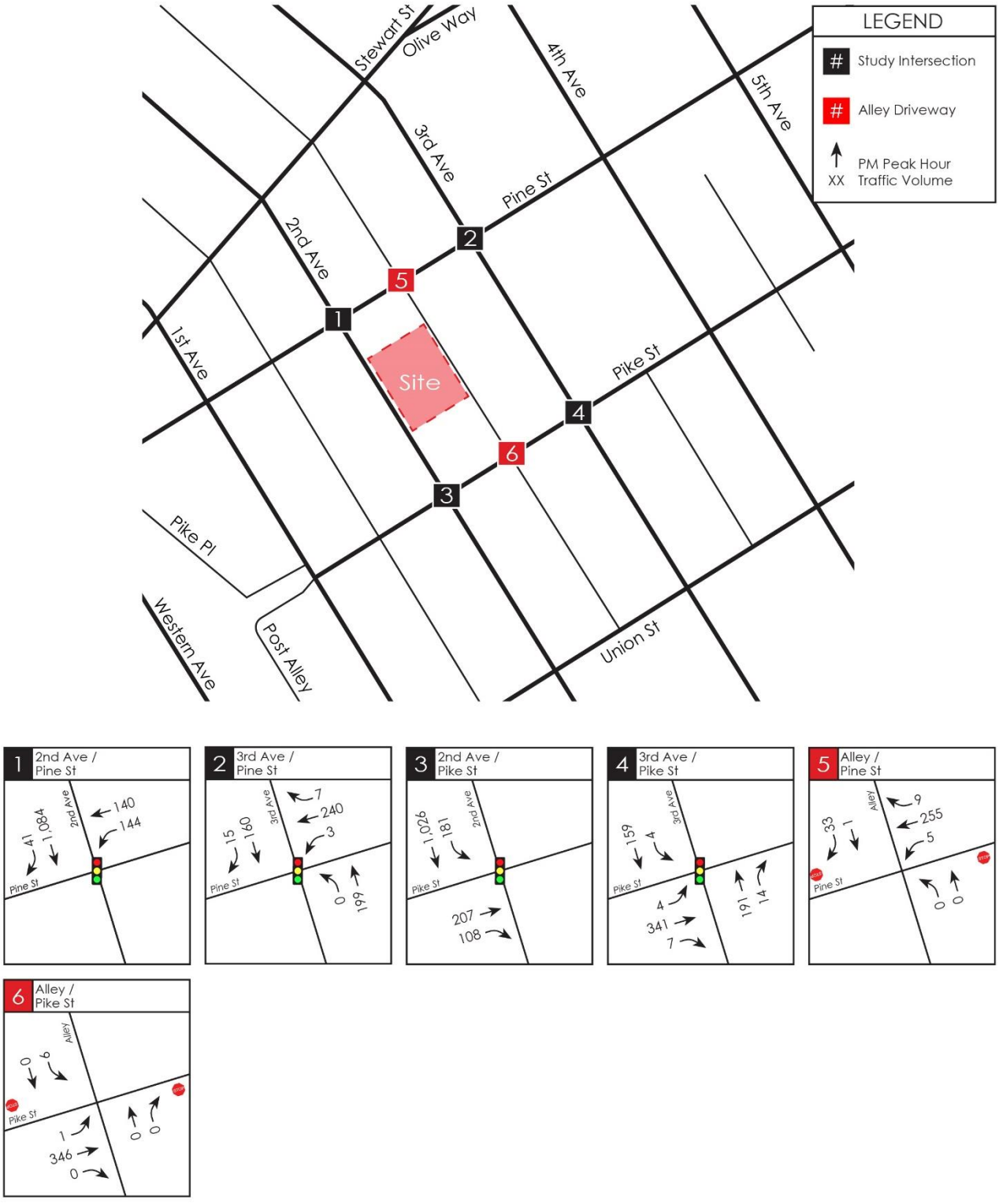

Figure 8: 2023 Without Project Weekday PM Peak Hour Traffic Volumes

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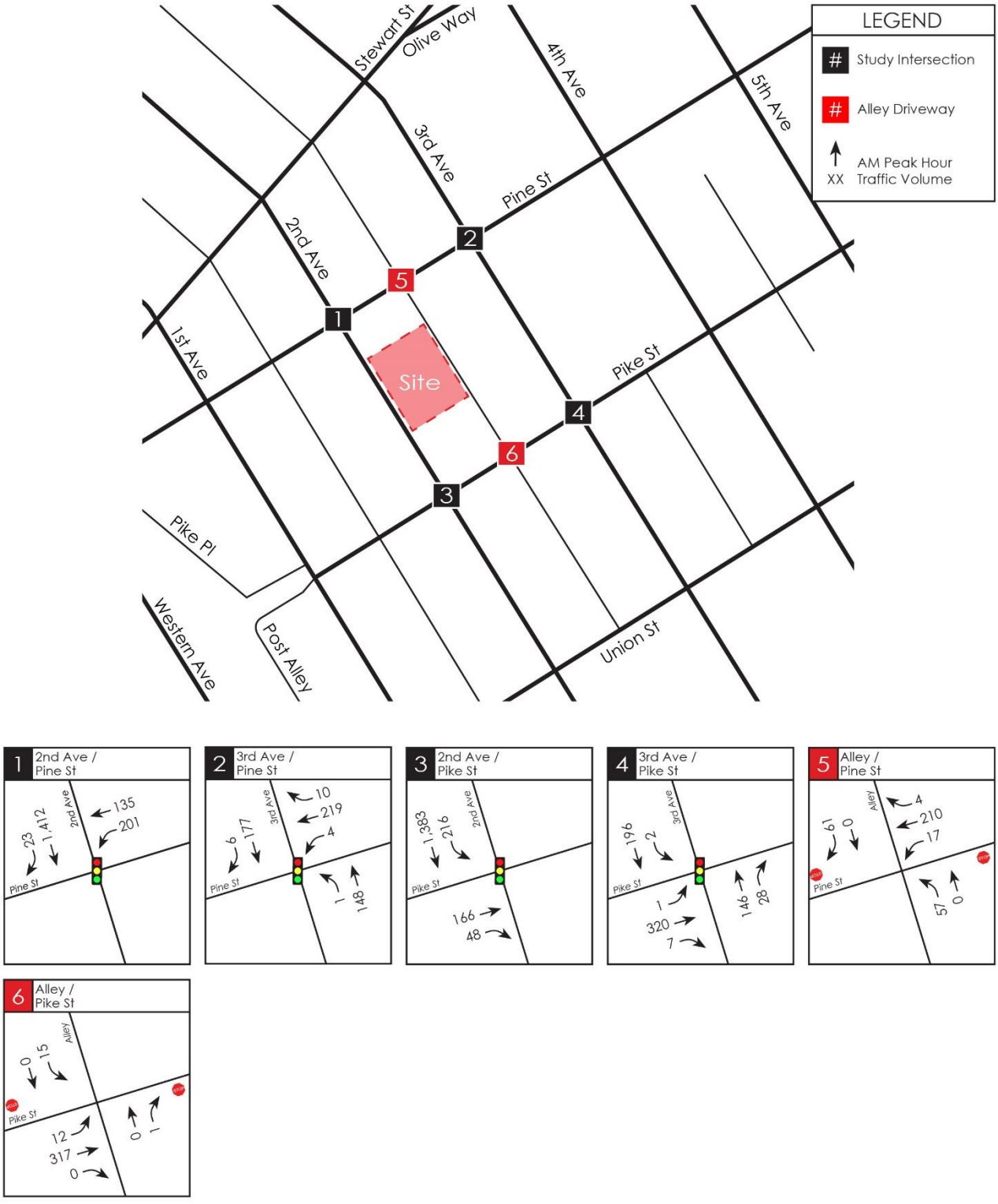

Figure 9: 2023 With Project Weekday AM Peak Hour Traffic Volumes

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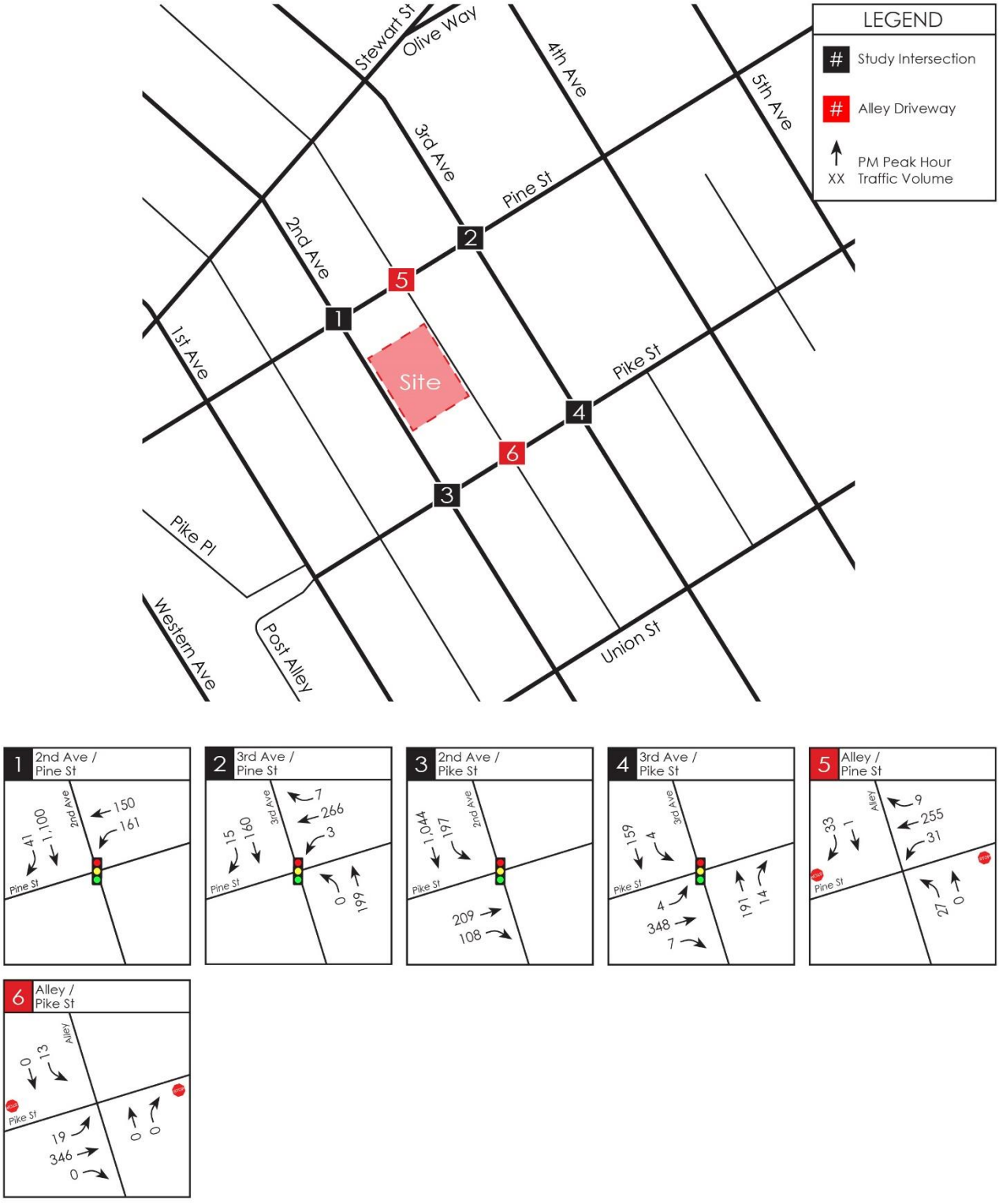

Figure 10: 2023 With Project Weekday PM Peak Hour Traffic Volumes

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Table 7
2023 AM and PM Peak Hour LOS Summary

Location	2023 Without Project LOS [1]	2023 Without Project Delay (sec) [2]	2023 With Project LOS [1]	2023 With Project Delay (sec) [2]
AM PEAK HOUR				
Signalized Intersections				
1. 2nd Avenue/Pine Street	C	24.6	C	32.3
2. 3rd Avenue/Pine Street	C	22.5	C	23.0
3. 2nd Avenue/Pike Street	B	14.4	B	17.1
4. 3rd Avenue/Pike Street	C	23.1	C	24.8
Stop-Controlled Driveways[3]				
5. Alley/Pine Street (NB Left-Thru)	A	12.6	D	33.3
6. Alley/Pike Street (SB Left-Thru)	D	26.8	D	30.3
PM PEAK HOUR				
Signalized Intersections				
1. 2nd Avenue/Pine Street	C	23.4	C	26.1
2. 3rd Avenue/Pine Street	C	23.5	C	24.2
3. 2nd Avenue/Pike Street	B	18.2	B	19.7
4. 3rd Avenue/Pike Street	C	27.1	C	27.5
Stop-Controlled Driveways[3]				
5. Alley/Pine Street (NB Left-Thru)[4]	-	-	E	38.1
6. Alley/Pike Street (SB Left-Thru)	D	36.0	E	47.0

1. LOS = Level of Service
2. Delay refers to average control delay expressed in seconds per vehicle.
3. Reported delays per *Simtraffic* results.
4. No existing NB exiting trips were observed during the PM peak hour. Therefore, no LOS delay reported.

As shown in Table 7, the four signalized study intersections are anticipated to operate at LOS C or better during the weekday AM and PM peak hours without and with the proposed project.

Alley Driveway Operations

The stop controlled alley intersections at Pike and Pine Streets are anticipated to include LOS E movements during the weekday PM peak hours with the proposed project. The LOS E operations at alley driveways in a downtown area are not uncommon, especially with heavy pedestrian volumes that exist at these locations. It should also be noted that LOS is not typically used as a regulatory tool for addressing entering and exiting traffic at alleys.

Under the scenario where a vehicle is waiting to exit the alley at the same time a vehicle is entering the alley, the vehicle entering the alley would yield to the vehicle exiting the alley due to the narrow width of the alley at both ends of the alley at Pine Street and Pine Street. Since both Pike Street and Pine Street are one-way streets, the increase in delay for entering vehicles as a result of needing to yield to exiting alley vehicles is expected to be minimal. For this situation, this could be considered a benefit for exiting alley vehicles since they would have a gap in traffic on the Pine or Pike created by the vehicle waiting to enter the alley.

Transportation Concurrency

The City of Seattle has implemented a Transportation Concurrency system to comply with one of the requirements of the Washington State Growth Management Act (GMA). The system, described in Director's Rule 2009-5 and the City's Land Use Code is designed to provide a mechanism that determines whether adequate transportation facilities would be available "concurrent" with proposed development projects. Transportation concurrency review in the City of Seattle is evaluated first by determining applicable screenlines. A screenline is an imaginary line drawn across several arterials at a particular place where the vehicular volume to-capacity ratio (v/c) is calculated. For the proposed 1516 2nd Avenue project, screenlines 10.11 (South of S Jackson St) and 12.12 (East of CBD) were evaluated.

Baseline peak-hour vehicular traffic volumes for the screenlines were obtained from Director's Rule 2009-5. Project-generated vehicular traffic was then added to baseline traffic volumes at the screenlines. The total vehicular traffic volume, including PM peak hour trips from the proposed project, was then divided by the capacity of all roadways crossing the screenlines to obtain a volume to capacity (v/c) ratio. This ratio was then compared to the LOS standard. Table 8 summarizes the transportation concurrency review results. As shown, the evaluated screenlines would continue to operate below the concurrency threshold with construction of the project. As a result, no concurrency-related mitigation is warranted or required for the project.

Table 8
Transportation Concurrency Assessment

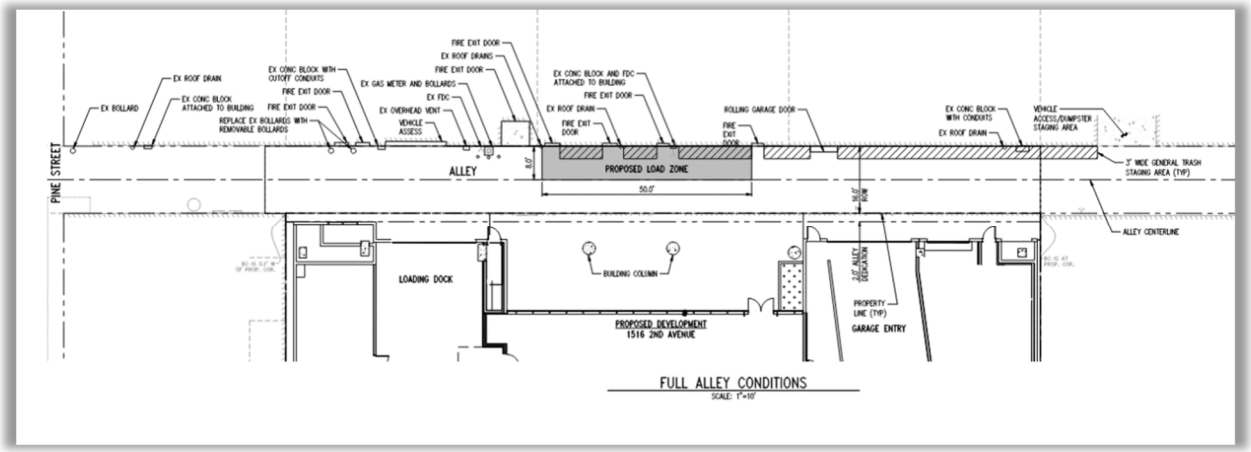
Screenline	Dir.	Capacity[1]	Baseline Peak-Hour Volume[1]	Proposed Project Trips	With Project V/C Ratio	V/C Threshold[1]
Screenline 10.11: South of S Jackson St	NB	12,900	7,586	6	0.59	1
	SB	12,980	8,671	4	0.67	1
Screenline 12.12: East of CBD	EB	13,300	8,266	8	0.62	1.2
	WB	11,736	6,491	15	0.55	1.2

[1] Data obtained from Director's Rule 2009-5 *Transportation Concurrency Project Review System*.

Alley Loading and Delivery Trucks

A majority of deliveries and all maintenance trucks serving the site will occur on the alley located on the east side of the site. The existing parking lot serving the site will be eliminated as well as the curb cut onto 2nd Ave. A loading zone on 2nd Ave is proposed along the property frontage at the north end of the property closest to Pine Street.

Four separate design functions are proposed along the alley to facilitate loading for commercial uses, deliveries and service vehicles, vehicle drop-off/pick-up, and access to the below-grade garage. Each of these functions are described next and illustrated in the exhibit below. In addition, a Loading Dock Management Plan is proposed to manage deliveries for the on-site residents and commercial uses in order to minimize impacts in the alley.



Loading Zone on 2nd Ave (Proposed)

A loading zone on 2nd Avenue is proposed adjacent to the property at the north end of the block closest to Pine Street. The proposed loading zone would convert approximately 105 feet of the approximately 340 foot existing left turn lane on 2nd Avenue (approaching Pike Street) into on-street parking and a loading zone. As a result, the queue storage for the southbound left turn lane would be reduced to approximately 235 feet.

Under 2023 future with project conditions, the 95th percentile southbound left-turn queue on 2nd Ave from Pike Street is anticipated to be about 200 feet during the weekday AM and PM peak hours, which would be accommodated by the future left-turn queue storage of 235 feet.

Loading Bay

A single bay loading dock is proposed to accommodate a variety of truck types including the largest truck type, an SU-30. The loading bay will also be able to accommodate a variety of service vehicles including a DL-23 consistent with a *FedEx* and *UPS* delivery vehicle as well as a 17-foot box truck and *Amazon Prime* van. All trucks and delivery vehicles would be able to access the loading dock from either the north or south as shown in Appendix F illustrating maneuvering of an SU-30 truck. The truck turning analysis was conducted using industry-adopted 'AutoTURN' evaluation. The truck turning analysis shows that existing bollards located on the east side of the alley would need to be replaced with removable bollards to accommodate an SU-30 truck entering and exiting the loading bay on the property.

Designated Loading Area on Alley (Proposed)

An additional loading area is proposed to be designated along the east portion of the alley adjacent to the site; this area would be striped for exclusive use by trucks and delivery vehicles when the on-site loading dock is utilized. Short-term quick-stay deliveries such as *Amazon Prime* vans and *FedEX* and *UPS* vehicles, as well as *USPS* mail delivery are also expected to use this space as a more convenient location than pulling into the loading bay.

The design of the building set-back includes the required 2-foot dedication for the public alley right-of-way as well as an additional 5 feet of property to provide more width to accommodate the proposed loading area, and still allow for two-way traffic. The intention of use is so that other passenger vehicles and trucks can traverse the alley in either direction when the loading area is occupied.

Porte-Cochere

A porte cochere is proposed that would accommodate passenger drop offs and pick-ups within the property. The location, design and function of the porte-cochere allows for passenger vehicles to enter from either direction of the alley.

Appendix E illustrates through AutoTURN the ability of a passenger vehicle to enter and exit the porte-cochere from either direction. When the designated loading area on the alley is not occupied, a passenger vehicle is also able to make a U-turn. When the designated loading area is occupied, a vehicle would continue their path to the north or south depending on which direction they arrived in the porte-cochere.

Garage Access

Access to and from the below-grade parking garage is located on the south portion of the site adjacent to the porte-cochere. The garage width is approximately 20 feet and will serve entering and exiting vehicles. The turning path of vehicles entering and exiting the garage is illustrated in Appendix F. Due to the limited alley width and building structural elements, vehicles entering and exiting the garage would need to yield to each other in order to accommodate a full turn. This is common in urban parking garage functions and typical in a downtown alley.

Loading and Delivery Plan

A Loading and Delivery Plan is being developed and will be implemented as part of the City's Loading Dock Management Plan (LDMP) process. The Loading and Delivery Plan would manage deliveries for the on-site residents and commercial uses to minimize impacts in the alley.

The Plan would coordinate move-in and move-out to designated times, coordinate delivery times for the commercial uses and service vehicles, limit the size of delivery trucks, identify protocols for scheduling deliveries, provide commercial vendors with performance specifications, enforce 30-minute limitations of loading in the alley, and ensure that two-way traffic can traverse the alley when the designated alley loading area is being utilized.

The Plan would also be shared with other property owners and residents that rely on the alley for deliveries and vehicle access.

Delivery Frequencies

Large hi-rise buildings downtown range in the frequency of move-in/out for residents with higher frequencies during beginning of the month. In general moves for large units can range from 25 to 75 per month. Moves last from 2 to 4 hours depending upon the size of the unit, and delivers are typically 30 minutes to an hour depending upon the size of the delivery.

On average there are a couple maintenance vehicles per day related to mechanical repairs that typically occur between 7:00 a.m. and 4:00 p.m.

Residential and commercial trash occurs 7 days per week, and residential compacted recycling about 5 times per week. Typically hi-rises separate commercial garbage and recycling from residential to save cost. Pick-up times range from 6:00 a.m. to 7:00 p.m. daily.

Typically large hi-rise buildings downtown average about 300 packages per day, which equates to about 10–15 delivery trucks per day 7 days a week. Each shipping company can come multiple times per day as early as 7:00 a.m. and as late as 9:00 p.m. Average unload/load time is approximately 15-30 minutes depending upon the time of year and how busy the alley/loading bays are during delivery periods.

Non-Motorized Transportation Impacts

Pedestrian Impacts

Based on Census data, it is estimated that approximately 40.7% of the residential trips would walk as a means of traveling to/from work. Based on this percentage, the residents are estimated to generate 141 walk trips during the weekday AM peak hour and 117 walk trips during the weekday PM peak hour. Additional walk trips would be generated by the commercial uses in the project. The existing pedestrian facilities in the project vicinity will accommodate these additional walk trips.

Bicycle Impacts

Based on Census data, it is estimated that approximately 1.2% of the residential trips would use bicycles as a means of travel to/from work. Based on this percentage, the residents are estimated to generate 4 bicycle trips during the weekday AM peak hour and 3 bicycle trips during the weekday PM peak hour. Additional bicycle trips may be generated by the commercial uses in the project. Existing bicycle facilities in the project vicinity located on Pine Street, Pike Street, and 2nd Avenue will accommodate these additional bicycle trips.

Parking Analysis

The parking analysis for the proposed 1516 2nd Avenue project evaluated parking demand versus proposed parking supply, as well as a comparison to City code requirements.

Parking Supply

On-site parking would be provided by 269 parking stalls in a below-grade garage, all of which will be dedicated for use by homeowners in the building.

Parking Code Requirements

According to Seattle Municipal Code (SMC) 23.49.019, both residential and non-residential uses within the Downtown zones have no minimum parking requirements.

Weekday Parking Demand

Residential Parking Demand. The peak parking demand for the proposed residential units was estimated based on rates and hourly variations included in the ITE *Parking Generation* (5th Edition) for Multifamily High Rise under the downtown Center Core setting. Based on a rate of 0.46 stalls/dwelling unit and 524 condominium units, the midnight peak parking demand is 241 stalls. The proposed residential supply will be greater than the residential demand and therefore no parking spillover is anticipated.

Retail Parking Demand. The peak parking demand for the proposed retail use was estimated based on rates for the downtown Center Core setting. Based on a rate of 1.33 stalls/1,000 SF and 3,502 SF of retail space, the 1:00 p.m. peak parking demand is 5 stalls. There will be no dedicated on-site parking for the retail use; it is anticipated that on-street public parking and parking garages/lots in the project vicinity would accommodate any short-term retail parking demand.

The detailed parking demand calculations for the proposed project are included in **Appendix G**.

PROJECT MITIGATION MEASURES

The traffic and parking impacts of the proposed 1561 2nd Avenue project are not expected to create a significant adverse impact to the local vehicular, pedestrian, bicycle, and transit networks. To mitigate the project impacts to the adjacent alley, the following measures are proposed:

- Provide an on-site loading bay for deliveries, commercial vendor use, and repair vehicles for the residential units.
- Dedicate 2 feet of property along the alley project frontage, and allocate an additional 5 feet of property area to accommodate a new proposed loading zone on the alley.
- Stripe a new 8-foot x 50-foot designated loading zone on the east side of the alley adjacent to the project to accommodate short-term delivery vehicles for parcels and mail.

  This will allow the improved access for loading and delivery vehicles to use the on-site loading bay and a new delivery parking zone in the alley, as well as help facilitate vehicle pick-up and drop-off in the porte-cochere.
- Develop a Loading and Delivery Plan which will be implemented as part of the City's Loading Dock Management Plan (LDMP) process.

Loading and Delivery Plan

A Loading and Delivery Plan is being developed and would be implemented as part of the City's Loading Dock Management Plan (LDMP) process. The Loading and Delivery Plan would manage deliveries for the on-site residents and commercial uses to minimize impacts in the alley. The Plan would also be shared with other property owners and residents that rely on the alley for deliveries and vehicle access.

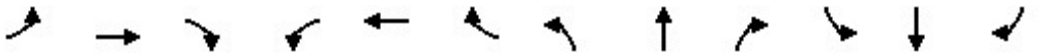
The Plan would include, but not be limited to the following:

- Allow use of the 8x50 foot designated loading area for use by adjacent properties.
- Identify protocols for scheduling deliveries for the commercial uses and service vehicles.
- Identify protocols and designate times for residential move-in and move-out.
- Limit the size of delivery trucks
- Provide commercial vendors with performance specifications, and enforce 30-minute limitations of loading in the alley.
- Ensure that two-way traffic can traverse the alley when the designated alley loading area is being utilized.
- Ensure that porte-cochere remains open 24 hours a day, and not blocked by delivery vehicles.
- Ensure garage access is not blocked and adequate sight lines are providing for entering and exiting vehicles.

Appendix B

Level of Service Calculations

2019 Existing



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	122	80	0	0	0	0	0	1294	22
Future Volume (vph)	0	0	0	122	80	0	0	0	0	0	1294	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1348	0	0	0	0	0	3065	1275
Flt Permitted					0.971							
Satd. Flow (perm)	0	0	0	0	1259	0	0	0	0	0	3065	1275
Right Turn on Red			Yes	No		No			Yes			Yes
Satd. Flow (RTOR)												97
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		366			170			441			347	
Travel Time (s)		10.0			4.6			12.0			9.5	
Confl. Peds. (#/hr)				104								174
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	35%	5%	0%	0%	0%	0%	0%	6%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	210	0	0	0	0	0	1348	23
Turn Type				Perm	NA						NA	custom
Protected Phases					4						2	5
Permitted Phases				4								
Minimum Split (s)				11.5	11.5						16.5	9.5
Total Split (s)				30.0	30.0						57.0	15.0
Total Split (%)				33.3%	33.3%						63.3%	16.7%
Yellow Time (s)				3.5	3.5						3.5	3.5
All-Red Time (s)				1.0	1.0						1.0	1.0
Lost Time Adjust (s)					0.0						0.0	0.0
Total Lost Time (s)					4.5						4.5	4.5
Lead/Lag				Lag	Lag							Lag
Lead-Lag Optimize?				Yes	Yes							Yes
Act Effct Green (s)					25.5						52.5	10.5
Actuated g/C Ratio					0.28						0.58	0.12
v/c Ratio					0.59						0.75	0.10
Control Delay					39.1						17.4	0.8
Queue Delay					0.0						0.1	0.0
Total Delay					39.1						17.5	0.8
LOS					D						B	A
Approach Delay					39.1						17.2	
Approach LOS					D						B	

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 63 (70%), Referenced to phase 2:SBT and 6:Ped, Start of 1st Green	
Natural Cycle: 60	
Control Type: Pretimed	

Lane Group	Ø3	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	6	8
Permitted Phases			
Minimum Split (s)	3.0	16.5	24.5
Total Split (s)	3.0	42.0	33.0
Total Split (%)	3%	47%	37%
Yellow Time (s)	2.0	3.5	3.5
All-Red Time (s)	0.0	1.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Maximum v/c Ratio: 0.75

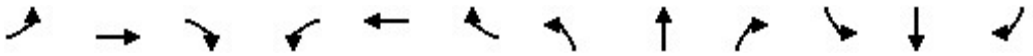
Intersection Signal Delay: 20.1	Intersection LOS: C
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: 2nd Ave & Pine St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	4	175	10	1	142	0	0	170	6
Future Volume (vph)	0	0	0	4	175	10	1	142	0	0	170	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		80	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			648			440			349	
Travel Time (s)		4.3			17.7			12.0			9.5	
Confl. Peds. (#/hr)				416		771	415					415
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	25%	24%	20%	100%	94%	0%	0%	89%	0%
Shared Lane Traffic (%)												
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Minimum Split (s)				23.5	23.5	23.5	19.5	19.5			19.5	
Total Split (s)				35.0	35.0	35.0	55.0	55.0			55.0	
Total Split (%)				38.9%	38.9%	38.9%	61.1%	61.1%			61.1%	
Yellow Time (s)				3.5	3.5	3.5	3.5	3.5			3.5	
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	
Lost Time Adjust (s)					0.0	0.0		0.0			0.0	
Total Lost Time (s)					4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 25 (28%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green	
Natural Cycle: 45	
Control Type: Pretimed	

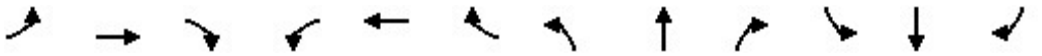
Splits and Phases: 2: 3rd Ave & Pine St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	175	10	1	142	0	0	170	6
Future Volume (veh/h)	0	0	0	4	175	10	1	142	0	0	170	6
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.71	0.96		1.00	1.00		0.81
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1443	1390	1443	456	456	0	0	523	523
Adj Flow Rate, veh/h				4	197	11	1	160	0	0	191	7
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				20	24	20	94	94	0	0	89	89
Cap, veh/h				9	461	296	41	477	0	0	543	20
Arrive On Green				0.34	0.34	0.34	0.19	0.19	0.00	0.00	0.56	0.56
Sat Flow, veh/h				28	1361	873	1	870	0	0	994	35
Grp Volume(v), veh/h				201	0	11	86	75	0	0	97	101
Grp Sat Flow(s),veh/h/ln				1389	0	873	456	394	0	0	497	507
Q Serve(g_s), s				10.1	0.0	0.8	0.0	14.8	0.0	0.0	9.6	9.8
Cycle Q Clear(g_c), s				10.1	0.0	0.8	14.8	14.8	0.0	0.0	9.6	9.8
Prop In Lane				0.02		1.00	0.01		0.00	0.00		0.07
Lane Grp Cap(c), veh/h				471	0	296	296	221	0	0	279	284
V/C Ratio(X)				0.43	0.00	0.04	0.29	0.34	0.00	0.00	0.35	0.36
Avail Cap(c_a), veh/h				471	0	296	296	221	0	0	279	284
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				23.0	0.0	19.9	22.1	22.1	0.0	0.0	10.8	10.8
Incr Delay (d2), s/veh				2.8	0.0	0.2	2.5	4.1	0.0	0.0	3.4	3.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.6	0.0	0.2	2.0	1.8	0.0	0.0	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				25.8	0.0	20.2	24.6	26.2	0.0	0.0	14.2	14.3
LnGrp LOS				C	A	C	C	C	A	A	B	B
Approach Vol, veh/h					212			161			198	
Approach Delay, s/veh					25.5			25.3			14.2	
Approach LOS					C			C			B	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		55.0				55.0		35.0				
Change Period (Y+Rc), s		4.5				4.5		4.5				
Max Green Setting (Gmax), s		50.5				50.5		30.5				
Max Q Clear Time (g_c+I1), s		16.8				11.8		12.1				
Green Ext Time (p_c), s		0.2				0.3		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		21.6
HCM 6th LOS		C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	146	41	0	0	0	0	0	0	172	1231	0
Future Volume (vph)	0	146	41	0	0	0	0	0	0	172	1231	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1439	0	0	0	0	0	0	0	1400	2647	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1439	0	0	0	0	0	0	0	1400	2647	0
Right Turn on Red			No			Yes			No	No		No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		393			168			365			441	
Travel Time (s)		10.7			4.6			10.0			12.0	
Confl. Peds. (#/hr)			437									
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	5%	10%	0%	0%	0%	0%	0%	0%	16%	8%	0%
Bus Blockages (#/hr)	0	0	14	0	0	0	0	0	0	0	60	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	191	0	0	0	0	0	0	0	176	1256	0
Turn Type		NA								Prot	NA	
Protected Phases		4								5	2 6	
Permitted Phases												
Detector Phase		4								5	2 6	
Switch Phase												
Minimum Initial (s)		7.0								5.0		
Minimum Split (s)		24.5								9.5		
Total Split (s)		30.0								25.0		
Total Split (%)		33.3%								27.8%		
Yellow Time (s)		3.5								3.5		
All-Red Time (s)		1.0								1.0		
Lost Time Adjust (s)		0.0								0.0		
Total Lost Time (s)		4.5								4.5		
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode		Max								None		
Act Effct Green (s)		25.5								20.5	55.5	
Actuated g/C Ratio		0.28								0.23	0.62	
v/c Ratio		0.47								0.55	0.77	
Control Delay		31.3								27.8	7.1	
Queue Delay		0.2								0.0	0.4	
Total Delay		31.4								27.8	7.5	
LOS		C								C	A	
Approach Delay		31.4									10.0	
Approach LOS		C									B	

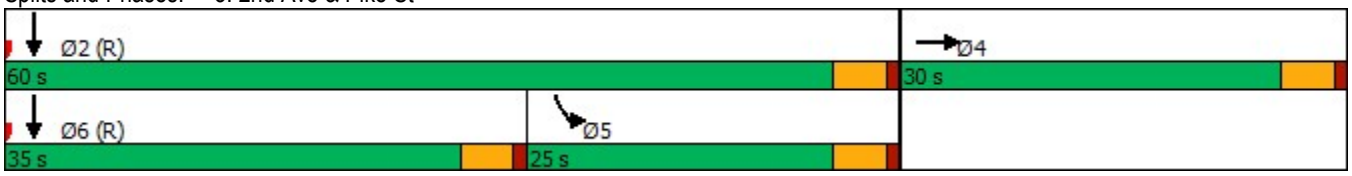
Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:SBT and 6:SBT, Start of 1st Green	

Lane Group	Ø2	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	16.5	16.5
Total Split (s)	60.0	35.0
Total Split (%)	67%	39%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Recall Mode	C-Max	C-Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: 2nd Ave & Pike St

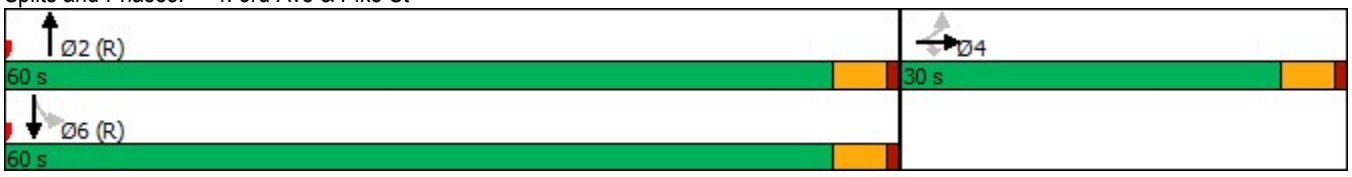


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	255	7	0	0	0	0	140	27	2	188	0
Future Volume (vph)	1	255	7	0	0	0	0	140	27	2	188	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		144			718			486			440	
Travel Time (s)		3.9			19.6			13.3			12.0	
Confl. Peds. (#/hr)	323		630						636	636		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	13%	0%	0%	0%	0%	0%	96%	15%	50%	82%	0%
Bus Blockages (#/hr)	0	14	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Minimum Split (s)	21.5	21.5	21.5					18.5		18.5	18.5	
Total Split (s)	30.0	30.0	30.0					60.0		60.0	60.0	
Total Split (%)	33.3%	33.3%	33.3%					66.7%		66.7%	66.7%	
Yellow Time (s)	3.5	3.5	3.5					3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0					1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		4.5	4.5					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary

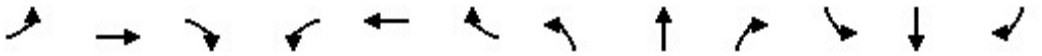
Area Type: CBD
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 81 (90%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green
Natural Cycle: 40
Control Type: Pretimed

Splits and Phases: 4: 3rd Ave & Pike St



HCM 6th Signalized Intersection Summary
4: 3rd Ave & Pike St

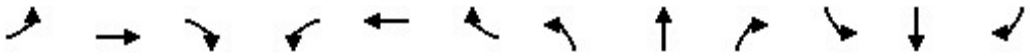
01/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	255	7	0	0	0	0	140	27	2	188	0
Future Volume (veh/h)	1	255	7	0	0	0	0	140	27	2	188	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.71				1.00		0.88	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1710	1537	1710				0	430	430	616	616	0
Adj Flow Rate, veh/h	1	280	8				0	154	30	2	207	0
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	13	0				0	96	96	82	82	0
Cap, veh/h	2	434	290				0	413	77	42	706	0
Arrive On Green	0.28	0.28	0.28				0.00	0.62	0.62	1.00	1.00	0.00
Sat Flow, veh/h	5	1531	1024				0	691	125	2	1173	0
Grp Volume(v), veh/h	281	0	8				0	91	93	112	97	0
Grp Sat Flow(s),veh/h/ln	1536	0	1024				0	408	386	615	533	0
Q Serve(g_s), s	14.4	0.0	0.5				0.0	10.0	10.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.4	0.0	0.5				0.0	10.0	10.9	0.0	0.0	0.0
Prop In Lane	0.00		1.00				0.00		0.32	0.02		0.00
Lane Grp Cap(c), veh/h	435	0	290				0	252	238	420	329	0
V/C Ratio(X)	0.65	0.00	0.03				0.00	0.36	0.39	0.27	0.29	0.00
Avail Cap(c_a), veh/h	435	0	290				0	252	238	420	329	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.3	0.0	23.3				0.0	8.5	8.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.0	0.2				0.0	4.0	4.7	1.6	2.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.1				0.0	1.1	1.2	0.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.5	0.0	23.5				0.0	12.5	13.4	1.6	2.3	0.0
LnGrp LOS	D	A	C				A	B	B	A	A	A
Approach Vol, veh/h		289						184			209	
Approach Delay, s/veh		35.2						13.0			1.9	
Approach LOS		D						B			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		60.0		30.0		60.0						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		55.5		25.5		55.5						
Max Q Clear Time (g_c+I1), s		12.9		16.4		2.0						
Green Ext Time (p_c), s		0.3		0.3		0.3						

Intersection Summary												
HCM 6th Ctrl Delay			19.0									
HCM 6th LOS			B									

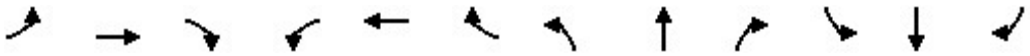


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	3	180	4	1	0	0	0	0	13
Future Volume (vph)	0	0	0	3	180	4	1	0	0	0	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			159			441			240	
Travel Time (s)		4.6			4.3			12.0			6.5	
Confl. Peds. (#/hr)				225		365	2		2	2		2
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	

5: Alley & Pine St Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBR	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1	0.0	0.1	0.3
Total Del/Veh (s)	10.7	8.2	6.0	7.4	0.6	16.0	8.5

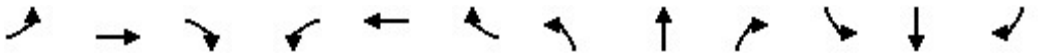


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	265	0	0	0	0	0	0	1	1	0	0
Future Volume (vph)	2	265	0	0	0	0	0	0	1	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		168			144			398			441	
Travel Time (s)		4.6			3.9			10.9			12.0	
Confl. Peds. (#/hr)	313		220	220		313	39		26	26		39
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	

6: Alley & Pike St Performance by movement

Movement	EBL	EBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1		0.0	0.0
Total Del/Veh (s)	6.5	7.2	11.6		0.2	7.2



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	115	95	0	0	0	0	0	995	39
Future Volume (vph)	0	0	0	115	95	0	0	0	0	0	995	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1496	0	0	0	0	0	2850	1454
Flt Permitted					0.973							
Satd. Flow (perm)	0	0	0	0	1242	0	0	0	0	0	2850	1454
Right Turn on Red			Yes	No		No			Yes			Yes
Satd. Flow (RTOR)												97
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		366			170			441			347	
Travel Time (s)		10.0			4.6			12.0			9.5	
Confl. Peds. (#/hr)				351								302
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	18%	3%	0%	0%	0%	0%	0%	14%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	226	0	0	0	0	0	1070	42
Turn Type				Perm	NA						NA	custom
Protected Phases					4						2	5
Permitted Phases				4								
Minimum Split (s)				11.5	11.5						16.5	9.5
Total Split (s)				32.0	32.0						55.0	15.0
Total Split (%)				35.6%	35.6%						61.1%	16.7%
Yellow Time (s)				3.5	3.5						3.5	3.5
All-Red Time (s)				1.0	1.0						1.0	1.0
Lost Time Adjust (s)					0.0						0.0	0.0
Total Lost Time (s)					4.5						4.5	4.5
Lead/Lag				Lag	Lag							Lag
Lead-Lag Optimize?				Yes	Yes							Yes
Act Effct Green (s)					27.5						50.5	10.5
Actuated g/C Ratio					0.31						0.56	0.12
v/c Ratio					0.60						0.67	0.16
Control Delay					34.0						16.5	1.4
Queue Delay					0.4						0.0	0.0
Total Delay					34.4						16.5	1.4
LOS					C						B	A
Approach Delay					34.4						15.9	
Approach LOS					C						B	

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 63 (70%), Referenced to phase 2:SBT and 6:Ped, Start of 1st Green	
Natural Cycle: 60	
Control Type: Pretimed	

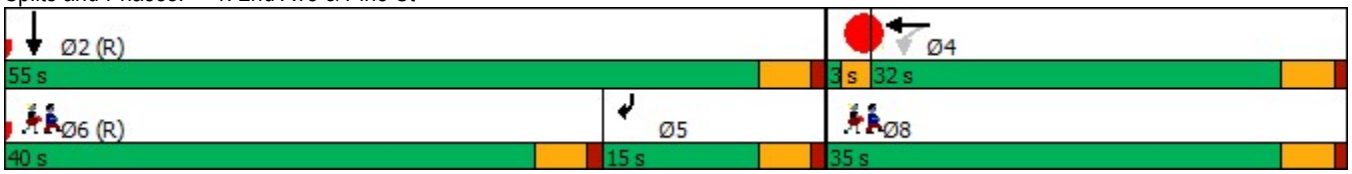
Lane Group	Ø3	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	6	8
Permitted Phases			
Minimum Split (s)	3.0	16.5	24.5
Total Split (s)	3.0	40.0	35.0
Total Split (%)	3%	44%	39%
Yellow Time (s)	2.0	3.5	3.5
All-Red Time (s)	0.0	1.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 19.1	Intersection LOS: B
Intersection Capacity Utilization 58.5%	ICU Level of Service B
Analysis Period (min) 15	

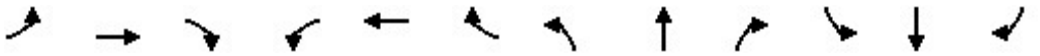
Splits and Phases: 1: 2nd Ave & Pine St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	3	193	7	0	191	0	0	154	14
Future Volume (vph)	0	0	0	3	193	7	0	191	0	0	154	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		80	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			648			440			349	
Travel Time (s)		4.3			17.7			12.0			9.5	
Confl. Peds. (#/hr)				1030		1142	887					887
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	11%	29%	0%	92%	0%	0%	89%	7%
Shared Lane Traffic (%)												
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Minimum Split (s)				23.5	23.5	23.5	19.5	19.5			19.5	
Total Split (s)				35.0	35.0	35.0	55.0	55.0			55.0	
Total Split (%)				38.9%	38.9%	38.9%	61.1%	61.1%			61.1%	
Yellow Time (s)				3.5	3.5	3.5	3.5	3.5			3.5	
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	
Lost Time Adjust (s)					0.0	0.0		0.0			0.0	
Total Lost Time (s)					4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 29 (32%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green	
Natural Cycle: 45	
Control Type: Pretimed	

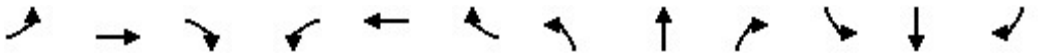
Splits and Phases: 2: 3rd Ave & Pine St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	193	7	0	191	0	0	154	14
Future Volume (veh/h)	0	0	0	3	193	7	0	191	0	0	154	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.66	1.00		1.00	1.00		0.73
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1323	1563	1323	483	483	0	0	523	523
Adj Flow Rate, veh/h				3	217	8	0	215	0	0	173	16
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				29	11	29	92	92	0	0	89	89
Cap, veh/h				7	522	252	0	515	0	0	500	45
Arrive On Green				0.34	0.34	0.34	0.00	0.19	0.00	0.00	0.56	0.56
Sat Flow, veh/h				21	1541	744	0	966	0	0	918	80
Grp Volume(v), veh/h				220	0	8	0	215	0	0	94	95
Grp Sat Flow(s),veh/h/ln				1562	0	744	0	459	0	0	497	474
Q Serve(g_s), s				9.8	0.0	0.6	0.0	18.6	0.0	0.0	9.2	9.9
Cycle Q Clear(g_c), s				9.8	0.0	0.6	0.0	18.6	0.0	0.0	9.2	9.9
Prop In Lane				0.01		1.00	0.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				529	0	252	0	515	0	0	279	266
V/C Ratio(X)				0.42	0.00	0.03	0.00	0.42	0.00	0.00	0.34	0.36
Avail Cap(c_a), veh/h				529	0	252	0	515	0	0	279	266
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				22.9	0.0	19.9	0.0	23.7	0.0	0.0	10.7	10.8
Incr Delay (d2), s/veh				2.4	0.0	0.2	0.0	2.5	0.0	0.0	3.2	3.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.9	0.0	0.1	0.0	2.4	0.0	0.0	1.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				25.3	0.0	20.1	0.0	26.2	0.0	0.0	13.9	14.6
LnGrp LOS				C	A	C	A	C	A	A	B	B
Approach Vol, veh/h					228			215			189	
Approach Delay, s/veh					25.1			26.2			14.2	
Approach LOS					C			C			B	

Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	55.0		55.0		35.0			
Change Period (Y+Rc), s	4.5		4.5		4.5			
Max Green Setting (Gmax), s	50.5		50.5		30.5			
Max Q Clear Time (g_c+I1), s	20.6		11.9		11.8			
Green Ext Time (p_c), s	0.4		0.3		0.2			

Intersection Summary		
HCM 6th Ctrl Delay	22.2	
HCM 6th LOS	C	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	181	99	0	0	0	0	0	0	159	931	0
Future Volume (vph)	0	181	99	0	0	0	0	0	0	159	931	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1296	0	0	0	0	0	0	0	1450	2486	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1296	0	0	0	0	0	0	0	1450	2486	0
Right Turn on Red			Yes			Yes			No	No		No
Satd. Flow (RTOR)		33										
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		393			168			365			441	
Travel Time (s)		10.7			4.6			10.0			12.0	
Confl. Peds. (#/hr)			1584									
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	0%	0%	12%	15%	0%
Bus Blockages (#/hr)	0	0	14	0	0	0	0	0	0	0	60	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	298	0	0	0	0	0	0	0	169	990	0
Turn Type		NA								Prot	NA	
Protected Phases		4								5	2 6	
Permitted Phases												
Detector Phase		4								5	2 6	
Switch Phase												
Minimum Initial (s)		7.0								5.0		
Minimum Split (s)		24.5								9.5		
Total Split (s)		35.0								20.0		
Total Split (%)		38.9%								22.2%		
Yellow Time (s)		3.5								3.5		
All-Red Time (s)		1.0								1.0		
Lost Time Adjust (s)		0.0								0.0		
Total Lost Time (s)		4.5								4.5		
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode		Max								None		
Act Effct Green (s)		30.5								15.5	50.5	
Actuated g/C Ratio		0.34								0.17	0.56	
v/c Ratio		0.65								0.68	0.71	
Control Delay		29.9								37.1	7.1	
Queue Delay		0.3								0.0	0.0	
Total Delay		30.2								37.1	7.2	
LOS		C								D	A	
Approach Delay		30.2									11.5	
Approach LOS		C									B	

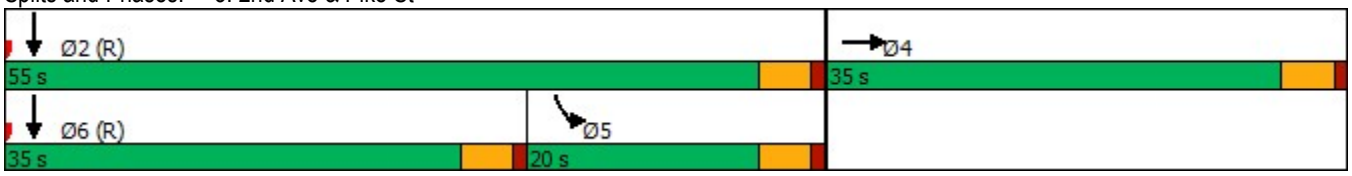
Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:SBT and 6:SBT, Start of 1st Green	

Lane Group	Ø2	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	16.5	16.5
Total Split (s)	55.0	35.0
Total Split (%)	61%	39%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Recall Mode	C-Max	C-Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 58.5%	ICU Level of Service B
Analysis Period (min) 15	

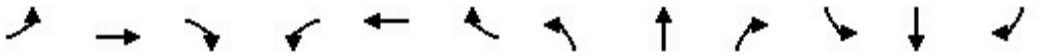
Splits and Phases: 3: 2nd Ave & Pike St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	294	7	0	0	0	0	184	13	4	153	0
Future Volume (vph)	4	294	7	0	0	0	0	184	13	4	153	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		144			718			486			440	
Travel Time (s)		3.9			19.6			13.3			12.0	
Confl. Peds. (#/hr)	628		1645						1113	1113		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	14%	0%	0%	0%	0%	92%	15%	0%	90%	0%
Bus Blockages (#/hr)	0	14	0	0	0	0	0	40	0	0	0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Minimum Split (s)	21.5	21.5	21.5					18.5		18.5	18.5	
Total Split (s)	35.0	35.0	35.0					55.0		55.0	55.0	
Total Split (%)	38.9%	38.9%	38.9%					61.1%		61.1%	61.1%	
Yellow Time (s)	3.5	3.5	3.5					3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0					1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		4.5	4.5					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 81 (90%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green	
Natural Cycle: 40	
Control Type: Pretimed	

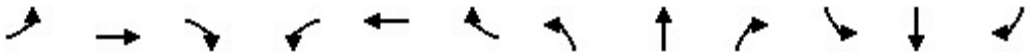
Splits and Phases: 4: 3rd Ave & Pike St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	294	7	0	0	0	0	184	13	4	153	0
Future Volume (veh/h)	4	294	7	0	0	0	0	184	13	4	153	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		0.85	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1523	1617	1523				0	483	483	510	510	0
Adj Flow Rate, veh/h	5	334	8				0	209	15	5	174	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	7	14				0	92	92	90	90	0
Cap, veh/h	8	539	306				0	481	34	49	522	0
Arrive On Green	0.34	0.34	0.34				0.00	0.56	0.56	0.19	0.19	0.00
Sat Flow, veh/h	24	1592	902				0	882	61	12	954	0
Grp Volume(v), veh/h	339	0	8				0	110	114	96	83	0
Grp Sat Flow(s),veh/h/ln	1615	0	902				0	459	459	502	441	0
Q Serve(g_s), s	15.8	0.0	0.5				0.0	12.5	13.0	0.0	14.7	0.0
Cycle Q Clear(g_c), s	15.8	0.0	0.5				0.0	12.5	13.0	14.8	14.7	0.0
Prop In Lane	0.01		1.00				0.00		0.13	0.05		0.00
Lane Grp Cap(c), veh/h	547	0	306				0	257	258	324	247	0
V/C Ratio(X)	0.62	0.00	0.03				0.00	0.43	0.44	0.30	0.34	0.00
Avail Cap(c_a), veh/h	547	0	306				0	257	258	324	247	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.9	0.0	19.8				0.0	11.4	11.5	22.1	22.1	0.0
Incr Delay (d2), s/veh	5.2	0.0	0.2				0.0	5.1	5.4	2.3	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	0.1				0.0	1.6	1.6	2.2	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.1	0.0	20.0				0.0	16.6	16.9	24.4	25.7	0.0
LnGrp LOS	C	A	C				A	B	B	C	C	A
Approach Vol, veh/h		347						224			179	
Approach Delay, s/veh		29.8						16.7			25.0	
Approach LOS		C						B			C	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		55.0		35.0		55.0						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		50.5		30.5		50.5						
Max Q Clear Time (g_c+I1), s		15.0		17.8		16.8						
Green Ext Time (p_c), s		0.4		0.4		0.3						

Intersection Summary												
HCM 6th Ctrl Delay			24.8									
HCM 6th LOS			C									

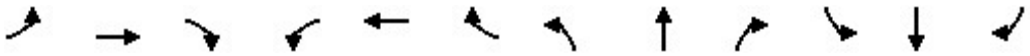


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	5	208	9	0	0	0	0	1	7
Future Volume (vph)	0	0	0	5	208	9	0	0	0	0	1	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			159			441			240	
Travel Time (s)		4.6			4.3			12.0			6.5	
Confl. Peds. (#/hr)				624		671						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	

5: Alley & Pine St Performance by movement

Movement	WBL	WBT	WBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.4	0.6	0.1	0.1	0.4
Total Del/Veh (s)	7.9	6.7	6.3	31.0	17.6	7.1



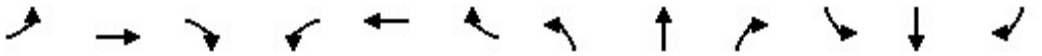
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	299	0	0	0	0	0	0	0	6	0	0
Future Volume (vph)	1	299	0	0	0	0	0	0	0	6	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		168			144			398			441	
Travel Time (s)		4.6			3.9			10.9			12.0	
Confl. Peds. (#/hr)	853		465	465		853	14		14	14		14
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	

6: Alley & Pike St Performance by movement

Movement	EBT	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	6.8	33.6	7.5

2023 Without Project



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	114	166	0	0	0	0	0	1403	23
Future Volume (vph)	0	0	0	114	166	0	0	0	0	0	1403	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1430	0	0	0	0	0	3065	1275
Flt Permitted					0.980							
Satd. Flow (perm)	0	0	0	0	1363	0	0	0	0	0	3065	1275
Right Turn on Red			Yes	No		No			Yes			Yes
Satd. Flow (RTOR)												97
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		366			170			441			347	
Travel Time (s)		10.0			4.6			12.0			9.5	
Confl. Peds. (#/hr)				108								181
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	35%	5%	0%	0%	0%	0%	0%	6%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	292	0	0	0	0	0	1461	24
Turn Type				Perm	NA						NA	custom
Protected Phases					4						2	5
Permitted Phases				4								
Minimum Split (s)				11.5	11.5						16.5	9.5
Total Split (s)				30.0	30.0						57.0	15.0
Total Split (%)				33.3%	33.3%						63.3%	16.7%
Yellow Time (s)				3.5	3.5						3.5	3.5
All-Red Time (s)				1.0	1.0						1.0	1.0
Lost Time Adjust (s)					0.0						0.0	0.0
Total Lost Time (s)					4.5						4.5	4.5
Lead/Lag				Lag	Lag							Lag
Lead-Lag Optimize?				Yes	Yes							Yes
Act Effct Green (s)					25.5						52.5	10.5
Actuated g/C Ratio					0.28						0.58	0.12
v/c Ratio					0.76						0.82	0.10
Control Delay					46.1						19.8	0.9
Queue Delay					1.6						0.6	0.0
Total Delay					47.7						20.4	0.9
LOS					D						C	A
Approach Delay					47.7						20.0	
Approach LOS					D						C	

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 63 (70%), Referenced to phase 2:SBT and 6:Ped, Start of 1st Green	
Natural Cycle: 65	
Control Type: Pretimed	

Lane Group	Ø3	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	6	8
Permitted Phases			
Minimum Split (s)	3.0	16.5	24.5
Total Split (s)	3.0	42.0	33.0
Total Split (%)	3%	47%	37%
Yellow Time (s)	2.0	3.5	3.5
All-Red Time (s)	0.0	1.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Maximum v/c Ratio: 0.82

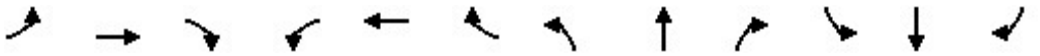
Intersection Signal Delay: 24.6	Intersection LOS: C
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: 2nd Ave & Pine St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	4	205	10	1	148	0	0	177	6
Future Volume (vph)	0	0	0	4	205	10	1	148	0	0	177	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		80	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			648			440			349	
Travel Time (s)		4.3			17.7			12.0			9.5	
Confl. Peds. (#/hr)				433		802	432					432
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	25%	24%	20%	100%	94%	0%	0%	89%	0%
Shared Lane Traffic (%)												
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Minimum Split (s)				23.5	23.5	23.5	19.5	19.5			19.5	
Total Split (s)				35.0	35.0	35.0	55.0	55.0			55.0	
Total Split (%)				38.9%	38.9%	38.9%	61.1%	61.1%			61.1%	
Yellow Time (s)				3.5	3.5	3.5	3.5	3.5			3.5	
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	
Lost Time Adjust (s)					0.0	0.0		0.0			0.0	
Total Lost Time (s)					4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 25 (28%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green	
Natural Cycle: 45	
Control Type: Pretimed	

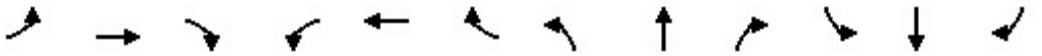
Splits and Phases: 2: 3rd Ave & Pine St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	205	10	1	148	0	0	177	6
Future Volume (veh/h)	0	0	0	4	205	10	1	148	0	0	177	6
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.71	0.96		1.00	1.00		0.80
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1443	1390	1443	456	456	0	0	523	523
Adj Flow Rate, veh/h				4	230	11	1	166	0	0	199	7
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				20	24	20	94	94	0	0	89	89
Cap, veh/h				8	463	294	41	477	0	0	544	19
Arrive On Green				0.34	0.34	0.34	0.19	0.19	0.00	0.00	0.56	0.56
Sat Flow, veh/h				24	1365	867	1	870	0	0	996	34
Grp Volume(v), veh/h				234	0	11	90	77	0	0	101	105
Grp Sat Flow(s),veh/h/ln				1389	0	867	456	394	0	0	497	507
Q Serve(g_s), s				12.1	0.0	0.8	0.0	15.4	0.0	0.0	10.1	10.3
Cycle Q Clear(g_c), s				12.1	0.0	0.8	15.4	15.4	0.0	0.0	10.1	10.3
Prop In Lane				0.02		1.00	0.01		0.00	0.00		0.07
Lane Grp Cap(c), veh/h				471	0	294	296	221	0	0	279	285
V/C Ratio(X)				0.50	0.00	0.04	0.30	0.35	0.00	0.00	0.36	0.37
Avail Cap(c_a), veh/h				471	0	294	296	221	0	0	279	285
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				23.7	0.0	19.9	22.4	22.4	0.0	0.0	10.9	10.9
Incr Delay (d2), s/veh				3.7	0.0	0.2	2.6	4.3	0.0	0.0	3.6	3.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.4	0.0	0.2	2.1	1.9	0.0	0.0	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				27.4	0.0	20.2	25.0	26.7	0.0	0.0	14.5	14.6
LnGrp LOS				C	A	C	C	C	A	A	B	B
Approach Vol, veh/h					245			167			206	
Approach Delay, s/veh					27.1			25.8			14.5	
Approach LOS					C			C			B	

Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	55.0		55.0		35.0			
Change Period (Y+Rc), s	4.5		4.5		4.5			
Max Green Setting (Gmax), s	50.5		50.5		30.5			
Max Q Clear Time (g_c+I1), s	17.4		12.3		14.1			
Green Ext Time (p_c), s	0.3		0.3		0.3			

Intersection Summary		
HCM 6th Ctrl Delay	22.5	
HCM 6th LOS	C	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	165	48	0	0	0	0	0	0	207	1348	0
Future Volume (vph)	0	165	48	0	0	0	0	0	0	207	1348	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1435	0	0	0	0	0	0	0	1400	2647	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1435	0	0	0	0	0	0	0	1400	2647	0
Right Turn on Red			No			Yes			No	No		No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		393			168			365			441	
Travel Time (s)		10.7			4.6			10.0			12.0	
Confl. Peds. (#/hr)			437									
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	5%	10%	0%	0%	0%	0%	0%	0%	16%	8%	0%
Bus Blockages (#/hr)	0	0	14	0	0	0	0	0	0	0	60	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	217	0	0	0	0	0	0	0	211	1376	0
Turn Type		NA								Prot	NA	
Protected Phases		4								5	2 6	
Permitted Phases												
Detector Phase		4								5	2 6	
Switch Phase												
Minimum Initial (s)		7.0								5.0		
Minimum Split (s)		24.5								9.5		
Total Split (s)		30.0								25.0		
Total Split (%)		33.3%								27.8%		
Yellow Time (s)		3.5								3.5		
All-Red Time (s)		1.0								1.0		
Lost Time Adjust (s)		0.0								0.0		
Total Lost Time (s)		4.5								4.5		
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode		Max								None		
Act Effct Green (s)		25.5								20.5	55.5	
Actuated g/C Ratio		0.28								0.23	0.62	
v/c Ratio		0.53								0.66	0.84	
Control Delay		33.0								29.0	8.1	
Queue Delay		0.5								0.0	1.0	
Total Delay		33.5								29.0	9.1	
LOS		C								C	A	
Approach Delay		33.5									11.8	
Approach LOS		C									B	

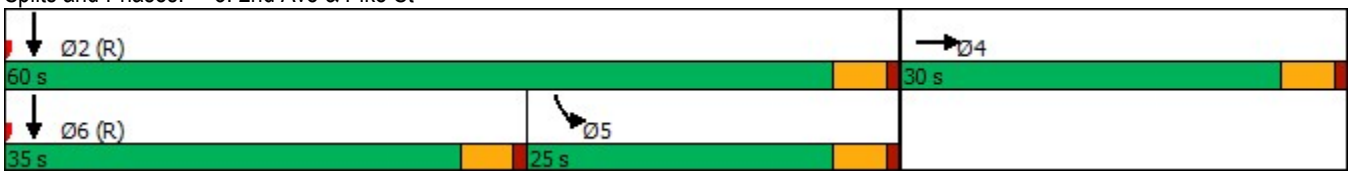
Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:SBT and 6:SBT, Start of 1st Green	

Lane Group	Ø2	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	16.5	16.5
Total Split (s)	60.0	35.0
Total Split (%)	67%	39%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Recall Mode	C-Max	C-Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 14.4	Intersection LOS: B
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

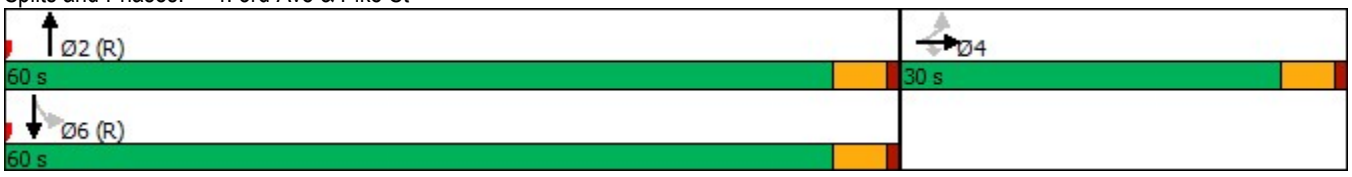
Splits and Phases: 3: 2nd Ave & Pike St

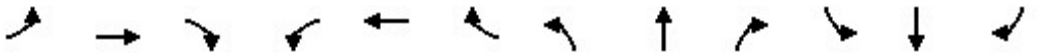


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	306	7	0	0	0	0	146	28	2	196	0
Future Volume (vph)	1	306	7	0	0	0	0	146	28	2	196	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		144			718			486			440	
Travel Time (s)		3.9			19.6			13.3			12.0	
Confl. Peds. (#/hr)	336		656						662	662		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	13%	0%	0%	0%	0%	0%	96%	15%	50%	82%	0%
Bus Blockages (#/hr)	0	14	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Minimum Split (s)	21.5	21.5	21.5					18.5		18.5	18.5	
Total Split (s)	30.0	30.0	30.0					60.0		60.0	60.0	
Total Split (%)	33.3%	33.3%	33.3%					66.7%		66.7%	66.7%	
Yellow Time (s)	3.5	3.5	3.5					3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0					1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		4.5	4.5					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 81 (90%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green	
Natural Cycle: 40	
Control Type: Pretimed	

Splits and Phases: 4: 3rd Ave & Pike St

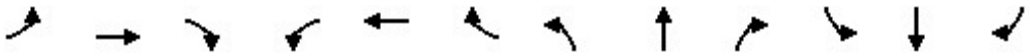




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	306	7	0	0	0	0	146	28	2	196	0
Future Volume (veh/h)	1	306	7	0	0	0	0	146	28	2	196	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		0.88	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1710	1537	1710				0	430	430	616	616	0
Adj Flow Rate, veh/h	1	336	8				0	160	31	2	215	0
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	13	0				0	96	96	82	82	0
Cap, veh/h	1	434	288				0	413	77	42	706	0
Arrive On Green	0.28	0.28	0.28				0.00	0.62	0.62	1.00	1.00	0.00
Sat Flow, veh/h	5	1532	1016				0	691	125	2	1174	0
Grp Volume(v), veh/h	337	0	8				0	95	96	116	101	0
Grp Sat Flow(s),veh/h/ln	1536	0	1016				0	408	386	615	533	0
Q Serve(g_s), s	18.1	0.0	0.5				0.0	10.5	11.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	18.1	0.0	0.5				0.0	10.5	11.4	0.0	0.0	0.0
Prop In Lane	0.00		1.00				0.00		0.32	0.02		0.00
Lane Grp Cap(c), veh/h	435	0	288				0	252	238	420	329	0
V/C Ratio(X)	0.77	0.00	0.03				0.00	0.38	0.40	0.28	0.31	0.00
Avail Cap(c_a), veh/h	435	0	288				0	252	238	420	329	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.6	0.0	23.3				0.0	8.6	8.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	12.6	0.0	0.2				0.0	4.3	5.0	1.6	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	0.0	0.1				0.0	1.2	1.2	0.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.2	0.0	23.5				0.0	12.9	13.8	1.6	2.4	0.0
LnGrp LOS	D	A	C				A	B	B	A	A	A
Approach Vol, veh/h		345						191			217	
Approach Delay, s/veh		41.8						13.4			2.0	
Approach LOS		D						B			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		60.0		30.0		60.0						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		55.5		25.5		55.5						
Max Q Clear Time (g_c+I1), s		13.4		20.1		2.0						
Green Ext Time (p_c), s		0.3		0.2		0.3						

Intersection Summary												
HCM 6th Ctrl Delay		23.1										
HCM 6th LOS		C										



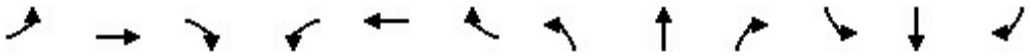
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	3	210	4	1	0	0	0	0	61
Future Volume (vph)	0	0	0	3	210	4	1	0	0	0	0	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			159			441			240	
Travel Time (s)		4.6			4.3			12.0			6.5	
Confl. Peds. (#/hr)				234		380	2		2	2		2
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

5: Alley & Pine St Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBR	All
Denied Del/Veh (s)	0.3	0.4	0.0	0.1	0.0	0.1	0.3
Total Del/Veh (s)	11.8	13.9	6.5	12.6	0.1	26.1	16.4



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	317	0	0	0	0	0	0	1	1	0	0
Future Volume (vph)	2	317	0	0	0	0	0	0	1	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		168			144			398			441	
Travel Time (s)		4.6			3.9			10.9			12.0	
Confl. Peds. (#/hr)	326		229				41		27	27		41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

6: Alley & Pike St Performance by movement

Movement	EBL	EBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.2	0.1	0.0	0.0	0.2
Total Del/Veh (s)	5.6	8.3	15.6	26.8	0.2	8.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	144	140	0	0	0	0	0	1084	41
Future Volume (vph)	0	0	0	144	140	0	0	0	0	0	1084	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1507	0	0	0	0	0	2850	1454
Flt Permitted					0.975							
Satd. Flow (perm)	0	0	0	0	1269	0	0	0	0	0	2850	1454
Right Turn on Red			Yes	No		No			Yes			Yes
Satd. Flow (RTOR)												97
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		366			170			441			347	
Travel Time (s)		10.0			4.6			12.0			9.5	
Confl. Peds. (#/hr)				365								314
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	18%	3%	0%	0%	0%	0%	0%	14%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	306	0	0	0	0	0	1166	44
Turn Type				Perm	NA						NA	custom
Protected Phases					4						2	5
Permitted Phases				4								
Minimum Split (s)				11.5	11.5						16.5	9.5
Total Split (s)				32.0	32.0						55.0	15.0
Total Split (%)				35.6%	35.6%						61.1%	16.7%
Yellow Time (s)				3.5	3.5						3.5	3.5
All-Red Time (s)				1.0	1.0						1.0	1.0
Lost Time Adjust (s)					0.0						0.0	0.0
Total Lost Time (s)					4.5						4.5	4.5
Lead/Lag				Lag	Lag							Lag
Lead-Lag Optimize?				Yes	Yes							Yes
Act Effct Green (s)					27.5						50.5	10.5
Actuated g/C Ratio					0.31						0.56	0.12
v/c Ratio					0.79						0.73	0.17
Control Delay					44.1						18.1	1.6
Queue Delay					2.5						0.1	0.0
Total Delay					46.6						18.2	1.6
LOS					D						B	A
Approach Delay					46.6						17.6	
Approach LOS					D						B	

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 63 (70%), Referenced to phase 2:SBT and 6:Ped, Start of 1st Green	
Natural Cycle: 60	
Control Type: Pretimed	

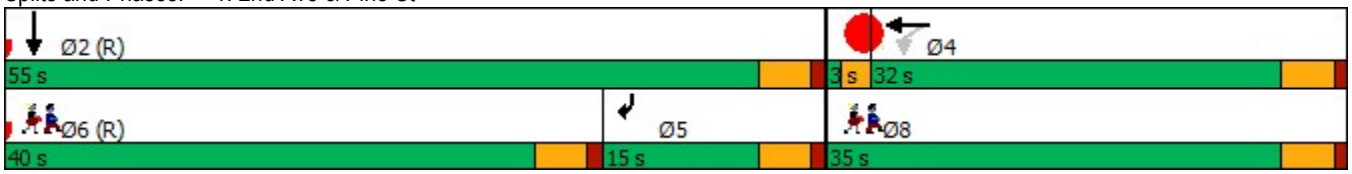
Lane Group	Ø3	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	6	8
Permitted Phases			
Minimum Split (s)	3.0	16.5	24.5
Total Split (s)	3.0	40.0	35.0
Total Split (%)	3%	44%	39%
Yellow Time (s)	2.0	3.5	3.5
All-Red Time (s)	0.0	1.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: 2nd Ave & Pine St



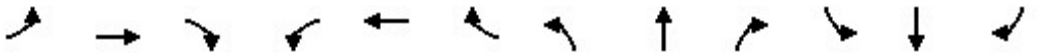
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	3	240	7	0	199	0	0	160	15
Future Volume (vph)	0	0	0	3	240	7	0	199	0	0	160	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		80	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			648			440			349	
Travel Time (s)		4.3			17.7			12.0			9.5	
Confl. Peds. (#/hr)				1072		1188	923					923
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	11%	29%	0%	92%	0%	0%	89%	7%
Shared Lane Traffic (%)												
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Minimum Split (s)				23.5	23.5	23.5	19.5	19.5			19.5	
Total Split (s)				35.0	35.0	35.0	55.0	55.0			55.0	
Total Split (%)				38.9%	38.9%	38.9%	61.1%	61.1%			61.1%	
Yellow Time (s)				3.5	3.5	3.5	3.5	3.5			3.5	
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	
Lost Time Adjust (s)					0.0	0.0		0.0			0.0	
Total Lost Time (s)					4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 29 (32%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green	
Natural Cycle: 45	
Control Type: Pretimed	

Splits and Phases: 2: 3rd Ave & Pine St

HCM 6th Signalized Intersection Summary
2: 3rd Ave & Pine St

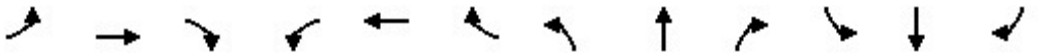
01/23/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	240	7	0	199	0	0	160	15
Future Volume (veh/h)	0	0	0	3	240	7	0	199	0	0	160	15
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.66	1.00		1.00	1.00		0.73
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1323	1563	1323	483	483	0	0	523	523
Adj Flow Rate, veh/h				3	270	8	0	224	0	0	180	17
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				29	11	29	92	92	0	0	89	89
Cap, veh/h				6	524	252	0	515	0	0	499	46
Arrive On Green				0.34	0.34	0.34	0.00	0.19	0.00	0.00	0.56	0.56
Sat Flow, veh/h				17	1545	744	0	966	0	0	915	81
Grp Volume(v), veh/h				273	0	8	0	224	0	0	98	99
Grp Sat Flow(s),veh/h/ln				1562	0	744	0	459	0	0	497	473
Q Serve(g_s), s				12.6	0.0	0.6	0.0	19.5	0.0	0.0	9.7	10.5
Cycle Q Clear(g_c), s				12.6	0.0	0.6	0.0	19.5	0.0	0.0	9.7	10.5
Prop In Lane				0.01		1.00	0.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				529	0	252	0	515	0	0	279	266
V/C Ratio(X)				0.52	0.00	0.03	0.00	0.44	0.00	0.00	0.35	0.37
Avail Cap(c_a), veh/h				529	0	252	0	515	0	0	279	266
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				23.8	0.0	19.9	0.0	24.0	0.0	0.0	10.8	11.0
Incr Delay (d2), s/veh				3.6	0.0	0.2	0.0	2.7	0.0	0.0	3.5	4.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.1	0.0	0.1	0.0	2.6	0.0	0.0	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				27.4	0.0	20.1	0.0	26.7	0.0	0.0	14.2	14.9
LnGrp LOS				C	A	C	A	C	A	A	B	B
Approach Vol, veh/h					281			224			197	
Approach Delay, s/veh					27.2			26.7			14.6	
Approach LOS					C			C			B	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		55.0				55.0		35.0				
Change Period (Y+Rc), s		4.5				4.5		4.5				
Max Green Setting (Gmax), s		50.5				50.5		30.5				
Max Q Clear Time (g_c+I1), s		21.5				12.5		14.6				
Green Ext Time (p_c), s		0.5				0.3		0.3				

Intersection Summary		
HCM 6th Ctrl Delay	23.5	
HCM 6th LOS	C	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	207	108	0	0	0	0	0	0	181	1026	0
Future Volume (vph)	0	207	108	0	0	0	0	0	0	181	1026	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1307	0	0	0	0	0	0	0	1450	2486	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1307	0	0	0	0	0	0	0	1450	2486	0
Right Turn on Red			Yes			Yes			No	No		No
Satd. Flow (RTOR)		32										
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		393			168			365			441	
Travel Time (s)		10.7			4.6			10.0			12.0	
Confl. Peds. (#/hr)			1648									
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	0%	0%	12%	15%	0%
Bus Blockages (#/hr)	0	0	14	0	0	0	0	0	0	0	60	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	335	0	0	0	0	0	0	0	193	1091	0
Turn Type		NA								Prot	NA	
Protected Phases		4								5	2 6	
Permitted Phases												
Detector Phase		4								5	2 6	
Switch Phase												
Minimum Initial (s)		7.0								5.0		
Minimum Split (s)		24.5								9.5		
Total Split (s)		35.0								20.0		
Total Split (%)		38.9%								22.2%		
Yellow Time (s)		3.5								3.5		
All-Red Time (s)		1.0								1.0		
Lost Time Adjust (s)		0.0								0.0		
Total Lost Time (s)		4.5								4.5		
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode		Max								None		
Act Effct Green (s)		30.5								15.5	50.5	
Actuated g/C Ratio		0.34								0.17	0.56	
v/c Ratio		0.72								0.78	0.78	
Control Delay		33.9								41.8	8.6	
Queue Delay		1.5								0.0	0.1	
Total Delay		35.4								41.8	8.7	
LOS		D								D	A	
Approach Delay		35.4									13.6	
Approach LOS		D									B	

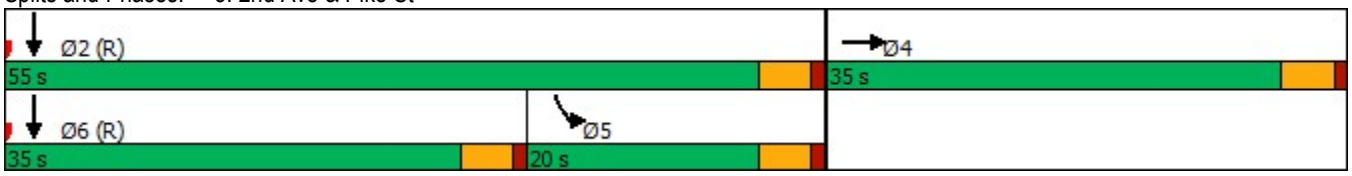
Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:SBT and 6:SBT, Start of 1st Green	

Lane Group	Ø2	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	16.5	16.5
Total Split (s)	55.0	35.0
Total Split (%)	61%	39%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Recall Mode	C-Max	C-Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

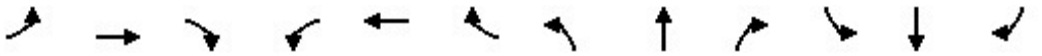
Splits and Phases: 3: 2nd Ave & Pike St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	341	7	0	0	0	0	191	14	4	159	0
Future Volume (vph)	4	341	7	0	0	0	0	191	14	4	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		144			718			486			440	
Travel Time (s)		3.9			19.6			13.3			12.0	
Confl. Peds. (#/hr)	653		1712						1158	1158		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	14%	0%	0%	0%	0%	92%	15%	0%	90%	0%
Bus Blockages (#/hr)	0	14	0	0	0	0	0	40	0	0	0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Minimum Split (s)	21.5	21.5	21.5					18.5		18.5	18.5	
Total Split (s)	35.0	35.0	35.0					55.0		55.0	55.0	
Total Split (%)	38.9%	38.9%	38.9%					61.1%		61.1%	61.1%	
Yellow Time (s)	3.5	3.5	3.5					3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0					1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		4.5	4.5					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 81 (90%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green	
Natural Cycle: 40	
Control Type: Pretimed	

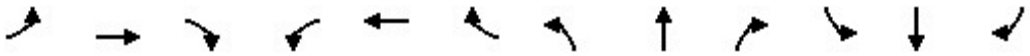
Splits and Phases: 4: 3rd Ave & Pike St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	341	7	0	0	0	0	191	14	4	159	0
Future Volume (veh/h)	4	341	7	0	0	0	0	191	14	4	159	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		0.85	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1523	1617	1523				0	483	483	510	510	0
Adj Flow Rate, veh/h	5	388	8				0	217	16	5	181	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	7	14				0	92	92	90	90	0
Cap, veh/h	7	541	306				0	480	35	48	523	0
Arrive On Green	0.34	0.34	0.34				0.00	0.56	0.56	0.19	0.19	0.00
Sat Flow, veh/h	21	1595	902				0	880	62	11	955	0
Grp Volume(v), veh/h	393	0	8				0	115	118	100	86	0
Grp Sat Flow(s),veh/h/ln	1616	0	902				0	459	459	502	441	0
Q Serve(g_s), s	19.1	0.0	0.5				0.0	13.2	13.7	0.0	15.3	0.0
Cycle Q Clear(g_c), s	19.1	0.0	0.5				0.0	13.2	13.7	15.4	15.3	0.0
Prop In Lane	0.01		1.00				0.00		0.14	0.05		0.00
Lane Grp Cap(c), veh/h	548	0	306				0	257	257	324	247	0
V/C Ratio(X)	0.72	0.00	0.03				0.00	0.45	0.46	0.31	0.35	0.00
Avail Cap(c_a), veh/h	548	0	306				0	257	257	324	247	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.0	0.0	19.8				0.0	11.6	11.7	22.4	22.3	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.2				0.0	5.5	5.8	2.5	3.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.0	0.1				0.0	1.7	1.7	2.3	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	20.0				0.0	17.1	17.5	24.8	26.2	0.0
LnGrp LOS	C	A	C				A	B	B	C	C	A
Approach Vol, veh/h		401						233			186	
Approach Delay, s/veh		33.6						17.3			25.4	
Approach LOS		C						B			C	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		55.0		35.0		55.0						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		50.5		30.5		50.5						
Max Q Clear Time (g_c+I1), s		15.7		21.1		17.4						
Green Ext Time (p_c), s		0.4		0.4		0.3						

Intersection Summary												
HCM 6th Ctrl Delay			27.1									
HCM 6th LOS			C									



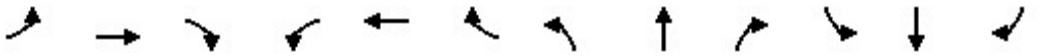
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	5	255	9	0	0	0	0	1	33
Future Volume (vph)	0	0	0	5	255	9	0	0	0	0	1	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			159			441			240	
Travel Time (s)		4.6			4.3			12.0			6.5	
Confl. Peds. (#/hr)				649		698						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

5: Alley & Pine St Performance by movement

Movement	WBL	WBT	WBR	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0	0.1	0.1	0.2
Total Del/Veh (s)	16.8	11.6	11.6	0.5	26.3	29.6	13.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	346	0	0	0	0	0	0	0	6	0	0
Future Volume (vph)	1	346	0	0	0	0	0	0	0	6	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		168			144			398			441	
Travel Time (s)		4.6			3.9			10.9			12.0	
Confl. Peds. (#/hr)	888		484						15	15		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

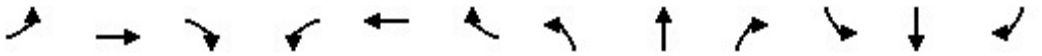
Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

6: Alley & Pike St Performance by movement

Movement	EBL	EBT	SBL	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.7	7.0	36.0	7.6

2023 With Project



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	201	135	0	0	0	0	0	1412	23
Future Volume (vph)	0	0	0	201	135	0	0	0	0	0	1412	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1351	0	0	0	0	0	3065	1275
Flt Permitted					0.971							
Satd. Flow (perm)	0	0	0	0	1249	0	0	0	0	0	3065	1275
Right Turn on Red			Yes	No		No			Yes			Yes
Satd. Flow (RTOR)												97
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		366			170			441			347	
Travel Time (s)		10.0			4.6			12.0			9.5	
Confl. Peds. (#/hr)				119								181
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	35%	5%	0%	0%	0%	0%	0%	6%	14%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	350	0	0	0	0	0	1471	24
Turn Type				Perm	NA						NA	custom
Protected Phases					4						2	5
Permitted Phases				4								
Minimum Split (s)				11.5	11.5						16.5	9.5
Total Split (s)				30.0	30.0						57.0	15.0
Total Split (%)				33.3%	33.3%						63.3%	16.7%
Yellow Time (s)				3.5	3.5						3.5	3.5
All-Red Time (s)				1.0	1.0						1.0	1.0
Lost Time Adjust (s)					0.0						0.0	0.0
Total Lost Time (s)					4.5						4.5	4.5
Lead/Lag				Lag	Lag							Lag
Lead-Lag Optimize?				Yes	Yes							Yes
Act Effct Green (s)					25.5						52.5	10.5
Actuated g/C Ratio					0.28						0.58	0.12
v/c Ratio					0.99						0.82	0.10
Control Delay					81.8						20.0	0.9
Queue Delay					0.0						1.0	0.0
Total Delay					81.8						21.0	0.9
LOS					F						C	A
Approach Delay					81.8						20.7	
Approach LOS					F						C	

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 63 (70%), Referenced to phase 2:SBT and 6:Ped, Start of 1st Green	
Natural Cycle: 80	
Control Type: Pretimed	

Lane Group	Ø3	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	6	8
Permitted Phases			
Minimum Split (s)	3.0	16.5	24.5
Total Split (s)	3.0	42.0	33.0
Total Split (%)	3%	47%	37%
Yellow Time (s)	2.0	3.5	3.5
All-Red Time (s)	0.0	1.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Maximum v/c Ratio: 0.99

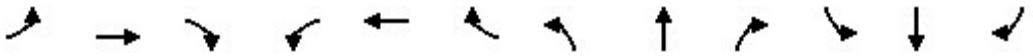
Intersection Signal Delay: 32.3	Intersection LOS: C
Intersection Capacity Utilization 71.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: 2nd Ave & Pine St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	4	219	10	1	148	0	0	177	6
Future Volume (vph)	0	0	0	4	219	10	1	148	0	0	177	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		80	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			648			440			349	
Travel Time (s)		4.3			17.7			12.0			9.5	
Confl. Peds. (#/hr)				489		802	432					432
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	25%	24%	20%	100%	94%	0%	0%	89%	0%
Shared Lane Traffic (%)												
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Minimum Split (s)				23.5	23.5	23.5	19.5	19.5			19.5	
Total Split (s)				35.0	35.0	35.0	55.0	55.0			55.0	
Total Split (%)				38.9%	38.9%	38.9%	61.1%	61.1%			61.1%	
Yellow Time (s)				3.5	3.5	3.5	3.5	3.5			3.5	
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	
Lost Time Adjust (s)					0.0	0.0		0.0			0.0	
Total Lost Time (s)					4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 25 (28%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green	
Natural Cycle: 45	
Control Type: Pretimed	

Splits and Phases: 2: 3rd Ave & Pine St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	4	219	10	1	148	0	0	177	6
Future Volume (veh/h)	0	0	0	4	219	10	1	148	0	0	177	6
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.71	0.96		1.00	1.00		0.80
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1443	1390	1443	456	456	0	0	523	523
Adj Flow Rate, veh/h				4	246	11	1	166	0	0	199	7
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				20	24	20	94	94	0	0	89	89
Cap, veh/h				8	463	294	41	477	0	0	544	19
Arrive On Green				0.34	0.34	0.34	0.19	0.19	0.00	0.00	0.56	0.56
Sat Flow, veh/h				22	1367	867	1	870	0	0	996	34
Grp Volume(v), veh/h				250	0	11	90	77	0	0	101	105
Grp Sat Flow(s),veh/h/ln				1389	0	867	456	394	0	0	497	507
Q Serve(g_s), s				13.1	0.0	0.8	0.0	15.4	0.0	0.0	10.1	10.3
Cycle Q Clear(g_c), s				13.1	0.0	0.8	15.4	15.4	0.0	0.0	10.1	10.3
Prop In Lane				0.02		1.00	0.01		0.00	0.00		0.07
Lane Grp Cap(c), veh/h				471	0	294	296	221	0	0	279	285
V/C Ratio(X)				0.53	0.00	0.04	0.30	0.35	0.00	0.00	0.36	0.37
Avail Cap(c_a), veh/h				471	0	294	296	221	0	0	279	285
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				24.0	0.0	19.9	22.4	22.4	0.0	0.0	10.9	10.9
Incr Delay (d2), s/veh				4.2	0.0	0.2	2.6	4.3	0.0	0.0	3.6	3.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.8	0.0	0.2	2.1	1.9	0.0	0.0	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.2	0.0	20.2	25.0	26.7	0.0	0.0	14.5	14.6
LnGrp LOS				C	A	C	C	C	A	A	B	B
Approach Vol, veh/h					261			167			206	
Approach Delay, s/veh					27.9			25.8			14.5	
Approach LOS					C			C			B	

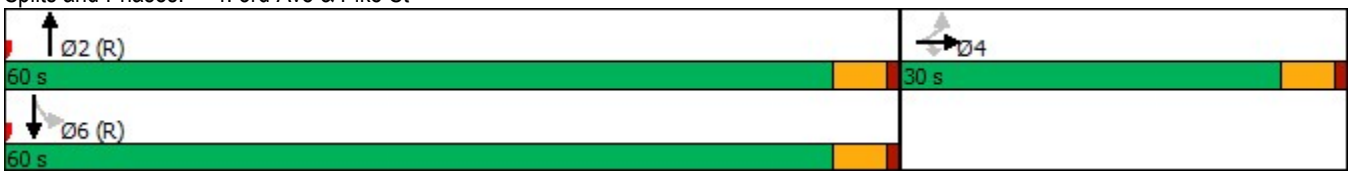
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	55.0		55.0		35.0			
Change Period (Y+Rc), s	4.5		4.5		4.5			
Max Green Setting (Gmax), s	50.5		50.5		30.5			
Max Q Clear Time (g_c+I1), s	17.4		12.3		15.1			
Green Ext Time (p_c), s	0.3		0.3		0.3			

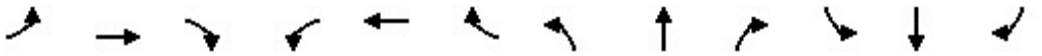
Intersection Summary		
HCM 6th Ctrl Delay	23.0	
HCM 6th LOS	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	320	7	0	0	0	0	146	28	2	196	0
Future Volume (vph)	1	320	7	0	0	0	0	146	28	2	196	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		144			718			486			440	
Travel Time (s)		3.9			19.6			13.3			12.0	
Confl. Peds. (#/hr)	404		656						662	662		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	13%	0%	0%	0%	0%	0%	96%	15%	50%	82%	0%
Bus Blockages (#/hr)	0	14	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Minimum Split (s)	21.5	21.5	21.5					18.5		18.5	18.5	
Total Split (s)	30.0	30.0	30.0					60.0		60.0	60.0	
Total Split (%)	33.3%	33.3%	33.3%					66.7%		66.7%	66.7%	
Yellow Time (s)	3.5	3.5	3.5					3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0					1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		4.5	4.5					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 81 (90%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green	
Natural Cycle: 40	
Control Type: Pretimed	

Splits and Phases: 4: 3rd Ave & Pike St





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	166	48	0	0	0	0	0	0	216	1383	0
Future Volume (vph)	0	166	48	0	0	0	0	0	0	216	1383	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1434	0	0	0	0	0	0	0	1400	2647	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1434	0	0	0	0	0	0	0	1400	2647	0
Right Turn on Red			No			Yes			No	No		No
Satd. Flow (RTOR)												
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		393			168			365			441	
Travel Time (s)		10.7			4.6			10.0			12.0	
Confl. Peds. (#/hr)			455									
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	5%	10%	0%	0%	0%	0%	0%	0%	16%	8%	0%
Bus Blockages (#/hr)	0	0	14	0	0	0	0	0	0	0	60	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	218	0	0	0	0	0	0	0	220	1411	0
Turn Type		NA								Prot	NA	
Protected Phases		4								5	2 6	
Permitted Phases												
Detector Phase		4								5	2 6	
Switch Phase												
Minimum Initial (s)		7.0								5.0		
Minimum Split (s)		24.5								9.5		
Total Split (s)		30.0								25.0		
Total Split (%)		33.3%								27.8%		
Yellow Time (s)		3.5								3.5		
All-Red Time (s)		1.0								1.0		
Lost Time Adjust (s)		0.0								0.0		
Total Lost Time (s)		4.5								4.5		
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode		Max								None		
Act Effct Green (s)		25.5								20.5	55.5	
Actuated g/C Ratio		0.28								0.23	0.62	
v/c Ratio		0.54								0.69	0.86	
Control Delay		33.1								31.5	10.7	
Queue Delay		0.6								0.0	1.6	
Total Delay		33.6								31.5	12.4	
LOS		C								C	B	
Approach Delay		33.6									14.9	
Approach LOS		C									B	

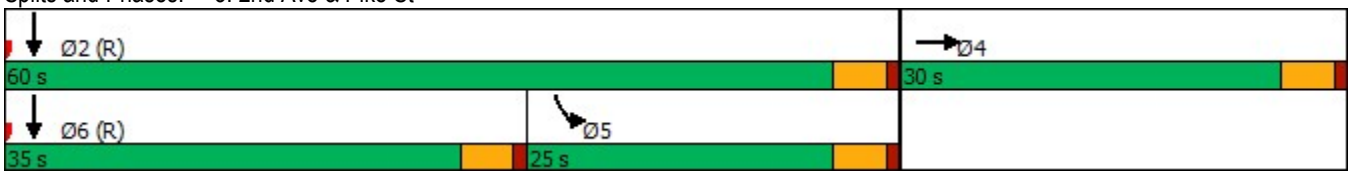
Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:SBT and 6:SBT, Start of 1st Green	

Lane Group	Ø2	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	16.5	16.5
Total Split (s)	60.0	35.0
Total Split (%)	67%	39%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Recall Mode	C-Max	C-Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

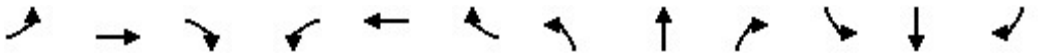
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 71.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: 2nd Ave & Pike St



HCM 6th Signalized Intersection Summary
4: 3rd Ave & Pike St

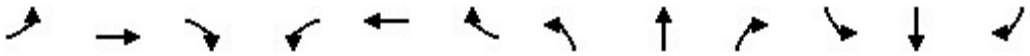
01/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	320	7	0	0	0	0	146	28	2	196	0
Future Volume (veh/h)	1	320	7	0	0	0	0	146	28	2	196	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		0.88	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1710	1537	1710				0	430	430	616	616	0
Adj Flow Rate, veh/h	1	352	8				0	160	31	2	215	0
Peak Hour Factor	0.91	0.91	0.91				0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	13	0				0	96	96	82	82	0
Cap, veh/h	1	434	288				0	413	77	42	706	0
Arrive On Green	0.28	0.28	0.28				0.00	0.62	0.62	1.00	1.00	0.00
Sat Flow, veh/h	4	1532	1016				0	691	125	2	1174	0
Grp Volume(v), veh/h	353	0	8				0	95	96	116	101	0
Grp Sat Flow(s),veh/h/ln	1536	0	1016				0	408	386	615	533	0
Q Serve(g_s), s	19.2	0.0	0.5				0.0	10.5	11.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	19.2	0.0	0.5				0.0	10.5	11.4	0.0	0.0	0.0
Prop In Lane	0.00		1.00				0.00		0.32	0.02		0.00
Lane Grp Cap(c), veh/h	435	0	288				0	252	238	420	329	0
V/C Ratio(X)	0.81	0.00	0.03				0.00	0.38	0.40	0.28	0.31	0.00
Avail Cap(c_a), veh/h	435	0	288				0	252	238	420	329	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.0	0.0	23.3				0.0	8.6	8.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	15.1	0.0	0.2				0.0	4.3	5.0	1.6	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	0.0	0.1				0.0	1.2	1.2	0.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	0.0	23.5				0.0	12.9	13.8	1.6	2.4	0.0
LnGrp LOS	D	A	C				A	B	B	A	A	A
Approach Vol, veh/h		361						191			217	
Approach Delay, s/veh		44.6						13.4			2.0	
Approach LOS		D						B			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		60.0		30.0		60.0						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		55.5		25.5		55.5						
Max Q Clear Time (g_c+I1), s		13.4		21.2		2.0						
Green Ext Time (p_c), s		0.3		0.2		0.3						

Intersection Summary												
HCM 6th Ctrl Delay		24.8										
HCM 6th LOS		C										



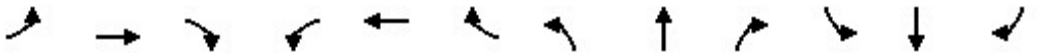
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	210	4	57	0	0	0	0	61
Future Volume (vph)	0	0	0	17	210	4	57	0	0	0	0	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			159			441			240	
Travel Time (s)		4.6			4.3			12.0			6.5	
Confl. Peds. (#/hr)				290		380	2		2	2		2
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

5: Alley & Pine St Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBR	All
Denied Del/Veh (s)	0.6	0.5	0.0	0.1	0.0	0.2	0.4
Total Del/Veh (s)	14.4	20.0	15.1	33.3	0.8	35.1	23.8



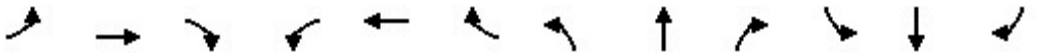
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	317	0	0	0	0	0	0	1	15	0	0
Future Volume (vph)	12	317	0	0	0	0	0	0	1	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		168			144			398			441	
Travel Time (s)		4.6			3.9			10.9			12.0	
Confl. Peds. (#/hr)	394		229				41		27	27		41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	100%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

6: Alley & Pike St Performance by movement

Movement	EBL	EBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	3.1	0.3	0.1	0.0	0.0	0.4
Total Del/Veh (s)	8.0	10.1	34.7	30.3	0.3	10.7



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	161	150	0	0	0	0	0	1100	41
Future Volume (vph)	0	0	0	161	150	0	0	0	0	0	1100	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	0		50
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	0	0	0	1505	0	0	0	0	0	2850	1454
Flt Permitted					0.975							
Satd. Flow (perm)	0	0	0	0	1261	0	0	0	0	0	2850	1454
Right Turn on Red			Yes	No		No			Yes			Yes
Satd. Flow (RTOR)												97
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		366			170			441			347	
Travel Time (s)		10.0			4.6			12.0			9.5	
Confl. Peds. (#/hr)				375								314
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	18%	3%	0%	0%	0%	0%	0%	14%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	334	0	0	0	0	0	1183	44
Turn Type				Perm	NA						NA	custom
Protected Phases					4						2	5
Permitted Phases				4								
Minimum Split (s)				11.5	11.5						16.5	9.5
Total Split (s)				32.0	32.0						55.0	15.0
Total Split (%)				35.6%	35.6%						61.1%	16.7%
Yellow Time (s)				3.5	3.5						3.5	3.5
All-Red Time (s)				1.0	1.0						1.0	1.0
Lost Time Adjust (s)					0.0						0.0	0.0
Total Lost Time (s)					4.5						4.5	4.5
Lead/Lag				Lag	Lag							Lag
Lead-Lag Optimize?				Yes	Yes							Yes
Act Effct Green (s)					27.5						50.5	10.5
Actuated g/C Ratio					0.31						0.56	0.12
v/c Ratio					0.87						0.74	0.17
Control Delay					51.8						18.4	1.6
Queue Delay					4.6						0.1	0.0
Total Delay					56.3						18.5	1.6
LOS					E						B	A
Approach Delay					56.3						17.9	
Approach LOS					E						B	

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 63 (70%), Referenced to phase 2:SBT and 6:Ped, Start of 1st Green	
Natural Cycle: 65	
Control Type: Pretimed	

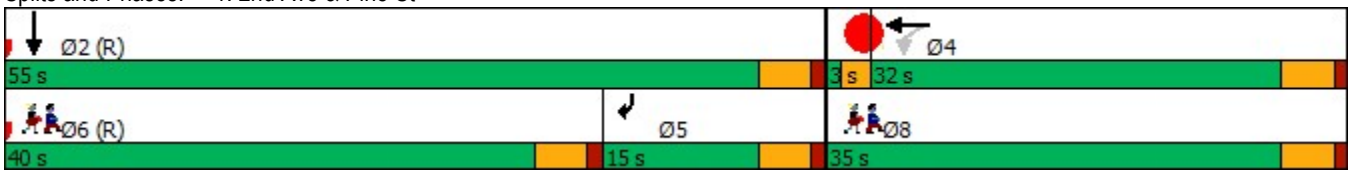
Lane Group	Ø3	Ø6	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Turn Type			
Protected Phases	3	6	8
Permitted Phases			
Minimum Split (s)	3.0	16.5	24.5
Total Split (s)	3.0	40.0	35.0
Total Split (%)	3%	44%	39%
Yellow Time (s)	2.0	3.5	3.5
All-Red Time (s)	0.0	1.0	1.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

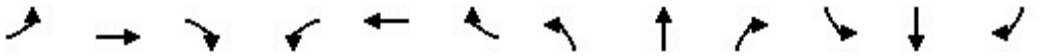
Splits and Phases: 1: 2nd Ave & Pine St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	3	266	7	0	199	0	0	160	15
Future Volume (vph)	0	0	0	3	266	7	0	199	0	0	160	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		80	0		0	0		0
Storage Lanes	0		0	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		159			648			440			349	
Travel Time (s)		4.3			17.7			12.0			9.5	
Confl. Peds. (#/hr)				1122		1188	923					923
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	11%	29%	0%	92%	0%	0%	89%	7%
Shared Lane Traffic (%)												
Turn Type				Perm	NA	Perm		NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Minimum Split (s)				23.5	23.5	23.5	19.5	19.5			19.5	
Total Split (s)				35.0	35.0	35.0	55.0	55.0			55.0	
Total Split (%)				38.9%	38.9%	38.9%	61.1%	61.1%			61.1%	
Yellow Time (s)				3.5	3.5	3.5	3.5	3.5			3.5	
All-Red Time (s)				1.0	1.0	1.0	1.0	1.0			1.0	
Lost Time Adjust (s)					0.0	0.0		0.0			0.0	
Total Lost Time (s)					4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 29 (32%), Referenced to phase 2:NBTL and 6:SBT, Start of 1st Green	
Natural Cycle: 45	
Control Type: Pretimed	

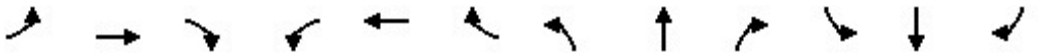
Splits and Phases: 2: 3rd Ave & Pine St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	266	7	0	199	0	0	160	15
Future Volume (veh/h)	0	0	0	3	266	7	0	199	0	0	160	15
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.66	1.00		1.00	1.00		0.73
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1323	1563	1323	483	483	0	0	523	523
Adj Flow Rate, veh/h				3	299	8	0	224	0	0	180	17
Peak Hour Factor				0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %				29	11	29	92	92	0	0	89	89
Cap, veh/h				5	524	252	0	515	0	0	499	46
Arrive On Green				0.34	0.34	0.34	0.00	0.19	0.00	0.00	0.56	0.56
Sat Flow, veh/h				16	1547	744	0	966	0	0	915	81
Grp Volume(v), veh/h				302	0	8	0	224	0	0	98	99
Grp Sat Flow(s),veh/h/ln				1563	0	744	0	459	0	0	497	473
Q Serve(g_s), s				14.3	0.0	0.6	0.0	19.5	0.0	0.0	9.7	10.5
Cycle Q Clear(g_c), s				14.3	0.0	0.6	0.0	19.5	0.0	0.0	9.7	10.5
Prop In Lane				0.01		1.00	0.00		0.00	0.00		0.17
Lane Grp Cap(c), veh/h				530	0	252	0	515	0	0	279	266
V/C Ratio(X)				0.57	0.00	0.03	0.00	0.44	0.00	0.00	0.35	0.37
Avail Cap(c_a), veh/h				530	0	252	0	515	0	0	279	266
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				24.4	0.0	19.9	0.0	24.0	0.0	0.0	10.8	11.0
Incr Delay (d2), s/veh				4.4	0.0	0.2	0.0	2.7	0.0	0.0	3.5	4.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.8	0.0	0.1	0.0	2.6	0.0	0.0	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.8	0.0	20.1	0.0	26.7	0.0	0.0	14.2	14.9
LnGrp LOS				C	A	C	A	C	A	A	B	B
Approach Vol, veh/h					310			224			197	
Approach Delay, s/veh					28.6			26.7			14.6	
Approach LOS					C			C			B	

Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	55.0		55.0		35.0			
Change Period (Y+Rc), s	4.5		4.5		4.5			
Max Green Setting (Gmax), s	50.5		50.5		30.5			
Max Q Clear Time (g_c+I1), s	21.5		12.5		16.3			
Green Ext Time (p_c), s	0.5		0.3		0.3			

Intersection Summary		
HCM 6th Ctrl Delay	24.2	
HCM 6th LOS	C	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	209	108	0	0	0	0	0	0	197	1044	0
Future Volume (vph)	0	209	108	0	0	0	0	0	0	197	1044	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1308	0	0	0	0	0	0	0	1450	2486	0
Flt Permitted										0.950		
Satd. Flow (perm)	0	1308	0	0	0	0	0	0	0	1450	2486	0
Right Turn on Red			Yes			Yes			No	No		No
Satd. Flow (RTOR)		31										
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		393			168			365			441	
Travel Time (s)		10.7			4.6			10.0			12.0	
Confl. Peds. (#/hr)			1648									
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%	0%	0%	0%	12%	15%	0%
Bus Blockages (#/hr)	0	0	14	0	0	0	0	0	0	0	60	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	337	0	0	0	0	0	0	0	210	1111	0
Turn Type		NA								Prot	NA	
Protected Phases		4								5	2 6	
Permitted Phases												
Detector Phase		4								5	2 6	
Switch Phase												
Minimum Initial (s)		7.0								5.0		
Minimum Split (s)		24.5								9.5		
Total Split (s)		35.0								20.0		
Total Split (%)		38.9%								22.2%		
Yellow Time (s)		3.5								3.5		
All-Red Time (s)		1.0								1.0		
Lost Time Adjust (s)		0.0								0.0		
Total Lost Time (s)		4.5								4.5		
Lead/Lag										Lag		
Lead-Lag Optimize?										Yes		
Recall Mode		Max								None		
Act Effct Green (s)		30.5								15.5	50.5	
Actuated g/C Ratio		0.34								0.17	0.56	
v/c Ratio		0.73								0.84	0.80	
Control Delay		34.4								48.1	9.2	
Queue Delay		2.0								0.0	0.1	
Total Delay		36.4								48.1	9.3	
LOS		D								D	A	
Approach Delay		36.4									15.4	
Approach LOS		D									B	

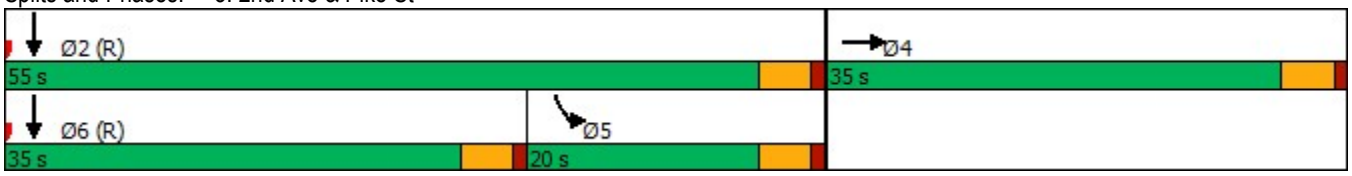
Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 75 (83%), Referenced to phase 2:SBT and 6:SBT, Start of 1st Green	

Lane Group	Ø2	Ø6
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	2	6
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	7.0	7.0
Minimum Split (s)	16.5	16.5
Total Split (s)	55.0	35.0
Total Split (%)	61%	39%
Yellow Time (s)	3.5	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Recall Mode	C-Max	C-Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		

Intersection Summary

Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: 2nd Ave & Pike St



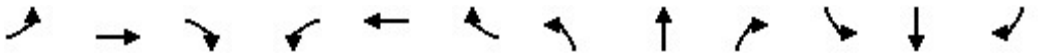
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	348	7	0	0	0	0	191	14	4	159	0
Future Volume (vph)	4	348	7	0	0	0	0	191	14	4	159	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		144			718			486			440	
Travel Time (s)		3.9			19.6			13.3			12.0	
Confl. Peds. (#/hr)	712		1712						1158	1158		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	14%	0%	0%	0%	0%	92%	15%	0%	90%	0%
Bus Blockages (#/hr)	0	14	0	0	0	0	0	40	0	0	0	0
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4		4							6		
Minimum Split (s)	21.5	21.5	21.5					18.5		18.5	18.5	
Total Split (s)	35.0	35.0	35.0					55.0		55.0	55.0	
Total Split (%)	38.9%	38.9%	38.9%					61.1%		61.1%	61.1%	
Yellow Time (s)	3.5	3.5	3.5					3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0					1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0					0.0			0.0	
Total Lost Time (s)		4.5	4.5					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												

Intersection Summary	
Area Type:	CBD
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 81 (90%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green	
Natural Cycle: 40	
Control Type: Pretimed	

Splits and Phases: 4: 3rd Ave & Pike St

HCM 6th Signalized Intersection Summary
4: 3rd Ave & Pike St

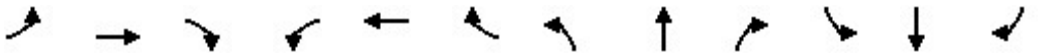
01/28/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	348	7	0	0	0	0	191	14	4	159	0
Future Volume (veh/h)	4	348	7	0	0	0	0	191	14	4	159	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.70				1.00		0.85	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1523	1617	1523				0	483	483	510	510	0
Adj Flow Rate, veh/h	5	395	8				0	217	16	5	181	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	7	14				0	92	92	90	90	0
Cap, veh/h	7	541	306				0	480	35	48	523	0
Arrive On Green	0.34	0.34	0.34				0.00	0.56	0.56	0.19	0.19	0.00
Sat Flow, veh/h	20	1595	902				0	880	62	11	955	0
Grp Volume(v), veh/h	400	0	8				0	115	118	100	86	0
Grp Sat Flow(s),veh/h/ln	1616	0	902				0	459	459	502	441	0
Q Serve(g_s), s	19.6	0.0	0.5				0.0	13.2	13.7	0.0	15.3	0.0
Cycle Q Clear(g_c), s	19.6	0.0	0.5				0.0	13.2	13.7	15.4	15.3	0.0
Prop In Lane	0.01		1.00				0.00		0.14	0.05		0.00
Lane Grp Cap(c), veh/h	548	0	306				0	257	257	324	247	0
V/C Ratio(X)	0.73	0.00	0.03				0.00	0.45	0.46	0.31	0.35	0.00
Avail Cap(c_a), veh/h	548	0	306				0	257	257	324	247	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.1	0.0	19.8				0.0	11.6	11.7	22.4	22.3	0.0
Incr Delay (d2), s/veh	8.3	0.0	0.2				0.0	5.5	5.8	2.5	3.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	0.1				0.0	1.7	1.7	2.3	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.5	0.0	20.0				0.0	17.1	17.5	24.8	26.2	0.0
LnGrp LOS	C	A	C				A	B	B	C	C	A
Approach Vol, veh/h		408						233			186	
Approach Delay, s/veh		34.2						17.3			25.4	
Approach LOS		C						B			C	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		55.0		35.0		55.0						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		50.5		30.5		50.5						
Max Q Clear Time (g_c+I1), s		15.7		21.6		17.4						
Green Ext Time (p_c), s		0.4		0.4		0.3						

Intersection Summary												
HCM 6th Ctrl Delay			27.5									
HCM 6th LOS			C									



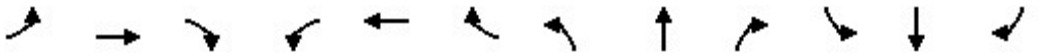
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	31	255	9	27	0	0	0	1	33
Future Volume (vph)	0	0	0	31	255	9	27	0	0	0	1	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		170			159			441			240	
Travel Time (s)		4.6			4.3			12.0			6.5	
Confl. Peds. (#/hr)				699		698						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

5: Alley & Pine St Performance by movement

Movement	WBL	WBT	WBR	NBL	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.6	0.1	0.0	0.1	0.1	0.4
Total Del/Veh (s)	14.0	14.0	11.4	38.1	19.4	33.2	17.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	346	0	0	0	0	0	0	0	13	0	0
Future Volume (vph)	19	346	0	0	0	0	0	0	0	13	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		168			144			398			441	
Travel Time (s)		4.6			3.9			10.9			12.0	
Confl. Peds. (#/hr)	947		484						15	15		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	CBD

Control Type: Unsignalized

6: Alley & Pike St Performance by movement

Movement	EBL	EBT	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.9	7.3	47.0	0.5	8.2

Appendix C

Trip Generation Calculations

1516 2nd Avenue

Trip Generation Estimate

Land Use	Size / Units	ITE LUC[2]	Baseline: Trip Rate[2]	Baseline: Auto Trips[3]	Baseline: Vehicle Mode-Split[4]	Baseline: AVO[4]	Baseline: Person Trips[3]	Infill[5,6,7]: Infill Vehicle Mode-Split	Infill[5,6,7]: Infill AVO	Directional Split[2]: Enter	Directional Split[2]: Exit	Vehicle Trip Generation[1]: Enter	Vehicle Trip Generation[1]: Exit	Vehicle Trip Generation[1]: Total
DAILY														
Proposed Uses:														
Multifamily Housing (High-Rise)	524 DU	222	8.04	--	--	--	4,213	28.4%	1.05	50%	50%	570	570	1,140
Retail	3,502 SF	820	37.75	132	100.0%	1.19	157	10.0%	1.20	50%	50%	6	7	13
Pass-By[8]	34%											-2	-2	-4
												4	5	9
Less Existing Uses:														
Office	48,600 SF	710	14.99	--	--	--	729	22.9%	1.19	50%	50%	70	70	140
Retail	11,000 SF	820	37.75	415	100.0%	1.19	494	10.0%	1.20	50%	50%	20	21	41
Pass-By[8]	34%											-7	-7	-14
												13	14	27
											Gross Daily Trips Generated =	576	577	1,153
											Less Pass-by Trips =	-2	-2	-4
											Less Existing Trips =	-83	-84	-167
											Total Proposed Net Daily Trips =	491	491	982

Notes:

1. Trips adjusted consistent with methodology included in Chapter 7 (Trip Generation for Urban Infill/Redevelopment) of the ITE Trip Generation Handbook, 3rd edition, September 2017.
2. Land Use Code, trip rates, and directional splits from Institute of Transportation Engineers (ITE) *Trip Generation Manual* , 10th Edition, 2017.
3. Trip generation estimate for retail land use based on trip rates associated with Urban/Suburban setting. Trip generation estimate for residential and office land uses based on person trip end rates associated with Center Core setting.
4. Baseline vehicle mode-split and AVO (average vehicle occupancy) for retail per Appendix B (Person Trip Data for Baseline Sites) of ITE *Trip Generation Handbook* , 3rd edition, September 2017.
5. Infill vehicle mode-split and AVO for residential based on 2017 American Community Survey results for Census Tract 81.
6. Infill vehicle mode-split and AVO for retail based on previously approved traffic studies in the area.
7. Infill vehicle mode-split and AVO for office based on data from 2017 Commute Seattle Center City Mode Split Survey for the Downtown Commercial Core.
8. Pass-by trip reductions based on methodology documented in the *ITE Trip Generation Handbook* , 3rd Edition, September 2017.

1516 2nd Avenue

Trip Generation Estimate

Land Use	Size / Units	ITE LUC[2]	Baseline: Trip Rate[2]	Baseline: Auto Trips[3]	Baseline: Vehicle Mode-Split[4]	Baseline: AVO[4]	Baseline: Person Trips[3]	Infill[5,6,7]: Infill Vehicle Mode-Split	Infill[5,6,7]: Infill AVO	Directional Split[2]: Enter	Directional Split[2]: Exit	Vehicle Trip Generation[1]: Enter	Vehicle Trip Generation[1]: Exit	Vehicle Trip Generation[1]: Total
AM PEAK HOUR														
Proposed Uses:														
Multifamily Housing (High-Rise)	524 DU	222	0.66	--	--	--	346	28.4%	1.05	26%	74%	24	70	94
Retail	3,502 SF	820	0.94	3	100.0%	1.17	4	10.0%	1.20	62%	38%	0	0	0
Pass-By[8]	34%											0	0	0
												0	0	0
Less Existing Uses:														
Office	48,600 SF	710	1.24	--	--	--	60	22.9%	1.19	87%	13%	10	2	12
												10	2	12
Retail	11,000 SF	820	0.94	10	100.0%	1.17	12	10.0%	1.20	62%	38%	1	0	1
Pass-By[8]	34%											0	0	0
												1	0	1
											Gross AM Peak Hour Trips Generated =	24	70	94
											Less Pass-by Trips =	0	0	0
											Less Existing Trips =	-11	-2	-13
											Total Proposed Net AM Peak Hour Trips =	13	68	81

Notes:

1. Trips adjusted consistent with methodology included in Chapter 7 (Trip Generation for Urban Infill/Redevelopment) of the ITE Trip Generation Handbook, 3rd edition, September 2017.
2. Land Use Code, trip rates, and directional splits from Institute of Transportation Engineers (ITE) *Trip Generation Manual* , 10th Edition, 2017.
3. Trip generation estimate for retail land use based on trip rates associated with Urban/Suburban setting. Trip generation estimate for residential and office land uses based on person trip end rates associated with Center Core setting.
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6. Infill vehicle mode-split and AVO for retail based on previously approved traffic studies in the area.
7. Infill vehicle mode-split and AVO for office based on data from 2017 Commute Seattle Center City Mode Split Survey for the Downtown Commercial Core.
8. Pass-by trip reductions based on methodology documented in the *ITE Trip Generation Handbook* , 3rd Edition, September 2017.

1516 2nd Avenue

Trip Generation Estimate

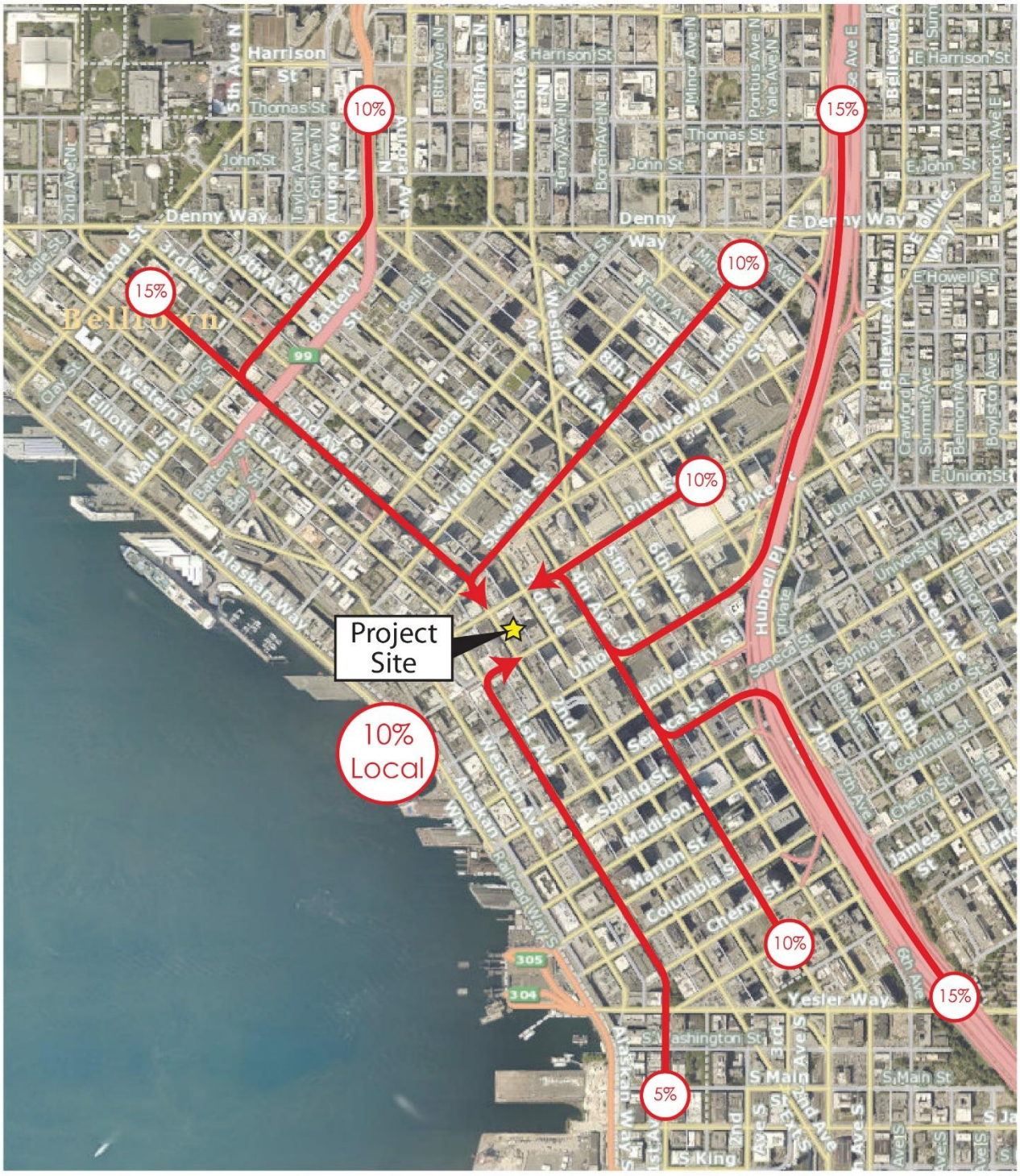
Land Use	Size / Units	ITE LUC[2]	Baseline: Trip Rate[2]	Baseline: Auto Trips[3]	Baseline: Vehicle Mode-Split[4]	Baseline: AVO[4]	Baseline: Person Trips[3]	Infill[5,6,7]: Infill Vehicle Mode-Split	Infill[5,6,7]: Infill AVO	Directional Split[2]: Enter	Directional Split[2]: Exit	Vehicle Trip Generation[1]: Enter	Vehicle Trip Generation[1]: Exit	Vehicle Trip Generation[1]: Total
PM PEAK HOUR														
Proposed Uses:														
Multifamily Housing (High-Rise)	524 DU	222	0.55	--	--	--	288	28.4%	1.05	57%	43%	44	34	78
Retail	3,502 SF	820	3.81	13	99.9%	1.20	16	10.0%	1.20	48%	52%	0	1	1
Pass-By[8]	34%											0	0	0
												0	1	1
Less Existing Uses:														
Office	48,600 SF	710	1.26	--	--	--	61	22.9%	1.19	16%	84%	2	10	12
												2	10	12
Retail	11,000 SF	820	3.81	42	99.9%	1.20	50	10.0%	1.20	48%	52%	2	2	4
Pass-By[8]	34%											0	-1	-1
												2	1	3
											Gross PM Peak Hour Trips Generated =	44	35	79
											Less Pass-by Trips =	0	0	0
											Less Existing Trips =	-4	-11	-15
											Total Proposed Net PM Peak Hour Trips =	40	24	64

Notes:

1. Trips adjusted consistent with methodology included in Chapter 7 (Trip Generation for Urban Infill/Redevelopment) of the ITE Trip Generation Handbook, 3rd edition, September 2017.
2. Land Use Code, trip rates, and directional splits from Institute of Transportation Engineers (ITE) *Trip Generation Manual* , 10th Edition, 2017.
3. Trip generation estimate for retail land use based on trip rates associated with Urban/Suburban setting. Trip generation estimate for residential and office land uses based on person trip end rates associated with Center Core setting.
4. Baseline vehicle mode-split and AVO (average vehicle occupancy) for retail per Appendix B (Person Trip Data for Baseline Sites) of ITE *Trip Generation Handbook* , 3rd edition, September 2017.
5. Infill vehicle mode-split and AVO for residential based on 2017 American Community Survey results for Census Tract 81.
6. Infill vehicle mode-split and AVO for retail based on previously approved traffic studies in the area.
7. Infill vehicle mode-split and AVO for office based on data from 2017 Commute Seattle Center City Mode Split Survey for the Downtown Commercial Core.
8. Pass-by trip reductions based on methodology documented in the *ITE Trip Generation Handbook* , 3rd Edition, September 2017.

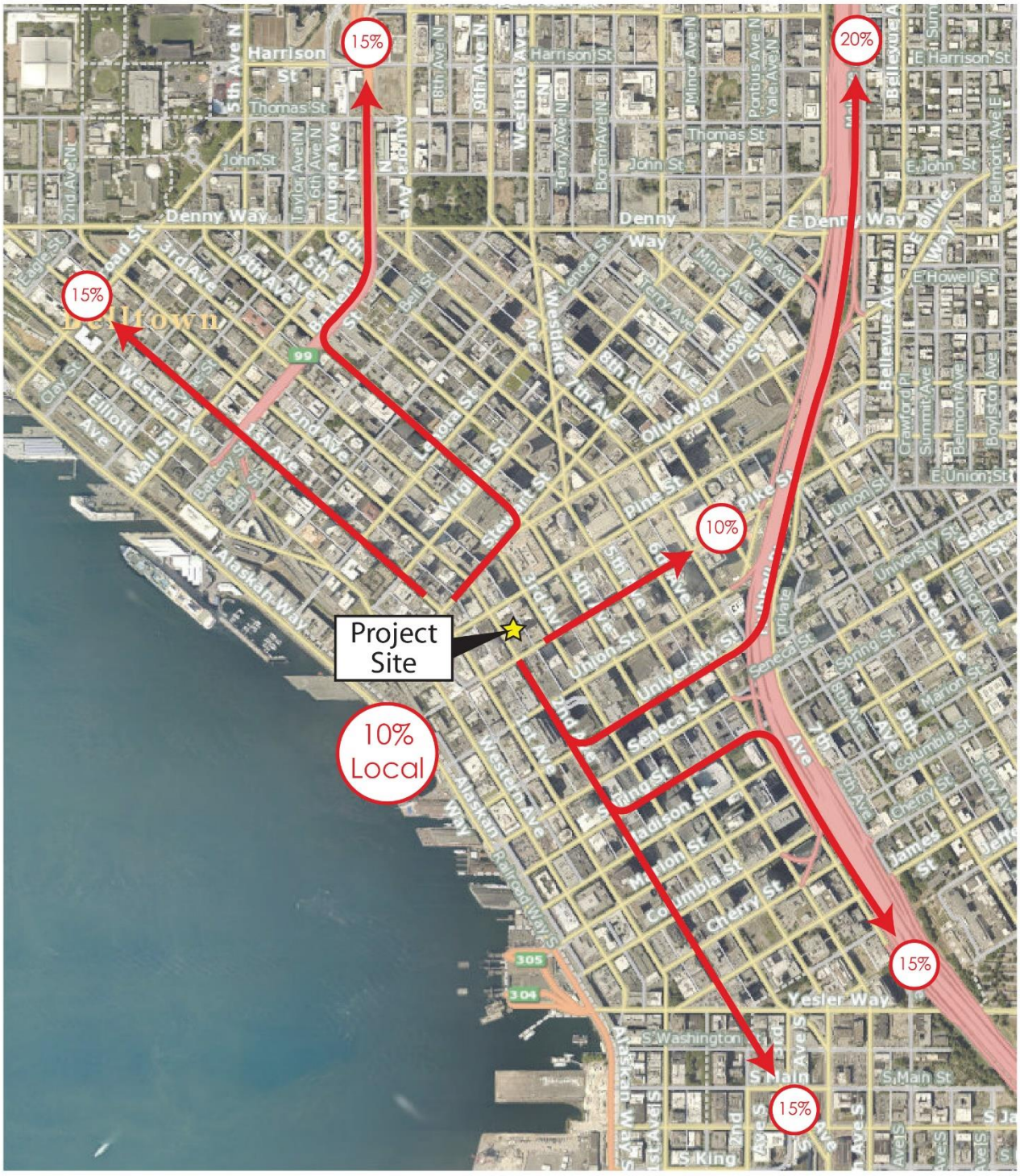
Appendix D

Project Trip Distribution Figures



Appendix D1: Residential Inbound Project Trip Distribution

N
NOT TO SCALE



Appendix D2: Residential Outbound Project Trip Distribution

N
NOT TO SCALE

Appendix D3: Retail Inbound Project Trip Distribution

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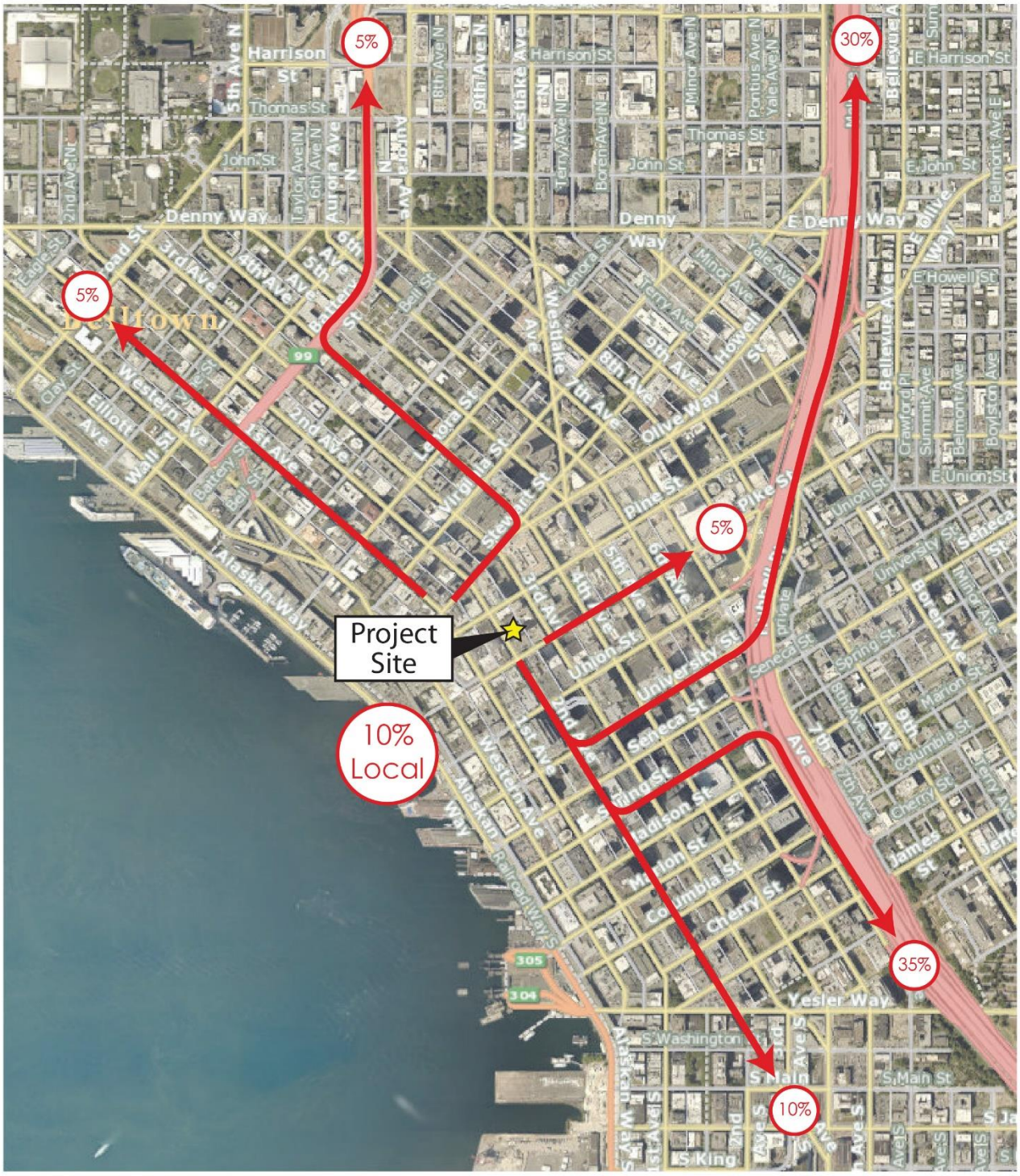
NOT TO SCALE



Appendix D4: Retail Outbound Project Trip Distribution

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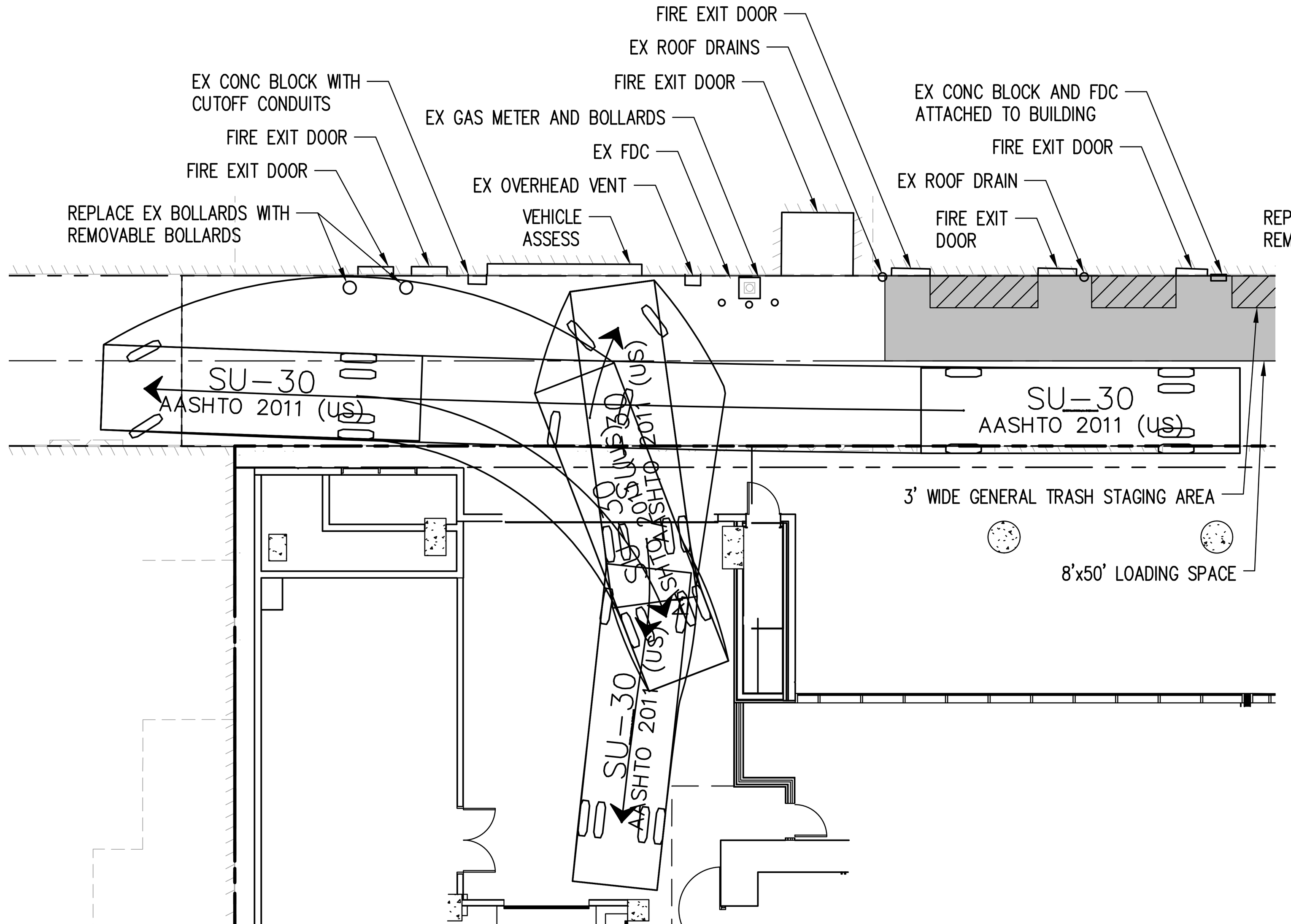
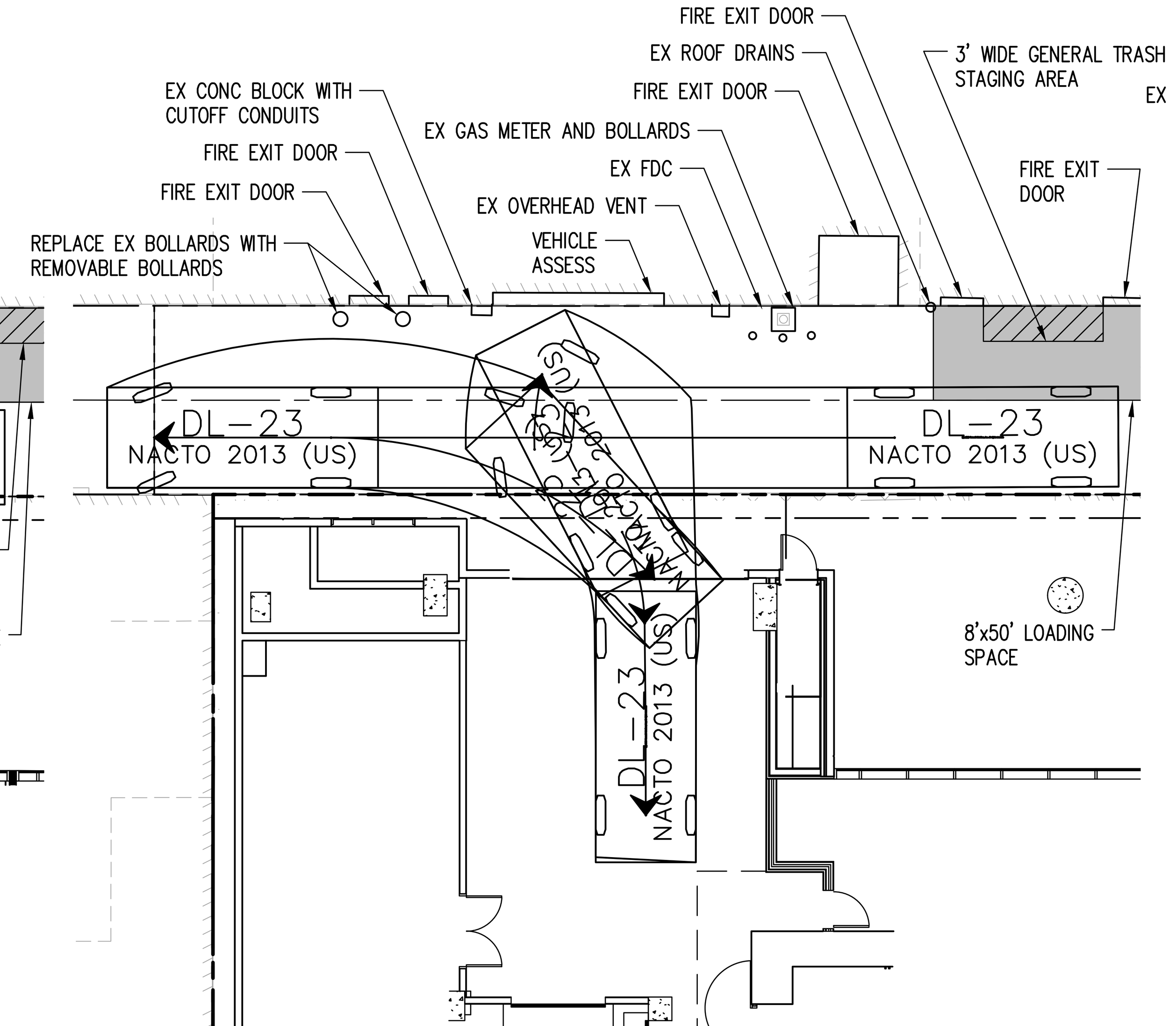
NOT TO SCALE

Appendix E

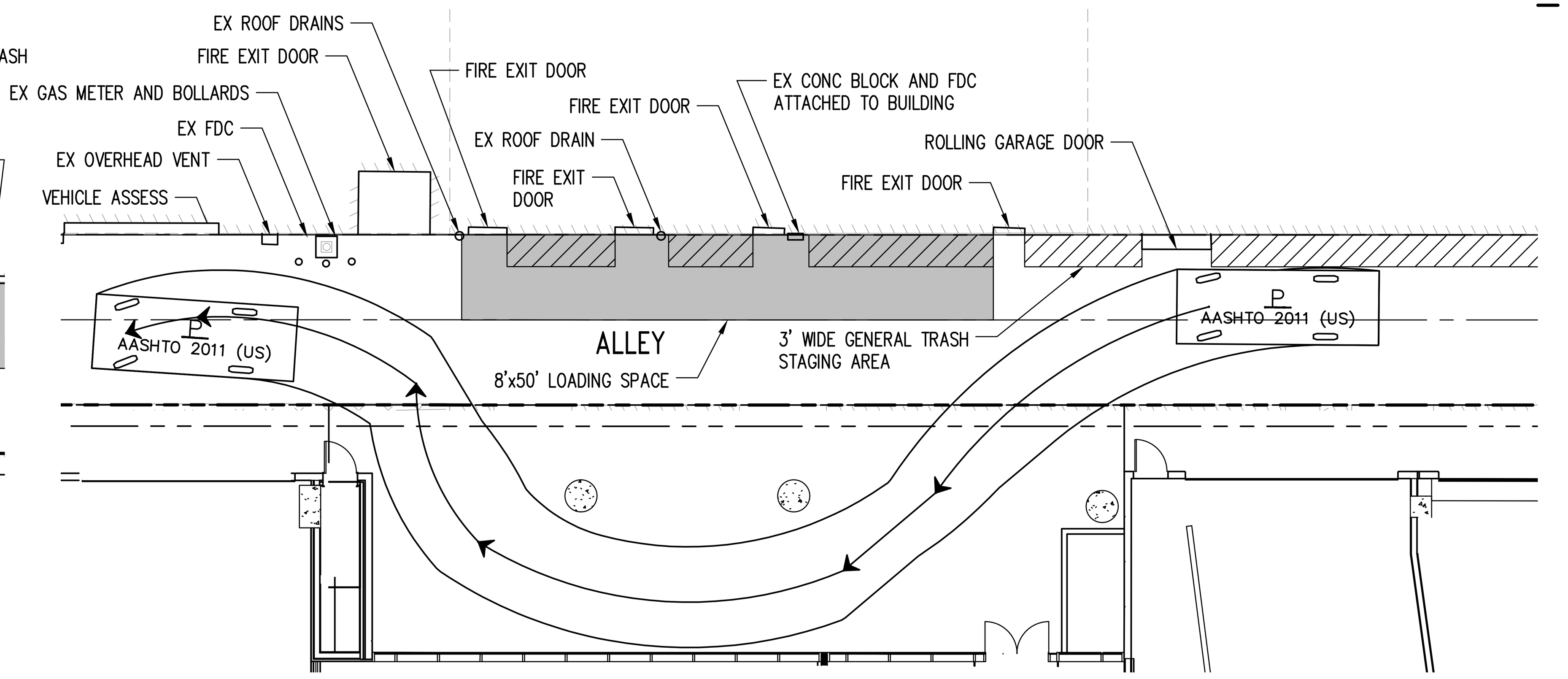
Truck Loading & Porte-Cochere Turning Movement Diagrams



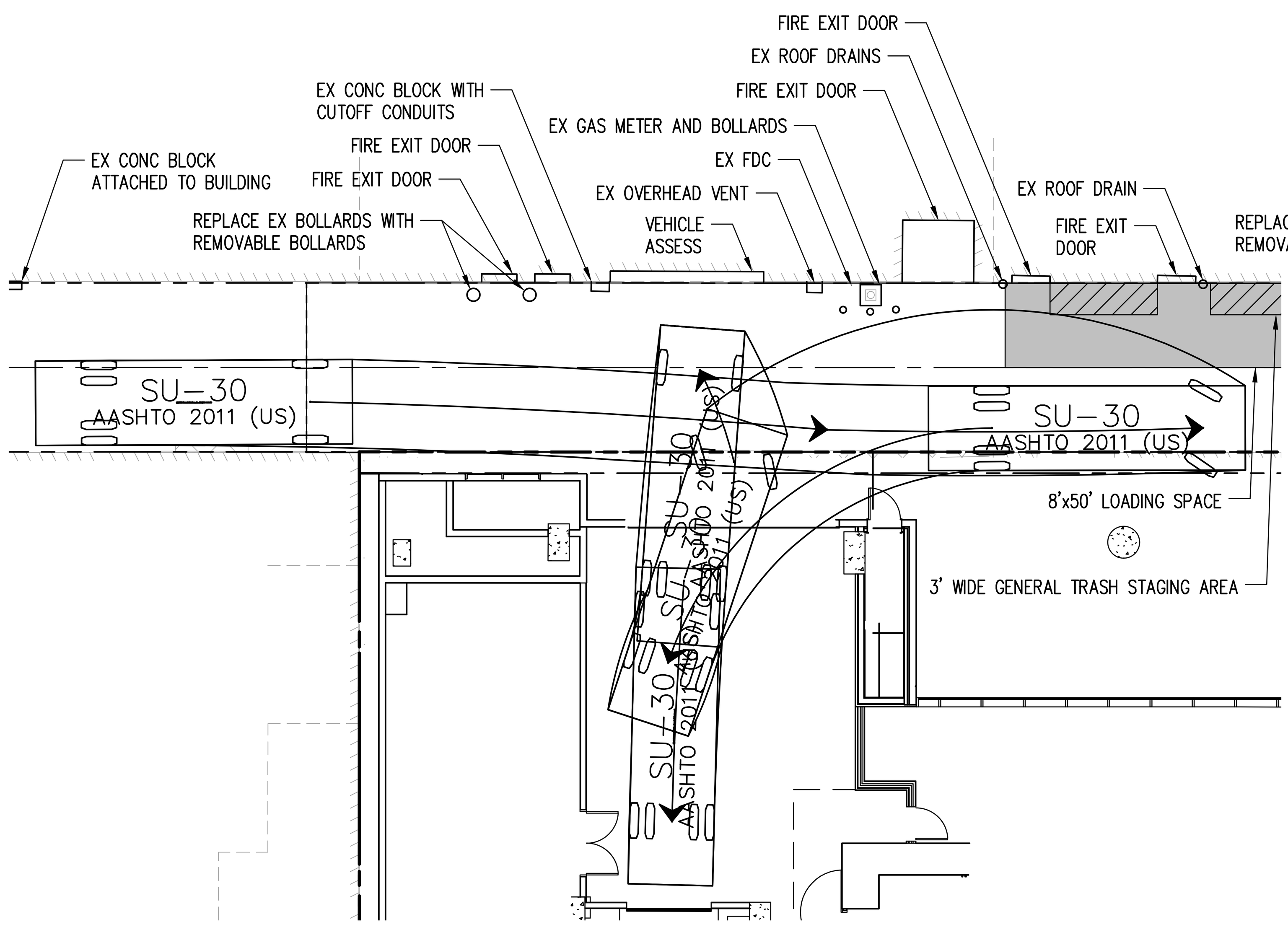
LOADING ZONE SU-30 TRUCK TURNING MOVEMENT
NORTHBOUND ENTRY
SCALE: 1"=10'



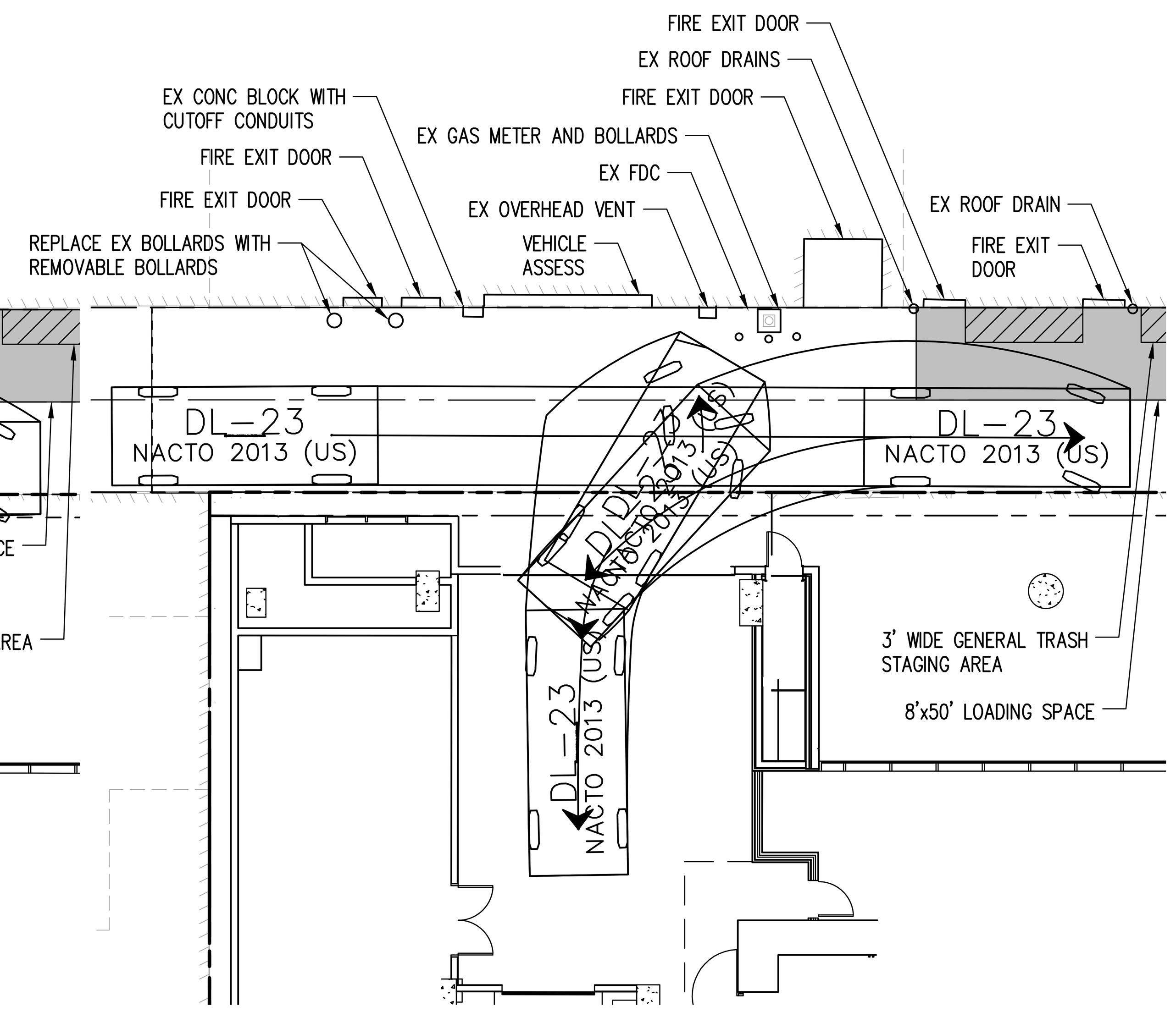
LOADING ZONE DELIVERY TRUCK TURNING MOVEMENT
NORTHBOUND ENTRY
SCALE: 1"=10'



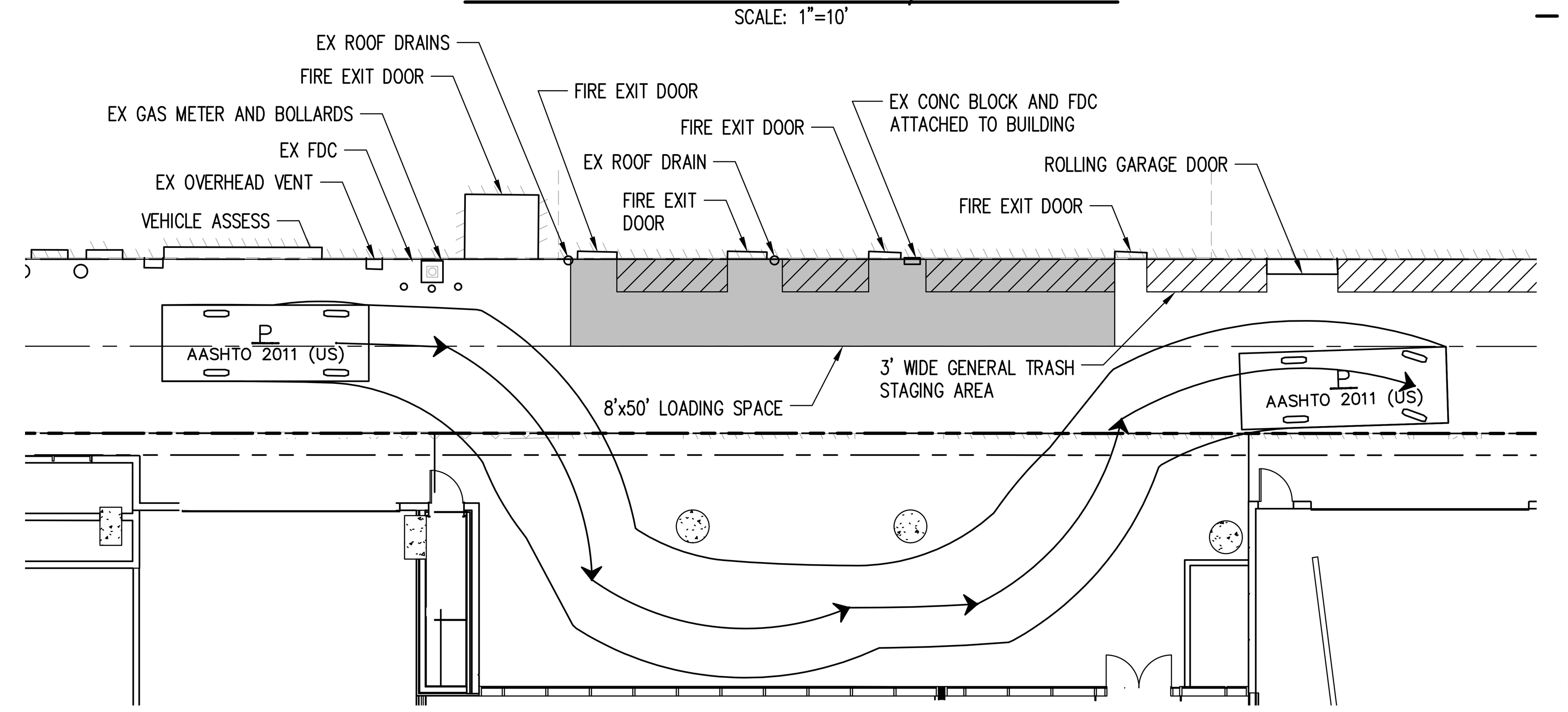
PORTE-COCHERE TURNING MOVEMENT
NORTHBOUND ENTRY/EXIT
SCALE: 1"=10'



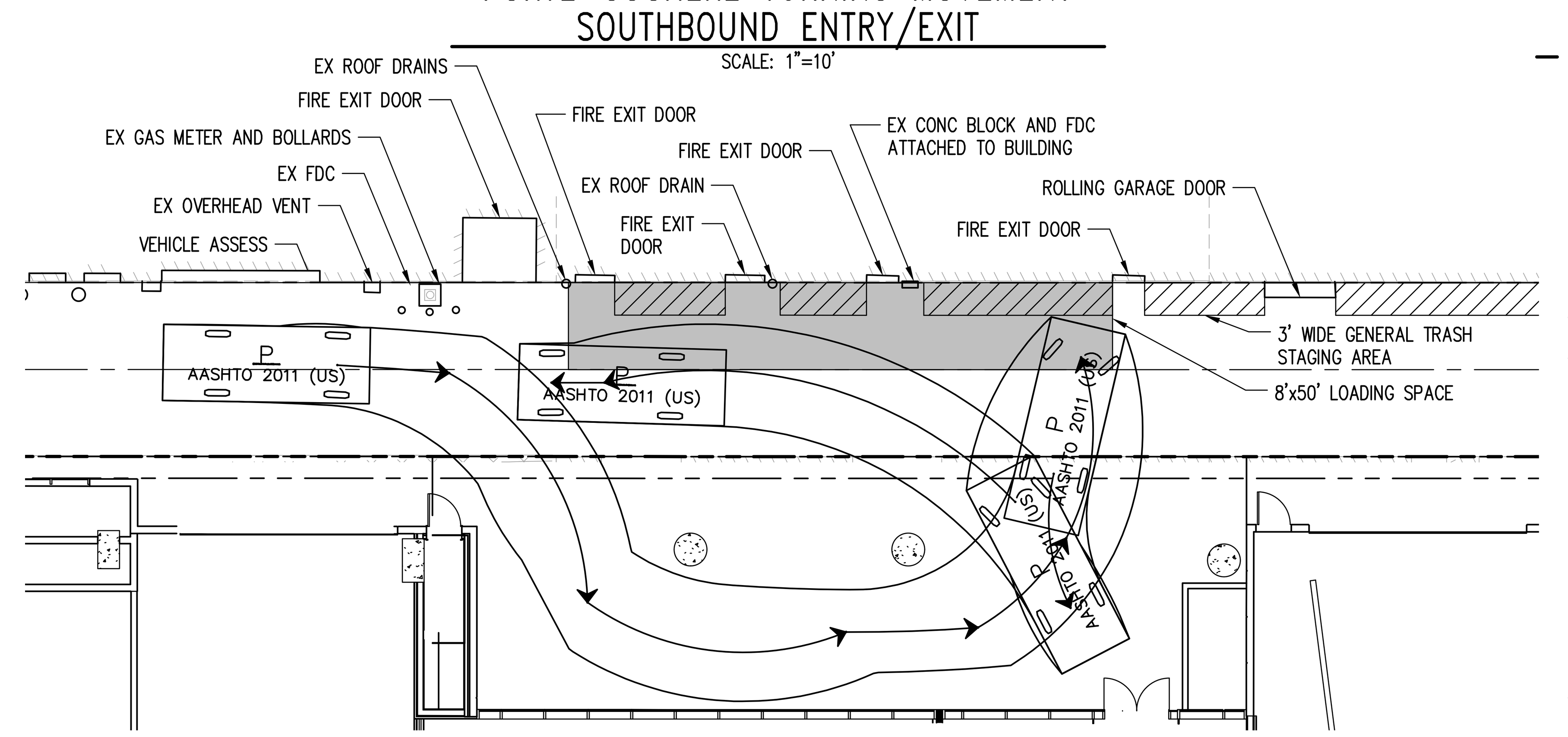
LOADING ZONE SU-30 TRUCK TURNING MOVEMENT
SOUTHBOUND ENTRY
SCALE: 1"=10'



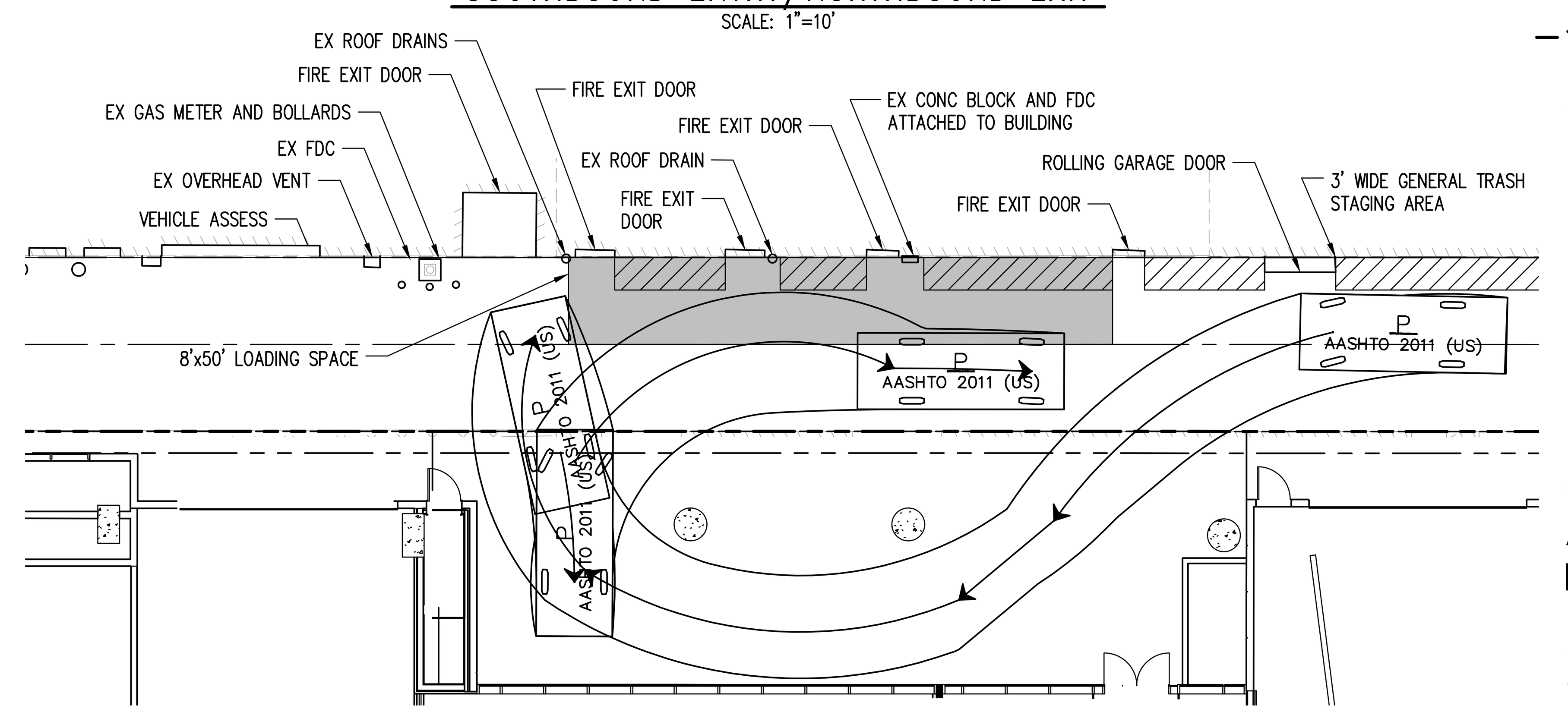
LOADING ZONE DELIVERY TRUCK TURNING MOVEMENT
SOUTHBOUND ENTRY
SCALE: 1"=10'



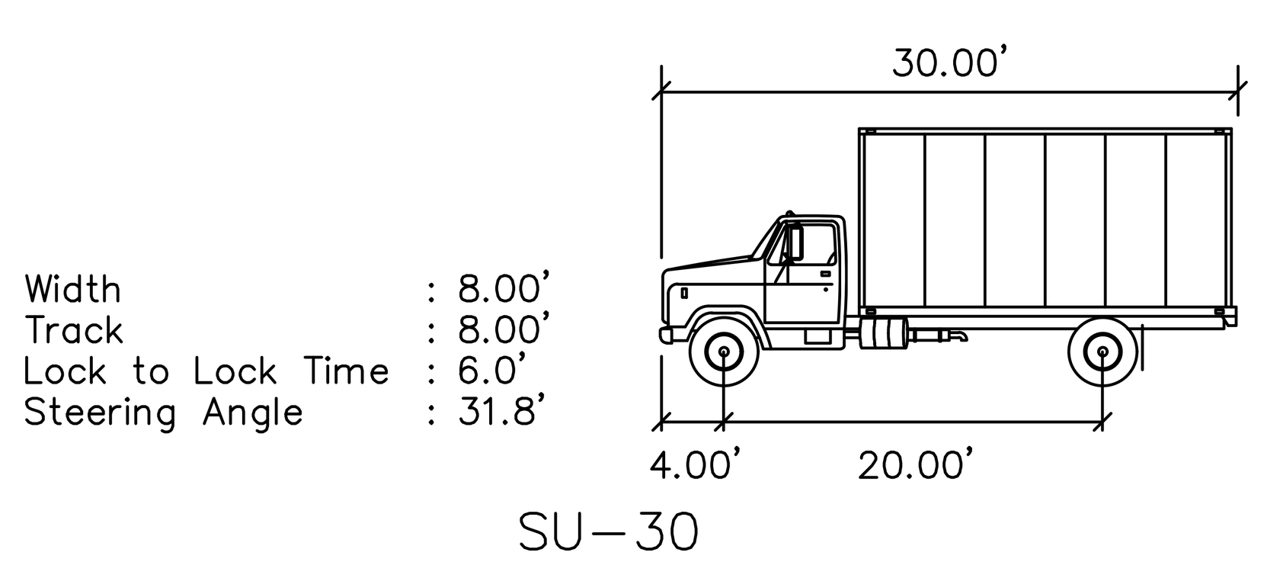
PORTE-COCHERE TURNING MOVEMENT
SOUTHBOUND ENTRY/EXIT
SCALE: 1"=10'



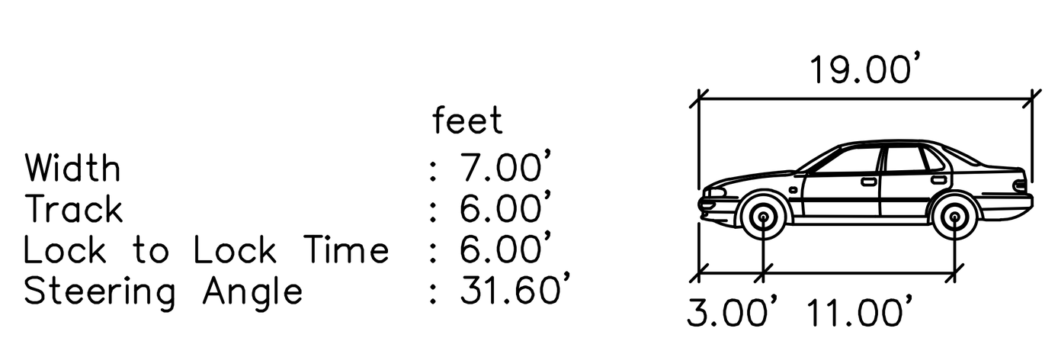
PORTE-COCHERE TURNING MOVEMENT
SOUTHBOUND ENTRY/NORTHBOUND EXIT
SCALE: 1"=10'



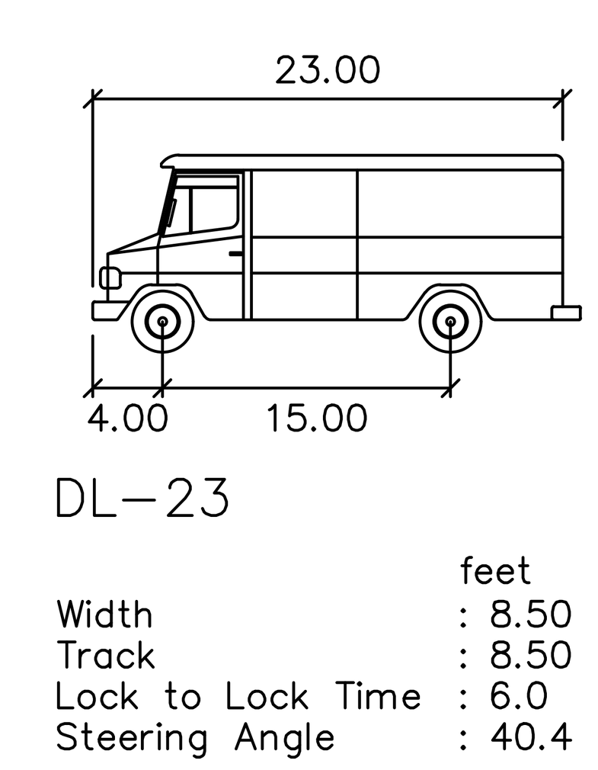
PORTE-COCHERE TURNING MOVEMENT
NORTHBOUND ENTRY/SOUTHBOUND EXIT
SCALE: 1"=10'



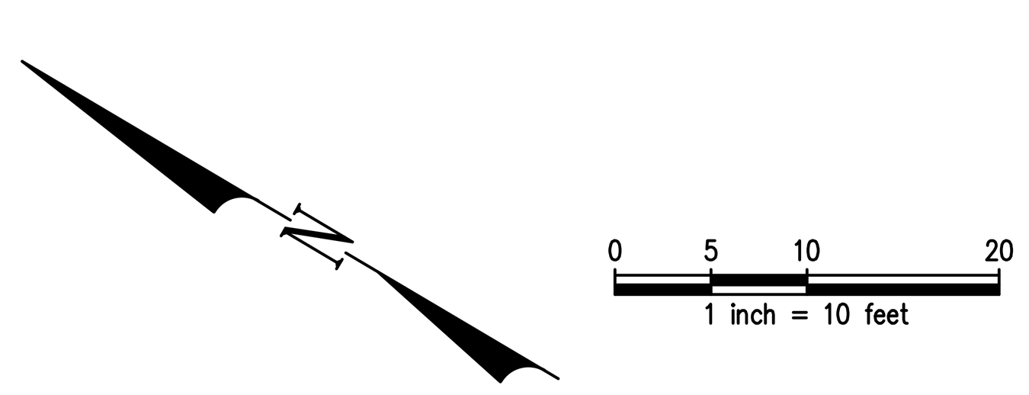
TRUCK DETAIL
NTS



PASSENGER VEHICLE DETAIL
NTS



DELIVERY TRUCK DETAIL
NTS



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wnniel
Feb 26, 2020 - 2:38pm

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landscape architecture
urban design

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suite 200
seattle, washington 98101

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(206) 626-0541 fax

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1601 5th Avenue, Suite 1600
Seattle, WA 98101
206.622.5822
www.kpff.com

1516 2ND AVE

1516 2ND AVENUE
SEATTLE, WA 98101

OWNER:

PINNACLE PLUS DEVELOPMENT
752 108TH AVE NE
BELLEVUE, WA 98004

if this drawing is not 30" x 42", it is a reduced print - scale accordingly

REVISIONS:

NO.	DESCRIPTION	BY	DATE
1	MUP Corrections 1		05/10/2019
3	MUP Corrections 3		02/26/2020

ISSUE INFORMATION:

DESCRIPTION	DATE
MUP SET	12/31/2018
SD SET	12/31/2018
DD SET	06/21/2019
SHORING PERMIT SET	08/30/2019
PHASE 1 PERMIT SET	09/27/2019

DOCUMENT SET TYPE:
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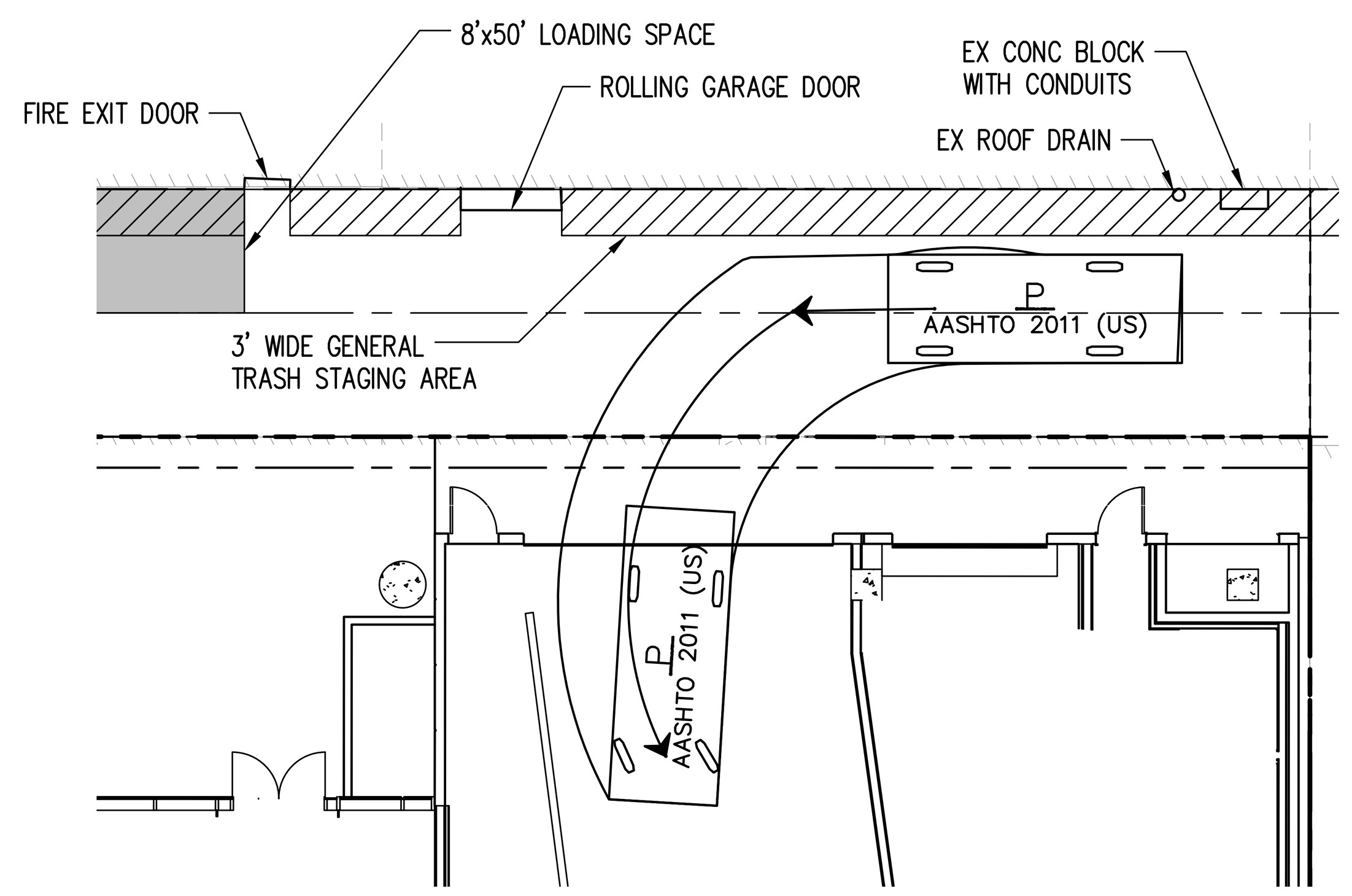
JOE DAN EBERHARD, STATE OF WASHINGTON, 31745, REGISTERED PROFESSIONAL ENGINEER
02/26/2020

SHEET TITLE:
ALLEY TURNING MOVEMENTS

PROJECT NO: 1800446
DRAWING NO.: C9.100
SCALE: AS NOTED
DATE: 02/26/2020
SHEET 2 OF 4

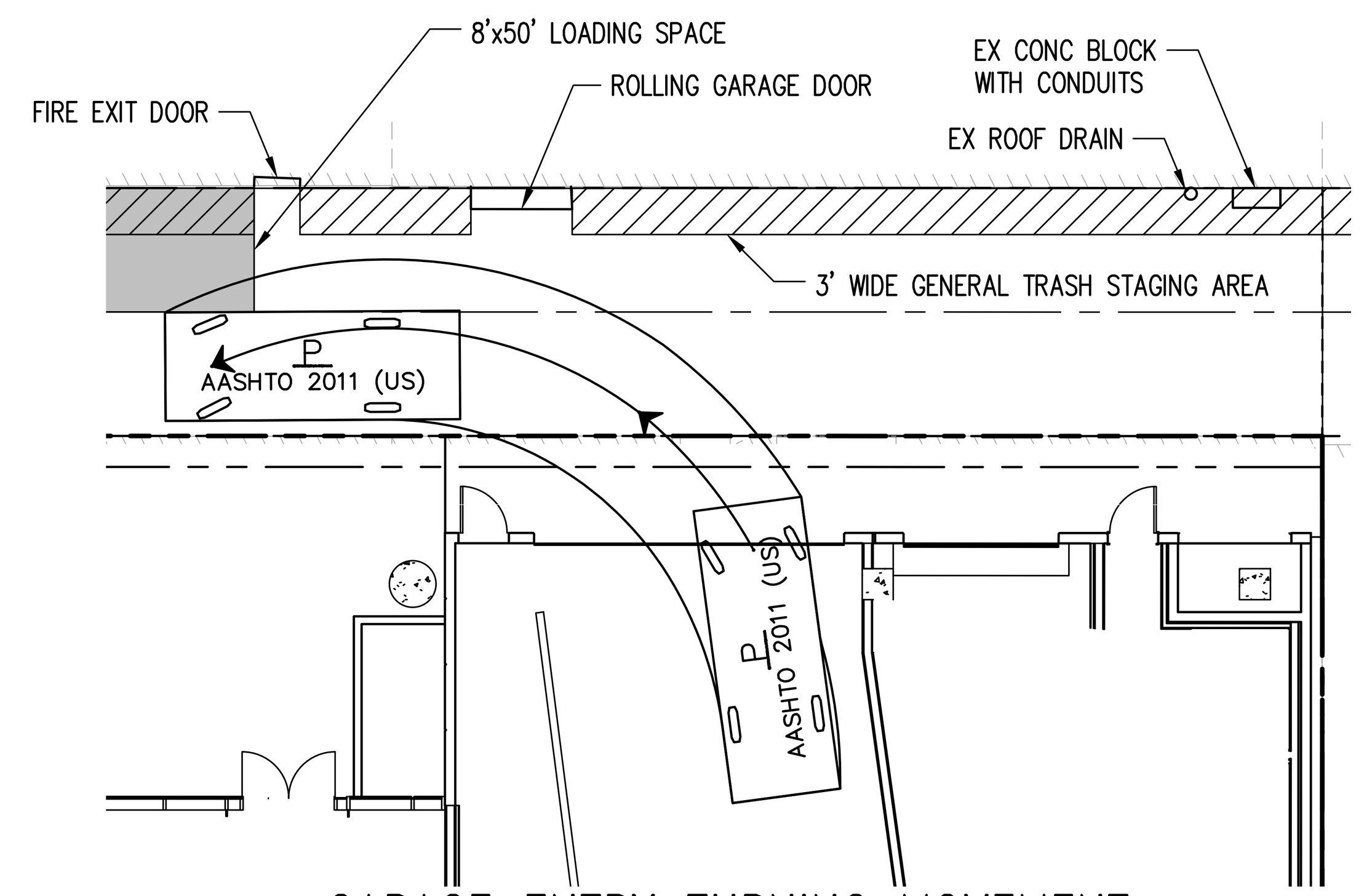
Appendix F

Garage Alley Access Turning Movement Diagrams



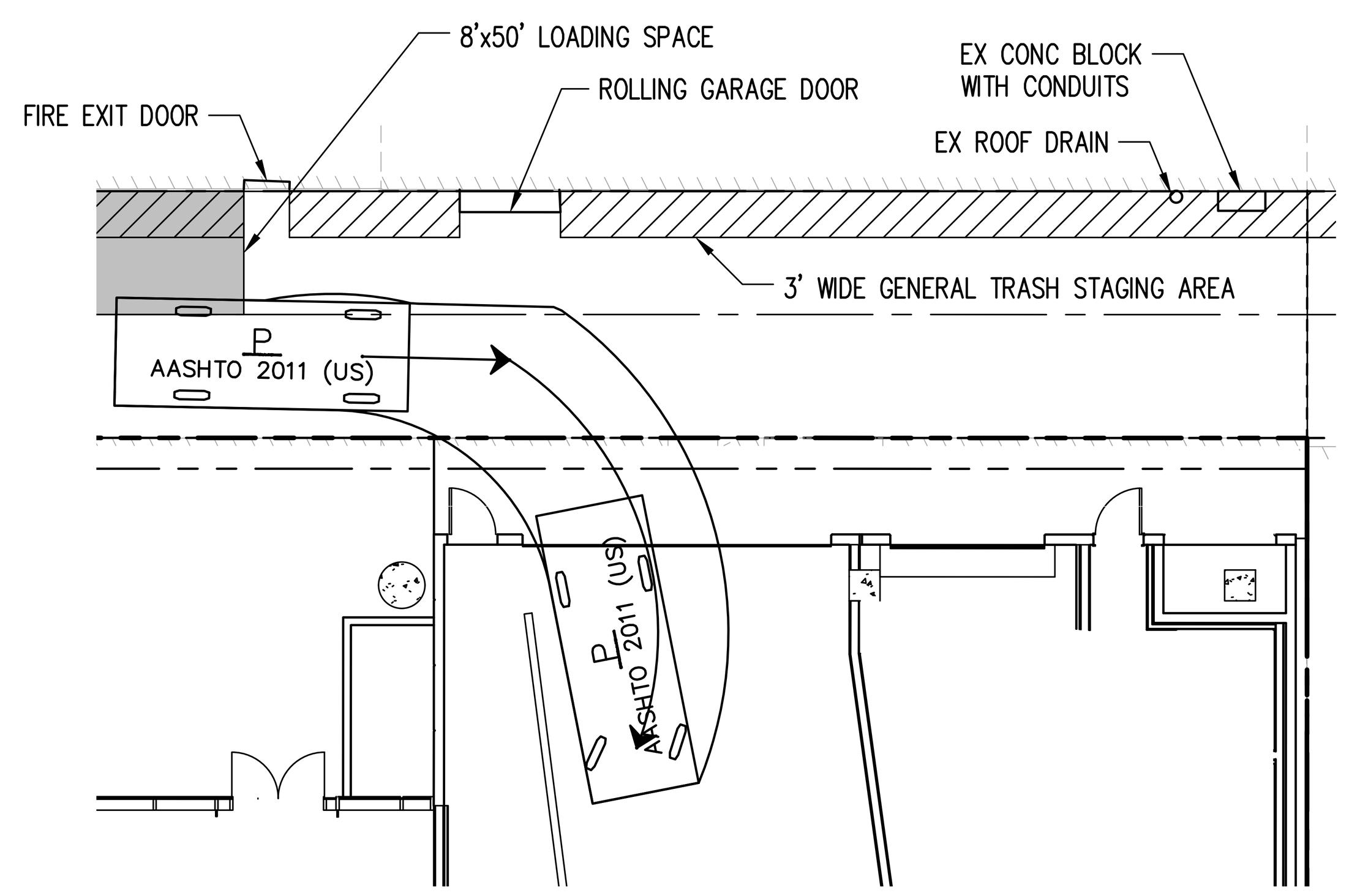
GARAGE ENTRY TURNING MOVEMENT NORTHBOUND ENTRY

SCALE: 1"=10'



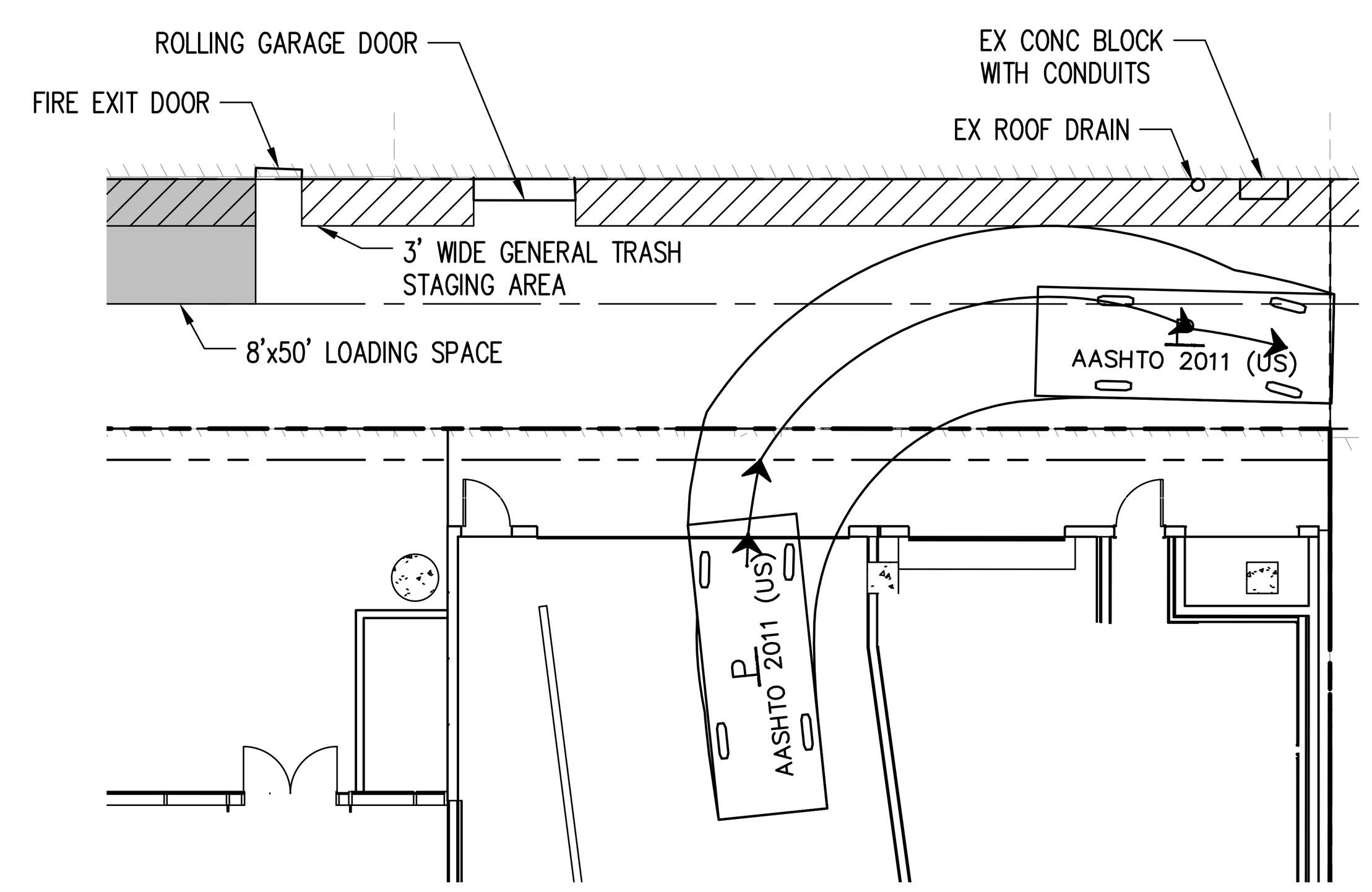
GARAGE ENTRY TURNING MOVEMENT NORTHBOUND EXIT

SCALE: 1"=10'



GARAGE ENTRY TURNING MOVEMENT SOUTHBOUND ENTRY

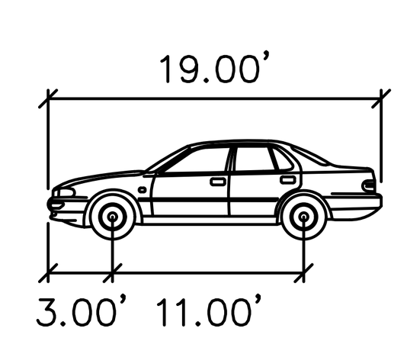
SCALE: 1"=10'



GARAGE ENTRY TURNING MOVEMENT SOUTHBOUND EXIT

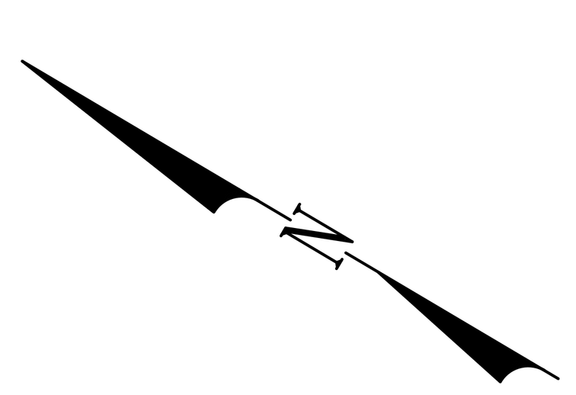
SCALE: 1"=10'

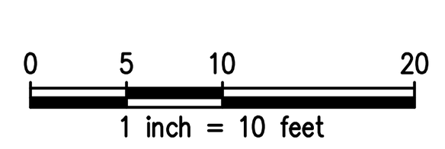
	feet
Width	: 7.00'
Track	: 6.00'
Lock to Lock Time	: 6.00'
Steering Angle	: 31.60'



PASSENGER VEHICLE DETAIL

NTS





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if this drawing is not 30" x 42", it is a reduced print - scale accordingly

REVISIONS:

NO.	DESCRIPTION	BY	DATE
1	MUP Corrections 1		05/10/2019
3	MUP Corrections 3		02/26/2020

ISSUE INFORMATION:

DESCRIPTION	DATE
MUP SET	12/31/2018
SD SET	12/31/2018
DD SET	06/21/2019
SHORING PERMIT SET	08/30/2019
PHASE 1 PERMIT SET	09/27/2019

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PROJECT NO: 1800446
DRAWING NO.: C9.200
SCALE: AS NOTED
DATE: 02/26/2020
SHEET 3 OF 4

Appendix G

Parking Demand Calculations

1516 2nd Avenue
Weekday Parking Demand Estimate

Use	High-Rise Multifamily (LUC 222) Center City Core		Retail (LUC 820) Center City Core		Sum of Separate Peak Parking
Size	Dwelling Units	524	Square Feet	3,502	
ITE Peak Parking Rate[1]	0.46		1.33		
Peak Parking Demand[1]	241		5		246
Start Time	Hourly Variation[2]	Hourly Parking Demand	Hourly Variation[1]	Hourly Parking Demand	Total Hourly Demand
1:00 AM	**100%**	**241**	**0%**	**0**	**241**
2:00 AM	**100%**	**241**	**0%**	**0**	**241**
3:00 AM	**100%**	**241**	**0%**	**0**	**241**
4:00 AM	**100%**	**241**	**0%**	**0**	**241**
5:00 AM	94%	227	0%	0	227
6:00 AM	83%	200	0%	0	200
7:00 AM	71%	171	0%	0	171
8:00 AM	61%	147	15%	1	148
9:00 AM	55%	133	32%	2	135
10:00 AM	54%	130	54%	3	133
11:00 AM	53%	128	71%	4	132
12:00 PM	50%	121	99%	5	126
1:00 PM	49%	118	100%	5	123
2:00 PM	49%	118	90%	5	123
3:00 PM	50%	121	83%	4	125
4:00 PM	58%	140	81%	4	144
5:00 PM	64%	154	84%	4	158
6:00 PM	67%	161	86%	4	165
7:00 PM	70%	169	80%	4	173
8:00 PM	76%	183	63%	3	186
9:00 PM	83%	200	42%	2	202
10:00 PM	90%	217	15%	1	218
11:00 PM	93%	224	0%	0	224
12:00 AM	**100%**	**241**	**0%**	**0**	**241**
				Peak:	241

Notes:

1. Peak Parking Rate and hourly variation in peak parking utilization based on ITE *Parking Generation* , 5th Edition, 2019.

2. Hourly variation in peak parking utilization based on LUC 221 (Mid-Rise Multifamily Housing).