

Transportation Impact Analysis

East Vancouver Costco

Vancouver, Washington

October 2009

Transportation Impact Analysis

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Vancouver, Washington

Prepared For:
Costco Wholesale
999 Lake Drive
Issaquah, WA 98027

Prepared By:
Kittelson & Associates, Inc.
610 SW Alder, Suite 700
Portland, OR 97205
(503) 228-5230

Project Principal: Chris Brehmer, P.E.
Project Manager: Joe Bessman, P.E.

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Section 1
Executive Summary

Executive Summary

Costco Wholesale is proposing to develop a new store site in Vancouver, Washington on the northeastern quadrant of the SE 1st Street/NE 192nd Avenue intersection. The subject property covers approximately 17.3 acres and is zoned for commercial use. The development application includes a Costco store, Costco Fuel, and approximately 28,200 square feet of additional retail buildings. Access to the proposed development is proposed via SE 1st Street, NE 192nd Avenue, and a new public loop road to be constructed around the periphery of the property. Construction of the site is expected to begin in the spring of 2010 with completion and occupancy later in the year.

The transportation impact analysis described in this report was prepared in accordance with City of Vancouver transportation impact analysis requirements. In addition to addressing City concurrency corridor modeling requirements, this report analyzes the impact of site-generated traffic on study intersections that are not addressed by the concurrency models.

Recommended mitigation measures needed to satisfy the City of Vancouver's Transportation Concurrency Ordinance as well as other intersection operational issues are summarized below. Additional mitigation measures may be identified by City staff in conjunction with their transportation concurrency modeling process.

SUMMARY OF MITIGATION RECOMMENDATIONS FOR SITE DEVELOPMENT

The following mitigation measures are recommended in conjunction with site development.

Frontage Improvements

- NE 192nd Avenue:
 - Complete half-street improvement for a standard 5-lane arterial cross section with bicycle lanes and a raised center median.
 - Construct a northbound right-turn deceleration lane at the mid-block right-in/right-out only site driveway per City standard detail T04-05.
 - Construct a northbound right-turn deceleration lane at the NE 192nd Avenue/NE 3rd Street intersection per City standard detail T04-05.
- SE 1st Street:
 - Construct a raised median on SE 1st Street between NE 192nd Avenue and the new loop road signal to the east with a median break at the existing Illahee Elementary School access driveway.
 - Full movement access should be preserved at the existing Illahee Elementary School driveway located on the south side of SE 1st Street.

- Maintain at least the existing 100 feet of westbound left-turn storage at the existing Illahee Elementary School driveway.
- Provide 200 feet of eastbound left-turn storage at the proposed new signalized intersection with the loop road.
- Provide 200 feet of westbound left-turn storage at the proposed new signalized intersection with the loop road.
- Construct a westbound right-turn deceleration lane with 100 feet of storage length at the right-in/right-out only site driveway per City standard detail T04-05.
- Modify the existing SE 1st Street/SE 192nd Avenue traffic signal to provide dual eastbound left-turn lanes. The improvement will require modification of the landscape strip along the southern edge of SE 1st Street, modification signal mast arm in the southeast quadrant of the intersection, and relocation of some luminaires along SE 1st Street west of SE 192nd Avenue.
- NE Third Street Loop Road:
 - Construct a new public loop road around the north and east sides of the site linking NE 192nd Avenue and SE 1st Street. The loop road should provide:
 - A three-lane cross section with bike lanes at the signalized intersections with NE 192nd Avenue and SE 1st Street.
 - A two-lane cross section with bike lanes east of the Costco Fuel Center access and north of the first east-west drive aisle reached when entering the site from SE 1st Street.
 - A raised median on the east approach of the NE 3rd Street/NE 192nd Avenue intersection; extending from the signalized intersection east past the right-out only driveway serving the Costco Fuel Center.
 - A landscape strip and detached sidewalk along both sides the new roadway.

Other Improvements

- Signalize the NE 3rd Street/NE 192nd Avenue intersection.
 - Provide a separate left-turn lane and shared through/right-turn lane on the westbound approach aligned with the Lacamas Market Center access to the west.
 - Provide 200 feet of southbound left-turn lane storage on NE 192nd Avenue at the intersection.
 - Provide protected-permitted phasing on the north-south approaches.

- Provide permitted phasing on the east-west approaches.
- Provide traffic signal interconnect to the SE 1st Street/NE 192nd Avenue intersection.
- Signalize the SE 1st Street/Loop Road intersection.
 - Provide a separate left-turn lane and shared through/right-turn lane on the northbound and southbound approaches.
 - Provide protected-permitted phasing on the east-west and north-south approaches.
 - Provide traffic signal interconnect to the SE 1st Street/NE 192nd Avenue intersection.
 - If possible, construct the traffic signal in a way that does not preclude the construction of a future westbound right-turn lane at the intersection (while off-site, a right-turn lane may be warranted by other future development to the east).
 - Provide a raised median on the north leg of the intersection (between the signalized intersection with SE 1st Street extending north past the southern driveway serving the Costco parking lot) to restrict the site driveway to right-in/right-out only turn movements.
- Illahee Elementary School Circulation Improvements
 - Modify the on-site circulation to relocate school bus traffic to the new traffic signal on SE 1st Street.
 - Retain the existing full-access unsignalized driveway onto SE 1st Street for parent and faculty use. A median break will be provided to retain all movements at the driveway.
- On-site landscaping and any above-ground utilities should be provided appropriately to ensure that adequate sight distance is provided and maintained.
- Fund off-site proportional share intersection mitigations as per City requirements at the intersections summarized in the table below:

Summary of Proportional Share Intersection Contributions

Intersection	Cost Per Trip	Number of Trips	Proportionate Share	East CITY District TIF Creditable?
SE 7 th Street & 136 th Avenue	\$772.00	3	\$2,316.00	No
Mill Plain & 136 th Avenue	\$1,851.85	8	\$14,814.80	Yes
Mill Plain Blvd. & I-205 NB Ramp	\$428.94	0	\$0	No
Mill Plain Blvd. & 164 th Avenue	\$184.20	31	\$5,710.20	No
164 th Avenue & 1 st Street	\$477.78	45	\$21,500.10	No
164 th Avenue & 12 th Street	\$259.84	0	\$0	No
164 th Avenue & 15 th Street	\$212.31	0	\$0	No
164 th Avenue & McGillivray Blvd.	\$494.51	20	\$9,890.20	No
164 th Avenue & 20 th Street	\$143.95	4	\$575.80	No
164 th Avenue & 34 th Street	\$844.59	2	\$1,689.18	No
166 th Avenue & McGillivray Blvd.	\$400.00	20	\$8,000.00	No
Hearthwood Street & 1 st Street	\$500.00	4	\$2,000.00	No
NE 137 th Avenue & NE 49 th Street	\$3,885.00/trip	2	\$7,770.00	No ¹
NE 20 th Street & 176 th Avenue	\$400.00	30	\$12,000.00	TBD ²
NE 18 th Street & 112 th Avenue	\$3,608.55	0	\$0	Yes
St Johns & 68 th Street (Signal)	\$1,000.00	0	\$0	No
Leiser/St Helens/McArthur	TBD	0	\$0	No
Fourth Plain & Rossiter Pedestrian Crossing Signal	\$500/dwelling unit	0	\$0	No
Total Proportionate Share Cost			\$86,266.28	\$14,814.80

No¹ - The project is TIF creditable, but only for the Evergreen TIF district

TBD² - The City of Vancouver has not determined whether this project will be TIF creditable

Additional details of the study methodology, findings, and recommendations are provided within this report.

Section 2
Introduction

Introduction

The purpose of this study was to determine the transportation-related impacts associated with the proposed Costco development in accordance with applicable City of Vancouver review criteria. As shown in Figure 1, the site is located along the north side of SE 1st Street east of NE 192nd Avenue. Figure 2 illustrates the proposed site plan. Full build-out and occupancy of the site is anticipated in the fall of 2010.

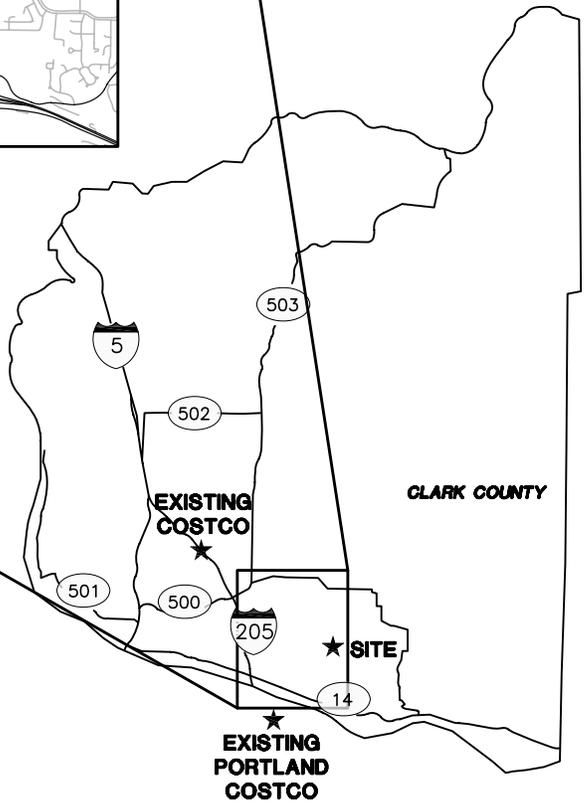
SCOPE AND METHODOLOGY

The study intersections and overall study area for this project were determined based on a review of existing travel patterns, the City of Vancouver's Concurrency Ordinance (Vancouver Municipal Code 11.95), and direction provided by city transportation concurrency staff.

Transportation Concurrency Corridors and Study Intersections

In accordance with the City of Vancouver's transportation concurrency ordinance, this report provides site-generated traffic assignments to all affected City of Vancouver concurrency corridors. Additionally, operational analyses are provided at proposed site-access points, key intersections in the site vicinity, and intersections of "regional significance" (intersections of arterial or collector classified roadways) located outside the affected transportation corridors and impacted by ten or more weekday peak hour trips. The study site is located within Transportation Analysis Zone (TAZ) #480. Site-generated trips within the City were tracked to five new trips at the following City-modeled Transportation Management Zones (TMZs)/concurrency corridors:

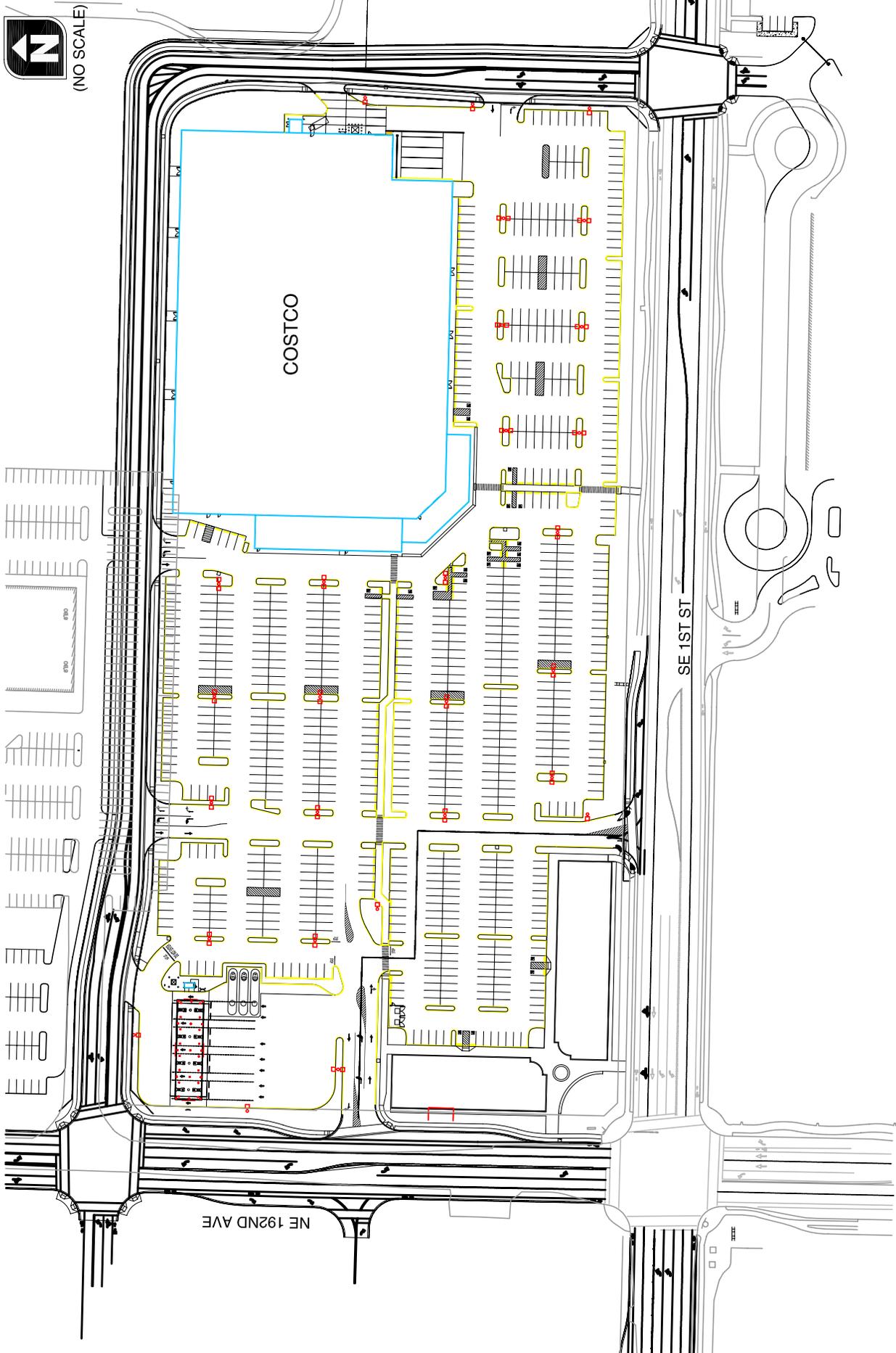
- SE Mill Plain Boulevard (I-205 to SE 136th Avenue)
- SE Mill Plain Boulevard (SE 136th Avenue to SE 164th Avenue)
- SE Mill Plain Boulevard (SE 164th Avenue to SE 192nd Avenue)
- SE 164th Avenue (SR 14 to SE 1st Street)
- NE 162nd Avenue (SE 1st Street to Fourth Plain Boulevard)
- SE 192nd Avenue (SR 14 to NE 18th Street)
- SE 138th Avenue (NE Fourth Plain Boulevard to NE 28th Street)
- SE 136th Avenue (SE Mill Plain Boulevard to NE 28th Street)
- NE 28th Street (NE 112th Avenue to NE 138th Avenue)
- NE 28th Street (NE 138th Avenue to NE 162nd Avenue)
- NE 18th Street (NE 112th Avenue to NE 138th Avenue)
- NE 18th Street (NE 138th Avenue to NE 162nd Avenue)
- Fourth Plain Boulevard (I-205 to NE 162nd Avenue)



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**SITE VICINITY MAP
VANCOUVER, WASHINGTON**

**FIGURE
1**



NOTE: TENTATIVE IMPROVEMENTS SHOWN AT THE ILLAHEE ELEMENTARY SCHOOL ACCESS ARE PRELIMINARY AND SUBJECT TO CHANGE

**PROPOSED SITE PLAN
VANCOUVER, WASHINGTON**

FIGURE
2

Analysis Periods

Weekday a.m. and p.m. peak hour traffic conditions were modeled at the study area intersections.

Study Intersections

The study intersections include:

- SE 1st Street/SE 172nd Avenue
- SE 1st Street/SE 192nd Avenue
- SE 1st Street/Existing Illahee Elementary School driveway
- SE 1st Street/SE 199th Avenue
- SE 1st Street/NW Friberg-Strunk Street (City of Camas)
- NE 192nd Avenue/NE 3rd Street

In addition to the study intersections outlined above, key site driveways were analyzed for safety, queuing, and operations during the weekday a.m. and p.m. peak hours. Further, weekday p.m. peak hour trip assignments were prepared for key intersections for use by City staff in assessing proportional share mitigation contributions.

Analysis Scenarios

In accordance with City of Vancouver requirements, the following analysis periods were studied:

- Year 2009 Existing Traffic Conditions
- Year 2010 Background Traffic Conditions (without site traffic)
- Year 2010 Total Traffic Conditions (with full site build-out)
- Year 2015 Background Traffic Conditions
- Year 2015 Total Traffic Conditions

Report Format

The remaining sections of this report address the following transportation issues:

- Existing land use and transportation system conditions within the site vicinity;
- Planned developments and transportation improvements in the study area;
- Forecast year 2010 and 2015 background traffic conditions;
- Trip generation and distribution estimates for the proposed development;
- Forecast year 2010 and 2015 total traffic conditions;
- Queuing analyses at the site-access driveways and key study intersections;
- A review of on-site traffic operations and circulation; and
- Conclusions and recommendations.

ANALYSIS METHODOLOGY

Intersection Levels of Service

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (Reference 1)¹. A description of level of service and the criteria by which they are determined is presented in Appendix “A.” Appendix “A” also indicates how level of service is measured and what is generally considered the acceptable range of level of service.

To ensure that the analyses were based on a reasonable worst-case scenario, peak 15-minute flow rates were used in the evaluation of all intersection levels of service. For this reason, the analyses reflect conditions that are only likely to occur for 15 minutes out of each average peak hour. Traffic conditions during typical weekday hours are expected to operate under better conditions than those described in this report.

Operating Standards

Level-of-service analyses in this report for signalized and all-way stop-controlled intersections were based on the average control delay per vehicle entering the intersection. The City of Vancouver requires that Level of Service “D” or better be maintained at signalized intersections; however, signalized intersections located on concurrency corridors may drop below Level of Service “D” as long as the overall minimum corridor travel speed is maintained².

The City of Camas operates and maintains the SE 1st Street/NW Friberg-Strunk Street intersection. The *City of Camas Design Standards Manual* states that: “A minimum Level of Service of “C” on minor and local streets, and “D” on collector/arterials or better should be maintained for traffic operations.” As SE 1st Street is an arterial facility, a Level of Service “D” is required.

¹ All of the study intersection operational analyses presented in this report were prepared using the TRAFFIX Version 8.0 software, which implements the Highway Capacity Manual methodology.

² The City of Vancouver evaluates concurrency corridors using a three-tiered review process. Tier 1 review is based upon a corridor-wide measure of effectiveness while Tier 2 is evaluated at the individual intersection level within the corridor. Tier 3 applies to all signalized intersections within the City.

Travel speed and delay analysis are used as the criteria for determining the acceptable service level for identified corridors under the Tier 1 evaluation. Tier 2 intersection analyses are performed in situations where corridors are approaching their level of service thresholds or key intersections within a corridor are suspected of having operational deficiencies. Acceptable signalized system intersection operating levels for Tier 2 are defined as the average weighted delay for all vehicles entering the intersection not exceeding 55 seconds. An exception to the Tier 2 standards is made for traffic signals within the Mill Plain Boulevard corridor between I-205 and SE 136th Avenue and all of the downtown, where the acceptable intersection operating delay is 80 seconds.

Tier 3 requirements stipulate that intersection delay shall not be permitted to exceed 2 signal cycles or 300 seconds for any traffic phase/movement at any signalized intersection.

For two-way stop-controlled intersections, level of service is based on the intersection's ability to accommodate the most difficult, or critical, movement as overall intersection level of service is not defined by the *2000 Highway Capacity Manual*. Generally, unsignalized intersections are considered to be operating acceptably as long as the critical minor-street movement has a volume-to-capacity ratio less than 1.0 and the major street turning and through movements operate at Level of Service "E" or better.

Queuing

Queuing analyses are presented in this report for both unsignalized and signalized intersections under build-out conditions. The intersection queuing analyses was conducted using Synchro 7 95th percentile queue lengths and all results were rounded up to the nearest vehicle length (one vehicle was assumed to occupy 25 feet).

Section 3
Existing Conditions

Existing Conditions

The existing conditions analysis identifies the site conditions and current operational and geometric characteristics of the roadways within the study area. These conditions will be compared with future conditions later in this report.

Kittelson & Associates, Inc. (KAI) staff visited and inventoried the proposed development site and surrounding area in July 2009. At that time, KAI collected information regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

SITE CONDITIONS AND ADJACENT LAND USES

The proposed site is generally vacant and is zoned for commercial use. LifePoint Church is located directly north of the site, commercial properties are located to the west and east (currently vacant), Illahee Elementary School to the south, and Union High School is located to the northeast. A portion of the northern side of the site is currently used by LifePoint Church for a surface parking. The commercially zoned land located directly east of the site on the north side of SE 1st Street is currently vacant and is owned by the Evergreen School District.

TRANSPORTATION FACILITIES

Table 1 summarizes the existing transportation facilities and roadways in the study area.

Table 1
Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification ¹	Number of Lanes	Posted Speed	Sidewalks?	Bicycle Lanes?	Median?	On-Street Parking?
NE 192 nd Avenue (North of 1 st Street)	Principal Arterial	2	40 mph	No	No	No	No
SE 192 nd Avenue (South of 1 st Street)	Principal Arterial	5	40 mph	Yes	Yes	Raised/ Landscaped	No
SE 1 st Street (East of 192 nd Ave.)	Principal Arterial	5	40 mph*	Yes	Yes	Partial Raised	No
SE 1 st Street (West of 192 nd Ave.)	Principal Arterial	2	40 mph	Partial	Partial	No	No
SE 172 nd Avenue	Minor Arterial	3	40 mph	Partial	Yes	No	No
NW Friberg-Strunk Street	Arterial ²	2/3	40 mph*	Partial	No	No	No

¹ Source: City of Vancouver *Arterial Street System and Classification Map*, Adopted June 11, 2009

² Source: City of Camas *Traffic Impact Fee Update Figure 6-1, Proposed Functional Classification*

* Speed limit reduced in school zone by time of day on school days

Roadway Facilities

The site has frontage on two principal arterials; NE 192nd Avenue and SE 1st Street. The site's SE 1st Street frontage has been constructed to include detached sidewalks, bicycle lanes, street trees, and

illumination. West of SE 192nd Avenue, SE 1st Street transitions to a two-lane section with sidewalks and frontage improvements located along limited portions of the roadway; primarily on the south side. SE 192nd Avenue has a two-lane cross section north of SE 1st Street and lacks curbs, sidewalks, or other improvements along the roadway. Figure 3 illustrates the location of the study intersections as well as the existing lane configurations and traffic control devices associated with them.

Pedestrian and Bicycle Facilities

The site's frontage along SE 1st Street includes detached sidewalks, street trees, bicycle lanes, and illumination. Pedestrian facilities are also located on the south side of SE 1st Street to the west of SE 192nd Avenue. SE 192nd Avenue has no curbs, sidewalks, bicycle lanes or other improvements north of SE 1st Street but is fully improved to the south of SE 1st Street and interconnected throughout the Columbia Tech Center campus and into the neighborhoods to the south. SE 1st Street has a variable speed limit system that is activated by changeable message signs on school days along the SE Illahee Elementary School frontage.

Transit Facilities

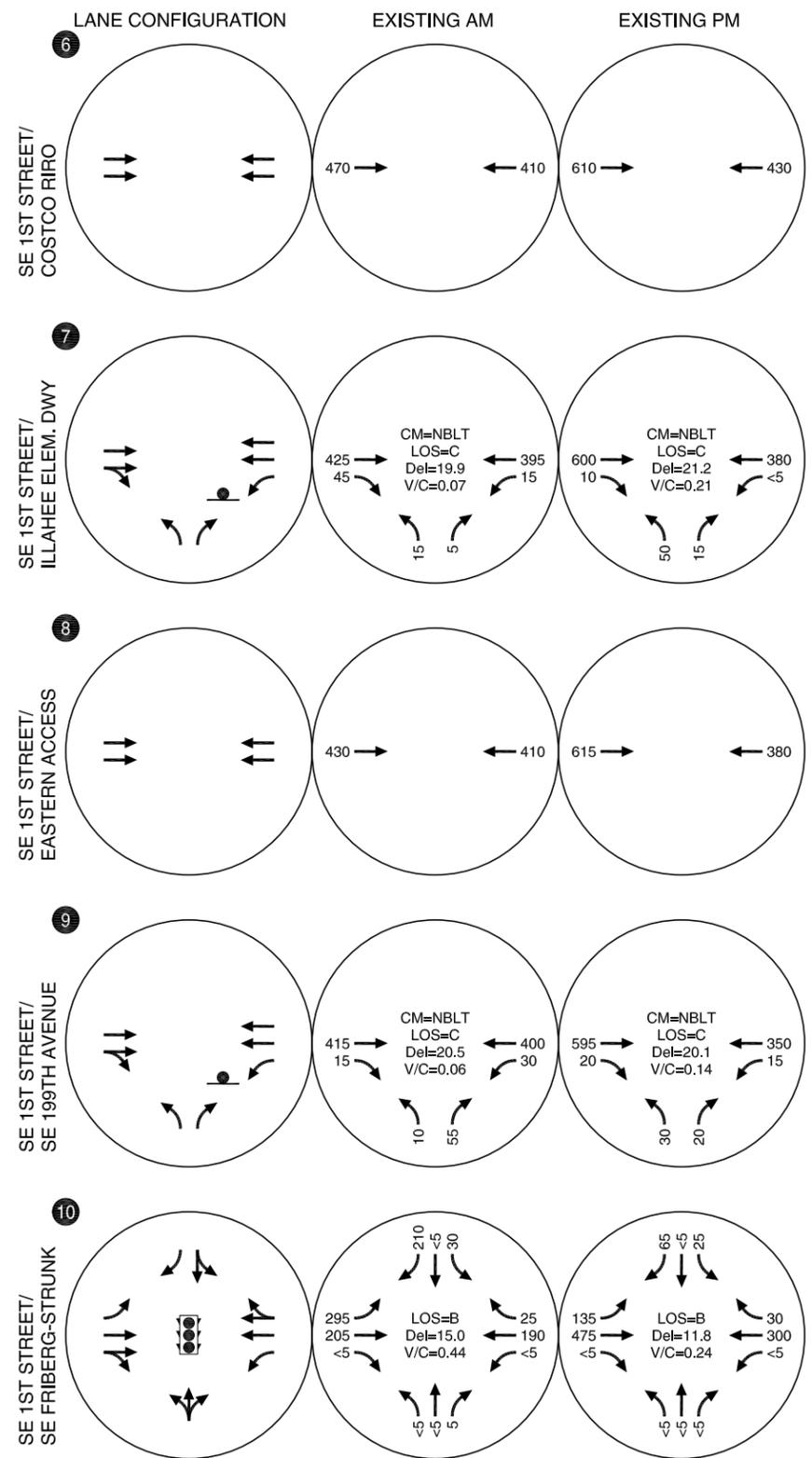
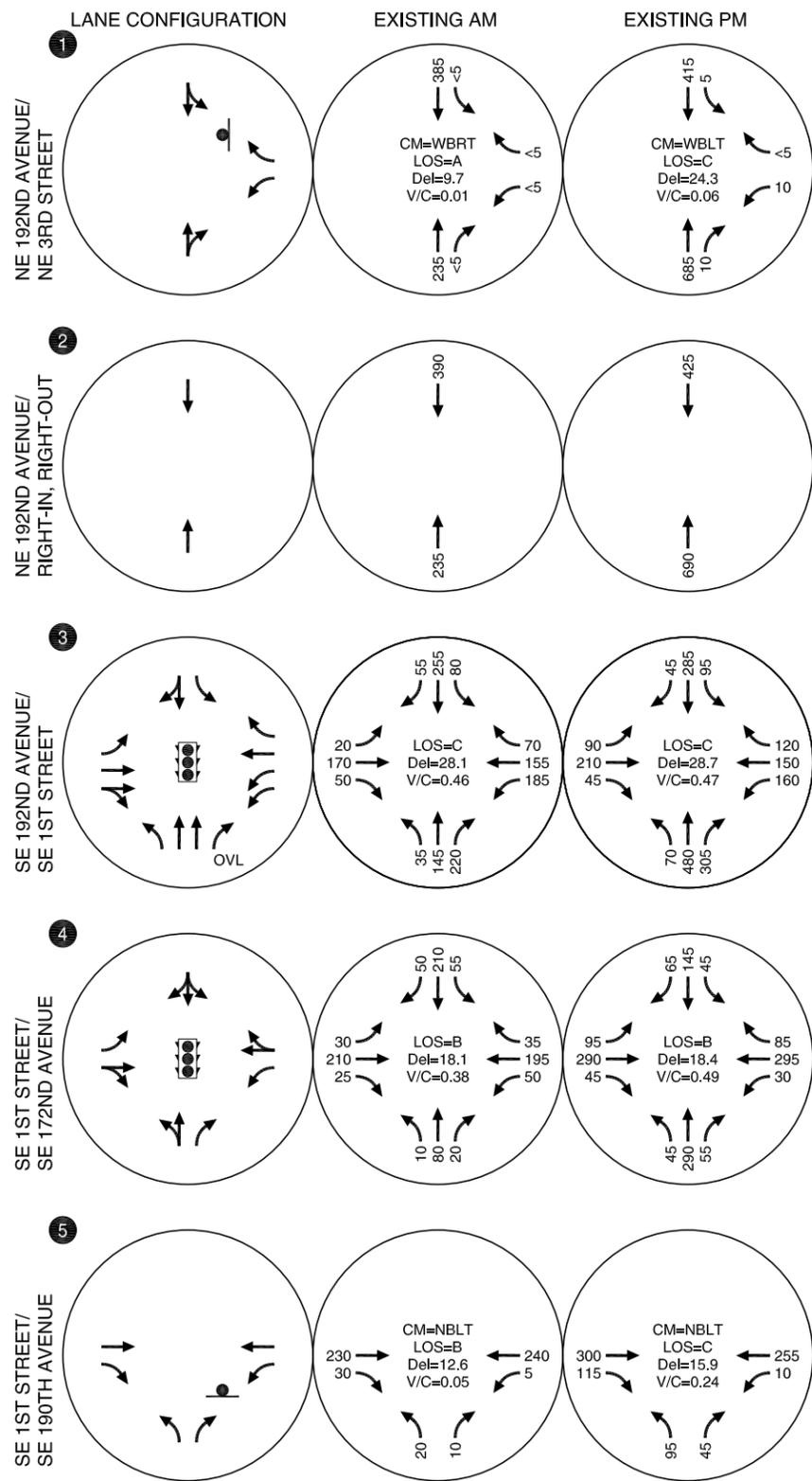
C-Tran currently offers two transit routes within the general site vicinity. Both routes travel along Mill Plain Boulevard and SE 164th Avenue (Reference 2). Operations of these routes are described below.

Route #37, *Mill Plain*, provides bus service between the 7th Street Transit Center and the Fisher's Landing Transit Center. Service along this route is provided seven days a week with headways ranging from 15 to 30 minutes weekdays to 30 minutes on Saturdays and Sundays. The nearest Route #37 bus stop to the site is currently located on SE 164th Avenue at SE Mill Plain Boulevard.

Route #30, *Burton*, provides daily service between the Fisher's Landing Transit Center in southeast Vancouver and the 7th Street Transit Center in downtown Vancouver. This route provides service along SE 1st Street and SE 192nd Avenue in the site vicinity. Headways range from 30 minutes weekdays and Saturdays to 50-60 minutes on Sundays. The nearest Route #30 bus stop to the site is located on SE 192nd Avenue, between SE 1st Street and SE 3rd Street.

TRAFFIC VOLUMES AND PEAK HOUR OPERATIONS

Manual turning-movement counts were obtained for all the existing study intersections in June 2009 while local schools were still in session. All the counts used in this analysis were conducted on a typical mid-week day during the morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak time periods. Within the immediate site frontage, the system-wide morning and evening peak hours were found to occur between 7:00 a.m. and 8:00 a.m. and 4:50 p.m. and 5:50 p.m., respectively. *Appendix "B" contains the traffic count worksheets used in this study.*



LEGEND

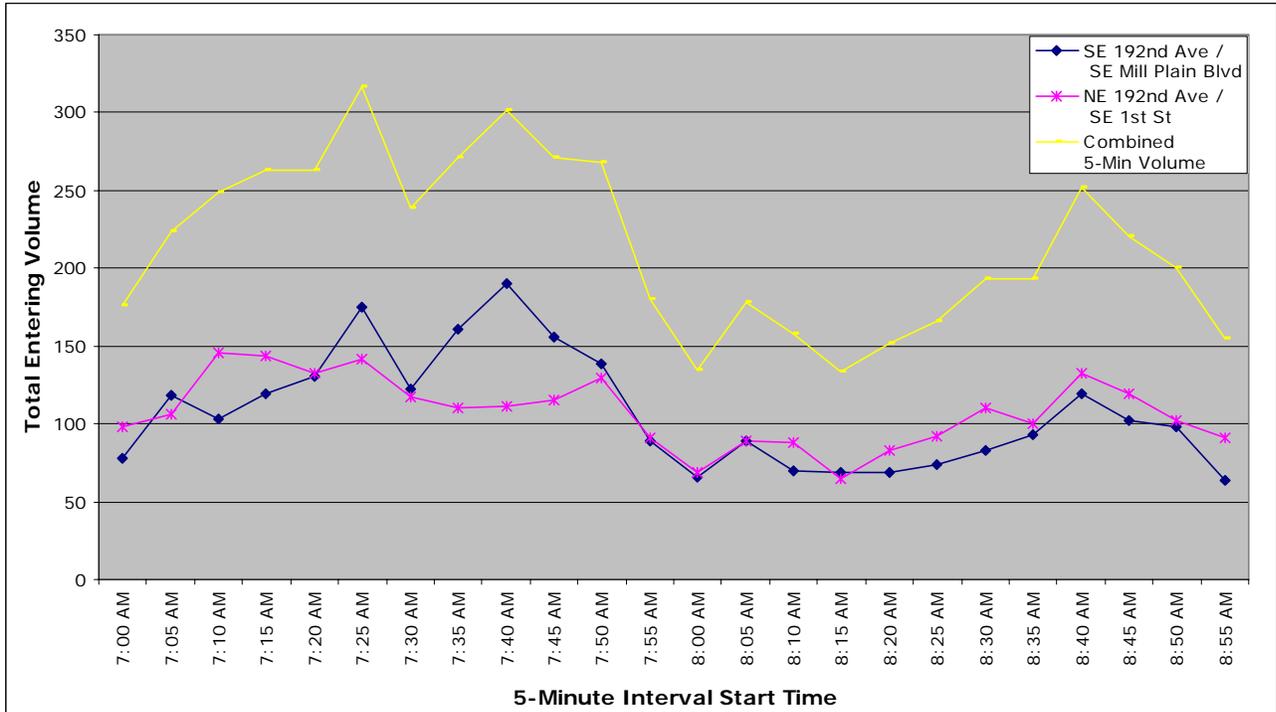
- CM = CRITICAL MOVEMENT (TWSC)
- LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
- Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- TWSC = TWO-WAY STOP CONTROL
- xx% = TRIP DISTRIBUTION PERCENTAGE
- OVL = OVERLAP SIGNAL PHASE
- = STOP SIGN
- ⬆️⬆️⬆️ = TRAFFIC SIGNAL
- ↔️ = TRAVEL LANE

YEAR 2009 LANE CONFIGURATIONS & EXISTING TRAFFIC CONDITIONS WEEKDAY AM AND PM PEAK HOURS VANCOUVER, WASHINGTON

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Volume plots from the weekday a.m. and p.m. peak periods are provided in Graphs 1 and 2. Figure 3 provides a summary of the year 2009 turning-movement counts, which are rounded to the nearest five vehicles per hour for the weekday a.m. and p.m. peak hours.

Graph 1
Weekday AM Peak Period Existing Volume Summary



Graph 2
Weekday PM Peak Period Existing Volume Summary

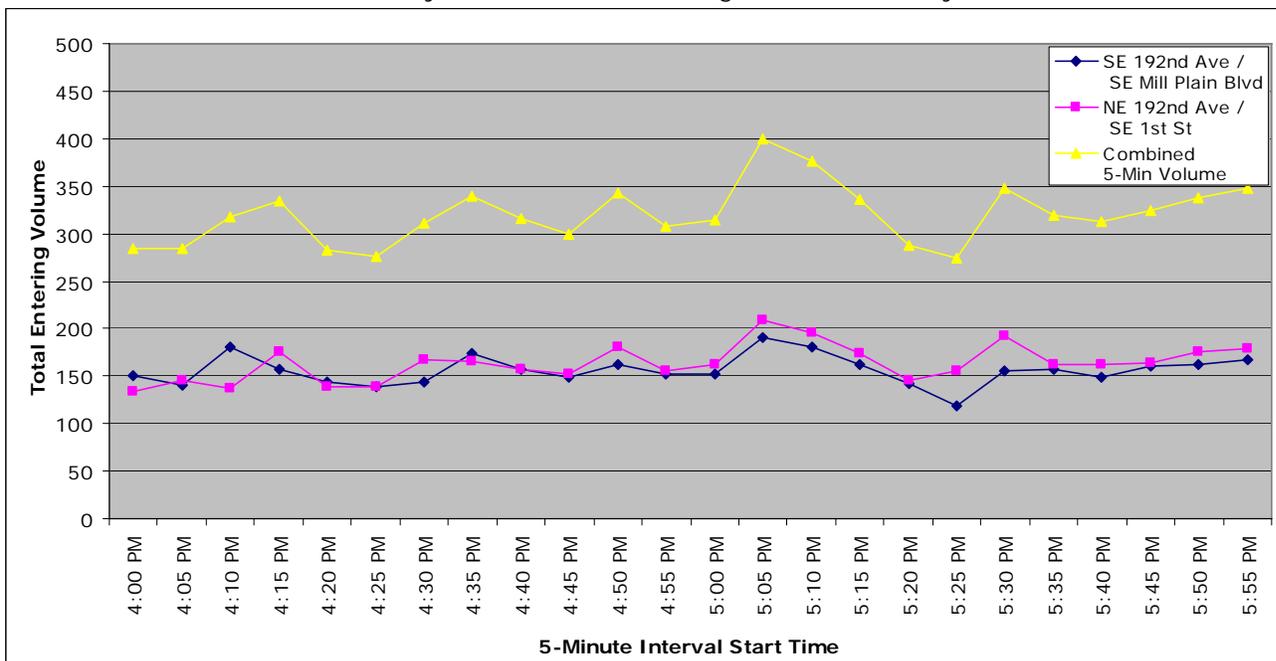


Figure 3 also summarizes the level-of-service analysis for the study intersections under the weekday a.m. and p.m. peak hour existing traffic conditions. All of the study intersections currently operate at acceptable levels of service during the weekday a.m. and p.m. peak hours. *Appendix "C" includes the level-of-service worksheets under year 2009 existing traffic conditions.*

TRAFFIC SAFETY

The study intersection crash history was obtained from the City of Vancouver for the period from January 1, 2004 to May 1, 2009 and was reviewed in an effort to identify potential safety issues³. Generally, the City of Vancouver considers a crash rate greater than one crash per million entering vehicles (MEV) to be an indicator that a potential geometric or operational issue may exist and that further evaluation should be considered. As shown in Table 2, the crash rates for the study intersections are lower than 1.0 crash/MEV. No potential safety deficiencies were identified based on review of the crash data alone. *Appendix "D" contains the crash data provided by City of Vancouver.*

Table 2
Intersection Crash History (January 2004 to May 2009)

Intersection	Crash Rate (MEV)	Collision Type					Severity		Total Crashes
		Angle	Turn	Rear-End	Fixed Object	Other	Non-injury	Injury	
SE 1 st Street/ SE 172 nd Avenue	0.44	5	7	0	0	1	11	2	13
SE 1 st Street/ SE 192 nd Avenue	0.12	1	1	1	1	1	2	3	5
SE 1 st Street/NW Friberg-Strunk Street	0.05	0	0	0	1	0	1	0	1

MEV: Million Entering Vehicles

Intersection Sight Distance

There were no sight distance deficiencies identified at the study intersections or the proposed site-access driveways. Each of the proposed site-access driveways is located on a straight tangent roadway section, and available intersection sight distance exceeds 500 feet.

³ The City of Camas provided crash data for the SE 1st Street/NW Friberg-Strunk Street intersection for the period from June 30, 2004 through June 30, 2009. The only reported crash involved a single-vehicle collision with a fixed object at 1:00 a.m. in the morning.

Section 4
Transportation Impact
Analysis

Transportation Impact Analysis

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed development is expected to be fully built-out and occupied, 2010, and five years after build-out, 2015. The impact of traffic generated by the proposed Costco Wholesale during the typical weekday a.m. and p.m. peak hours was examined as follows:

- Planned developments and transportation improvements in the site vicinity were identified.
- Background traffic conditions for the years 2010 and 2015 were analyzed at each of the study intersections during the weekday a.m. and p.m. peak hours.
- Site-generated trips were estimated for build-out of the site.
- Site trip-distribution patterns were derived and a site-generated trip assignment was prepared.
- Year 2010 and 2015 total traffic conditions were analyzed at each of the study intersections and site-access points during the weekday a.m. and p.m. peak hours.
- On-site circulation issues and site-access operations were evaluated.

YEAR 2010 BACKGROUND TRAFFIC CONDITIONS

The year 2010 background traffic analysis identifies how the study area's transportation system will operate without the proposed Costco Wholesale development. This analysis includes traffic attributed to planned developments within the study area and to general growth in the region, but does not include traffic from the proposed development.

Planned Developments and Transportation Improvements

The primary roadway improvement project identified in the immediate site vicinity is associated with the planned Lacamas Market Center. The Lacamas Market Center will ultimately be constructing a loop road around their site in the form of NE 190th Avenue and NE 3rd Street. The project will also be signalizing the NE 190th Avenue/SE 1st Street intersection and will be constructing SE 1st Street to a fully improved cross section between NE 192nd Avenue and NE 190th Avenue. Lacamas Market Center will also be constructing half-street improvements along NE 192nd Avenue between SE 1st Street and NE 3rd Street, including a raised median for the full length of the site.

The City of Vancouver's 2010-2015 *Transportation Improvement Program* (TIP, Reference 3) lists several other projects in the area surrounding the site. The plan indicates that intersection improvements associated with the SE 164th Avenue South Corridor Intersection Capacity Improvement Project (including the intersections of SE 34th Street, SE McGillivray Boulevard, SE 20th Street, SE 15th Street, SE 12th Street, SE Mill Plain Boulevard, and SE 1st Street) are fully funded and in the construction phase. A traffic signal interconnect project is also listed as funded for construction along SE 192nd Avenue between SE 34th Street and SE 1st Street.

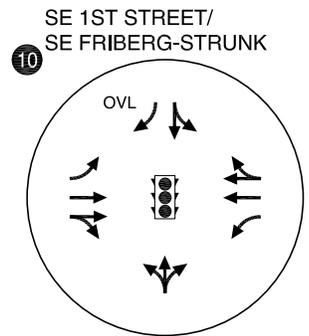
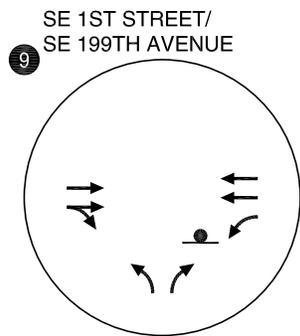
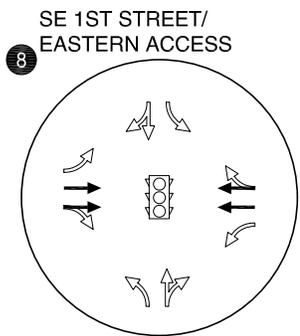
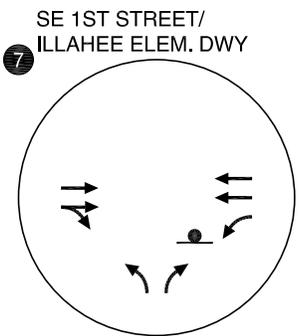
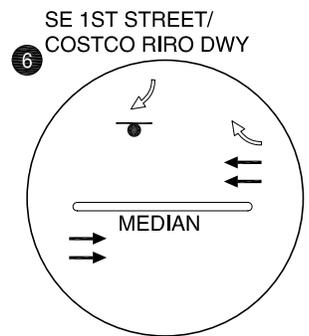
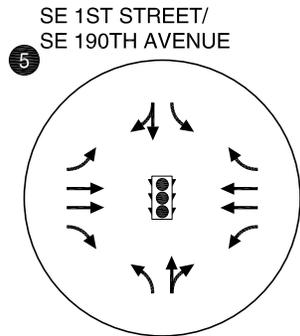
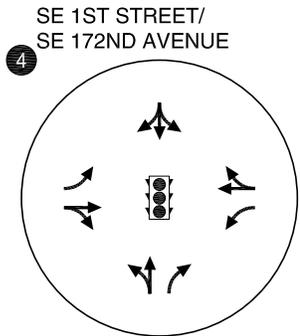
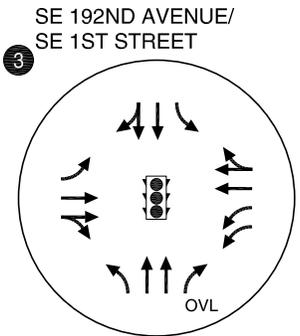
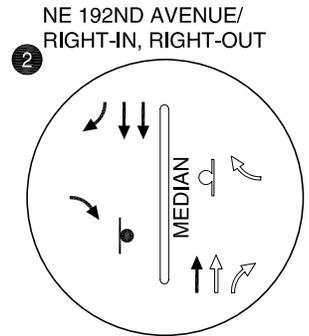
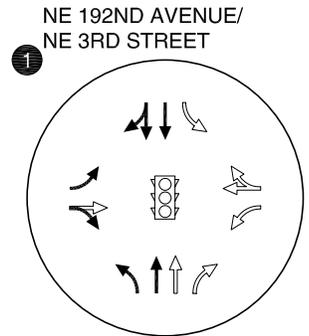
The plan also identifies improvements to SE 1st Street to upgrade the roadway to *Principal Arterial* standards between SE 164th Avenue and SE 192nd Avenue. The TIP lists the SE 1st Street project as being in the design phase.

Figure 4 illustrates the assumed lane configurations and traffic control devices associated with improvements anticipated by the year of opening, 2010.

Year 2010 Background Traffic Volumes

The year 2010 background traffic analysis was developed through the application of a four-percent annual growth rate to account for both regional growth and approved developments in the site vicinity, as required by the City of Vancouver. In addition, traffic volumes associated with the approved Lacamas Market Center, Two Creeks, and Union Self-Storage were also included throughout the network. The 2010 background traffic volumes do not include traffic from the proposed Costco development. *In-process traffic worksheets are included in Appendix "E".*

Figures 5 and 6 illustrate the year 2010 background traffic conditions for the weekday a.m. and p.m. peak hours. As shown in the figures, all but one of the study intersections are forecast to continue to operate acceptably. The unsignalized eastbound left-turn movement at the intersection of NE 3rd Street/NE 192nd Avenue is forecast to operate at Level of Service "F" during the weekday pm. peak hour. Major street turning and through movements are forecast to operate acceptably. *Appendix "E" contains the year 2010 background traffic level-of-service worksheets.*



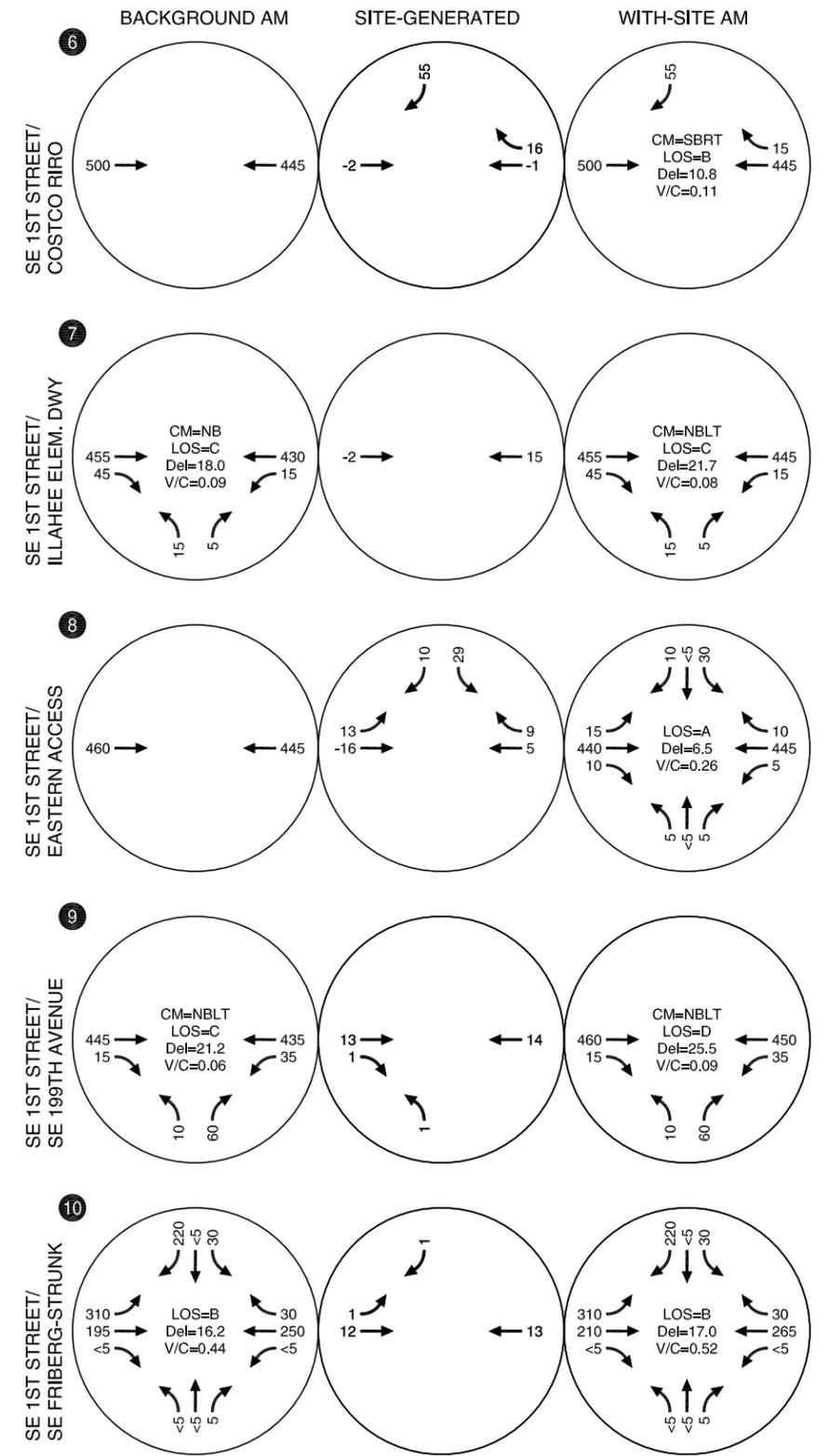
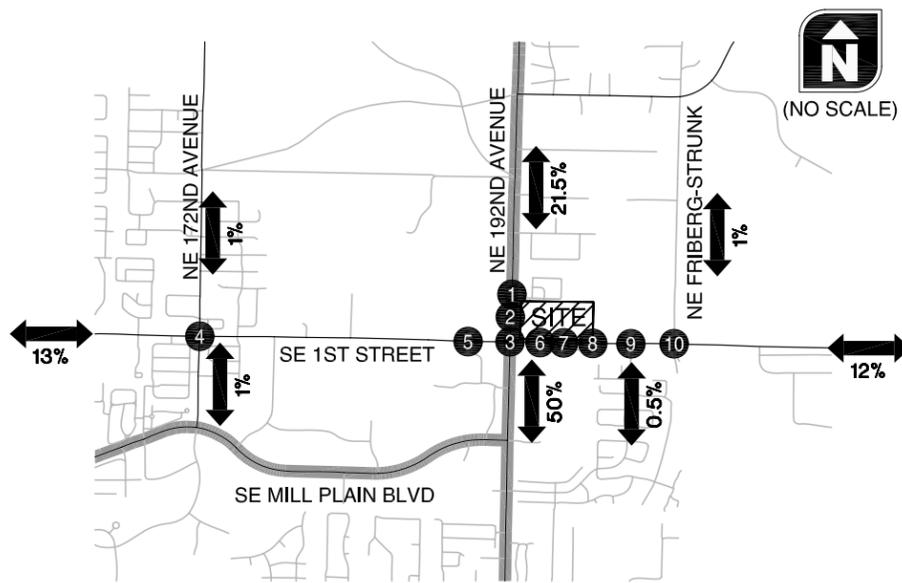
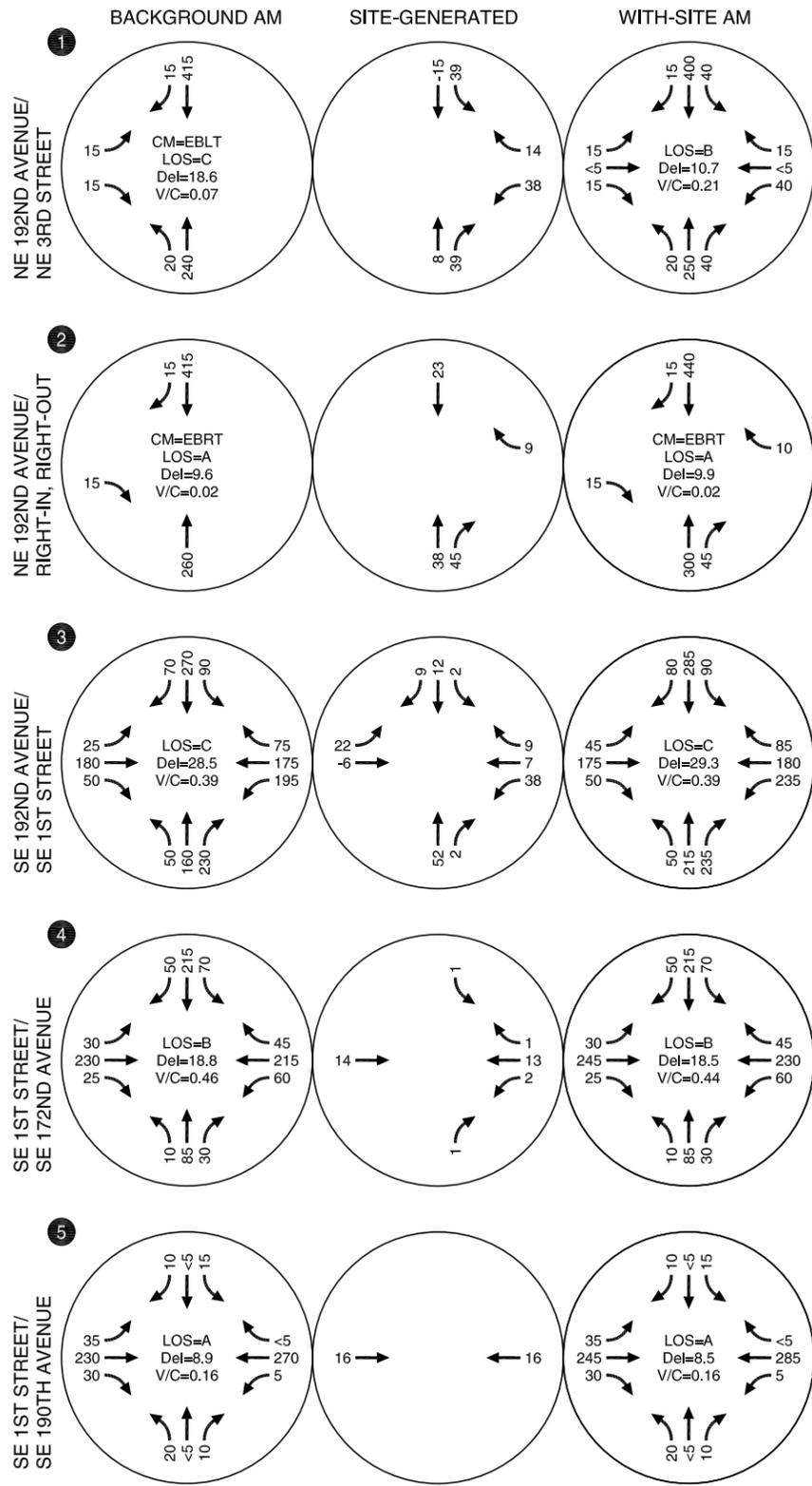
LEGEND

- OVL - OVERLAP
- - STOP SIGN
- ⬆️⬇️⬆️ - TRAFFIC SIGNAL

HOLLOW CONFIGURATIONS TO BE PROVIDED AS PART OF THE COSTCO DEVELOPMENT

YEAR 2010 ASSUMED LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES VANCOUVER, WASHINGTON

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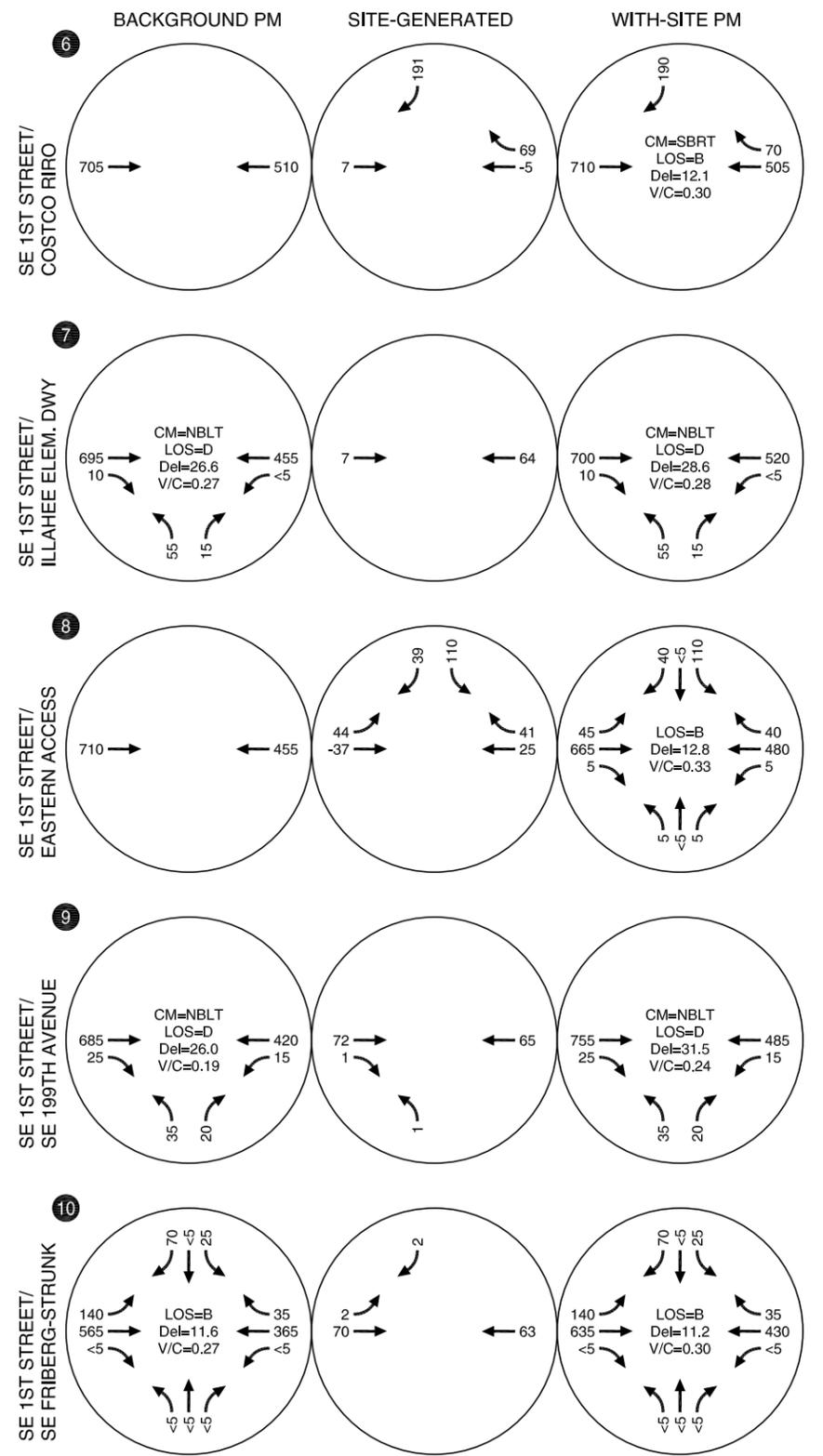
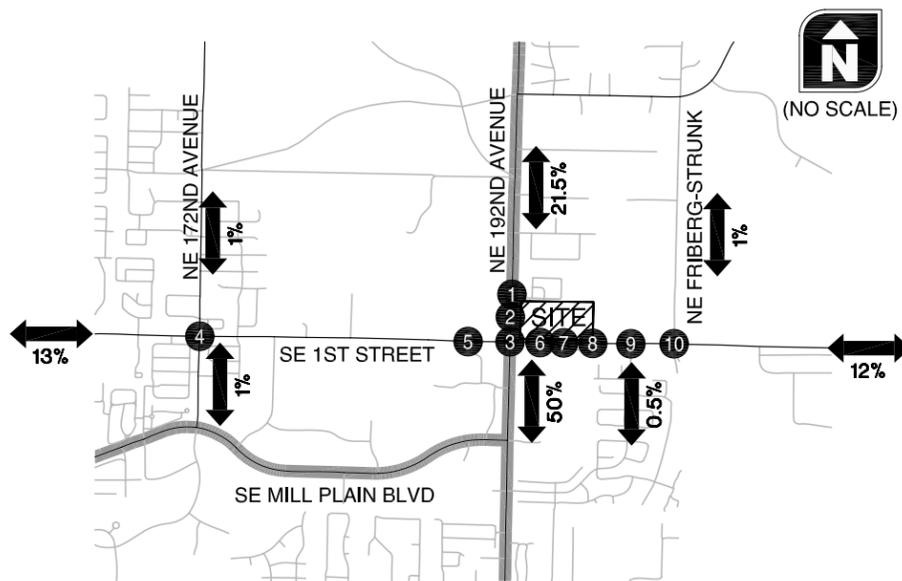
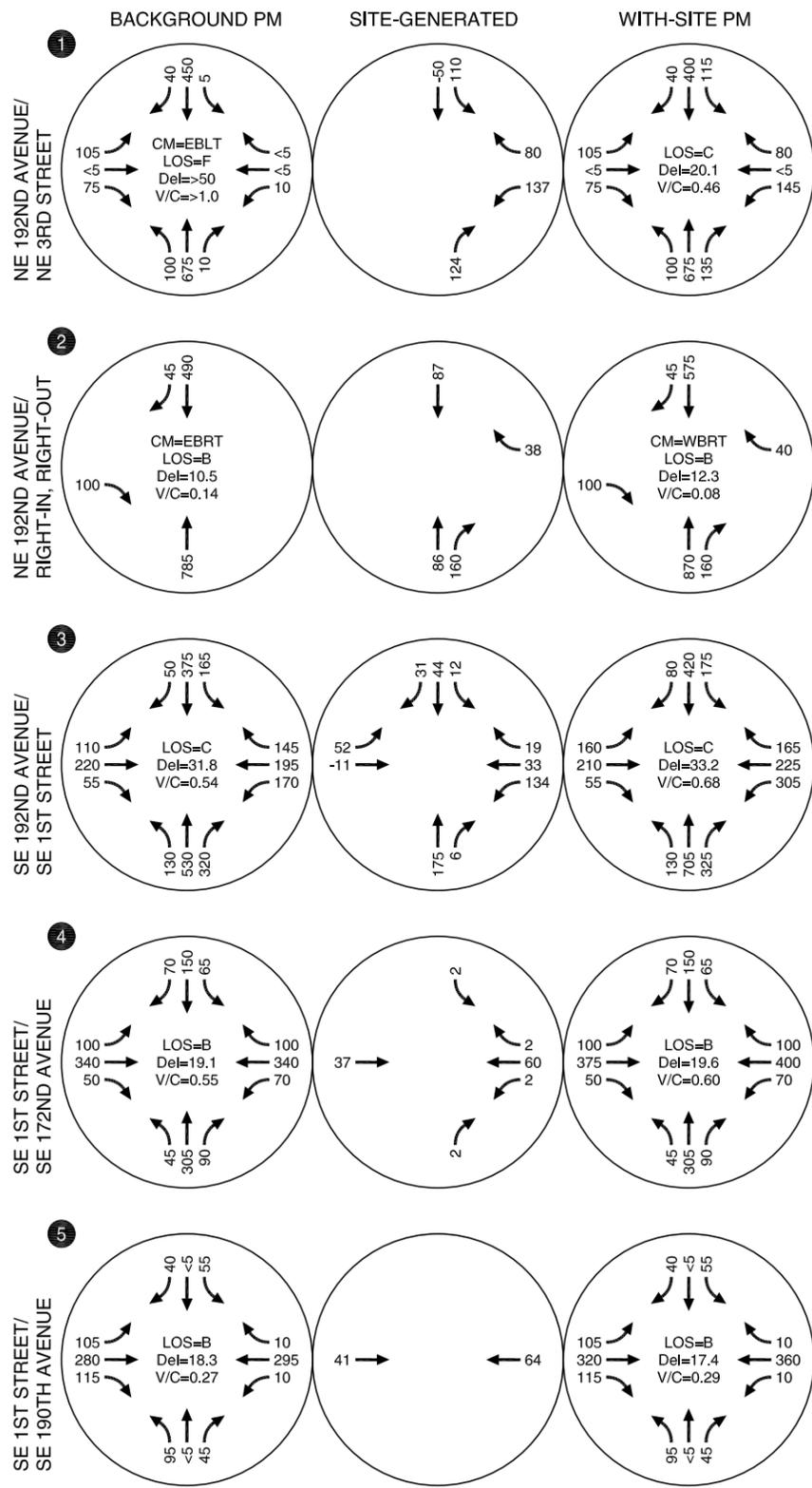


*INTERSECTION 7 CONVERTED TO LEFT-IN, RIGHT-IN, RIGHT-OUT MOVEMENTS UNDER TOTAL TRAFFIC CONDITIONS
 NOTE: NEGATIVE VALUES REFLECT PASS-BY TRIPS

LEGEND
 CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWSC = TWO-WAY STOP CONTROL
 xx% = TRIP DISTRIBUTION PERCENTAGE

**YEAR 2010 TRAFFIC CONDITIONS
 WEEKDAY AM PEAK HOUR
 VANCOUVER, WASHINGTON** **FIGURE 5**

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*INTERSECTION 7 CONVERTED TO LEFT-IN, RIGHT-IN, RIGHT-OUT MOVEMENTS UNDER TOTAL TRAFFIC CONDITIONS
NOTE: NEGATIVE VALUES REFLECT PASS-BY TRIPS

LEGEND

- CM = CRITICAL MOVEMENT (TWSC)
- LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
- Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- TWSC = TWO-WAY STOP CONTROL
- xx% = TRIP DISTRIBUTION PERCENTAGE

**YEAR 2010 TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
VANCOUVER, WASHINGTON**

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PROPOSED DEVELOPMENT PLAN

Costco Wholesale is proposing to develop a new Costco store, Costco Fuel, and approximately 28,200 square feet of additional retail buildings on the study site. Construction of the site is expected to begin in the spring of 2010 with completion and occupancy later in the year.

Transportation Improvements

Several transportation improvements are proposed in conjunction with site development that will also benefit adjacent properties. Figure 2 illustrates the site plan and the proposed transportation improvements. The proposed improvements include standard half-street improvements along NE 192nd Avenue as well as construction of a public loop road (NE 3rd Street) between SE 1st Street and NE 192nd Avenue. Specific improvements associated with the development include:

- Constructing a northbound right-turn deceleration lane along NE 192nd Avenue at the mid-block right-in/right-out only site driveway and at the NE 3rd Street intersection.
- Constructing a westbound right-turn deceleration lane at the mid-block right-in/right-out only site driveway on SE 1st Street.
- Constructing a raised median on SE 1st Street between NE 192nd Avenue and the new loop road signal to the east. The proposed median will include a break for the existing Illahee Elementary access.
- Construct a new public loop road around the north and east sides of the site linking NE 192nd Avenue and SE 1st Street. The loop road should provide:
 - A three-lane cross section with bike lanes at the signalized intersections with NE 192nd Avenue and SE 1st Street.
 - A two-lane cross section with bike lanes east of the Costco Fuel Center access and north of the first east-west drive aisle reached when entering the site from SE 1st Street.
 - A raised median on the east approach of the NE 3rd Street/NE 192nd Avenue intersection; extending from the signalized intersection east past the right-out only driveway serving the Costco Fuel Center.
 - A landscape strip and detached sidewalk along both sides the new roadway.
- Signalizing the NE 3rd Street/NE 192nd Avenue intersection.
- Signalizing the SE 1st Street/Loop Road intersection.
- Circulation and connectivity enhancements along the north side of the Illahee Elementary School as well as at the Jehovah's Witness Kingdom Hall located on the south side of SE 1st Street east of the site, including modifications to the existing Kingdom Hall gated access. All school bus traffic will be relocated to the new signalized intersection.

Trip Generation

To fully understand the impact of trips generated by a given land use, four trip types are defined and quantified by the June 2004 Institute of Transportation Engineers (ITE) *Trip Generation Handbook* (Reference 4): primary trips, pass-by trips, diverted linked trips, and internal trips, as described below.

Primary Trips

Primary trips are trips that are made for the specific and sole purpose of visiting a generator such as Costco.

Pass-by Trips

Pass-by trips are trips that are passing directly by the generator. A visit to the generator is an intermediate stop on the way from an origin to a primary trip destination without requiring a diversion. Because no diversion is required, a pass-by trip only adds turning movements to the transportation system at the site-access driveway(s). Pass-by trips occur on the roadways adjacent to the site; in this case SE 1st Street and NE 192nd Avenue would be the roadways that serve pass-by trips. The ITE *Transportation Impact Analyses for Site Development: An ITE Proposed Recommended Practice* indicates that the number of pass-by trips should not exceed 15 percent of the adjacent street traffic volume (Reference 5).

Diverted Linked Trips

Diverted linked trips are trips that are currently on the roadway system, but change path and travel some distance out of direction to access the development. The trip to the generator is not the primary trip for this vehicle. Diverted linked trips add traffic to streets adjacent to a site, but may not add traffic to the area's major travel routes.

Based on Costco Warehouse market study data and numerous trip generation studies, Costco Wholesale stores average 30 percent diverted trips during the p.m. peak hour. Given the location of the site and the presence of two other Costco's within convenient driving distance, diverted linked trips were assumed to travel to the site from NE 162nd Avenue/SE 164th Avenue, SR 14, SE 192nd Avenue, and SE Mill Plain Boulevard for City concurrency modeling purposes.

While diverted trips were assumed, they were treated as net new trips at all of the study intersections and thus only impact off-site concurrency corridor trip assignments. Diverted trips were simply assumed to originate from major travel corridors and were then treated as new trips continuing to the site. *The weekday p.m. peak hour diverted trip assignment is included in Appendix "G."*

Internal Trips

An internal trip is made between two different uses within the same development and does not impact the surrounding transportation system. Internal trips were assumed between the two retail buildings and the Costco Wholesale store and were estimated as per the ITE *Trip Generation Handbook* (Reference 4).

Trip Generation Estimate

The projected weekday daily, a.m., and p.m. peak-hour vehicle trip ends for the Costco Wholesale and Costco Fuel were estimated based on Costco Wholesale trip generation studies for the western United States. The trips associated with the remaining non-Costco retail space were estimated using trip rates from *Trip Generation, 8th Edition* (Reference 6) and the *Trip Generation Handbook* (Reference 4). Table 3 summarizes the anticipated number of trips that will be generated by the proposed development (all daily trip ends shown in Table 3 have been rounded to the nearest even number of trips). Appendix “F” contains additional documentation of the trip generation assumptions.

Table 3
Trip Generation Estimate

Land Use	ITE Code	Size (Square Feet)	Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
Shopping Center	820	28,200	1,212	28	17	11	105	51	54
<i>Internal Trips per ITE</i>			(242)	-	-	-	(21)	(11)	(10)
<i>Pass-by Trips (34%)</i>			(330)	(10)	(5)	(5)	(28)	(14)	(14)
Costco with Gas Station	Field Data	154,700	11,736	288	144	144	1,080	518	562
<i>Internal Trips per ITE</i>			(242)	-	-	-	(21)	(10)	(11)
<i>Pass-by Trips (34% AM/35% PM)</i>			(3,678)	(98)	(49)	(49)	(370)	(185)	(185)
<i>Diverted Trips (39% AM/31% PM)*</i>			(2,298)	(112)	(56)	(56)	(328)	(157)	(171)
Total Trips			12,948	316	161	155	1,185	569	616
<i>Total Internal Trips</i>			(484)	-	-	-	(42)	(21)	(21)
Total Driveway Trips ¹			12,464	316	161	155	1,143	548	595
<i>Total Pass-by Trips</i>			(4,008)	(108)	(54)	(54)	(398)	(199)	(199)
<i>Total Diverted Trips</i>			(2,298)	(112)	(56)	(56)	(328)	(164)	(164)
Net New Trips²			6,158	96	51	45	417	185	232

¹ Total Driveway Trips = Total Trips – Total Internal Trips

² Net New Trips = Total Driveway Trips – Total Pass-by Trips – Total Diverted Trips

*Diverted Trips assumed to be 20 percent and pass-by 32 percent on a daily basis based on Costco Wholesale data

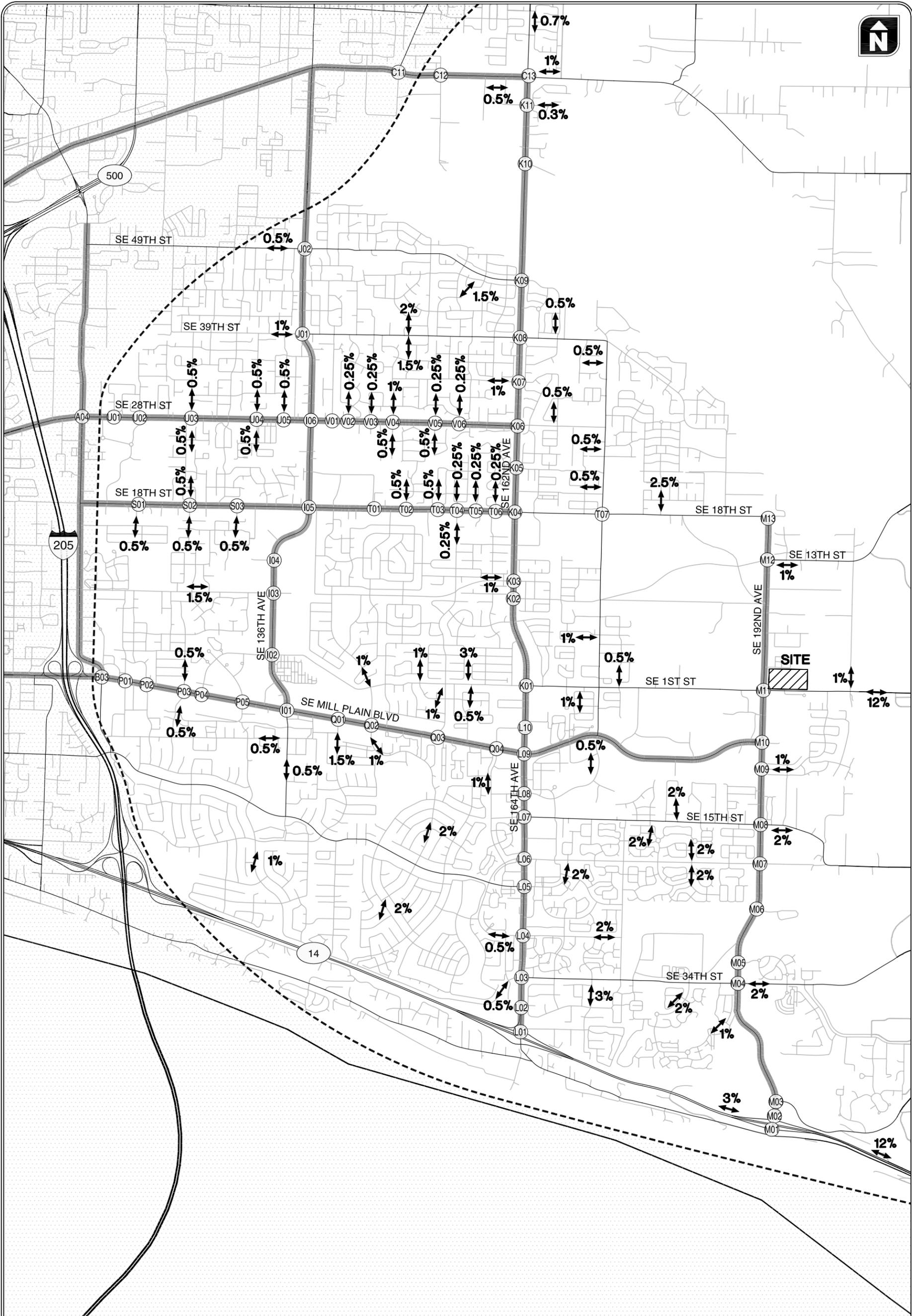
As shown in Table 3, the proposed East Vancouver Costco development is estimated to generate 6,158 net new daily trips, including 96 net new trips during the weekday a.m. peak hour and 417 net new trips during the weekday p.m. peak hour. It should be noted that the Costco Warehouse will not open until 10:00 a.m. while the fuel center and retail pads will be open during the morning commute period (Costco Warehouses open to business members at 10:00 a.m. and to all members at 11:00 a.m.).

Site Trip Distribution

The estimated site distribution pattern was determined through a review of a market study prepared for Costco Wholesale, Southwest Washington Regional Transportation Council (RTC) forecast model data, and existing turning movement patterns at the study intersections. Figure 7 shows the estimated trip distribution pattern and the location of local concurrency corridors.

As shown in the figure, Costco’s trip distribution is expected to be substantially influenced by two other existing Costco stores; the Portland Costco near the Portland International Airport and the Costco located near the NE 88th Street/NE Andresen Road intersection. Based on Costco membership records and the market study, approximately 27,900 of the 48,000 households (58

percent) currently living within the market area shown in Figure 7 are already Costco members. As such, it can be reasonably concluded that the majority of the new store site customers are already shopping at one of the existing Costco stores and will no longer need to travel as far to reach the store. Some of these customers are reflected by the use of diverted linked trips, though in no instance were diverted or captured existing Costco trips subtracted off roads or intersections in this study.



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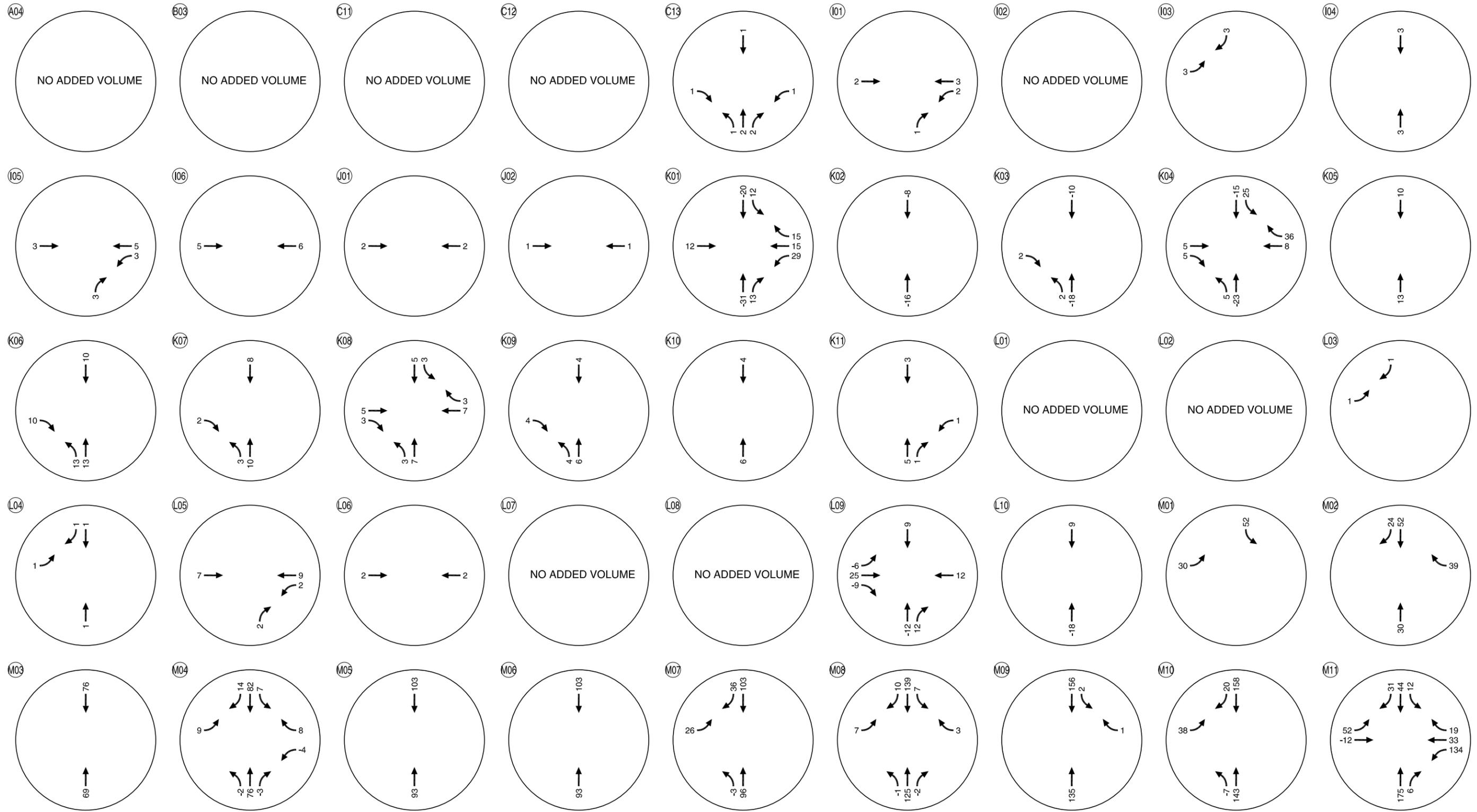
LEGEND

- MARKET BOUNDARY
- ## CONCURRENCY INTERSECTION
- CONCURRENCY CORRIDOR

ESTIMATED TRIP DISTRIBUTION PATTERN VANCOUVER, WASHINGTON

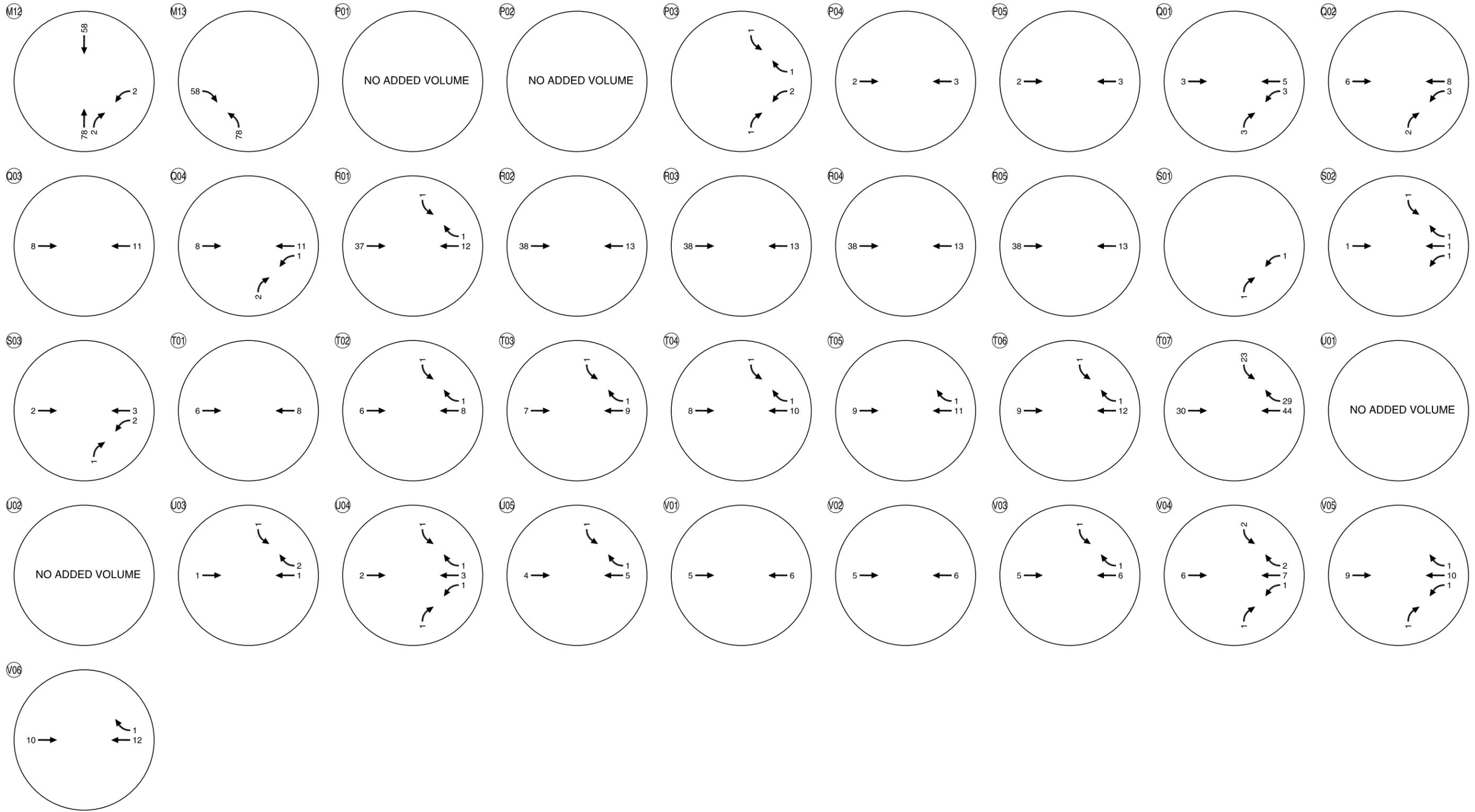
Site Trip Assignment

Based on the estimated trip distribution pattern, the peak hour site-generated traffic volumes associated with the proposed Costco development were assigned to key intersections within the site vicinity. Figures 5 and 6 show the assignment of site-generated trips to the local study area intersections during the weekday a.m. and p.m. peak hours, respectively (Appendix "G" contains illustrations of the pass-by and diverted trip assignment). Weekday p.m. peak hour trip assignments for those intersections studied as part of the transportation concurrency modeling process prepared by the City of Vancouver are illustrated in Figures 8 and 9 and in Table 4. Table 5 summarizes the weekday p.m. peak hour trip assignment by corridor while Table 6 summarizes the assignment to proportional share intersections within the City of Vancouver.



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CONCURRENCY CORRIDOR TRIP ASSIGNMENT
WEEKDAY PM PEAK HOUR
VANCOUVER, WASHINGTON



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CONCURRENCY CORRIDOR TRIP ASSIGNMENT
WEEKDAY PM PEAK HOUR
VANCOUVER, WASHINGTON

Table 4
Weekday PM Peak Hour Concurrency Corridor Trip Assignment

Intersection ID (Figure 7)	Street Name		Southbound			Westbound			Northbound			Eastbound		
	East-West	North-South	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
4th Plain - I-205 to 162nd														
C01	NE 4 th Plain Blvd	I-205 NB On-Ramp	0	0	0	0	0	0	0	0	0	0	0	0
C02	NE 4 th Plain Blvd	NE 102 nd Ave	0	0	0	0	0	0	0	0	0	0	0	0
C03	NE 4 th Plain Blvd	NE 106 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
C04	NE 4 th Plain Blvd	NE Gher Rd	0	0	0	0	0	0	0	0	0	0	0	0
C05	NE 4 th Plain Blvd	NE 114 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
C06	NE 4 th Plain Blvd	NE 117 th Ave - SR-500	0	0	0	0	0	0	0	0	0	0	0	0
C07	NE 4 th Plain Blvd	NE 121 st Ave	0	0	0	0	0	0	0	0	0	0	0	0
C08	NE 4 th Plain Blvd	NE 131 st Ave	0	0	0	0	0	0	0	0	0	0	0	0
C09	NE 4 th Plain Blvd	NE 137 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
C10	NE 4 th Plain Blvd	NE 143 rd Ave	0	0	0	0	0	0	0	0	0	0	0	0
C11	NE 4 th Plain Blvd	NE Ward Rd	0	0	0	0	0	0	0	0	0	0	0	0
C12	NE 4 th Plain Blvd	NE 152 nd Ave	0	0	0	0	0	0	0	0	0	0	0	0
C13	NE 4 th Plain Blvd	NE 162 nd Ave	0	1	0	1	0	0	1	2	2	0	0	1
136th - 28th to Mill Plain														
I01	NE Mill Plain Blvd	SE 136 th Ave	0	0	0	2	3	0	0	0	1	0	2	0
I02	NE 4 th St	NE 137 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
I03	NE 9 th St	NE 137 th Ave	0	0	3	0	0	0	0	0	3	0	0	0
I04	NE Evergreen Transit Center	NE 137 th Ave	0	3	0	0	0	0	0	3	0	0	0	0
I05	NE 18 th St	NE 137 th Ave	0	0	0	3	5	0	0	0	3	0	3	0
I06	NE 28 th St	NE 137 th Ave	0	0	0	0	6	0	0	0	0	0	5	0
138th - 4th Plain to 28th														
J01	NE 39 th St	NE 137 th Ave	0	0	0	0	2	0	0	0	0	0	2	0
J02	NE 49 th St	NE 137 th Ave	0	0	0	0	1	0	0	0	0	0	1	0
162nd - 1st to Fourth Plain														
K01	SE 1 st St	SE 164 th Ave	12	-20	0	29	15	15	0	-31	13	0	12	0
K02	NE 9 th St	NE 162 nd Ave	0	-8	0	0	0	0	0	-16	0	0	0	0
K03	NE 11 th St	NE 162 nd Ave	0	-10	0	0	0	0	2	-18	0	0	0	2
K04	NE 18 th St	NE 162 nd Ave	25	-15	0	0	8	36	5	-23	0	0	5	5
K05	NE 23 rd St	NE 162 nd Ave	0	10	0	0	0	0	0	13	0	0	0	0
K06	NE 28 th St	NE 162 nd Ave	0	10	0	0	0	0	13	13	0	0	0	10
K07	NE 34 th St	NE 162 nd Ave	0	8	0	0	0	0	3	10	0	0	0	2
K08	NE 39 th St	NE 162 nd Ave	3	5	0	0	7	3	3	7	0	0	5	3
K09	NE Poplar St	NE 162 nd Ave	0	4	0	0	0	0	4	6	0	0	0	4
K10	NE 59 th St	NE 162 nd Ave	0	4	0	0	0	0	0	6	0	0	0	0
K11	NE 65 th St	NE 162 nd Ave	0	3	0	1	0	0	0	5	1	0	0	0
164th - SR14 to 1st														
L01	SR-14 Eastbound Ramps	SE 164 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
L02	SR-14 Westbound Ramps	SE 164 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
L03	SE 34 th St	SE 164 th Ave	0	0	1	0	0	0	0	0	0	1	0	0
L04	SE 29 th St	SE 164 th Ave	0	1	1	0	0	0	0	1	0	1	0	0
L05	SE McGillivray Blvd	SE 164 th Ave	0	0	0	2	9	0	0	0	2	0	7	0
L06	SE 20 th St	SE 164 th Ave	0	0	0	0	2	0	0	0	0	0	2	0
L07	SE 15 th St	SE 164 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
L08	SE Tech Center Drive	SE 164 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
L09	SE Mill Plain Blvd	SE 164 th Ave	0	9	0	0	12	0	0	-12	12	-6	25	-9
L10	SE 6 th St	SE 164 th Ave	0	9	0	0	0	0	0	-18	0	0	0	0
192nd - SR14 to 18th														
M01	SR 14 Eastbound Ramps	SE 192 nd Ave	52	0	0	0	0	0	0	0	0	30	0	0
M02	SR 14 Westbound Ramps	SE 192 nd Ave	0	52	24	0	0	39	0	30	0	0	0	0
M03	SE Brady Rd	SE 192 nd Ave	0	76	0	0	0	0	0	69	0	0	0	0
M04	SE 34 th St	SE 192 nd Ave	7	82	14	-4	0	8	-2	76	-3	9	0	0
M05	SE 31 st St	SE 192 nd Ave	0	103	0	0	0	0	0	93	0	0	0	0
M06	SE 25 th St	SE 192 nd Ave	0	103	0	0	0	0	0	93	0	0	0	0
M07	SE 20 th St	SE 192 nd Ave	0	103	36	0	0	0	-3	96	0	26	0	0
M08	SE 15 th St	SE 192 nd Ave	7	139	10	0	0	3	-1	125	-2	7	0	0
M09	SE Westridge Blvd	SE 192 nd Ave	2	156	0	0	0	1	0	135	0	0	0	0
M10	SE Mill Plain Rd	SE 192 nd Ave	0	158	20	0	0	0	-7	143	0	38	0	0
M11	SE 1 st St	SE 192 nd Ave	12	44	31	134	33	19	0	175	6	52	-12	0
M12	NE 13 th St	NE 192 nd Ave	0	58	0	2	0	0	0	78	2	0	0	0
M13	NE 18 th St	NE 192 nd Ave	0	0	0	0	0	0	78	0	0	0	0	58
Mill Plain - I-205 to 136th														
P01	SE Mill Plain Blvd	SE 117 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
P02	SE Mill Plain Blvd	SE 120 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
P03	SE Mill Plain Blvd	SE 124 th Ave	1	0	0	2	0	1	0	0	1	0	0	0
P04	SE Mill Plain Blvd	SE 126 th Ave	0	0	0	0	3	0	0	0	0	0	2	0
P05	SE Mill Plain Blvd	SE 131st Ave	0	0	0	0	3	0	0	0	0	0	2	0
Mill Plain - 136th to 164th														
Q01	SE Mill Plain Blvd	SE Olympia Ave	0	0	0	3	5	0	0	0	3	0	3	0
Q02	SE Mill Plain Blvd	SE Hearthwood-Parkcrest	0	0	0	3	8	0	0	0	2	0	6	0
Q03	SE Mill Plain Blvd	SE 155 th Ave	0	0	0	0	11	0	0	0	0	0	8	0
Q04	SE Mill Plain Blvd	SE 160 th Ave	0	0	0	1	11	0	0	0	2	0	8	0

(Continued)

Table 4 (Continued)
Weekday PM Peak Hour Concurrency Corridor Trip Assignment

Intersection ID (Figure 7)	Street Name		Southbound			Westbound			Northbound			Eastbound		
	East-West	North-South	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Mill Plain - 164th to 192nd														
R01	SE Mill Plain Blvd	SE 168 th Ave	1	0	0	0	12	1	0	0	0	0	37	0
R02	SE Mill Plain Blvd	SE 172 nd Ave	0	0	0	0	13	0	0	0	0	0	38	0
R03	SE Mill Plain Blvd	SE 178 th Ave	0	0	0	0	13	0	0	0	0	0	38	0
R04	SE Mill Plain Blvd	SE 184 th Ave	0	0	0	0	13	0	0	0	0	0	38	0
R05	SE Mill Plain Blvd	SE 190 th Ave	0	0	0	0	13	0	0	0	0	0	38	0
18th - 112th to 138th														
S01	NE 18 th St	NE 118 th Ave	0	0	0	1	0	0	0	0	1	0	0	0
S02	NE 18 th St	NE 125 th Ave	1	0	0	1	1	1	0	0	0	0	1	0
S03	NE 18 th St	NE 130 th Ave	0	0	0	2	3	0	0	0	1	0	2	0
18th - 138th to 162nd														
T01	NE 18 th St	NE 146 th Ave	0	0	0	0	8	0	0	0	0	0	6	0
T02	NE 18 th St	NE 149 th Ave	1	0	0	0	8	1	0	0	0	0	6	0
T03	NE 18 th St	NE 153 rd Ave	1	0	0	0	9	1	0	0	0	0	7	0
T04	NE 18 th St	NE 155 th Ave	1	0	0	0	10	1	0	0	0	0	8	0
T05	NE 18 th St	NE 157 th Ave	0	0	0	0	11	1	0	0	0	0	9	0
T06	NE 18 th St	NE 159 th Ave	1	0	0	0	12	1	0	0	0	0	9	0
T07	NE 18 th St	NE 172 nd Ave	0	0	23	0	44	29	0	0	0	0	30	0
28th - 112th to 138th														
U01	NE 28 th St	NE 115 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
U02	NE 28 th St	NE 119 th Ave	0	0	0	0	0	0	0	0	0	0	0	0
U03	NE 28 th St	NE 124 th Ave	1	0	0	0	1	2	0	0	0	0	1	0
U04	NE 28 th St	NE 132 nd Ave	1	0	0	1	3	1	0	0	1	0	2	0
U05	NE 28 th St	NE 135 th Ave	1	0	0	0	5	1	0	0	0	0	4	0
28th - 138th to 162nd														
V01	NE 28 th St	NE 141 st Ave	0	0	0	0	6	0	0	0	0	0	5	0
V02	NE 28 th St	NE 143 rd Ave	0	0	0	0	6	0	0	0	0	0	5	0
V03	NE 28 th St	NE 145 th Ave	1	0	0	0	6	1	0	0	0	0	5	0
V04	NE 28 th St	NE 148 th Ave	2	0	0	1	7	2	0	0	1	0	6	0
V05	NE 28 th St	NE 152 nd Ave	0	0	0	1	10	1	0	0	1	0	9	0
V06	NE 28 th St	NE 155 th Ave	0	0	0	0	12	1	0	0	0	0	10	0

Table 5
Weekday PM Peak Hour TMZ Trip Assignment

Corridor Name	Corridor Limit	Number of PM Peak Hour Trips Added to Corridor
18 th Street	112 th Avenue to 138 th Avenue	8
18 th Street	138 th Avenue to 162 nd Avenue	23
28 th Street	112 th Avenue to 138 th Avenue	11
28 th Street	138 th Avenue to 162 nd Avenue	23
112 th Avenue	Mill Plain Blvd. to 28 th Street	0
112 th Avenue	28 th Street to 51 st Street	0
136 th Avenue	Mill Plain Blvd. to 28 th Street	6
138 th Avenue	28 th Street to Fourth Plain Blvd.	0
162 nd Avenue	1 st Street to Fourth Plain Blvd.	66
164 th Avenue	SR 14 to 1 st Street	4
192 nd Avenue	SR 14 to 18 th Street	499
Andresen Road	Mill Plain Blvd. to SR-500	0
Andresen Road	SR-500 to 78 th Street	0
Burton Road	Andresen Road to 112 th Avenue	0
Fourth Plain Boulevard	Port to I-5	0
Fourth Plain Boulevard	I-5 to Stapleton Road	0
Fourth Plain Boulevard	Stapleton Road to I-205	0
Fourth Plain Boulevard	117 th Avenue to 162 nd Avenue	2
Mill Plain Boulevard	I-5 to Andresen Road	0
Mill Plain Boulevard	Andresen Road to I-205	0
Mill Plain Boulevard	I-205 to 136 th	5
Mill Plain Boulevard	136 th Avenue to 164 th Avenue	22
Mill Plain Boulevard	164 th Avenue to 192 nd Avenue	51
St. Johns Boulevard	Fourth Plain to 78 th	0

Table 6
Weekday PM Peak Hour Proportional Share Intersection Contribution

Intersection	Cost Per Trip	Number of Trips	Proportionate Share	East CITY District TIF Creditable?
SE 7 th Street & 136 th Avenue	\$772.00	3	\$2,316.00	No
Mill Plain & 136 th Avenue	\$1,851.85	8	\$14,814.80	Yes
Mill Plain Blvd. & I-205 NB Ramp	\$428.94	0	\$0	No
Mill Plain Blvd. & 164 th Avenue	\$184.20	31	\$5,710.20	No
164 th Avenue & 1 st Street	\$477.78	45	\$21,500.10	No
164 th Avenue & 12 th Street	\$259.84	0	\$0	No
164 th Avenue & 15 th Street	\$212.31	0	\$0	No
164 th Avenue & McGillivray Blvd.	\$494.51	20	\$9,890.20	No
164 th Avenue & 20 th Street	\$143.95	4	\$575.80	No
164 th Avenue & 34 th Street	\$844.59	2	\$1,689.18	No
166 th Avenue & McGillivray Blvd.	\$400.00	20	\$8,000.00	No
Hearthwood Street & 1 st Street	\$500.00	4	\$2,000.00	No
NE 137 th Avenue & NE 49 th Street	\$3,885.00/trip	2	\$7,770.00	No ¹
NE 20 th Street & 176 th Avenue	\$400.00	30	\$12,000.00	TBD ²
NE 18 th Street & 112 th Avenue	\$3,608.55	0	\$0	Yes
St Johns & 68 th Street (Signal)	\$1,000.00	0	\$0	No
Leiser/St Helens/McArthur	TBD	0	\$0	No
Fourth Plain & Rossiter Pedestrian Crossing Signal	\$500/dwelling unit	0	\$0	No
Total Proportionate Share Cost			\$86,266.28	\$14,814.80

No¹ - The project is TIF creditable, but only for the Evergreen TIF district

TBD² - The City of Vancouver has not determined whether this project will be TIF creditable

As shown in Table 6, the estimated proportionate share costs associated with the proposed development is \$86,266.28 of which \$14,814.80 is directly TIF creditable within the East City TIF district the site is located in.

YEAR 2010 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate with the traffic generated by the proposed site development. The year 2010 background traffic volumes for the weekday a.m. and p.m. peak hours were added to the site-generated traffic to arrive at the total traffic volumes as shown in Figures 5 and 6.

Intersection Level of Service

The weekday a.m. and p.m. peak hour turning-movement volumes shown in Figures 5 and 6 were used to conduct an operational analysis at each study intersection to determine the year 2010 total traffic levels of service. The results of the total traffic analysis shown in the two figures indicate that all of the study intersections and site access points are forecast to operate at acceptable levels of service during the weekday a.m. and p.m. peak hours with the proposed access modifications and frontage improvements in place. *Appendix "H" contains the year 2010 total traffic level-of-service worksheets.*

YEAR 2015 BACKGROUND TRAFFIC CONDITIONS

As required by City code, an analysis of traffic conditions five years after site build-out was also prepared. The year 2015 background traffic analysis identifies how the study area's transportation system will operate in 2015 prior to site build-out. This analysis includes traffic growth due to development within the study area and from general growth in the region, but does not include traffic from the proposed development. Year 2015 background traffic volumes were developed from the year 2010 volumes using a four percent annual growth rate.

Figures 10 and 11 illustrate the year 2015 background traffic conditions for the weekday a.m. and p.m. peak hours and the corresponding levels of services. As shown in the figures, all of the study intersections are forecast to continue to operate acceptably with the exception of the unsignalized intersection of NE 3rd Street/NE 192nd Avenue. Similar to the year 2010 background conditions, minor street stop-controlled left-turns are shown to operate with long delays due to the high levels of projected traffic increases along SE 192nd Avenue. *Appendix "I" contains the year 2015 background traffic level-of-service worksheets.*

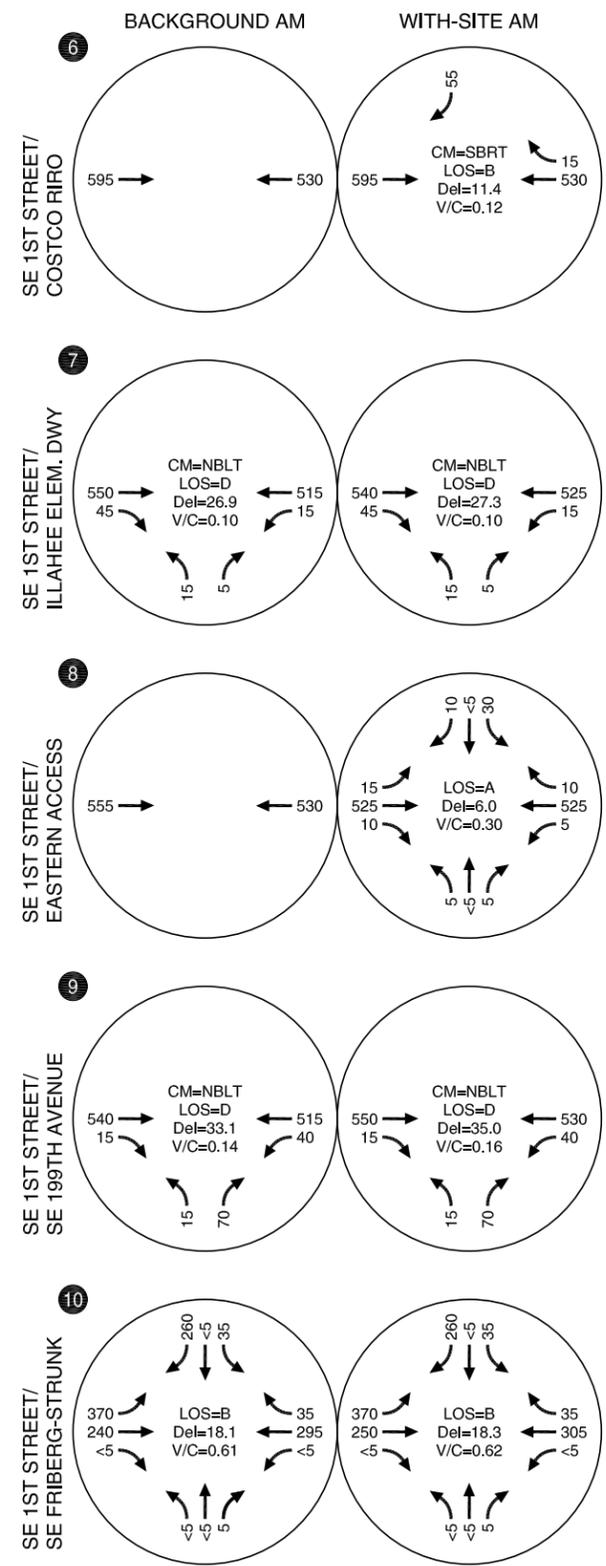
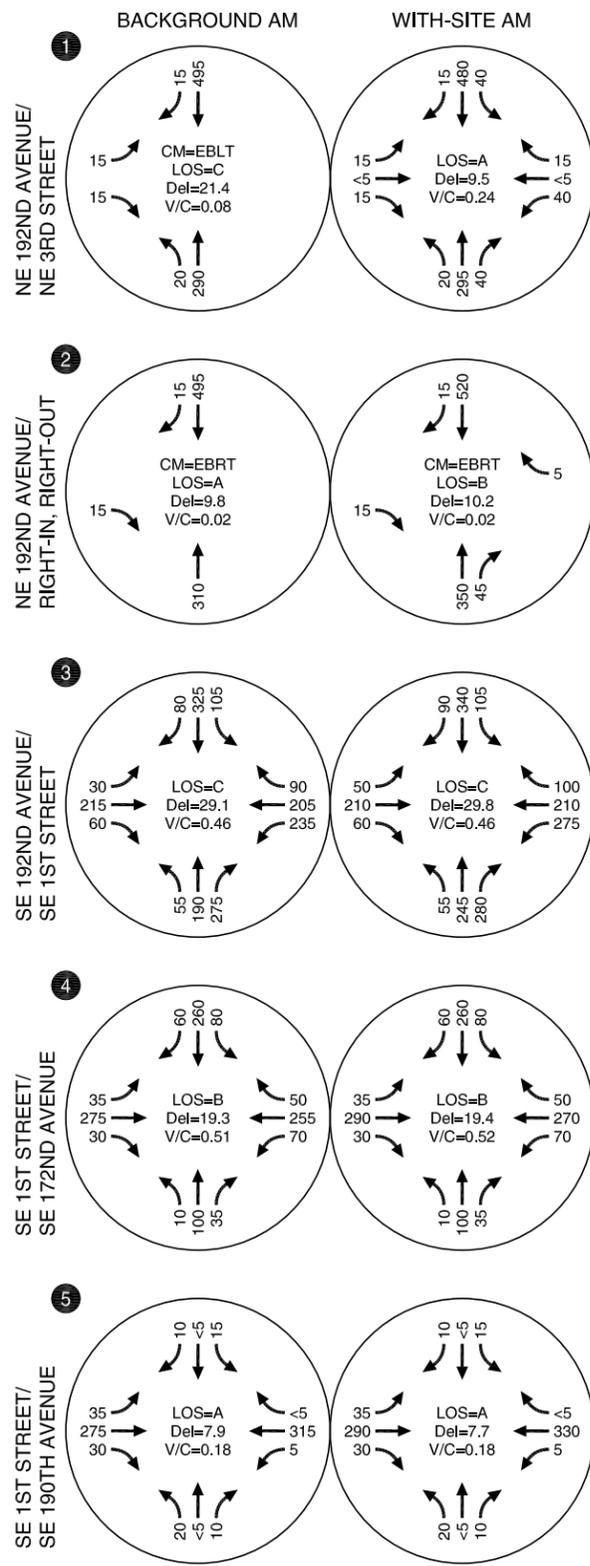
YEAR 2015 TOTAL TRAFFIC CONDITIONS

The total traffic conditions analysis forecasts how the study area's transportation system will operate in 2015 with the proposed Costco development. The year 2015 background traffic volumes for the weekday a.m. and p.m. peak hours were added to the site-generated traffic to arrive at the total traffic volumes.

The 2015 total traffic conditions are illustrated in Figures 10 and 11. As shown in the figures, the future traffic conditions were shown to operate similar to conditions forecast in 2010 and no additional recommendations were identified other than those planned as part of site development. Appendix "I" contains the operational analysis worksheets prepared for the respective analysis periods.

QUEUING ANALYSIS

A queuing analysis was conducted to ensure that adequate storage distance will be available at the study intersections and at the site driveways under forecast year 2010 and 2015 total traffic conditions. A Synchro 7 model was used to assess queue interaction between the signalized



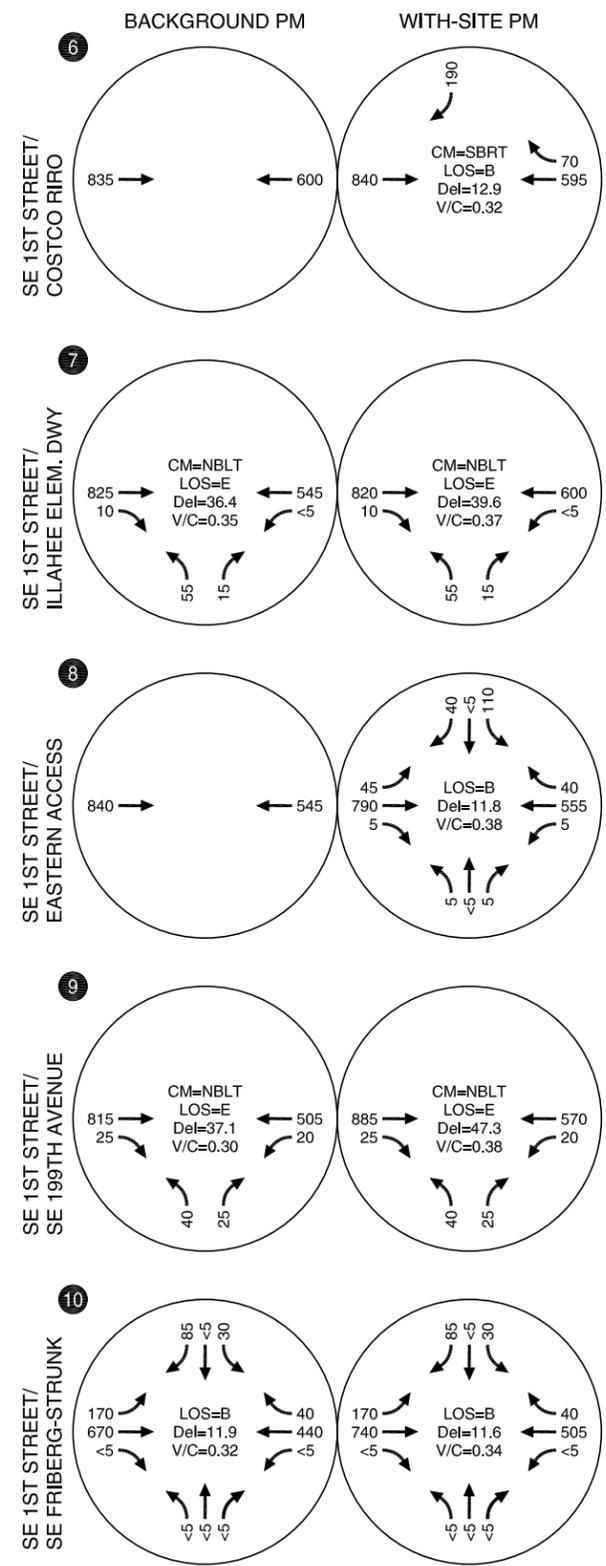
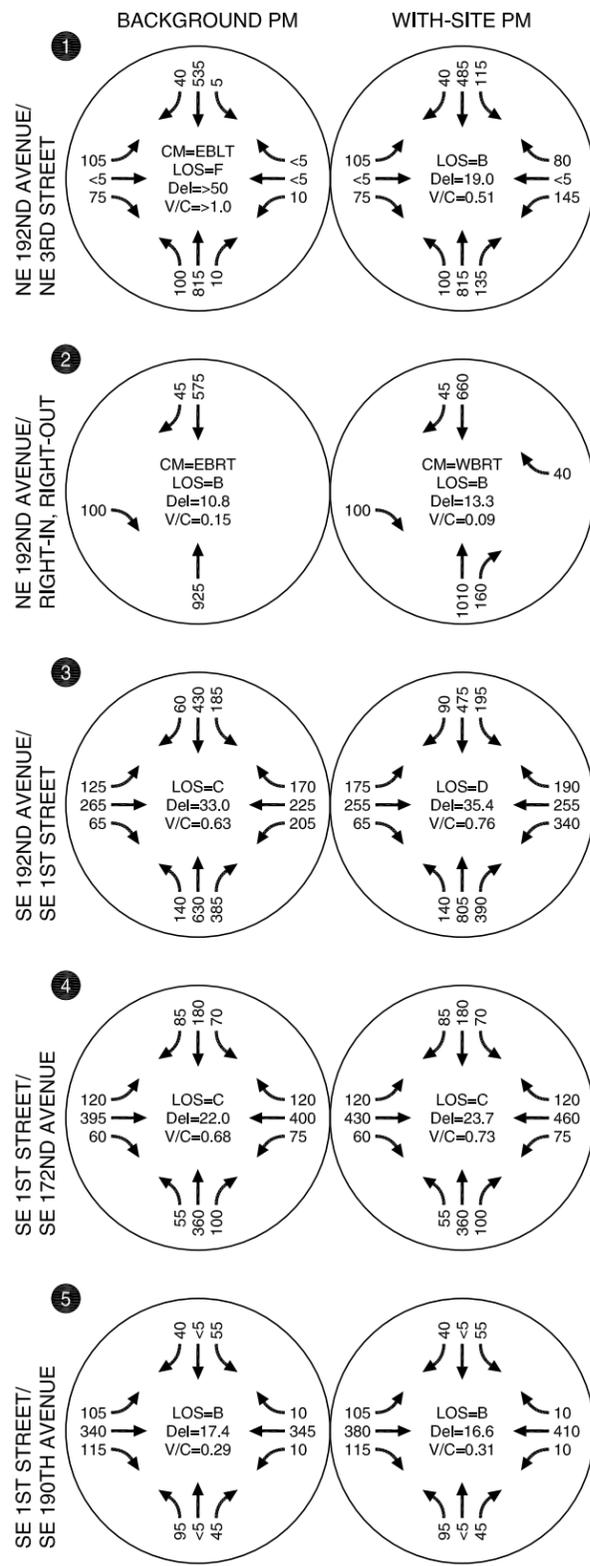
LEGEND

- CM = CRITICAL MOVEMENT (TWSC)
- LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
- Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- TWSC = TWO-WAY STOP CONTROL

*INTERSECTION 7 CONVERTED TO LEFT-IN, RIGHT-IN, RIGHT-OUT MOVEMENTS UNDER TOTAL TRAFFIC CONDITIONS
NOTE: NEGATIVE VALUES REFLECT PASS-BY TRIPS

**YEAR 2015 TRAFFIC CONDITIONS
WEEKDAY AM PEAK HOUR
VANCOUVER, WASHINGTON** **FIGURE 10**

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LEGEND

- CM = CRITICAL MOVEMENT (TWSC)
- LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
- Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
- V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
- TWSC = TWO-WAY STOP CONTROL

*INTERSECTION 7 CONVERTED TO LEFT-IN, RIGHT-IN, RIGHT-OUT MOVEMENTS UNDER TOTAL TRAFFIC CONDITIONS
NOTE: NEGATIVE VALUES REFLECT PASS-BY TRIPS

**YEAR 2015 TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
VANCOUVER, WASHINGTON**

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intersections and site driveways. The results of the 95th percentile queuing analysis are presented in Table 7.

Table 7
Forecast 95th Percentile Queuing Lengths (With Site Conditions)

Intersection	Approach Lane	2010 Weekday AM Peak Hour (feet)	2010 Weekday PM Peak Hour (feet)	2015 Weekday AM Peak Hour (feet)	2015 Weekday PM Peak Hour (feet)	Storage Available (feet)
NE 192 nd Avenue/ SE 1 st Street	SB LT	125	225	125	275	390
	WB LT	150	175	175	175	240
	Single EB LT/ (Dual EB LT)	100/ (50)	200/ (75)	100/ (50)	250/ (125)	220
	SB TH	150	250	200	225	Continuous
	WB TH	125	150	125	175	Continuous
NE 192 nd Avenue/ NE 3 rd Street	NB LT	25	25	25	25	180
	SB LT	25	75	50	50	200
	WB LT	75	175	50	200	235
	EB LT	50	125	50	125	85*
	NB TH	25	50	100	50	Continuous
	SB TH	100	150	150	150	Continuous
Loop Road/ SE 1 st Street	NB LT	25	25	25	25	50**
	SB LT	50	125	50	125	140
	WB LT	25	25	25	25	165
	EB LT	25	25	25	25	220
	NB TH	25	25	25	25	Continuous
	SB TH	25	25	25	25	Continuous
	EB TH	75	150	100	225	Continuous
	WB TH	75	125	100	175	Continuous
NE 192 nd Avenue/ Mid-block Site Access	WB RT	25	25	25	25	110
SE 1 st Street/ Mid-block Site Access	SB RT	25	50	25	50	115
SE 1 st Street/ Illahee Elementary Access Driveway	NB LT	25	25	25	25	25
	NB RT	25	25	25	25	130
	WB LT	25	25	25	25	100

NB=Northbound; SB=Southbound; WB=Westbound; EB=Eastbound, LT=Left; TH=Through, RT=Right

*Additional storage available

**Additional storage available in through lane

Based on the Synchro modeling, the forecast queues were found to be accommodated with the existing and proposed storage lengths, with one exception. Eastbound 95th percentile left-turn queues are forecast to exceed the available storage bay at the SE 192nd Avenue/SE 1st Street



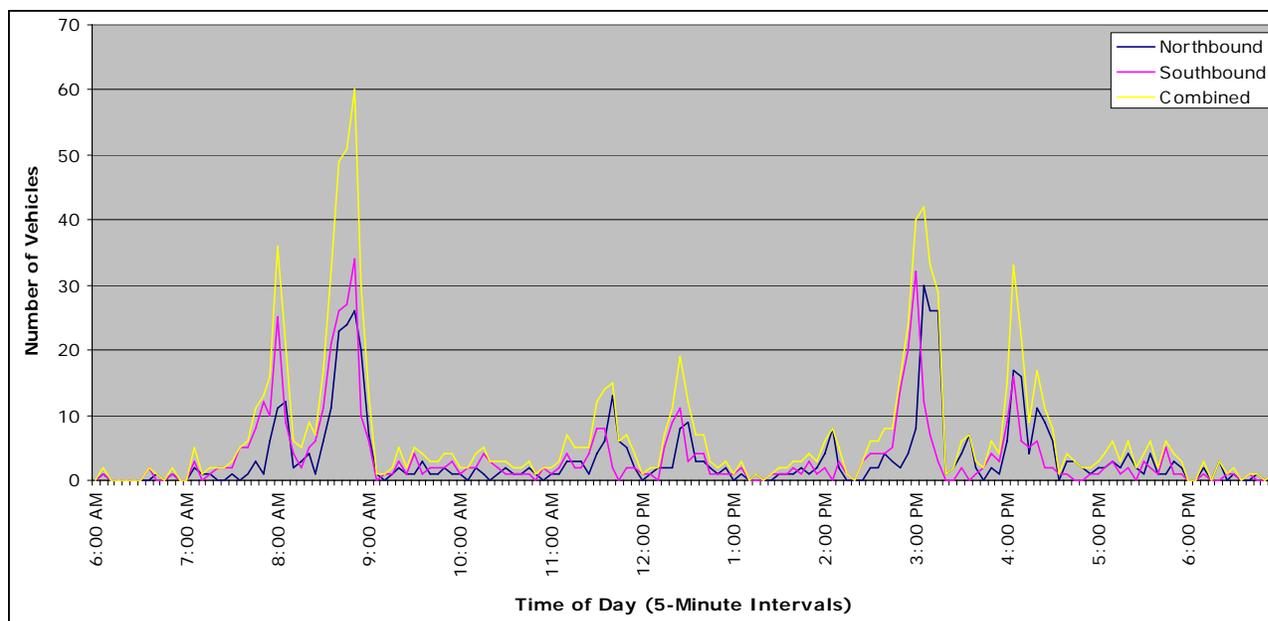
intersection. To better manage queues between the SE 1st Street/SE 192nd Avenue and SE 1st Street/SE 190th Avenue traffic signals, it is recommended that dual eastbound left-turn lanes be provided. The dual left-turn lanes will mirror the westbound intersection approach and improve intersection operations (the forecast eastbound left-turn queue with dual left-turn lanes in 2015 is 125 feet and can be readily accommodated). *Queuing analysis worksheets are included in Appendix "J".*

PEAK SCHOOL TRAFFIC CONDITIONS SENSITIVITY ANALYSIS

In addition to the weekday a.m. and p.m. commuter peak hour assessment, further review of the daily volume profiles and tube counts collected at the Illahee Elementary School access was completed to assess specific queuing needs during the critical school arrival and dismissal times. This assessment was conducted to ensure that the design of the westbound left-turn storage bay at the unsignalized full-access school driveway and the eastbound left-turn storage bay at the SE 1st Street/loop road intersection could be appropriately designed to avoid interaction throughout the day.

Historical tube count data was obtained at the Illahee Elementary School entrance onto SE 1st Street on May 31, 2006. Graph 3 illustrates the volume profile from the access driveway in the northbound, southbound, and combined directions. As shown in the graph, the critical period for minor street traffic at the school entrance is contained within the typical 7:00 to 9:00 a.m. commute period, although in comparison to Graph 1 the school peak occurs after through traffic volumes along SE 1st Street have peaked (7:00 to 8:00 a.m.). The weekday a.m. commute period contains a more pronounced peak as compared to the afternoon school peak, which is spread between 2:00 and 5:00 p.m. with two distinct and similarly intense peaks.

Graph 3
Illahee Elementary School Daily Volume Profile (Historical 2006 Data)



School attendance boundaries were also reviewed for the Illahee Elementary School to identify typical home to school routes for parent drop-off trips (Evergreen School District website, Reference 7). Based on review of the Evergreen School District website, it was identified that the majority of the boundary is to the west, with only limited lower-density residential areas to the north likely to use 202nd Avenue to the east as an ingress route. Based on this assessment, and as reflected in the existing traffic counts, the westbound left-turn demand at the unsignalized access is likely to remain low, limiting the future storage need at the intersection.

While the historical data provides an assessment of the arrival/departure patterns at the school start and end times, review of the Illahee Elementary School website noted that new school start times will be implemented for the 2009/2010 school year in an effort to reduce bus shifts district-wide. The new Illahee School start time will be at 9:25 a.m. with dismissal at 3:35 p.m. The postponement of the critical school start time will further reduce the coincidence of the peak school period with the peak traffic experienced on the system.

At the time this report was prepared, traffic counts associated with the start time shift were not available. As a result, analysis of the driveways during the peak school opening time data was completed using data from the 2008/2009 school year as collected in May 2009 to conservatively assess the system queuing needs. While the weekday a.m. peak hour analysis was focused on the system peak, the school peak analysis assessed the 7:55 to 8:55 a.m. period based on the peak volumes at the school entrance.

Consistent with the school attendance boundary assessment, during the critical driveway period it was noted that approximately 25 percent of the driveway movements are to and from the east under existing conditions. Between 7:55 and 8:55 a.m. there were only 32 westbound left-turns, although 27 (84 percent) of these occurred during the 20-minute period between 8:30 and 8:50 a.m. equally spread throughout the four separate five-minute intervals.

Operational assessment of the school driveway shows that with continued regional growth along SE 1st Street, the driveway is forecast to operate acceptably at Level of Service "D", with a critical northbound left-turn delay of 32.0 seconds per vehicle during the critical driveway 7:55 to 8:55 a.m. peak period. The 95th percentile northbound queue during the school peak fifteen minute period is shown to reach three vehicles, and the westbound left-turn queue is estimated to be a single vehicle.

Based on review of the school peak conditions, there are no anticipated changes to the system needs based on the school peaking characteristics. It is further expected that with the planned postponement of the school start time that conditions will be further improved beyond those shown in this analysis. *Illahae Elementary School Data is included within Appendix "K".*

TRAFFIC SIGNAL WARRANT ANALYSIS

As previously documented, signalization of the NE 192nd Avenue/NE 3rd Street intersection and the SE 1st Street/Loop Road intersection is proposed in conjunction with site development and was assumed for the operational analyses. The need for signalization of the two intersections was confirmed through review of the *Manual on Uniform Traffic Control Devices* (MUTCD, Reference 8) signal warrant analysis procedures at both locations.

The purpose of the traffic signal warrants is to provide an indication for when a signal could be installed. Traffic signal warrants are intended to identify the minimum conditions for when a traffic signal might be justified. There are a total of eight signal warrants, as listed below:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network

In this warrant analysis, only volume-based Signal Warrants 1, 2, 3 were reviewed.

To determine whether MUTCD Signal Warrants will be met, a 24-hour volume profile was obtained for SE 1st Street and used with forecast peak hour turning movements at both intersections. In addition, a 24-hour traffic volume profile was reviewed for the Illahee Elementary School access. Consistent with the previously described operational analyses, the existing traffic counts were increased with approved traffic volumes from the Lacamas Market Center study, application of a 4 percent annual regional growth rate, as well as site-generated traffic.

The signal warrant analysis determined that the forecast 2010 traffic volumes meet MUTCD volume-based Signal Warrants 1, 2, and 3 at the NE 192nd Avenue/NE 3rd Street intersection, which has previously been identified for signalization when warranted. The SE 1st Street/Loop Road intersection meets Signal Warrant 2, and has been designed in a manner that directly benefits Illahee Elementary School, Kingdom Hall, and the commercial property east of the site between the Union High School campus and SE 1st Street. Given the improved school and church access, pedestrian safety, and benefit to site circulation, signalization of both intersections is recommended in conjunction with site development. *Signal Warrant Analysis Worksheets are included in Appendix "L".*

ON-SITE CIRCULATION/SITE-ACCESS OPERATIONS

The proposed site plan (shown in Figure 2) was reviewed to ensure that adequate intersection sight distance will be provided at the existing site-access driveways. Based on a review of the proposed site plan and field observation, adequate intersection sight distance can be provided at the site-access driveways as proposed. It is recommended that on-site landscaping and any aboveground utilities should be appropriately located to ensure that adequate sight distance is maintained.

Pedestrian facilities include detached sidewalks along the site frontage, as well as pedestrian connections between the proposed buildings and both roadways. Bicycle lanes and street lighting are provided along the site frontage of SE 1st Street and SE 192nd Avenue as well as along the proposed public loop road.

Internal circulation was evaluated as part of this study to ensure that the site provides sufficient on-site circulation for pedestrian movements and internal site traffic. Kittelson & Associates, Inc. worked with the project development team to enhance the operational and safety aspects of the proposed site-access driveways, on-site circulation, delivery vehicle access and circulation, and parking. Through this analysis, the proposed site plan has been refined to meet the needs of both pedestrian and vehicular traffic. *Truck turning movement diagrams are documented in Appendix "M".*

SUPPLEMENTAL INFORMATION

Supplemental information is located in Appendix "N". The following documentation is required by the City of Vancouver for technical completeness:

- Road Modification Request Form
- Traffic Study Review Checklist
- Request for Concurrency

Section 5
Conclusions and
Recommendations

Conclusions and Recommendations

The results of the transportation impact analysis indicate that the proposed Costco Wholesale development can be constructed while maintaining acceptable levels of service and safety on the surrounding transportation system with the recommended mitigation measures in place. The findings of this analysis and our recommendations are discussed below.

FINDINGS

Year 2009 Existing Conditions

- All of the study intersections operate at acceptable levels of service during the weekday a.m. and p.m. peak hours.
- A review of historical crash data did not reveal any patterns or trends in the site vicinity that require mitigation associated with this project.

Year 2010 Background Traffic Conditions

- All of the study intersections are forecast to operate at acceptable levels of service during the weekday a.m. and p.m. peak hours with exception of the NE 192nd Avenue/NE 3rd Street intersection. The eastbound left-turn at this intersection is forecast to operate over-capacity and at Level of Service "F" in an unsignalized configuration during the weekday p.m. peak hour.
- Significant changes are planned along SE 192nd Avenue and along SE 1st Street west of SE 192nd Avenue associated with the approved Lacamas Town Center development. Improvements include the installation of the SE 1st Street/SE 190th Avenue traffic signal, roadway widening, and frontage improvements.

Proposed Development Plan

- The proposed Costco Warehouse, fuel center, and retail pad development will include approximately 183,000 square-feet of retail space. Access to the development will be provided through the proposed NE 192nd Avenue/NE 3rd Street signal, a right-in, right-out mid-block access onto NE 192nd Avenue, a mid-block right-in, right-out access onto SE 1st Street, and a new traffic signal along SE 1st Street that will be shared with the Jehovah's Witness Kingdom Hall and Illahee Elementary School.
- A new public loop road will be constructed connecting the two proposed signals on NE 192nd and SE 1st Street around the site.
- The proposed Costco Warehouse, fuel center, and retail pads are estimated to generate 6,158 daily net new trips; 96 net new trips (51 inbound, 45 outbound) are projected to occur during the weekday a.m. peak hour and 417 net new trips (185 inbound, 232 outbound) are projected to occur during the weekday p.m. peak hour.

Year 2010 Total Traffic Conditions

- All of the study intersections, site access points, and internal site intersections are forecast to operate with acceptable levels of service during the weekday a.m. and p.m. peak hours.
- With site development, MUTCD Signal Warrants 1, 2, and 3 will be met at the SE 192nd Avenue/NE 3rd Street intersection and Signal Warrant 2 will be met at the SE 1st Street /Loop Road intersection.
- The NE 192nd Avenue/NE 3rd Street intersection will operate acceptably with the installation of a new traffic signal.

Year 2015 Background Traffic Conditions

- Similar to the 2010 background conditions, all of the study intersections and proposed site-access locations will continue to operate acceptably with exception of the NE 192nd Avenue/NE 3rd Street intersection in its unsignalized configuration.

Year 2015 Total Traffic Conditions

- All of the study intersections and site driveways are forecast to operate acceptably during the weekday a.m. and p.m. peak hours assuming provision of the transportation improvements proposed in conjunction with site development.
- With the recommended dual eastbound left-turn lanes in place, forecast 95th percentile queues can be accommodated within the available or proposed storage bays.

RECOMMENDATIONS

The following list summarizes the mitigation measures recommended as part of the proposed Costco Wholesale site development.

Frontage Improvements

- NE 192nd Avenue:
 - Complete half-street improvement for a standard 5-lane arterial cross section with bicycle lanes and a raised center median.
 - Construct a northbound right-turn deceleration lane at the mid-block right-in/right-out only site driveway per City standard detail T04-05.
 - Construct a northbound right-turn deceleration lane at the NE 192nd Avenue/NE 3rd Street intersection per City standard detail T04-05.
- SE 1st Street:
 - Construct a raised median on SE 1st Street between NE 192nd Avenue and the new loop road signal to the east with a median break at the existing Illahee Elementary School access driveway.



- Full movement access should be preserved at the existing Illahee Elementary School driveway located on the south side of SE 1st Street.
- Maintain at least the existing 100 feet of westbound left-turn storage at the existing Illahee Elementary School driveway.
- Provide 200 feet of eastbound left-turn storage at the proposed new signalized intersection with the loop road.
- Provide 200 feet of westbound left-turn storage at the proposed new signalized intersection with the loop road.
- Construct a westbound right-turn deceleration lane with 100 feet of storage length at the right-in/right-out only site driveway per City standard detail T04-05.
- Modify the existing SE 1st Street/SE 192nd Avenue traffic signal to provide dual eastbound left-turn lanes. The improvement will require modification of the landscape strip along the southern edge of SE 1st Street, modification signal mast arm in the southeast quadrant of the intersection, and relocation of some luminaires along SE 1st Street west of SE 192nd Avenue.
- NE Third Street Loop Road:
 - Construct a new public loop road around the north and east sides of the site linking NE 192nd Avenue and SE 1st Street. The loop road should provide:
 - A three-lane cross section with bike lanes at the signalized intersections with NE 192nd Avenue and SE 1st Street.
 - A two-lane cross section with bike lanes east of the Costco Fuel Center access and north of the first east-west drive aisle reached when entering the site from SE 1st Street.
 - A raised median on the east approach of the NE 3rd Street/NE 192nd Avenue intersection; extending from the signalized intersection east past the right-out only driveway serving the Costco Fuel Center.
 - A landscape strip and detached sidewalk along both sides the new roadway.

Other Improvements

- Signalize the NE 3rd Street/NE 192nd Avenue intersection.
 - Provide a separate left-turn lane and shared through/right-turn lane on the westbound approach aligned with the Lacamas Market Center access to the west.
 - Provide 200 feet of southbound left-turn lane storage on NE 192nd Avenue at the intersection.
 - Provide protected-permitted phasing on the north-south approaches.
 - Provide permitted phasing on the east-west approaches.
 - Provide traffic signal interconnect to the SE 1st Street/NE 192nd Avenue intersection.



- Signalize the SE 1st Street/Loop Road intersection.
 - Provide a separate left-turn lane and shared through/right-turn lane on the northbound and southbound approaches.
 - Provide protected-permitted phasing on the east-west and north-south approaches.
 - Provide traffic signal interconnect to the SE 1st Street/NE 192nd Avenue intersection.
 - If possible, construct the traffic signal in a way that does not preclude the construction of a future westbound right-turn lane at the intersection (while off-site, a right-turn lane may be warranted by other future development to the east).
- Illahee Elementary School Circulation Improvements
 - Modify the on-site circulation to relocate school bus traffic to the new traffic signal on SE 1st Street.
 - Retain the existing full-access unsignalized driveway onto SE 1st Street for parent and faculty use. A median break will be provided to retain all movements at the driveway.
- On-site landscaping and any above-ground utilities should be provided appropriately to ensure that adequate sight distance is provided and maintained.
- Fund off-site proportional share intersection mitigations as per City requirements at the intersections summarized below:

Summary of Proportional Share Intersection Contributions

Intersection	Cost Per Trip	Number of Trips	Proportionate Share	East CITY District TIF Creditable?
SE 7 th Street & 136 th Avenue	\$772.00	3	\$2,316.00	No
Mill Plain & 136 th Avenue	\$1,851.85	8	\$14,814.80	Yes
Mill Plain Blvd. & I-205 NB Ramp	\$428.94	0	\$0	No
Mill Plain Blvd. & 164 th Avenue	\$184.20	31	\$5,710.20	No
164 th Avenue & 1 st Street	\$477.78	45	\$21,500.10	No
164 th Avenue & 12 th Street	\$259.84	0	\$0	No
164 th Avenue & 15 th Street	\$212.31	0	\$0	No
164 th Avenue & McGillivray Blvd.	\$494.51	20	\$9,890.20	No
164 th Avenue & 20 th Street	\$143.95	4	\$575.80	No
164 th Avenue & 34 th Street	\$844.59	2	\$1,689.18	No
166 th Avenue & McGillivray Blvd.	\$400.00	20	\$8,000.00	No
Hearthwood Street & 1 st Street	\$500.00	4	\$2,000.00	No
NE 137 th Avenue & NE 49 th Street	\$3,885.00/trip	2	\$7,770.00	No ¹
NE 20 th Street & 176 th Avenue	\$400.00	30	\$12,000.00	TBD ²
NE 18 th Street & 112 th Avenue	\$3,608.55	0	\$0	Yes
St Johns & 68 th Street (Signal)	\$1,000.00	0	\$0	No
Leiser/St Helens/McArthur	TBD	0	\$0	No
Fourth Plain & Rossiter Pedestrian Crossing Signal	\$500/dwelling unit	0	\$0	No
Total Proportionate Share Cost			\$86,266.28	\$14,814.80

No¹ - The project is TIF creditable, but only for the Evergreen TIF district

TBD² - The City of Vancouver has not determined whether this project will be TIF creditable

Section 6
References

References

1. Transportation Research Board. *Highway Capacity Manual*. 2000.
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6. Institute of Transportation Engineers. *Trip Generation, 8th Edition*. 2008.
7. Evergreen School District. <http://www.evergreenps.org/Pages/default.aspx>. September 2009.
8. U.S. Department of Transportation Federal Highway Administration. *Manual on Uniform Traffic Control Devices (MUTCD)*.

