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Proposed Commercial Service at Paine Field Traffic Impact Analysis

**Prepared for: Federal Aviation Administration
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GLOSSARY

Average Daily Trips	The total two-way traffic on a roadway or generated by the project. Abbreviation – ADT.
Capacity	The maximum amount of traffic that can travel along a roadway or through an intersection with the given conditions.
Channelization	The separation of traffic flow into specific lanes.
Growth Management Act	The Growth Management Act requires state and local governments to manage growth through, among other guidelines, development regulations. Abbreviation – GMA.
Level of Service	A measure of the effectiveness of a roadway or intersection to handle an amount of traffic. Abbreviation – LOS.
Puget Sound Regional Council	A regional planning group that works with local jurisdictions and agencies to develop policies and make decisions about regional transportation, lane use and economic development. Abbreviation – PSRC.
Revised Code of Washington (RCW)	Compilation of all permanent Washington State laws now in force.
State Environmental Protection Act	The state policy requiring agencies to determine the environmental impacts of development. Abbreviation – SEPA.
Single-Point Urban Interchange	The SPUI is an interchange that has a single signal, as opposed to two signals for a standard interchange, and provides additional capacity over a standard interchange. Abbreviation – SPUI.
Snohomish County Code	Compilation and codification of Snohomish County laws, resolutions and ordinances. Abbreviation – SCC.
Traffic	The movement of motorized and non-motorized vehicles, persons and bicycles through or along the roadway, intersections, sidewalks and walkways.
Transportation Service Area	A sub-area of Snohomish County. Abbreviation – TSA.
Transportation Demand Management	A program to reduce the number of new trips generated by a development by encouraging alternative modes of transportation. Abbreviation – TDM.
Trip	A one-direction movement, which begins at an origin and ends at a destination.
Trip Distribution	The calculation and assignment of trips from a land development proposal to the surrounding road network.
Trip End	Each trip has two ends, the origin and the destination. Trip ends for a location are the summation of origins and destinations.
Trip Generation	The number of trips created by a particular land use or activity.
Urban Growth Areas	Those areas designated by Snohomish County after consultation with cities, where urban growth will be encouraged and supported by public facilities and services. Abbreviation – UGA.
WSDOT	Washington State Department of Transportation.

1. EXECUTIVE SUMMARY

The proposed project is the introduction of commercial service at Paine Field. The project will consist of 20 daily aircraft operations by Horizon Air and 20 weekly aircraft operations by Allegiant Air, with each operation being either an arrival (landing) or a departure (takeoff). These operations are anticipated to result in 956 average daily vehicle trips including 212 peak-hour vehicle trips added to the surrounding roadways and intersections. The trip generation calculations were performed using data from various sources, including the airlines and correlation with Bellingham International Airport and the Institute of Transportation Engineers. The peak-hour trip generation is conservative since it has been assumed that one arrival and one departure for each airline will occur in one hour and all passengers will arrive and depart Paine Field in that hour.

The trips from the project were distributed onto the surrounding road system based on regional data provided by the Puget Sound Regional Council area model, existing traffic patterns from the local area, other approved distributions from the local area and input from Snohomish County and City of Everett staff. The project may change some travel patterns in the Puget Sound region since it is anticipated that the project may divert some vehicle trips to Paine Field from Sea-Tac International Airport and Bellingham International Airport. This change in regional travel patterns could reduce the number of vehicles at the intersections and along the arterials analyzed in this report. However, a reduction has not been included in the analysis. The distribution of trips therefore assumes all of the trips generated by the project are new.

Scoping discussions were held with staff at Snohomish County, the Washington State Department of Transportation (WSDOT), the City of Mukilteo and the City of Everett. These scoping discussions were performed to evaluate the trip generation and trip distribution and determine the scope of analysis required for the project. There were a total of three Snohomish County arterial units that meet the threshold for analysis and eleven WSDOT, City of Mukilteo and City of Everett intersections that were requested for analysis and meet the threshold for analysis. All of these arterials and intersections were analyzed for level of service. The level of service analysis was conducted for existing conditions for without and with the project in the year 2013, opening operations, and without and with the project in the year 2018, full operation.

The following Snohomish County arterials units have been analyzed in both directions as part of this report:

- #227 – Beverly Park Road (PM peak-hour)
- #228 – Airport Road/128th Street SW (AM and PM peak-hours)
- #231 – Airport Road (AM and PM peak-hours)

The following WSDOT intersections, designated by their associated study intersection numbers, have been analyzed as part of this report:

1. SR-525 at Beverly Park Road
11. I-5 Southbound Ramps at 128th Street SW
17. I-5 Northbound Ramps at 128th Street SW
20. Airport Road at SR-526 Westbound Ramps

The following City of Mukilteo intersections, designated by their associated study intersection numbers, have been analyzed as part of this report:

21. SR-526/Paine Field Boulevard at 84th Street SW
22. 44th Avenue W at 84th Street SW
23. SR-525 at 84th Street SW

The following City of Everett intersections, designated by their associated study intersection numbers, have been analyzed as part of this report:

5. Beverly Park Road at Airport Road
6. SR-99 at Airport Road
18. Airport Road at 112th Street SW
19. Airport Road at Casino Road
24. SR-526 Westbound Ramps at Evergreen Way

The project will not cause any Snohomish County arterials or any WSDOT, City of Mukilteo or City of Everett intersections to change from an acceptable to a deficient level of service. All of the Snohomish County arterials analyzed in this report are anticipated to operate at acceptable levels of service in the opening year and the year 2018 with full operation of the project.

The project will, however, add trips to four intersections that are anticipated to operate at deficient levels of service, whether or not the proposed project is implemented. These intersections are SR-525 at Beverly Park Road (WSDOT intersection), SR-99 at Airport Road (City of Everett intersection), the I-5 northbound ramps at 128th Street SW/SR-96 (WSDOT intersection) and SR-525 at 84th Street SW (City of Mukilteo Intersection). The project's impacts to the WSDOT intersections will be mitigated through the WSDOT traffic mitigation fees. The City of Everett has identified that capacity improvements for single-occupancy vehicles to the intersection of SR-99 at Airport Road are not practical due to the existing lane configuration and lack of right-of-way. The SR-525 at 84th Street SW intersection could operate at an acceptable level with improved signal timings and therefore the impacts to this intersection will be mitigated through the City of Mukilteo traffic mitigation fees.

The Washington Growth Management Act (GMA) and Revised Code of Washington (RCW) 82.02.050(2) authorize local jurisdictions to establish proportionate share traffic mitigation fees in order to fund capital facilities, such as roads and intersections. Snohomish County Code (SCC) 30.66B applies that authority to developments in order to fund road improvements that

would accommodate development. Additionally, through SCC 30.66B and the State Environmental Policy Act (SEPA), Snohomish County has established reciprocal traffic mitigation fee interlocal agreements with WSDOT and the City of Mukilteo that are within the influence area of the project. Based on the trip generation and identified codes the total traffic mitigation fees identified in this report for payment to Snohomish County, WSDOT and the City of Mukilteo for the project is \$333,262.85. The Snohomish County mitigation fees are \$206,161.40, the WSDOT mitigation fees are \$32,695.20 and the City of Mukilteo mitigation fees are \$94,406.25.

2. PROJECT IDENTIFICATION

Gibson Traffic Consultants, Inc. (GTC) has been retained to analyze the traffic impacts of the proposed commercial service at Paine Field, the project. GTC is a Snohomish County approved professional traffic engineering consulting firm registered and licensed in the State of Washington.

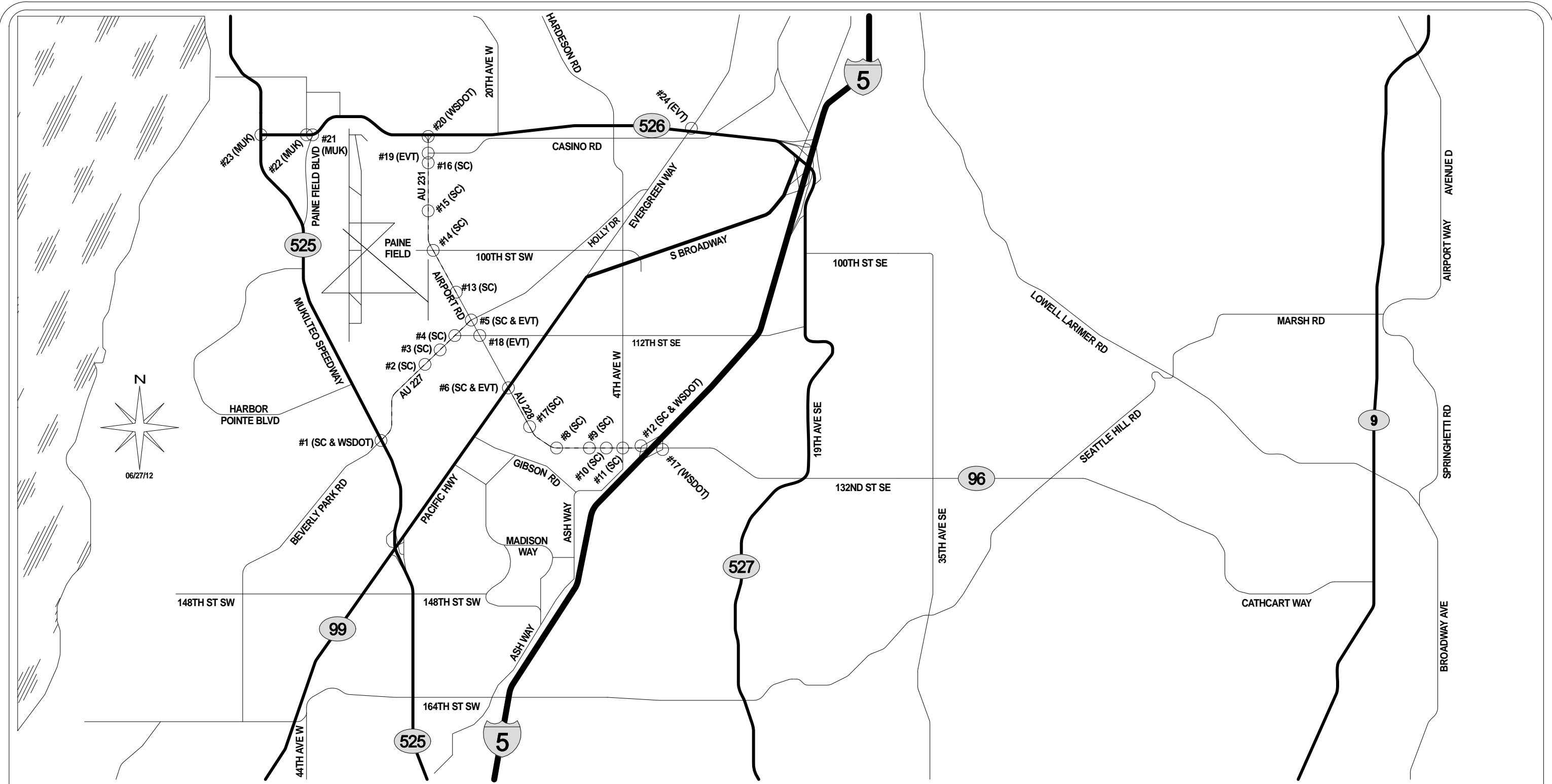
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Brad Lincoln, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington and member of the Washington State section of ITE.

The project will add commercial airline flights to Paine Field, which currently serves only general aviation. This project will require building permits and therefore an analysis of the traffic impacts of the project is required. Paine Field is located in Snohomish County Transportation Service Area D (TSA D). The access to the project will be from the existing intersection of Airport Road at 100th Street SW. This intersection is currently signalized and provides the primary access to Paine Field. A site vicinity map is included in Figure 1.

The project will provide service by Horizon Air and by Allegiant Air. Horizon Air is anticipated to start at 12 daily operations and grow to 20 daily operations. Allegiant Air is anticipated to begin with 4 weekly operations and increase to 20 weekly operations. For the purposes of this report, each operation is either an arrival or a departure and it has been assumed the operations will be evenly split between arrivals and departures. The operations are anticipated to provide service to Portland, Oregon, Spokane, Washington and Las Vegas, Nevada. Impacts to Snohomish County arterials and intersections within the surrounding jurisdictions have been analyzed within this report.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #09-017




PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

FIGURE 1

SITE VICINITY
MAP

SNOHOMISH COUNTY

LEGEND

-  PAINE FIELD LOCATION
-  INTERSECTION NUMBER (JURISDICTION)
-  SNOHOMISH COUNTY ARTERIAL

JURISDICTIONS:
 SC - SNOHOMISH COUNTY (ARTERIAL ANALYSIS)
 WSDOT - WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (INTERSECTION ANALYSIS)
 MUK - CITY OF MUKILTEO (INTERSECTION ANALYSIS)
 EVT - CITY OF EVERETT (INTERSECTION ANALYSIS)

3. METHODOLOGY

3.1 General

Trip generation for the project is based on detailed data from Horizon Air and Allegiant Air, information collected at Bellingham International Airport and detailed analysis by Hirsh Associates, consulting specialist in aircraft operations. Data was collected from Bellingham International Airport since Horizon Air and Allegiant Air both provide service there that is similar to the service proposed for Paine Field. The trip generation methodology was discussed with Jim Bloodgood, the Snohomish County Traffic Engineer, and input from those discussions has been incorporated into the trip generation calculations.

The distribution of trips generated by the project is based on regional modeling information provided by Puget Sound Regional Council (PSRC), review by the Snohomish County Traffic Engineer with consultation from the Snohomish County traffic modeling group, recent traffic studies approved in the site vicinity and peak-hour turning movement counts at the surrounding intersections. The trip distribution was provided to Snohomish County, the City of Mukilteo and the City of Everett for comment prior to the publication of this report. The trip distribution used in this report includes comments from Snohomish County and City of Everett staff.

Congestion at intersections is generally measured in terms of level of service (LOS). In accordance with the 2010 Highway Capacity Manual (HCM), road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. The level of service at signalized, roundabout and all-way stop-controlled intersections is based on the average delay of all approaches. The level of service for two-way stop-controlled intersections is based on average delays for the critical stopped approach. Geometric characteristics and conflicting traffic movements are taken into consideration when determining level of service values. A summary of the intersection level of service criteria is included in Table 1.

Table 1: Level of Service Criteria for Intersections

Level of ¹ Service	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	Signalized Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays ²	>50	>80

The City of Mukilteo and the City of Everett have a level of service threshold of LOS D for the operation of their intersections. WSDOT has a level of service threshold of LOS D for intersections along SR-525 and SR-526 and a threshold of LOS E for I-5 interchange ramps.

The levels of service for the arterials analyzed in this report are based on the Snohomish County category. Arterials are also rated between LOS A and LOS F by Snohomish County. A summary of the Snohomish County arterial level of service criteria is included in Table 2.

¹ **Source:** *Highway Capacity Manual 2000*.

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).

LOS B: Generally stable traffic flow conditions.

LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.

LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).

LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.

LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

² When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

Table 2: Level of Service Criteria for Arterials

Level of Service	Expected Delay	Average Arterial Speed (miles per hour)	
		Urban, Category II	Urban, Category III
A	Little/No Delay	> 35	> 30
B	Short Delays	> 28	> 24
C	Average Delays	> 22	> 18
D	Long Delays	> 17	> 14
E	Very Long Delays	> 13	> 10
F	Extreme Delays	≤ 13	≤ 10

Snohomish County has a level of service threshold of LOS E for the operation of their arterials.

The intersection and arterial level of service analysis has been performed using the existing or programmed lane configuration, intersection control, peak-hour factors and heavy vehicle percentages.

The arterial analysis in this report has been performed using the *Synchro 8.0, Build 814* software and according to Snohomish County's methodology for analyzing arterial units. The arterials were calibrated in *Synchro 8.0* for arterial speeds and intersection delays to match the existing data as close as possible while using the existing signal timing information. The main functions used to calibrate the arterials to the existing travel time and signal information are adjusting the lost time adjust and all-red time values.

The WSDOT, City of Mukilteo and City of Everett intersections have been analyzed using the existing signal timings, peak-hour factor and heavy-vehicle factors for the intersections. These are the only factors that are required to be calibrated by the surrounding jurisdictions for the intersection analysis. There are several intersections that were analyzed as part of the arterial analysis and as part of the analysis for the surrounding jurisdictions. Any changes to the lost time adjust and all-red time values used for the calibration of the Snohomish County arterial analysis has been removed for the intersection analysis according to the standard procedures of the surrounding jurisdictions for individual intersection analysis. The operation of intersections under the Snohomish County arterial analysis could therefore be slightly different than the operation under the intersection analysis for the intersections of the surrounding jurisdictions.

3.2 Scope of Analysis

The analysis of the impact of the project on Snohomish County arterials is based on the requirements of SCC 30.66B for developments within unincorporated Snohomish County that generate 50 or more peak-hour trips. Snohomish County requires the analysis of critical arterial units and arterial units in arrears impacted with 3 or more directional peak-hour trips from developments generating 50 or more peak-hour trips. Developments within unincorporated Snohomish County are also required to show peak-hour development trips at Snohomish County

key intersections impacted with 3 or more directional peak-hour trips on any approach or departure.

The analysis of impacts to intersections within the surrounding jurisdictions is based on the interlocal agreements between Snohomish County and the surrounding jurisdictions and the requirements of the State Environmental Protection Act (SEPA). The surrounding jurisdictions include WSDOT the City of Mukilteo and the City of Everett. Gibson Traffic Consultants staff has had several discussions with these jurisdictions to confirm the methodology and scope of the level of analysis required for the project.

The interlocal agreement between Snohomish County and WSDOT typically requires WSDOT intersections within unincorporated Snohomish County impacted with 10 or more PM peak-hour trips from developments generating more than 50 PM peak-hour trips to be analyzed for existing and future conditions, unless scoped differently with WSDOT. This report includes analysis of all WSDOT intersections identified in the WSDOT letter dated July 14, 2009 and impacted with 10 PM peak-hour trips. The project will account for 0.58% or less of the traffic on the roadway on SR-525 south of Beverly Park Road (see pages F-1 and F-2 of the attachments), SR-99 south of Airport Road (see pages F-16 and F-17 of the attachments) and SR-96 east of the I-5 northbound ramps (see pages F-49 and F-50). Intersections along SR-525 south of Beverly Park Road, SR-99 south of Airport Road and SR-96 east of the I-5 northbound ramps have therefore not been analyzed due to the low impact of the project. The interlocal agreement also provides for mitigation fees to WSDOT for improvement/collection projects impacted within the development's unincorporated Transportation Service Area (TSA). Mitigation fees are based on the area wide mitigation fee or the fee for impacts to individual WSDOT collection projects. Additionally, WSDOT high accident locations within the unincorporated development's TSA impacted with 10 or more PM peak-hour trips are to be identified.

The interlocal agreement between Snohomish County and the City of Mukilteo requires existing and future analysis of City of Mukilteo arterial intersections impacted with 10 or more directional PM peak-hour trips. The interlocal agreement also includes a provision for the payment of mitigation fees based on pre-determined areas or impacts to actual improvement projects.

Snohomish County and the City of Everett do not have an interlocal agreement; however, impacts to City of Everett intersections have been analyzed under the requirements of SEPA. The City of Everett uses a threshold of 50 or more total PM peak-hour trips to determine which intersections require level of service analysis. This threshold has therefore been used to determine which City of Everett intersections require level of service analysis. The City of Everett is responsible for the highway intersections within the incorporated part of their Urban Growth Boundary. Therefore the 50 peak-hour trip threshold is to be used for highway intersections within the City of Everett as the threshold for analysis, based on comments from the City of Everett. However, the intersection of Evergreen Way at the SR-526 westbound ramps has been analyzed at the request of WSDOT, despite only being impacted with 10 PM peak-hour trips. Mitigation for impacts to City of Everett intersections is only required under SEPA, there are not pre-determined mitigation fees.

Opening operations of the project are anticipated to be 2013. The full operations are anticipated to occur in the year 2018. The analysis of the impacts of the project has therefore been performed for the following five conditions:

1. Existing Conditions
2. 2013 without Project
3. 2013 with Project
4. 2018 without Project
5. 2018 with Project

4. TRIPS FROM THE PROJECT

4.1 Trip Generation

Trip generation calculations for the project are based on detailed data from Horizon Air and Allegiant Air, data collected at Bellingham International Airport, discussions with Snohomish County's traffic engineer and data from Hirsh Associates.

The detailed data from Horizon Air and Allegiant Air is summarized in Table 3.

Table 3: Airline Trip Generation Data at 2018 Full Operations

Horizon Air		Allegiant Air	
Data	Value	Data	Value
Operations (daily):	20	Operations (daily):	2.8 ³
Operations (Peak-Hour):	2	Operations (Peak-Hour):	2
Seats:	76	Seats:	150
Load Factor:	73%	Load Factor:	90%
Vehicle Occupancy:	1.50	Vehicle Occupancy:	2.40

The operations per day in Table 3 are based on the full operations, which are not anticipated until 2018. The opening operations analyzed for 2013 will have fewer daily flights and may have fewer flights during the peak-hours. However, the trip generation calculations have been performed for the full operations and used for the opening operations and full operations analysis. This methodology accounts for the highest anticipated use to occur at opening operations and full operations, a conservatively high assumption for the 2013 with project scenario.

Along with the airline specific data, it is anticipated that there will be a total of 17 new employees over two shifts at Paine Field due to the proposed commercial service. It has been anticipated that half of the employees on each shift will generate a trip during the peak-hour with the trips evenly split between inbound and outbound trips.

³ Allegiant Air anticipates 20 directional trips per week, equal to 2.8 directional trips per day.

The trip generation calculations are based on the data in Table 1 and input from the Snohomish County Traffic Engineer. The peak-hour trip generation calculations have been performed assuming that all of the Horizon Air and Allegiant Air passengers will arrive during the same hour and there is one arrival and one departure for each airline. This assumption is conservatively high since data from the airlines and data collected at Bellingham International Airport suggests a timeframe closer to two hours for an arrival and departure for both of the airlines. The peak-hour trip generation calculations performed for this report also assume a Horizon Air load factor of 90%, which is higher than the system-wide load factor provided by Horizon Air. The use of a 90% load factor increases the number of peak-hour trips generated, as compared to the system-wide 73% factor. The Horizon Air system-wide load factor was used for the Horizon Air daily trip generation calculations. The trip generation calculations are summarized in Table 4 for the daily trip generation and Table 5 for the peak-hour trip generation.

Table 4: Total Daily Trip Generation Summary at 2018 Full Operations

Trip Generator	Operations/ Employees	Seats	Load Factor	Vehicle Occupancy	Daily Trips		
					Total	Inbound	Outbound
Horizon Air	20	76	73%	1.50	740	370	370
Allegiant Air	2.8	150	90%	2.40	158	79	79
Employees	34	---	---	1.00	68	34	34
TOTAL					966	483	483

Table 5: Total Peak-Hour Trip Generation Summary at 2018 Full Operations

Trip Generator	Operations/ Employees	Seats	Load Factor	Vehicle Occupancy	Peak-Hour Trips		
					Total	Inbound	Outbound
Horizon Air	20	76	90%	1.50	92	46	46
Allegiant Air	2.8	150	90%	2.40	114	57	57
Employees	17	---	---	1.00	8	4	4
TOTAL					214	107	107

The peak-hour trip generation is assumed to occur during both the AM and PM peak-hour, which is a conservative estimate. The assumption that there will be one arrival and one departure for each of the airlines during the AM and PM peak-hours will alone result in 20 operations for Horizon Air and Allegiant Air between Monday and Friday. This is equal to, or greater than, the anticipated weekly operations, including the weekends. However, the assumption that there is one arrival and one departure for each airline results in an analysis of the highest possible impacts of the project.

The critical peak-hour trip generation was also compared to data provided in the Institute of Transportation Engineers (ITE) *Trip Generation, 8th Edition (2008)*. ITE is the resource that is used for typical residential and commercial developments. ITE Land Use Code 021 is the code for a commercial airport. ITE's data shows that there would be 6.9 peak-hour trips per flight.

Therefore for the 2018 with project analysis using ITE data would project 157 trips for the PM peak-hour, which is approximately 74% of the anticipated PM peak-hour trips using the Horizon Air and Allegiant Air data. This shows the conservative nature of the trip generation used for this report since most of the airports used for the ITE data have bigger airplanes and therefore more vehicle trips per flight.

These trip generation calculations were also compared to data collected at Bellingham International Airport. Data was collected between 2:30 PM and 4:30 PM on Thursday, July 16, 2009 by the independent count firm of Traffic Data Gathering (TDG). Data was collected during this timeframe since it included an arrival and departure for both Horizon Air and Allegiant Air, which is equivalent to the assumption used for the peak-hour trip generation calculations for the project. The data collected at Bellingham International Airport showed a trip generation of 201 trips during the peak 2-hour period and an average vehicle occupancy rate of 2.08. This data is within approximately 5% of the anticipated trip generation for the project. The weighted average vehicle occupancy for the project is 2.10, which is within 1% of the average vehicle occupancy calculated for Bellingham International Airport. It is important to note that the data collected at the Bellingham International Airport is over a 2-hour period, which included one arrival and one departure for Horizon Air and Allegiant Air. The peak-hour at Bellingham International Airport, which had 148 trips, is only 74% of the peak 2-hour period, which has 201 trips. The data collected at Bellingham International Airport should therefore validate that the peak-hour trip generation calculations for the proposed commercial terminal at Paine Field are conservatively high. It is also important to note that the data from Bellingham International Airport showed an average vehicle occupancy rate of 2.08, which is similar to what was provided by Hirsh Associates.

The project is anticipated to generate 966 total average daily trips with 214 total trips occurring during the peak-hour. However, it is not anticipated that all of these trips will impact the off-site street system, the arterials and intersections of Snohomish County, WSDOT, the City of Mukilteo and the City of Everett. It is anticipated that at least 1% of the trips generated will remain on the Paine Field grounds and will travel to and from the internal uses, which include aviation type uses. It is therefore anticipated that only 956 average daily trips and 212 peak-hour trips will be added to the arterials and intersections of Snohomish County, WSDOT, the City of Mukilteo and the City of Everett.

Table 6: Off-Site Trip Generation Summary at 2018 Full Operations

Trip Type	Percentage of Trips Off-Site	Total Trip Generation			Off-Site Trip Generation		
		Total	Inbound	Outbound	Total	Inbound	Outbound
Average Daily	99%	966	483	483	956	478	478
Peak-Hour	99%	214	107	107	212	106	106

The impacts of these trips are what have been analyzed in this report. It is important to note that these trip generation calculations do not include a 5% reduction for on-site Transportation Demand Management measures, which is discussed in more detail later in this report.

A qualitative analysis of the trips generated by the construction of the proposed commercial service terminal at Paine Field has been performed for this report. The new terminal is anticipated to consist of modular buildings and there is not likely to be a significant amount of earthwork performed as part of the construction. Based on this information, the construction traffic will not exceed the 956 average daily trips and 212 peak-hour trips generated by the full operations of the project that have been evaluated in this report. An analysis of the impacts of the construction traffic has therefore not been performed as part of this report.

4.2 Trip Distribution

The distribution of trips generated by the project is based on regional modeling information provided by PSRC, review by the Snohomish County Traffic Engineer with consultation from the Snohomish County traffic modeling group, the City of Everett Traffic Engineer, recent traffic studies approved in the site vicinity and peak-hour turning movement counts at the surrounding intersections. The trip distribution was provided to Snohomish County for comment prior to the publication of this report. The distribution was reviewed and approved by the Snohomish County Traffic Engineer prior to the publication of this report.

A detailed trip distribution is included in Figure 2.

4.2.1. Regional Distribution

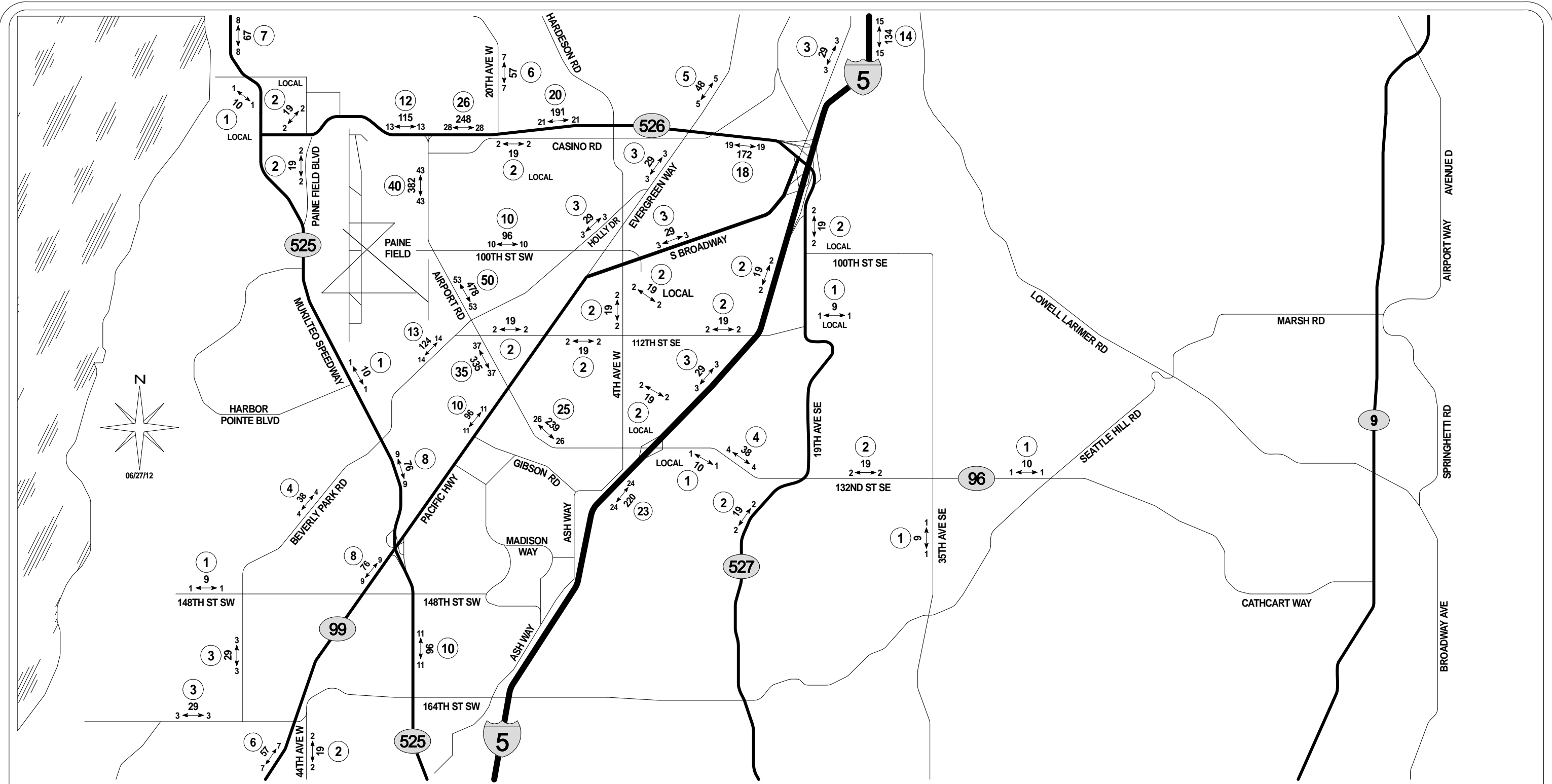
It is anticipated that 48% of the trips will travel to and from the south along Beverly Park Road, SR-99, SR-525, Interstate-5, SR-527 and 35th Avenue SE. Approximately 32% of the trips will travel to and from the north along SR-525, 20th Avenue W, SR-99/Evergreen Way and Interstate-5. It is estimated that 14% of the trips will travel to and from the east, mainly to and from local areas between Paine Field and Interstate-5. The remaining 6% of the trips are anticipated to travel to and from the west, mainly to and from local areas around SR-525 and SR-526.

4.2.1. Local Distribution

It is anticipated that 50% of the trips will travel to and from the south along Airport Road in the vicinity of the development. These trips will be split between trips along Beverly Park Road (thirteen percent), trips along 112th Street SW (two percent), trips along SR-99 (ten percent) and trips along 128th Street SW (twenty-five percent). Approximately 40% of the trips will travel to and from the north along Airport Road in the vicinity of the development. These trips will be split between Casino Road (two percent) and SR-526 (twelve percent to and from the west and twenty-six percent to and from the east).

4.2.1. Snohomish County Key Intersection Impacts

Snohomish County requires development to provide detailed turning movement information for key intersections impacted with 3 or more directional peak-hour trips. The key intersections impacted with 3 or more directional peak-hour trips from the project are shown in the attachments in graphical and tabular format.



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TRAFFIC IMPACT STUDY
GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

AWDT
AM/PM ← → PEAK

NEW SITE TRAFFIC
(DAILY/PEAK-HOUR)

TRIP DISTRIBUTION %

25

SNOHOMISH COUNTY

FIGURE 2
**DISTRIBUTION OF TRIPS
GENERATED BY THE PROJECT**

5. TURNING MOVEMENT VOLUMES

AM and PM peak-hour turning movement volumes have been either collected or calculated for the following five conditions:

1. Existing Conditions
2. 2013 without Project
3. 2013 with Project
4. 2018 without Project
5. 2018 with Project

The methodology used to determine the turning movements for each of these conditions is discussed in the following sections.

5.1 Existing Turning Movements

Existing peak-hour turning movement volumes were obtained from Snohomish County or WSDOT or were collected by the independent count firm of TDG. The majority of the existing turning movement volumes used in this report were collected in the year 2012. Data collected prior to 2012 was compared to data from 2012 at surrounding intersections. The comparison showed that counts from 2012 and counts prior to 2012 are consistent with each other. All of the existing counts used for the analysis in this report are included in the attachments.

5.2 2013 without Project Turning Movements

The 2013 without Project turning movements have been calculated by applying a 2% annually compounding growth rate to the existing turning movements. The 2% annually compounded growth rate is based on the average growth at study intersections due to Snohomish County pipeline data, which is from May of 2012 and includes developments approved prior to May 2012. The Snohomish County pipeline data is a list of all pending applications, and is required by SCC 30.66B.145 to be used for future level of service analysis. The average annually compounding growth at the study intersections from Snohomish County pipeline data is approximately 0.75%. The use of a 2% growth rate to determine the 2013 without project turning movements should be considered conservatively high.

5.3 2013 with Project Turning Movements

The 2013 with project turning movements have been calculated by adding the trips from the full operations of the project to the 2013 without project turning movements. This is again a conservative estimate of the volumes that would be anticipated for the 2013 with project conditions since the trips from the project are based on the full operations, which are not anticipated in 2013. However, this analysis would account for any acceleration of the schedule, all though this is not anticipated. The 2013 with project analysis therefore represent the highest turning movements that could be anticipated for the 2013 with project conditions.

5.4 2018 without Project Turning Movements

The 2018 without project turning movements have been calculated by adding pipeline data from Snohomish County, City of Mukilteo and City of Everett developments to the 2013 without project turning movements. In addition, an annually compounding growth rate has been used at select study intersections where Snohomish County pipeline was not available.

The following developments were requested by City of Mukilteo staff during the scoping process and prior discussions to be included as pipeline projects in addition to the official Snohomish County pipeline data.

- Mukilteo Town Center – City of Mukilteo development
- Center 44 Commercial – City of Everett development
- Metropolitan Commerce Center – City of Everett development

The pipeline trips for these developments are based on data collected from Transportation Solutions, Inc. (TSI) for the Mukilteo Town Center development and distributions performed by Gibson Traffic Consultants for the Center 44 Commercial and Metropolitan Commerce Center developments. None of the distributions for these developments extended to all of the study intersections. The assumptions used to assign the pipeline trips to all of the study intersections are summarized in Table 7.

Table 7: Pipeline Trip Assumptions

Development	Assumption
Mukilteo Town Center	<ul style="list-style-type: none"> • 3% of trips on Beverly Park Road south of SR-525 continue south of 148th Street SW. • 1% of trips on Beverly Park Road north of SR-525 are to and from local areas south of Center Road. • 2% of trips are on Airport Road/128th Street SW between SR-526 and 3rd Avenue W.
Center 44 Commercial	<ul style="list-style-type: none"> • 10% of trips on Beverly Park Road between SR-525 and 148th Street SW. • 10% of trips on SR-525 east of Beverly Park Road • 15% of trips are on Airport Road/128th Street SW between SR-526 and Interstate-5. • 10% of trips on Interstate-5 south of 128th Street SW. • 5% of trips on 128th Street SW west of Interstate-5.
Metropolitan Commerce Center	<ul style="list-style-type: none"> • 10% of trips on Beverly Park Road between SR-525 and 148th Street SW. • 15% of trips on SR-525 east of Beverly Park Road • 15% of trips are on Airport Road/128th Street SW between SR-526 and Interstate-5. • 10% of trips on Interstate-5 south of 128th Street SW. • 5% of trips on 128th Street SW west of Interstate-5.

There are some WSDOT or City of Mukilteo study intersections where Snohomish County pipeline data is not available. For these intersections the Snohomish County pipeline data was either interpolated based on adjacent intersections, such as along Airport Road, or was estimated using a 0.5% annually compounding growth rate, such as along 84th Street SW. The addition of the annual growth rate and pipeline data resulted in an equivalent straight line growth rate of 1.95% from the 2013 without project to 2018 without project conditions, averaged over all of the study intersections.

Snohomish County pipeline data and pipeline data from the three pipeline projects is not available for the intersection of Evergreen Way at the SR-526 westbound ramps. This intersection was analyzed as part of the *Swift* Bus Rapid Transit Implementation Traffic Report, which is included in the attachments. An annual straight-line growth rate of 0.53% was used for this intersection in the *Swift* Bus Rapid Transit Implementation Traffic Report. Using the same 0.5% annually compounded growth rate applied to the other study intersections, but without Snohomish County and development pipeline trips, results in an annual straight-line growth rate of 0.63%. The growth rate used in this report for the intersection of Evergreen Way at the SR-526 westbound ramps is greater than the growth rate used in the *Swift* Bus Rapid Transit Implementation Traffic Report for the same intersection. The methodology in this report should therefore be acceptable.

5.5 2018 with Project Turning Movements

The 2018 with project turning movements were calculated by adding the trips from the project to the 2018 without project turning movements.

All of the turning movement calculations are included in the attachments of this report.

6. SNOHOMISH COUNTY ARTERIAL IMPACTS

Snohomish County uses impacts to arterial units to evaluate the concurrency of a development. Critical arterial units, arterial units in arrears and arterial units at ultimate capacity impacted with 3 directional peak-hour trips are required to be analyzed for developments generating 50 or more peak-hour trips. In addition, Snohomish County requires arterial units impacted with 50 or more directional peak-hour trips to be analyzed. The arterial units within TSA D impacted with 3 or more directional and 50 or more directional peak-hour trips from the project are summarized in Table 8.

Table 8: Impacted Snohomish County Critical Arterial Units

Arterial Unit #	Roadway Name	West/South Limit	East/North Limit
227	Beverly Park Road	SR-525	Airport Road
228	Airport Road/128 th Street SW	SR-99	I-5 Southbound Ramps
231	Airport Road	106 th Street SW	Kasch Park Road

A full list of Snohomish County's critical arterials, arterial units in arrears and arterial units at ultimate capacity is included in the attachments.

Arterial Unit #227 is currently only critical in the northbound and southbound directions during the PM peak-hour; the arterial unit is not critical in either direction during the AM peak-hour and is not impacted with 50 or more directional peak-hour trips from the project. Arterial Unit #228 is critical in both directions during the AM and PM peak-hours. Arterial Unit #231 is not critical in either direction during either the AM or PM peak-hours. However, Arterial Unit #231 is impacted with 50 directional peak-hour trips in both directions during the AM and PM peak-hours and is therefore required to be analyzed.

The arterials studied for this report are all located within the urban area. Arterial Units #227 and #231 are Urban Category II arterials. Urban Category II arterials have an acceptable arterial travel speed threshold of 13 mph. Arterial Unit #228 is classified as an Urban Category III arterial. Urban Category III arterials have an acceptable arterial travel speed threshold of 10 mph.

The trips from the project will not impact any arterial units in arrears or arterial units at ultimate capacity with 3 or more directional peak-hour trips.

The operation of the arterial units is based on travel speeds along the arterial and delay at the signalized intersections along the arterial. The signalized intersections that have been analyzed as part of the arterial analysis are summarized in Table 9.

Table 9: Intersections for the Snohomish County Arterial Analysis

Intersection	AM Peak-Hour Analysis	PM Peak-Hour Analysis
1. Beverly Park Road at SR-525	No	Yes
2. Center Road at Beverly Park Road	No	Yes
3. Fairmount E.S. Driveway at Beverly Park Road	No	Yes
4. 112th Street SW at Beverly Park Road	No	Yes
5. Beverly Park Road at Airport Road	No	Yes
6. SR-99 at Airport Road	Yes	Yes
7. Admiralty Road at Airport Road	Yes	Yes
8. 128th Street SW at Gibson Road	Yes	Yes
9. 128th Street SW at 8th Avenue W	Yes	Yes
10. 128th Street SW at 5th Avenue W	Yes	Yes
11. 128th Street SW at 4th Avenue W	Yes	Yes
12. 128th Street SW at I-5 Southbound Ramps	Yes	Yes
13. 106th Street SW at Airport Road	Yes	Yes
14. 100th Street SW at Airport Road	Yes	Yes
15. 94th Street SW at Airport Road	Yes	Yes
16. Kasch Park Road at Airport Road	Yes	Yes

The existing signal timings for the study intersections are based on data received from Snohomish County and WSDOT. The existing signal timings have been used for the existing and future analysis, which is a conservative analysis since the jurisdictions are likely to update the signal timings in the future to maximize the operation of the intersection.

The existing turning movements for the arterial analysis are shown in Figure 3 for the AM peak-hour and Figure 4 for the PM peak-hour. The 2013 without project conditions turning movements for the AM peak-hour arterial analysis are shown in Figure 5 and turning movements for the PM peak-hour arterial analysis are shown in Figure 6. The trips generated by the project used for the arterial analysis are shown in Figure 7 for the AM peak-hour and Figure 8 for the PM peak-hour. The arterial turning movements for the 2013 with project conditions are shown in Figure 9 for the AM peak-hour and Figure 10 for the PM peak-hour. The 2018 without project conditions turning movements for the arterial analysis are shown in Figure 11 for the AM peak-hour and Figure 12 for the PM peak-hour. The AM peak-hour turning movements for the arterial analysis are shown in Figure 13 and the PM peak-hour turning movements for the arterial analysis are shown in Figure 14.

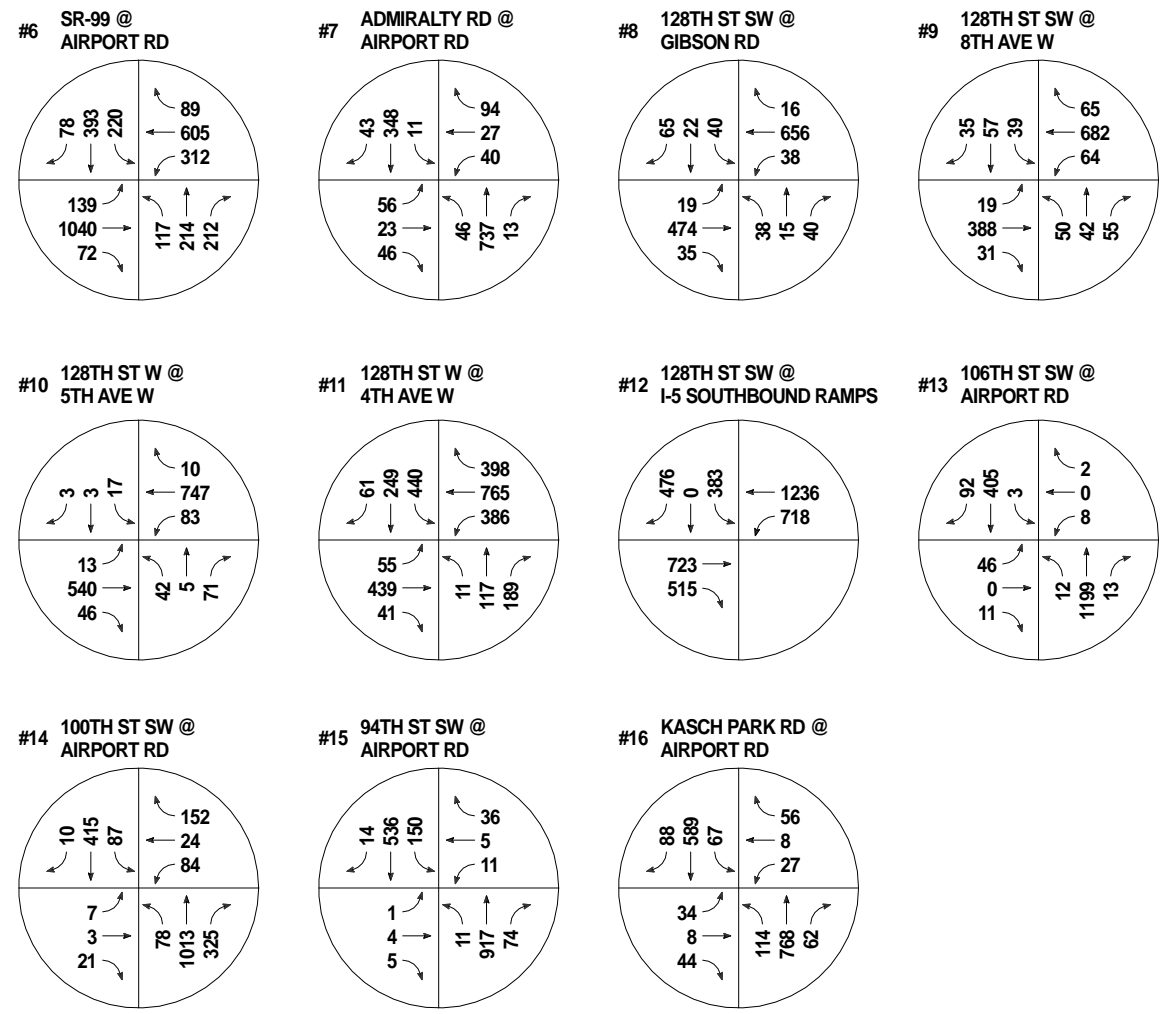
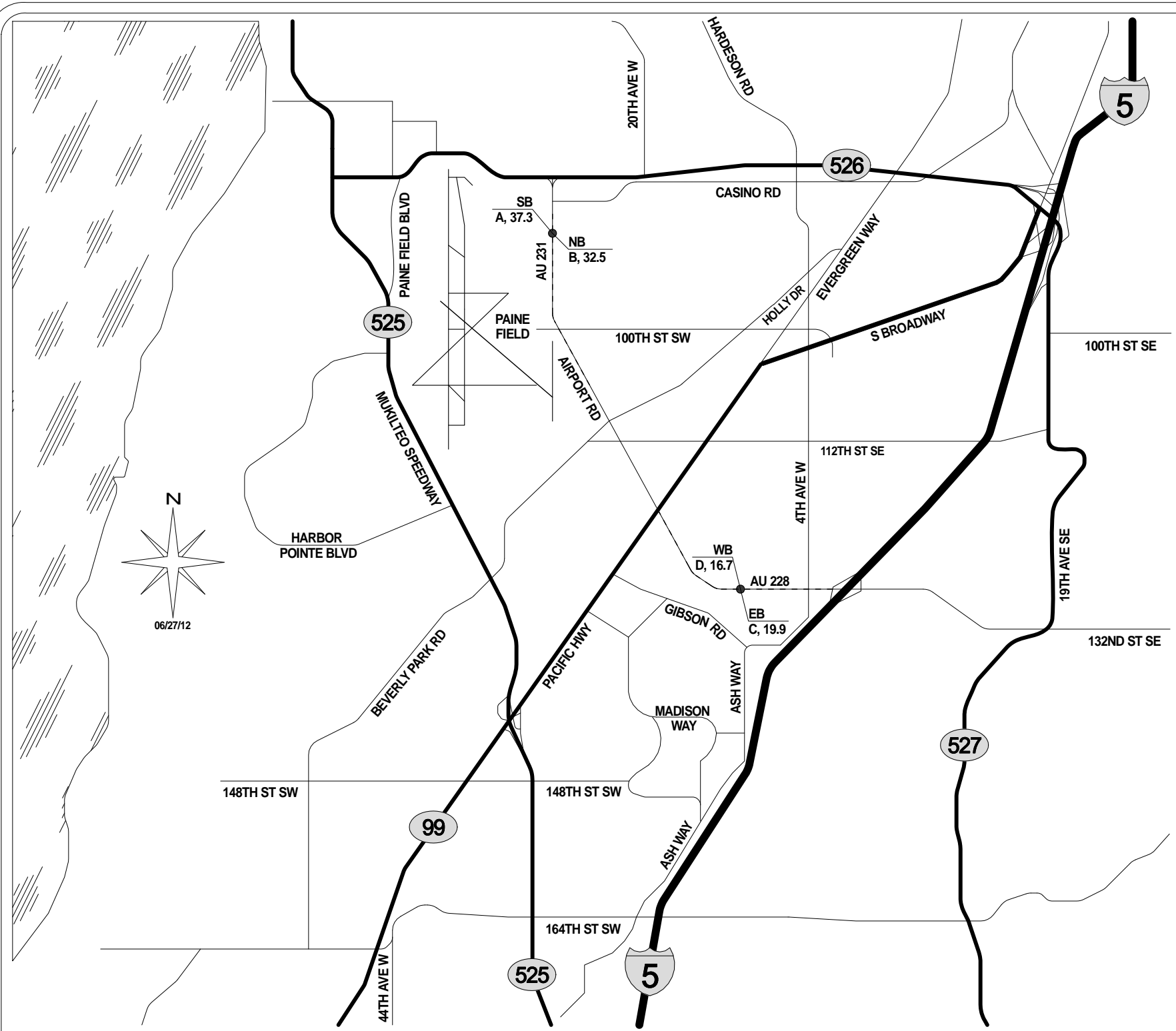
6.1 Arterial Unit #227 – Beverly Park Road

Arterial Unit #227, Beverly Park Road between SR-525 and Airport Road, is a 1.33 mile long arterial that is critical in the eastbound and westbound directions during the PM peak-hour. Arterial Unit #227 is an Urban Category II arterial, which has an acceptable arterial travel speed threshold of 13.0 mph.

6.1.1. Existing Conditions

The existing arterial travel time data for Arterial Unit #227 was collected by the independent count firm TDG. Arterial travel time data for Arterial Unit #227 was collected in May of 2012.

The eastbound direction of Arterial Unit #227 in the *Synchro* software was only able to be calibrated to an arterial flow speed of 24.9 mph, which is 2.3 mph slower than the field collected data. The delay in the calibrated system was higher than what was in the field data and was not able to be calibrated to a lower delay. This represents a conservative calibration since the calibrated arterial flow speed is slower than the field data. The westbound direction of Arterial Unit #227 was calibrated to within 0.1 mph for the arterial flow speed, as compared to the data collected by TDG. These are acceptable tolerances based on Snohomish County's methodology for analyzing arterial units, especially since the calibrated system for the eastbound direction has a slower arterial flow speed than the field data. The arterial unit currently operates at acceptable LOS C in the eastbound direction and acceptable LOS D in the westbound direction during the PM peak-hour.



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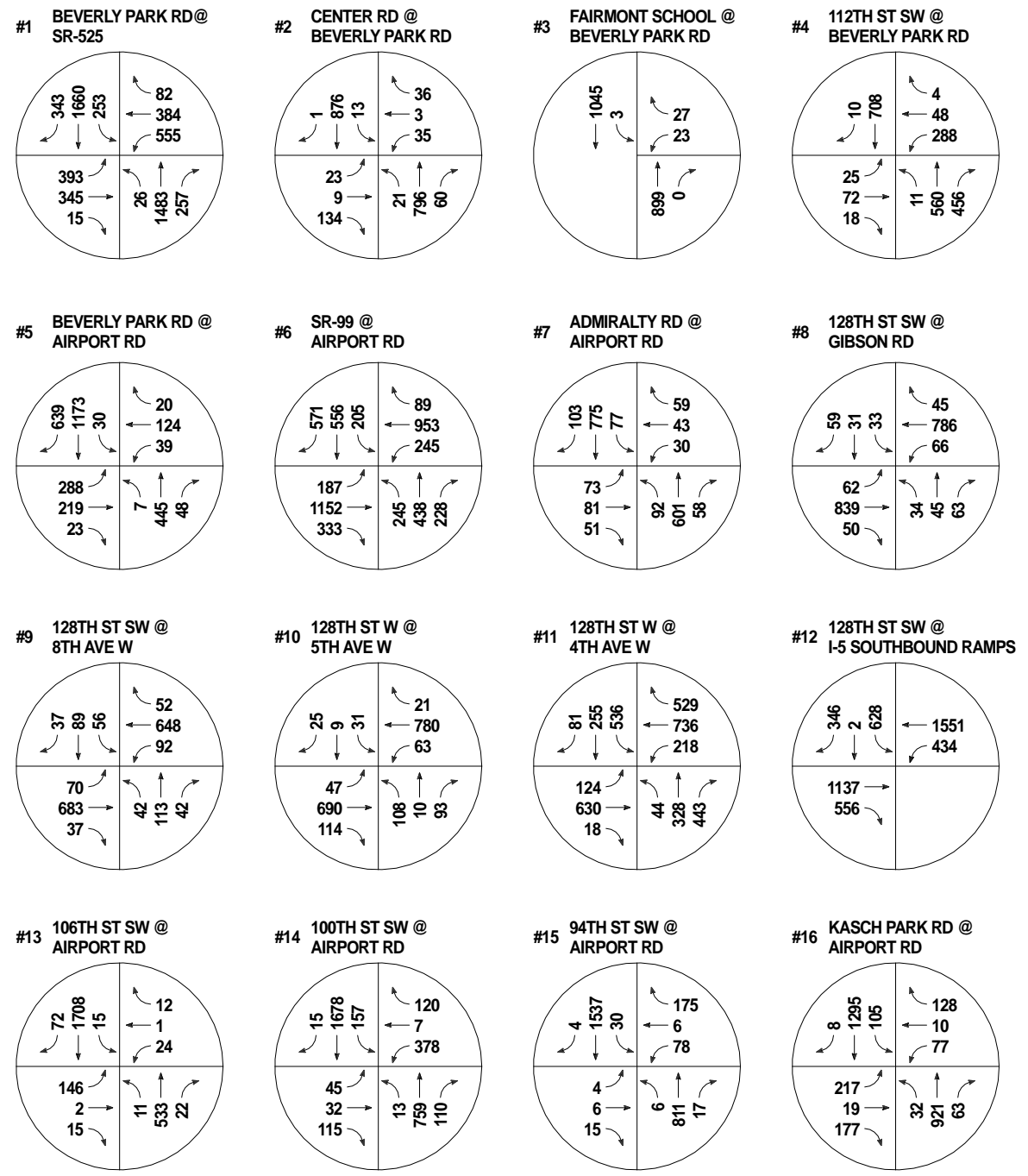
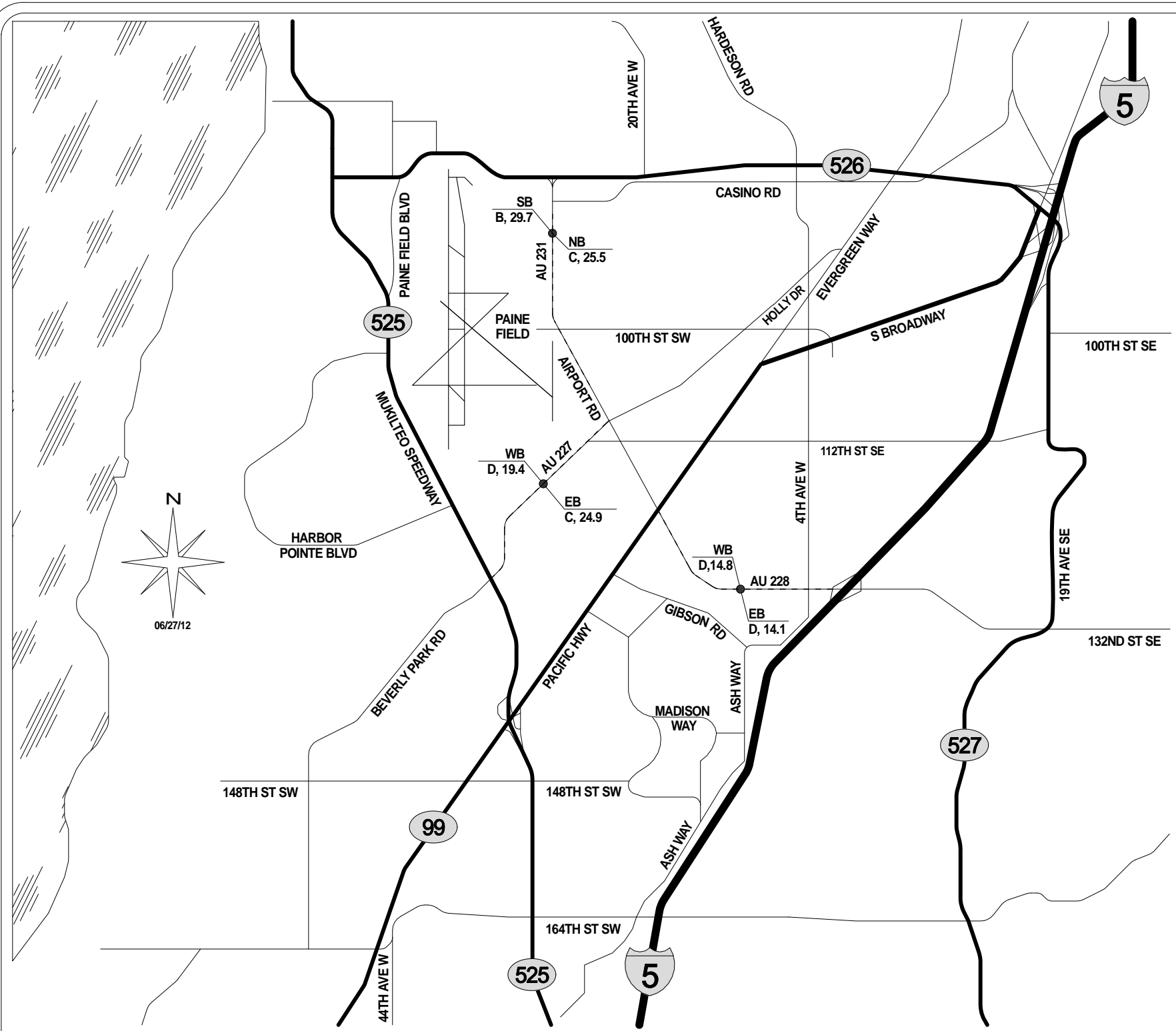
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → AM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 3
EXISTING
AM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



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TRAFFIC IMPACT STUDY
GTC #09-017

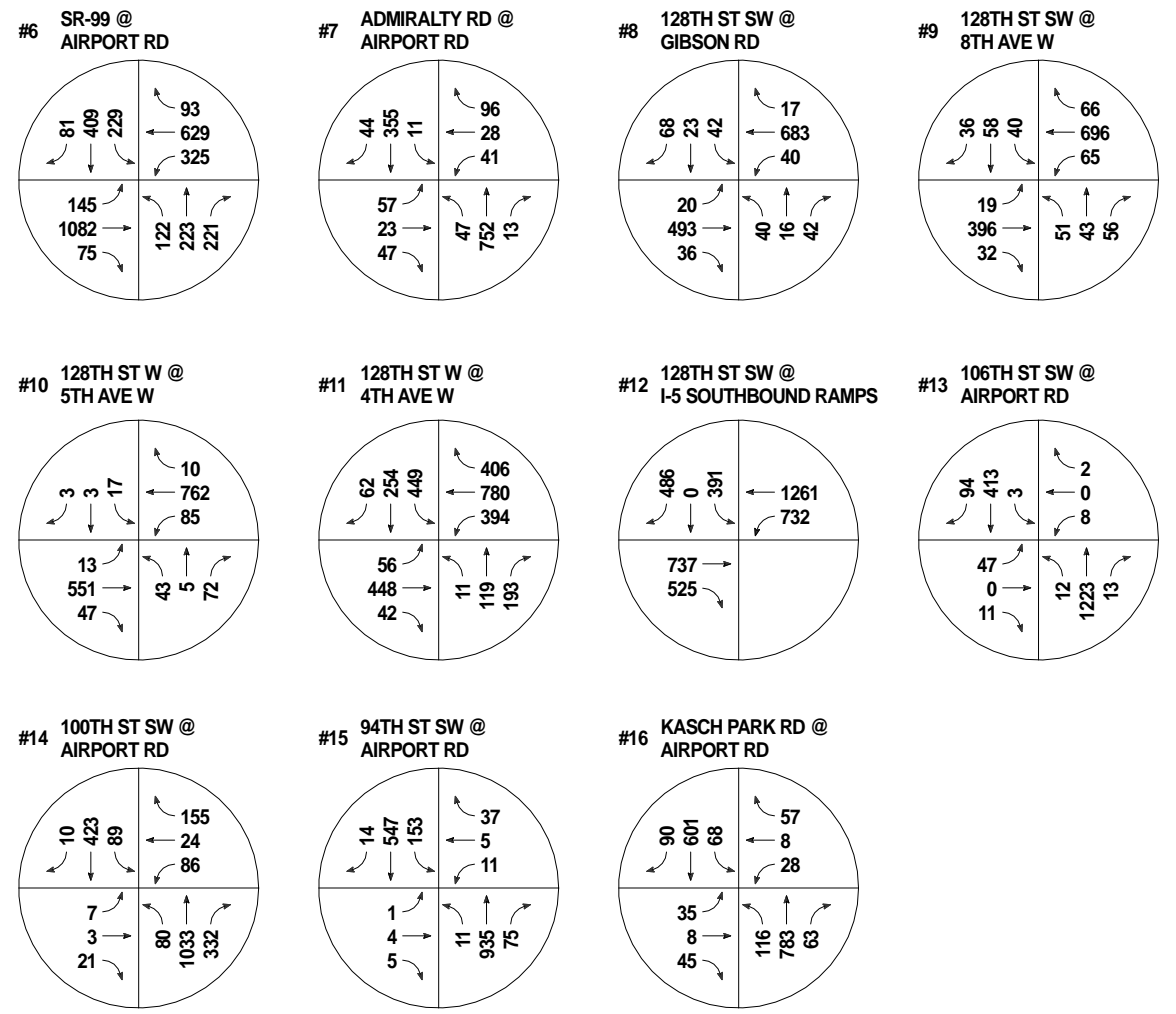
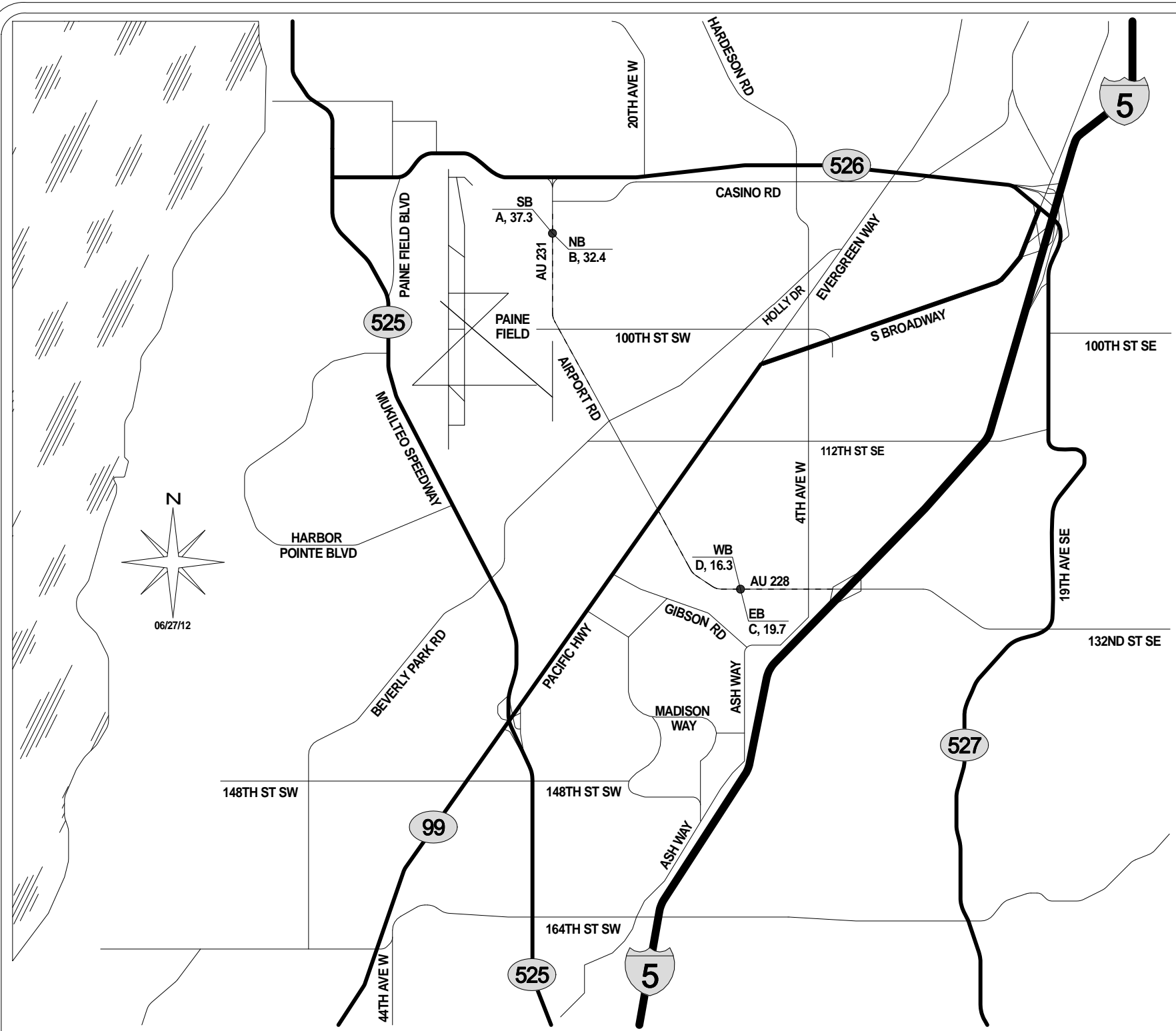
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 4
EXISTING
PM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



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TRAFFIC IMPACT STUDY
GTC #09-017

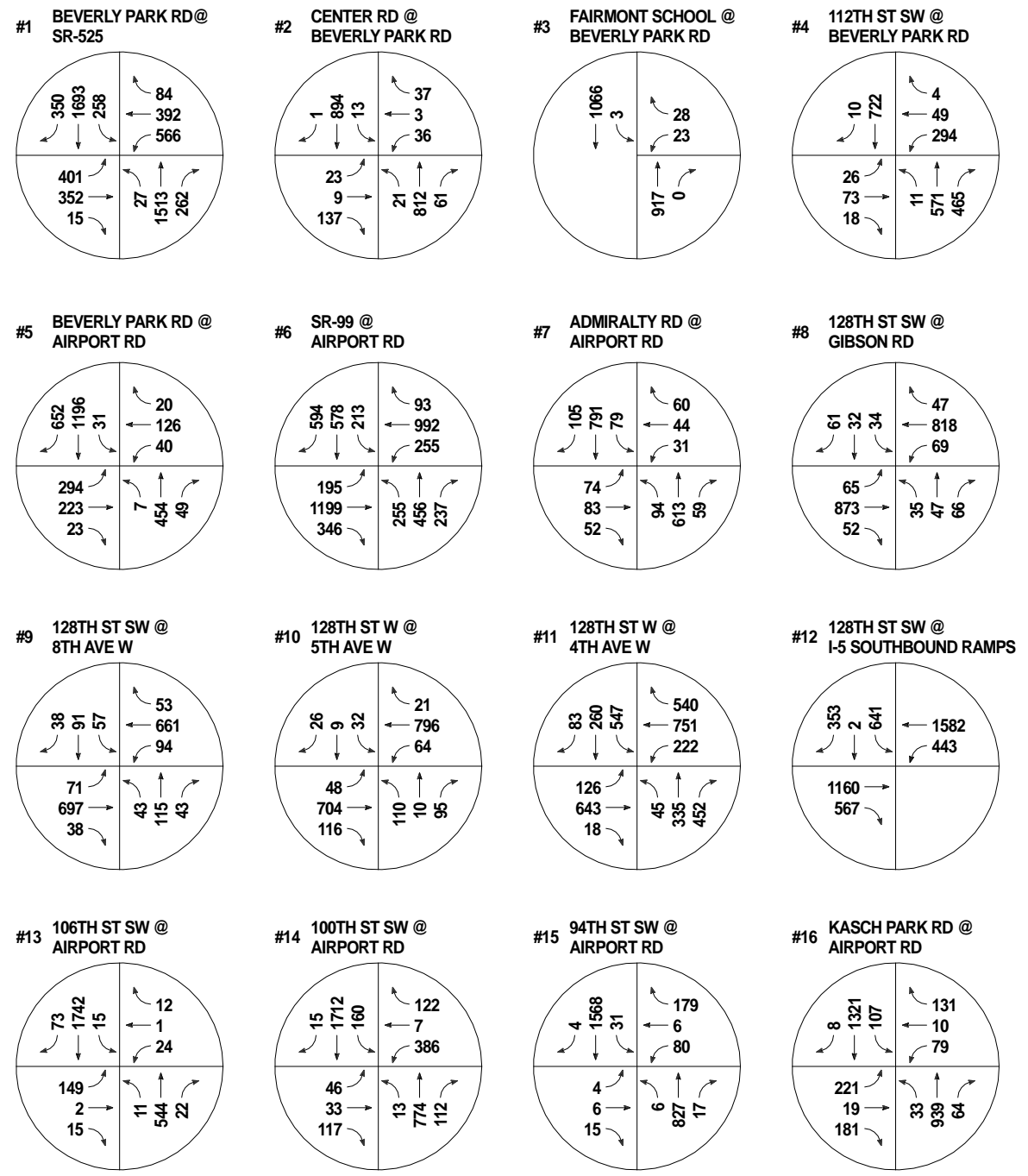
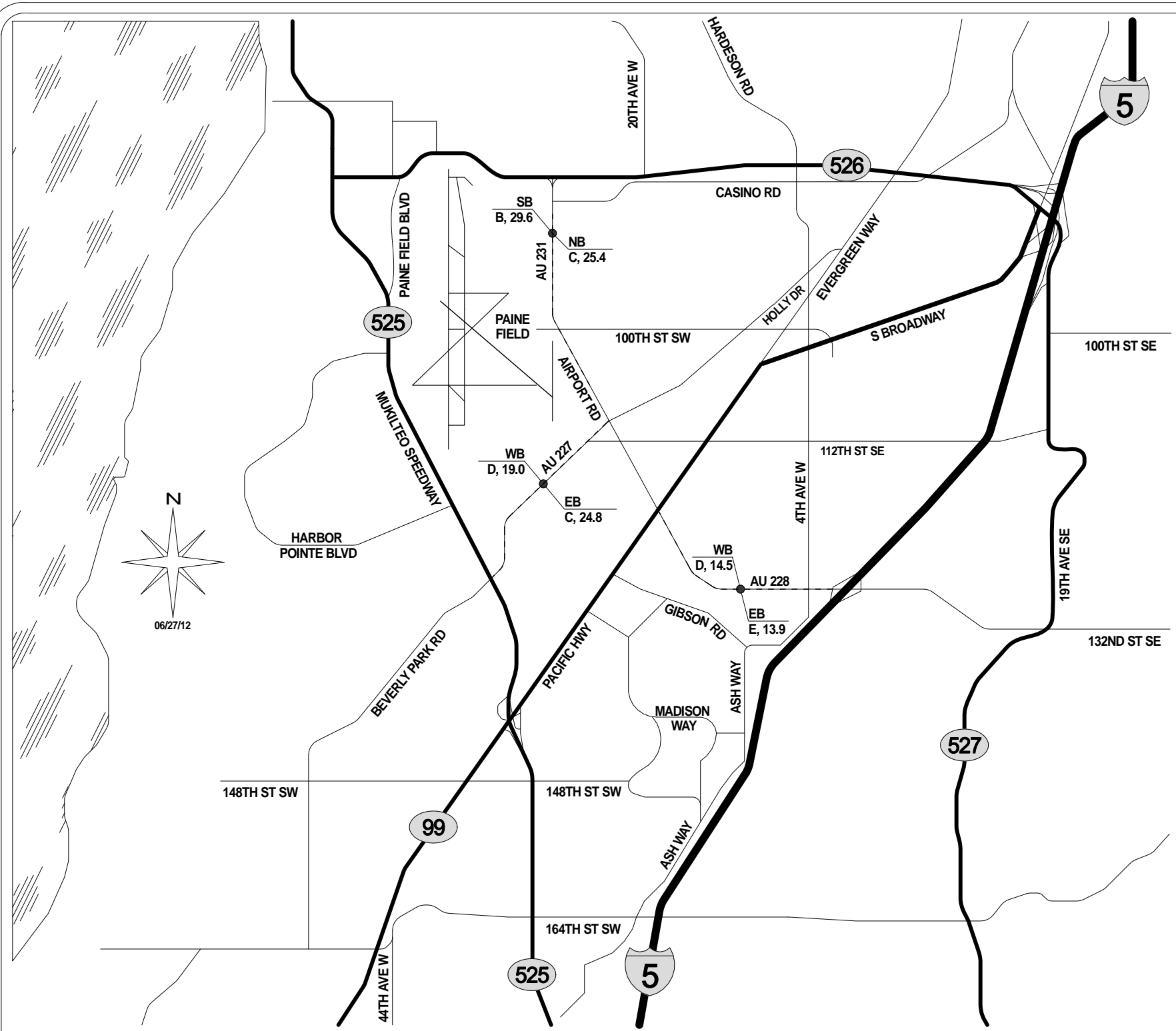
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → AM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 5
2013 WITHOUT PROJECT
AM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



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TRAFFIC IMPACT STUDY
GTC #09-017

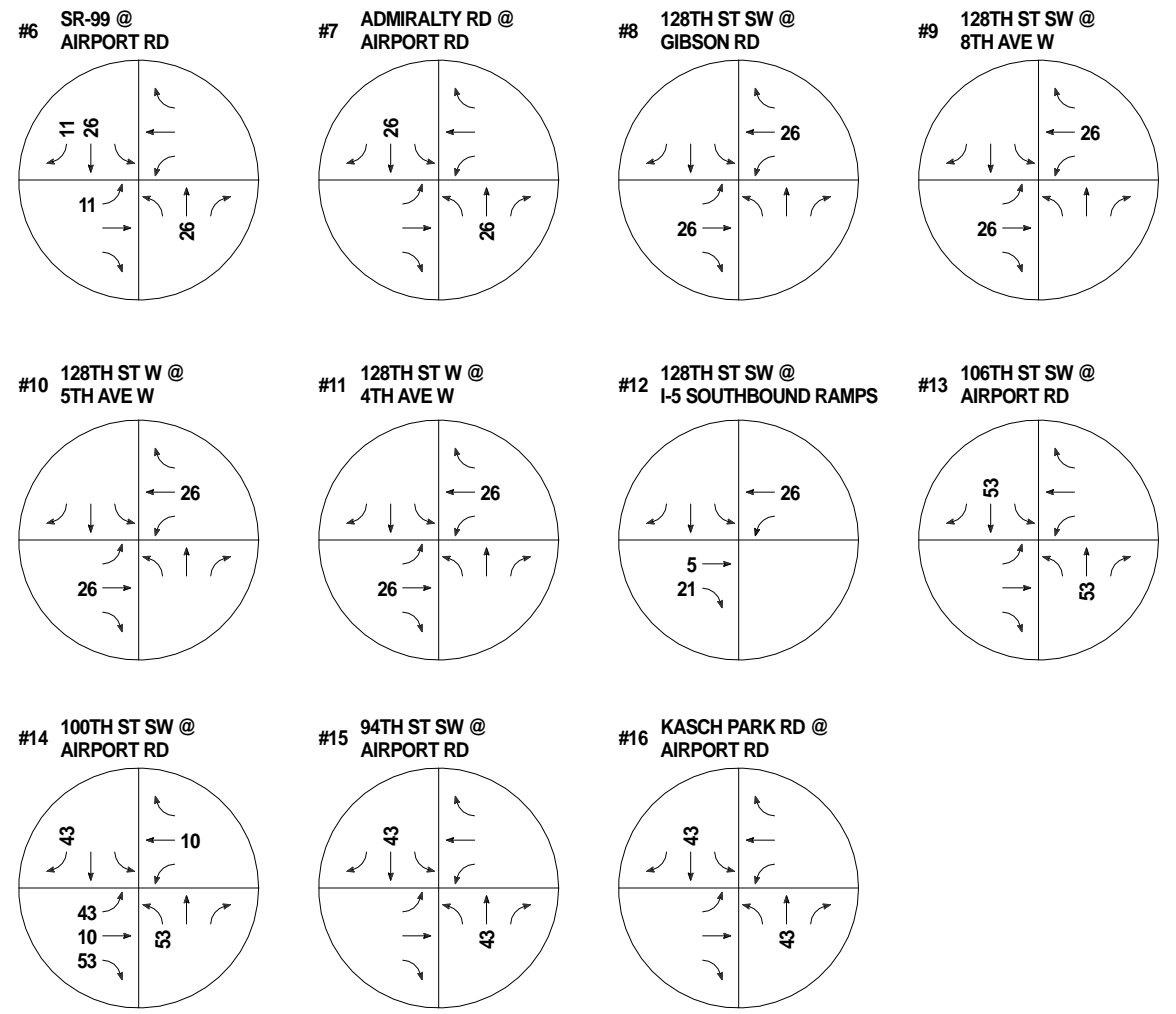
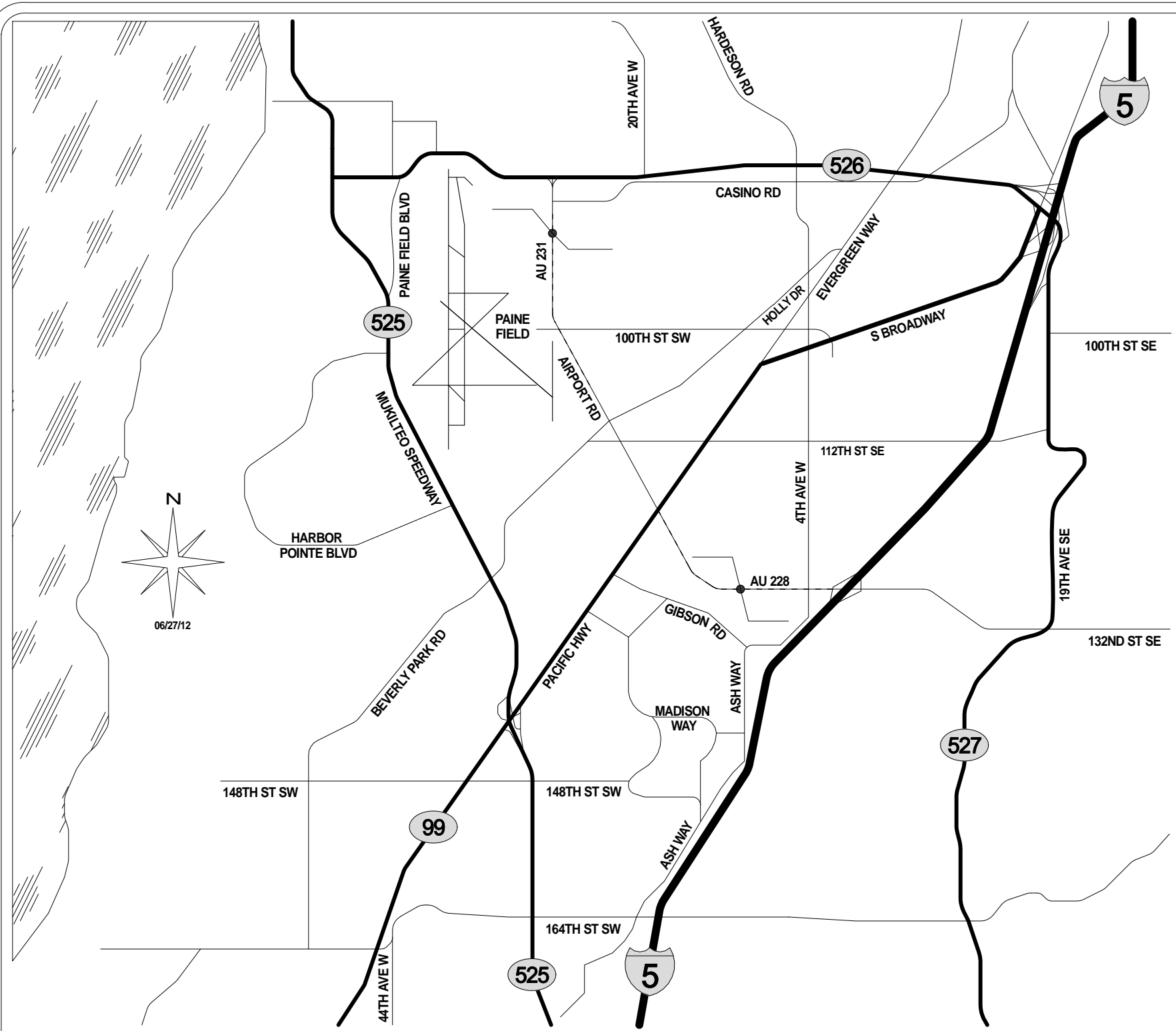
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 6
2013 WITHOUT PROJECT
PM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



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TRAFFIC IMPACT STUDY
GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

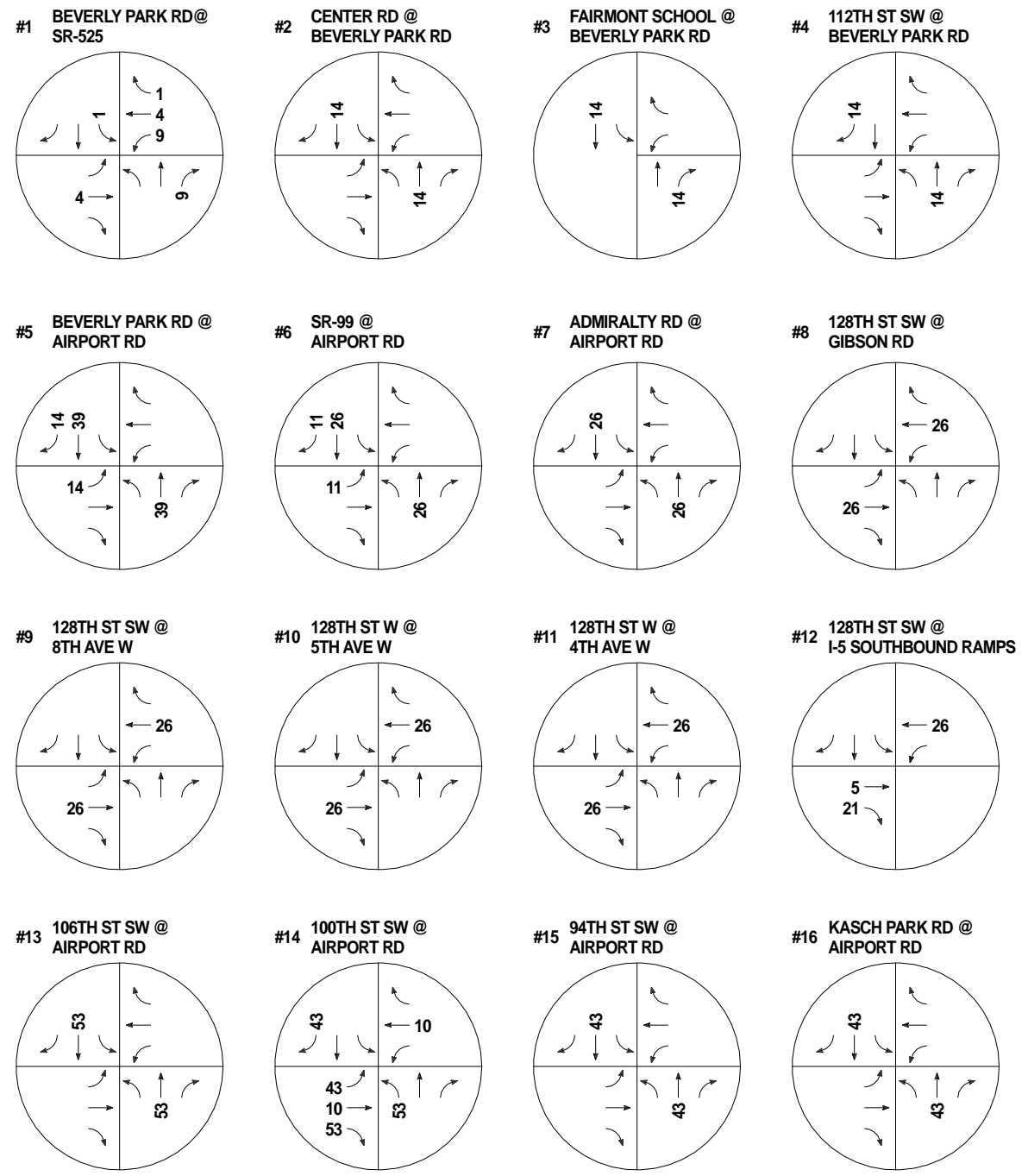
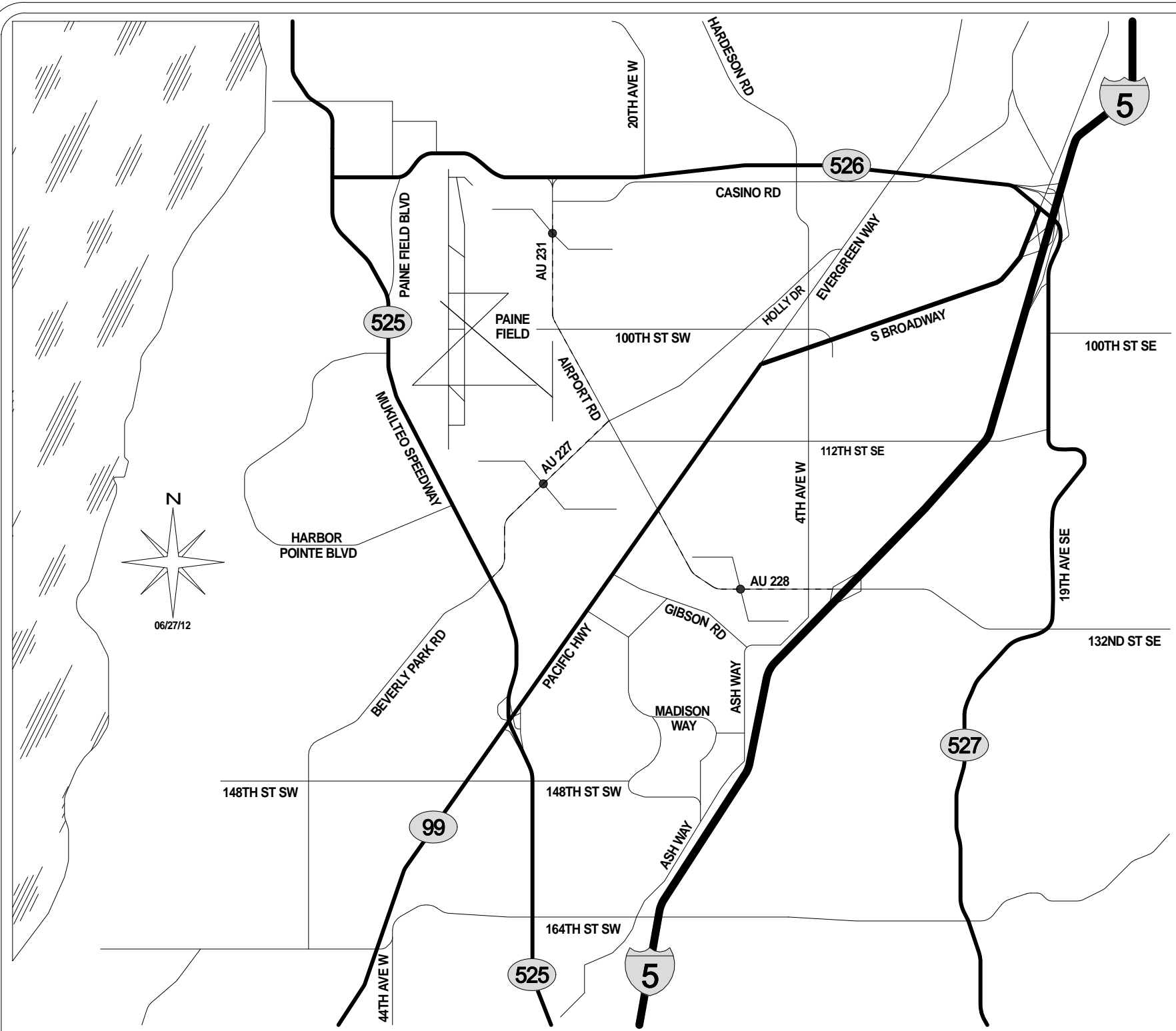
LEGEND

- xxx → AM PEAK-HOUR TURNING MOVEMENT VOLUMES
- xx ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

FIGURE 7

AM PEAK-HOUR
PROJECT TRIPS

SNOHOMISH COUNTY



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TRAFFIC IMPACT STUDY
GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

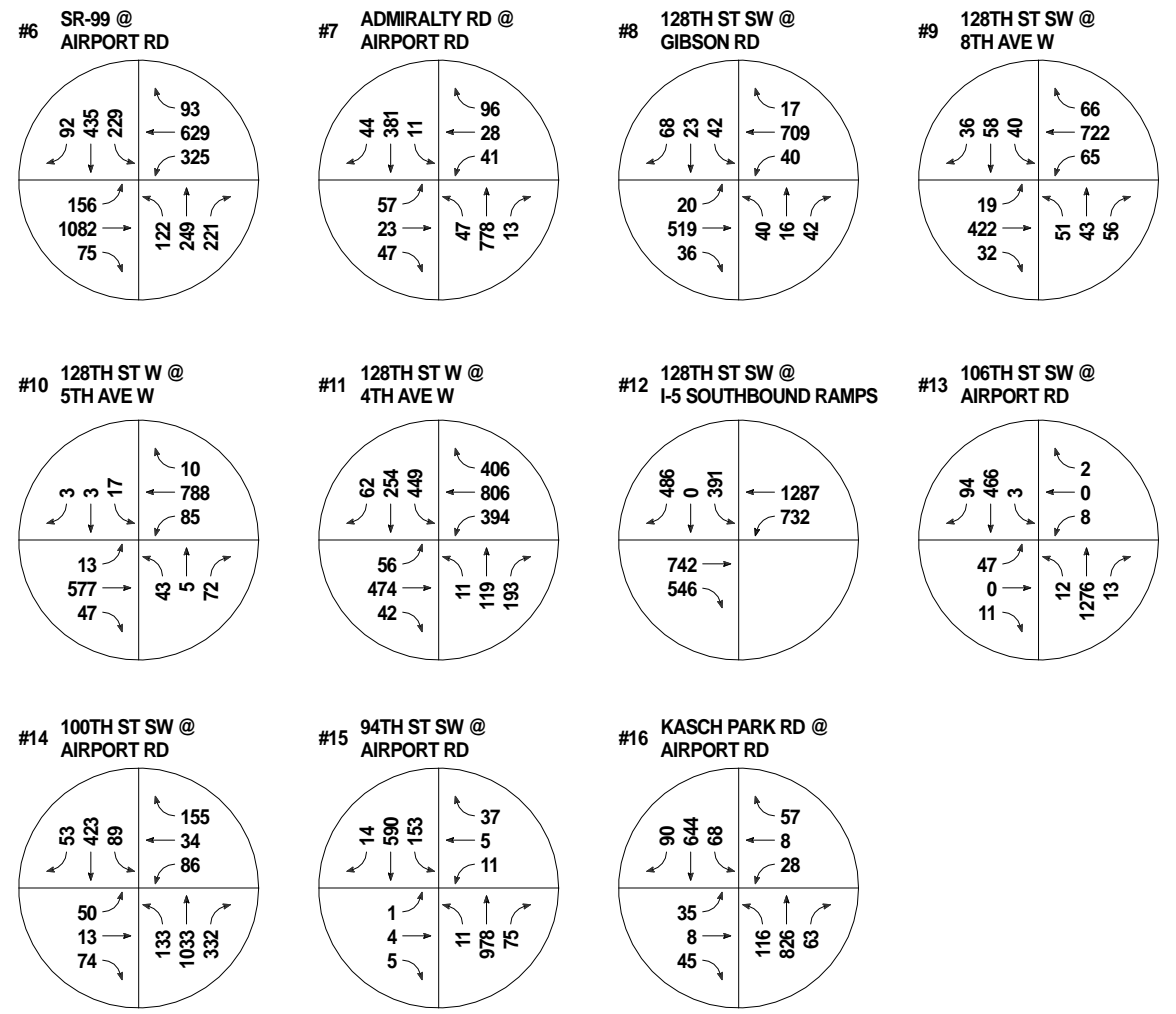
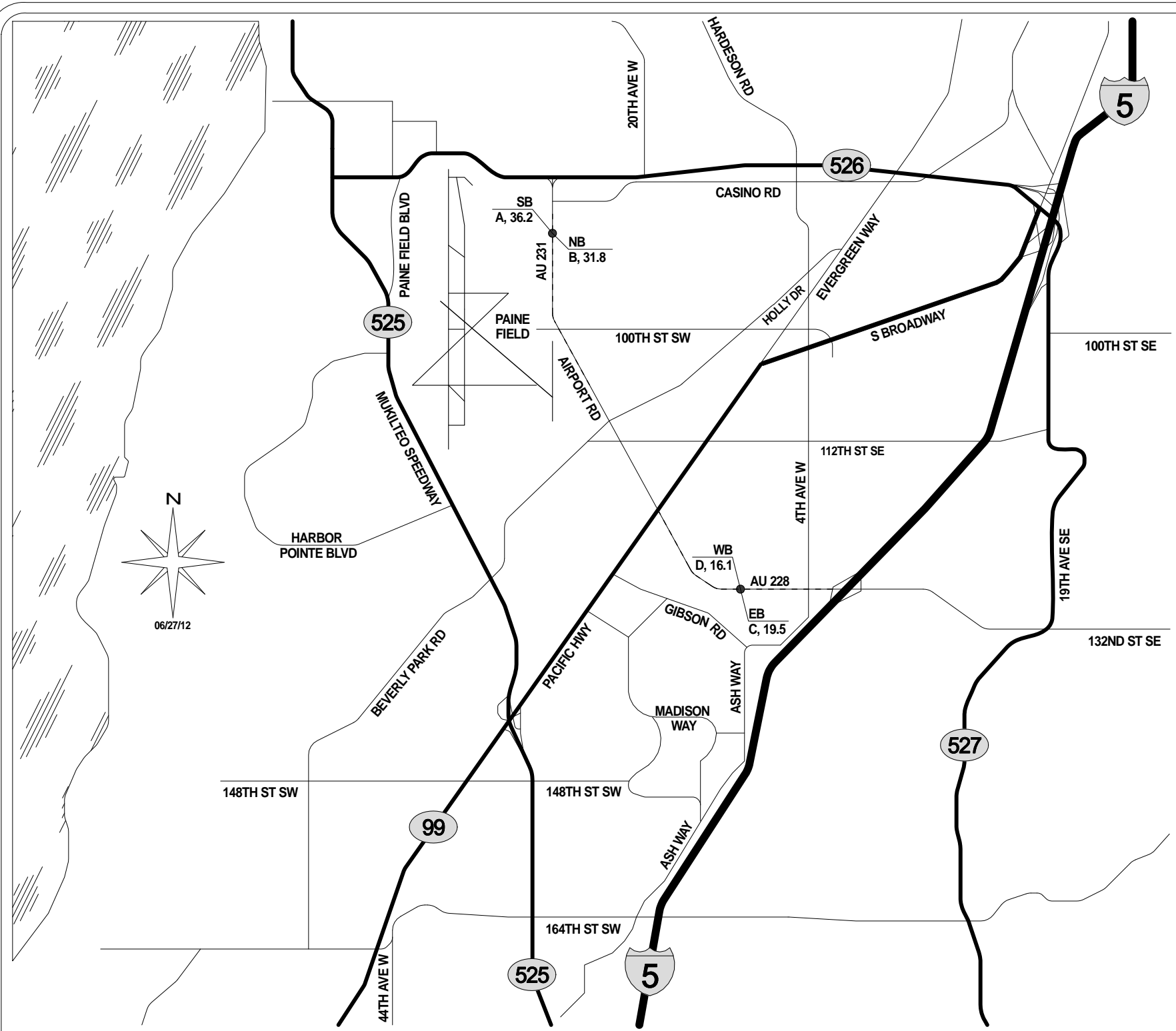
LEGEND

- xxx → PM PEAK-HOUR TURNING MOVEMENT VOLUMES
- xx ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

FIGURE 8

PM PEAK-HOUR
PROJECT TRIPS

SNOHOMISH COUNTY



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TRAFFIC IMPACT STUDY
GTC #09-017

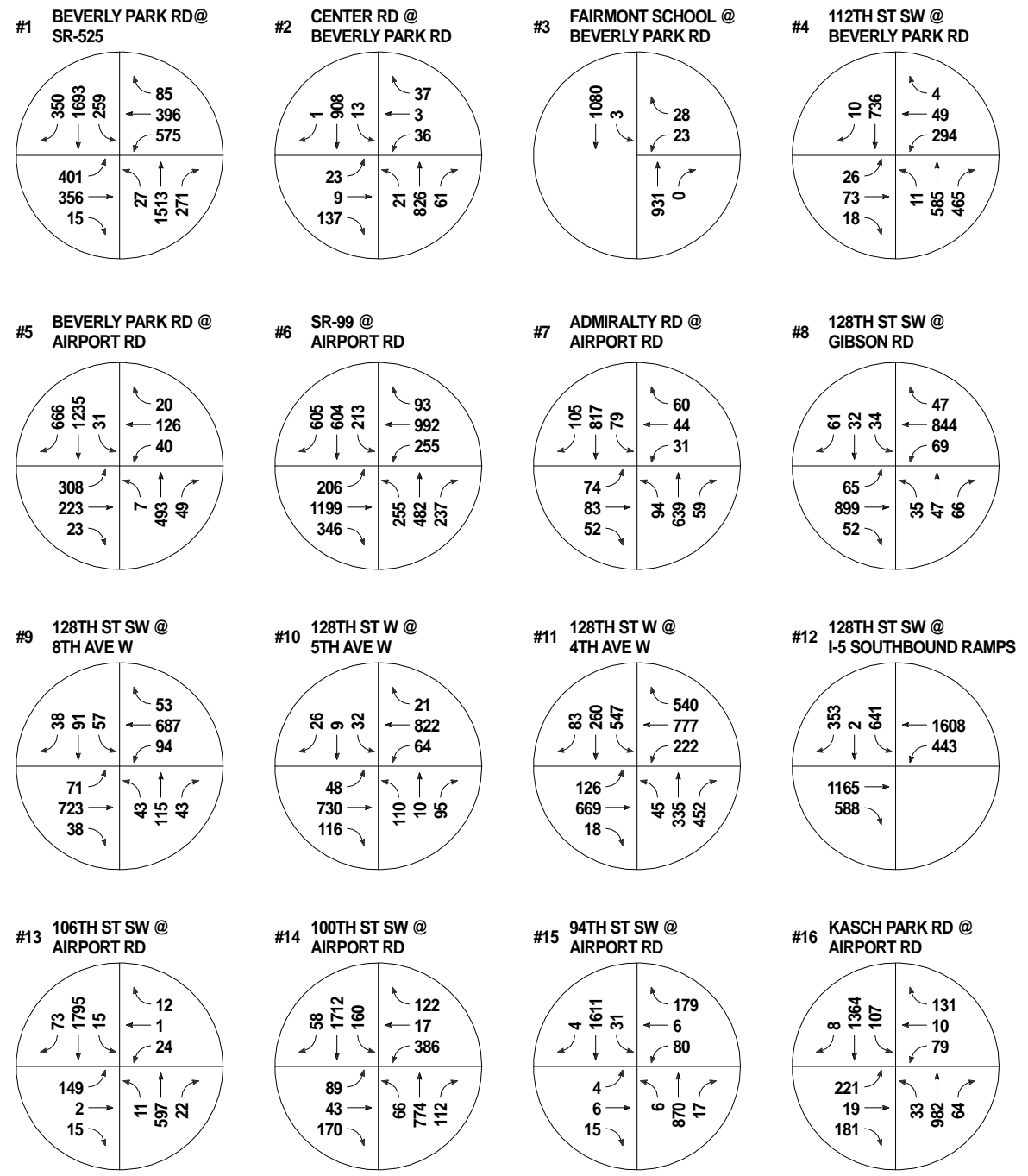
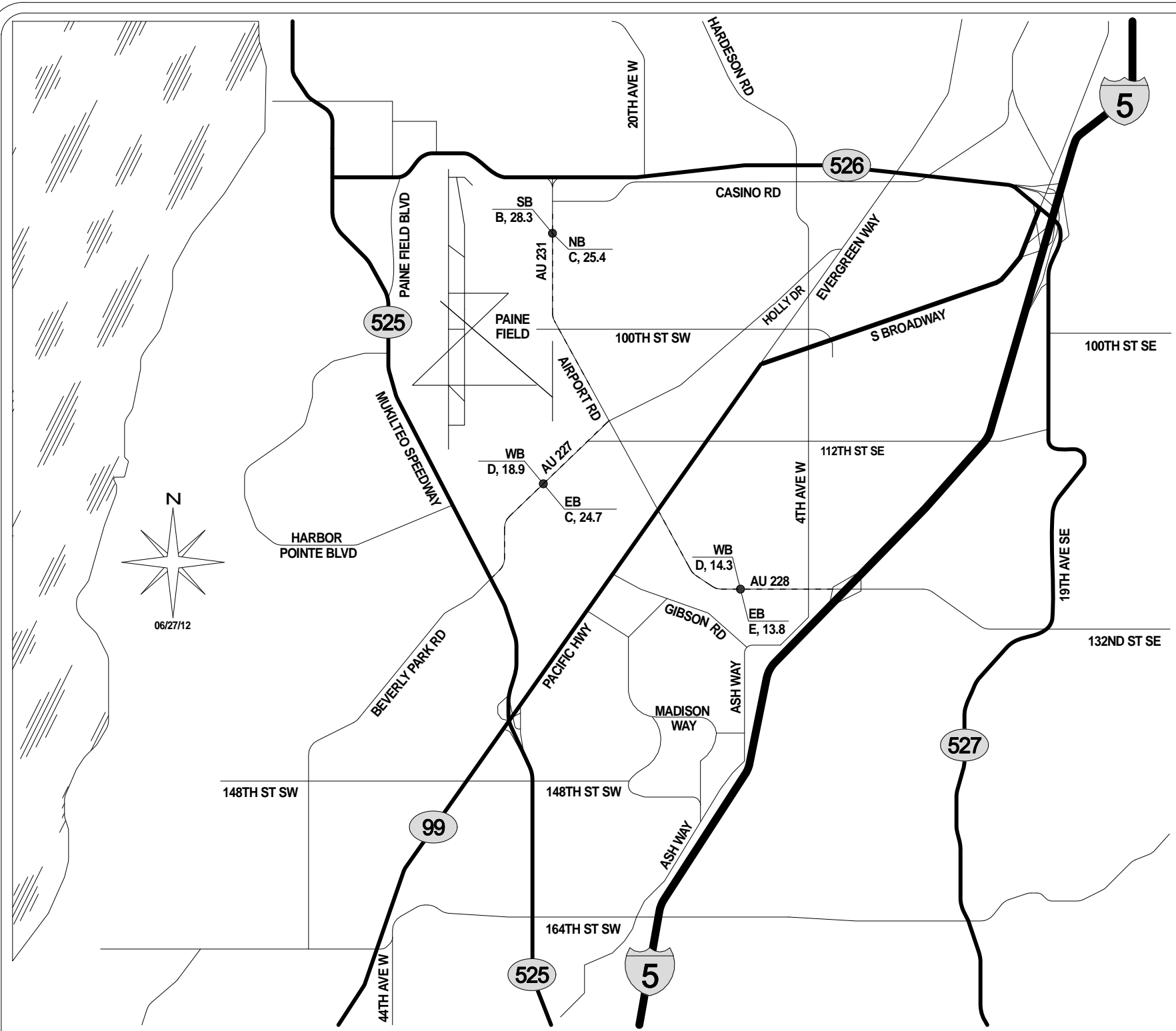
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → AM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 9
2013 WITH PROJECT
AM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



GIBSON TRAFFIC CONSULTANTS

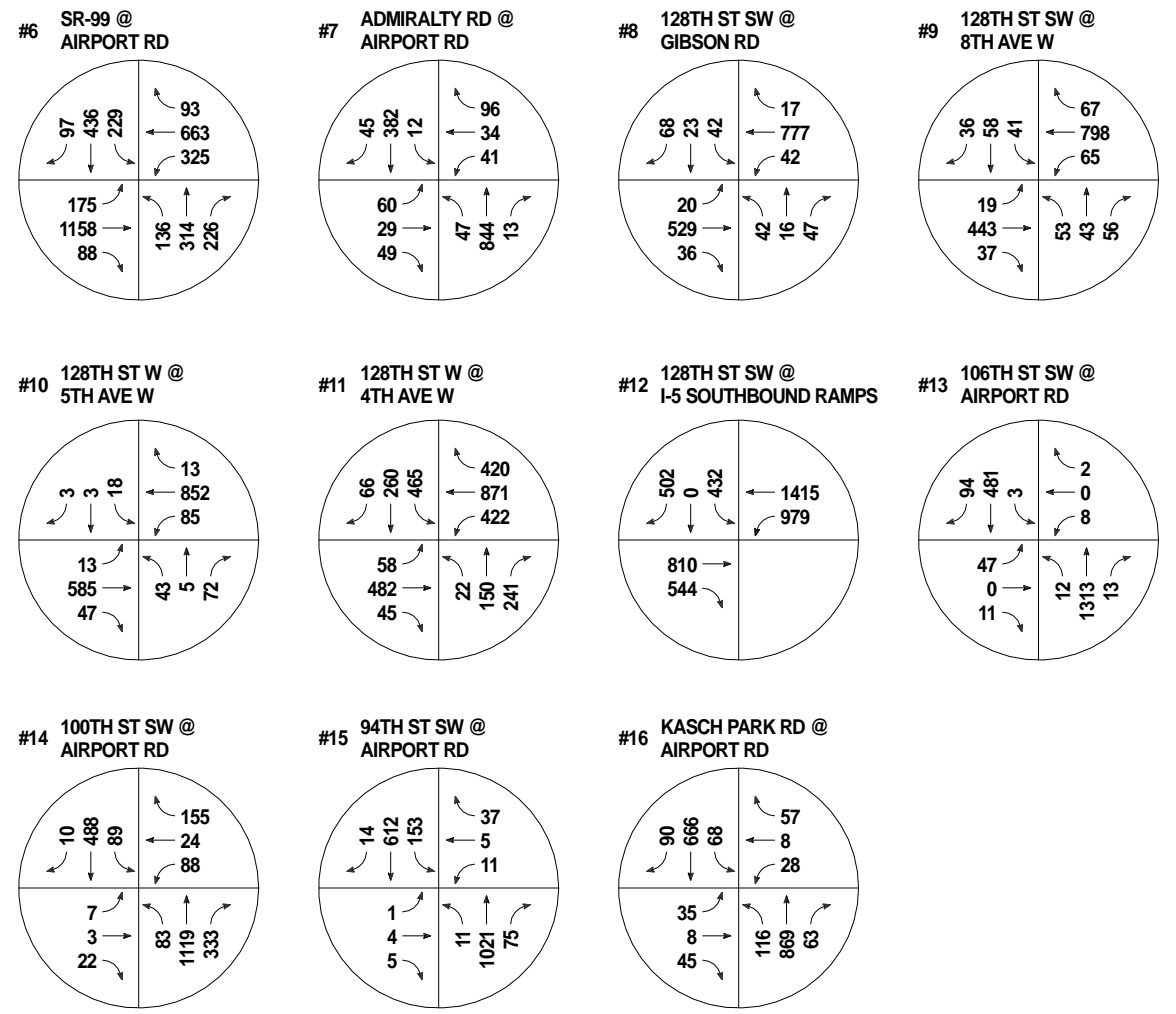
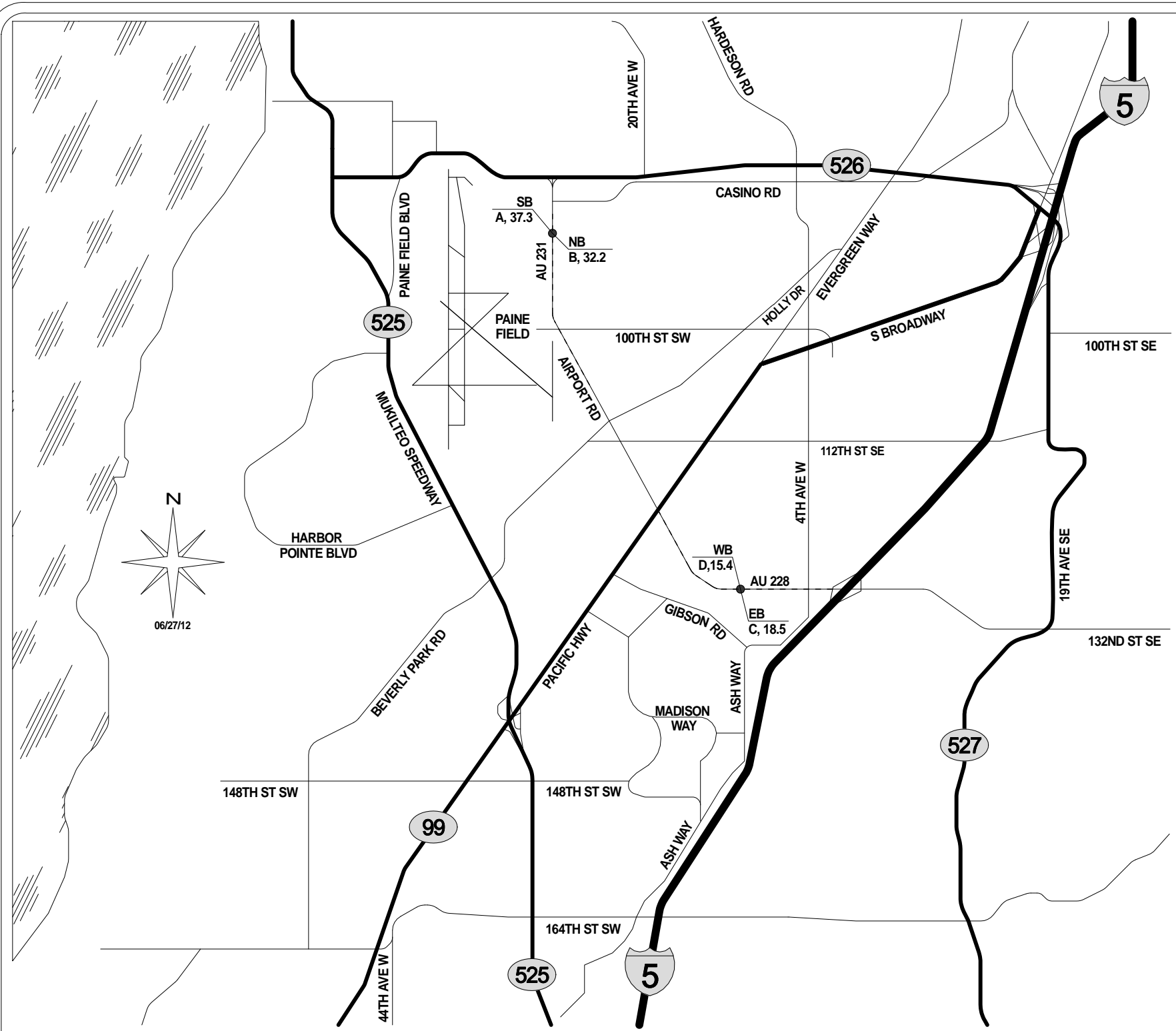
TRAFFIC IMPACT STUDY
GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND
 XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES
 XX ARTERIAL DIRECTION
 X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

FIGURE 10
 2013 WITH PROJECT
 PM PEAK-HOUR
 ARTERIAL TURNING
 MOVEMENTS

SNOHOMISH COUNTY



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #09-017

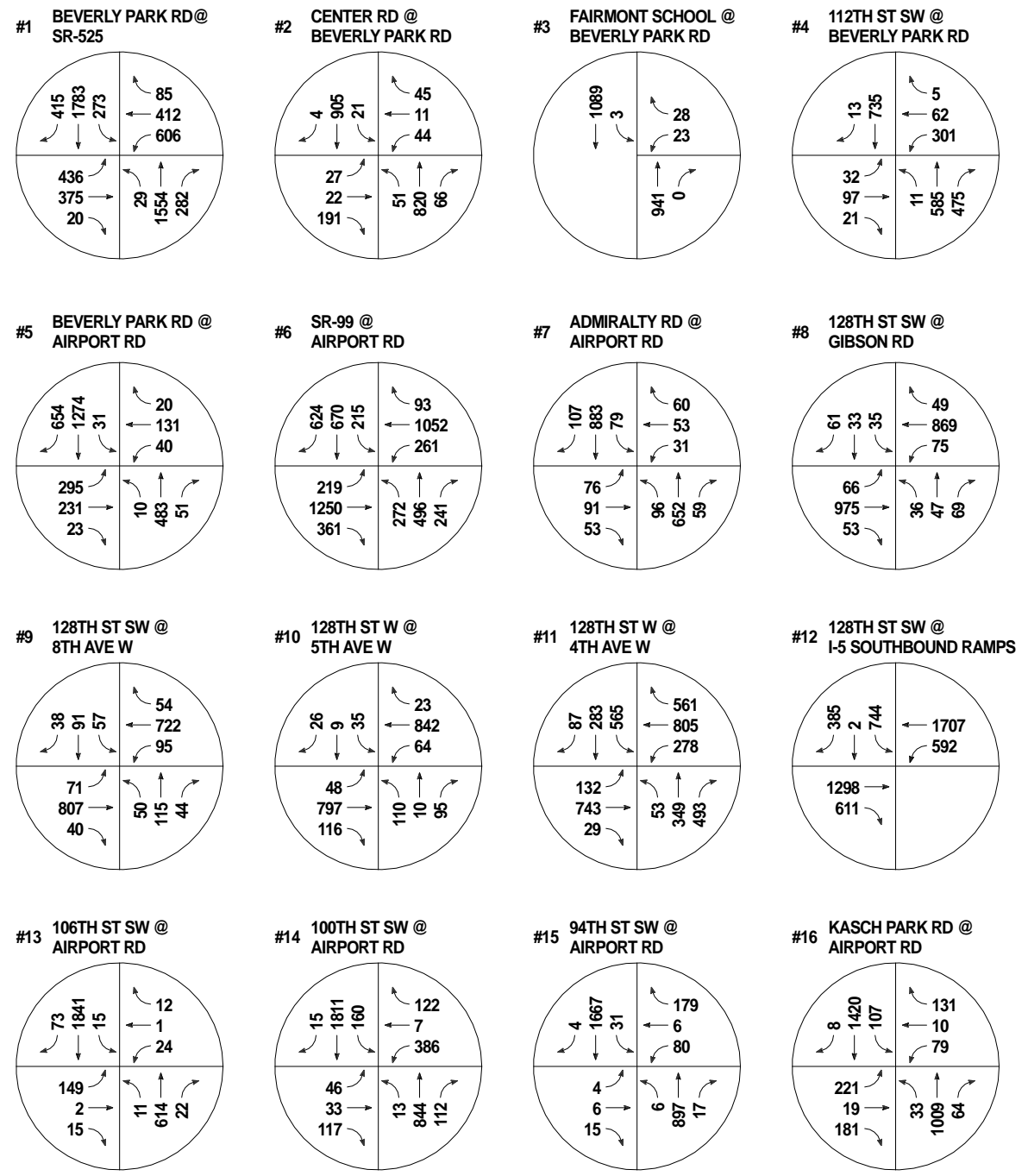
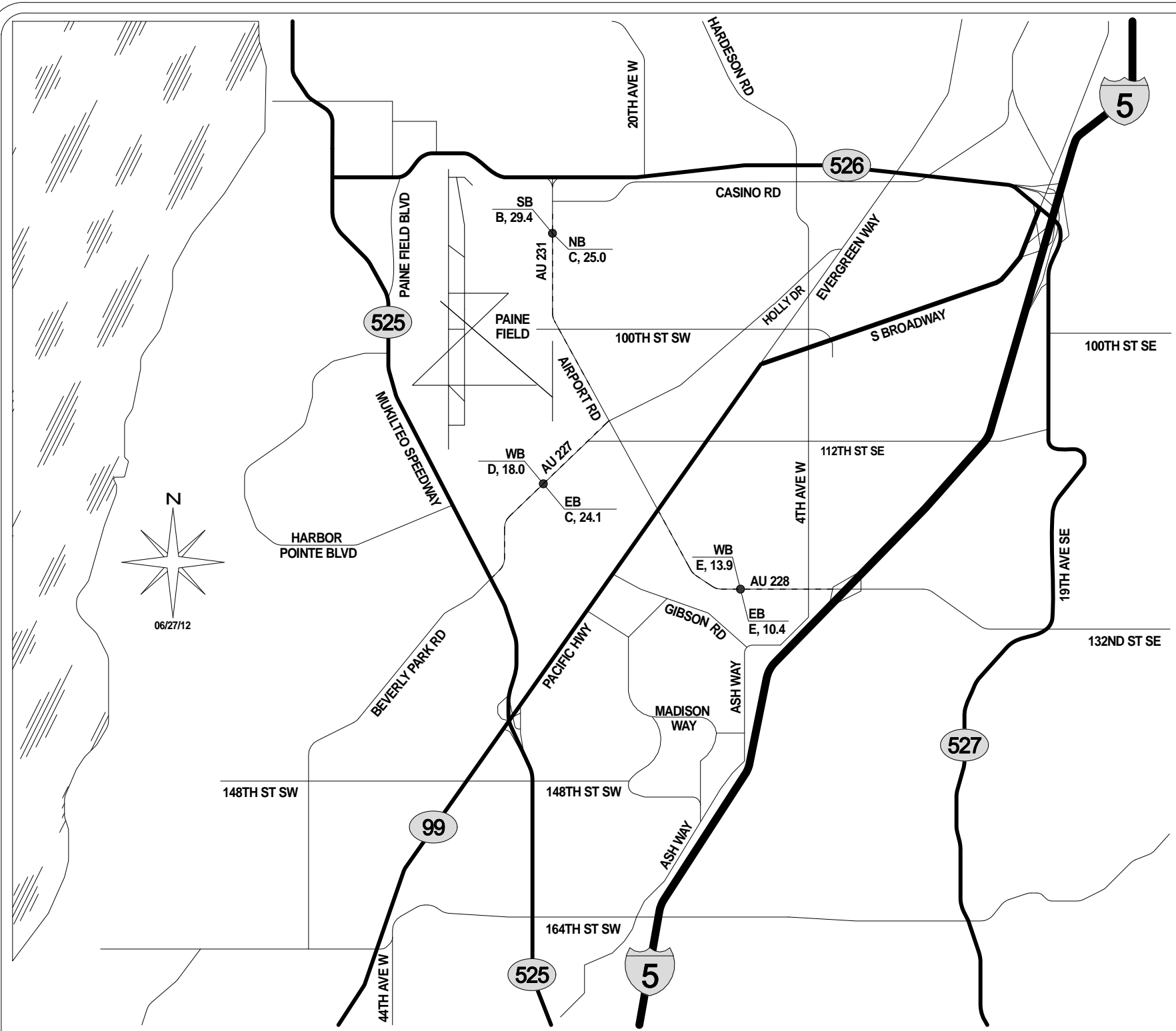
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → AM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 11
2018 WITHOUT PROJECT
AM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



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TRAFFIC IMPACT STUDY
GTC #09-017

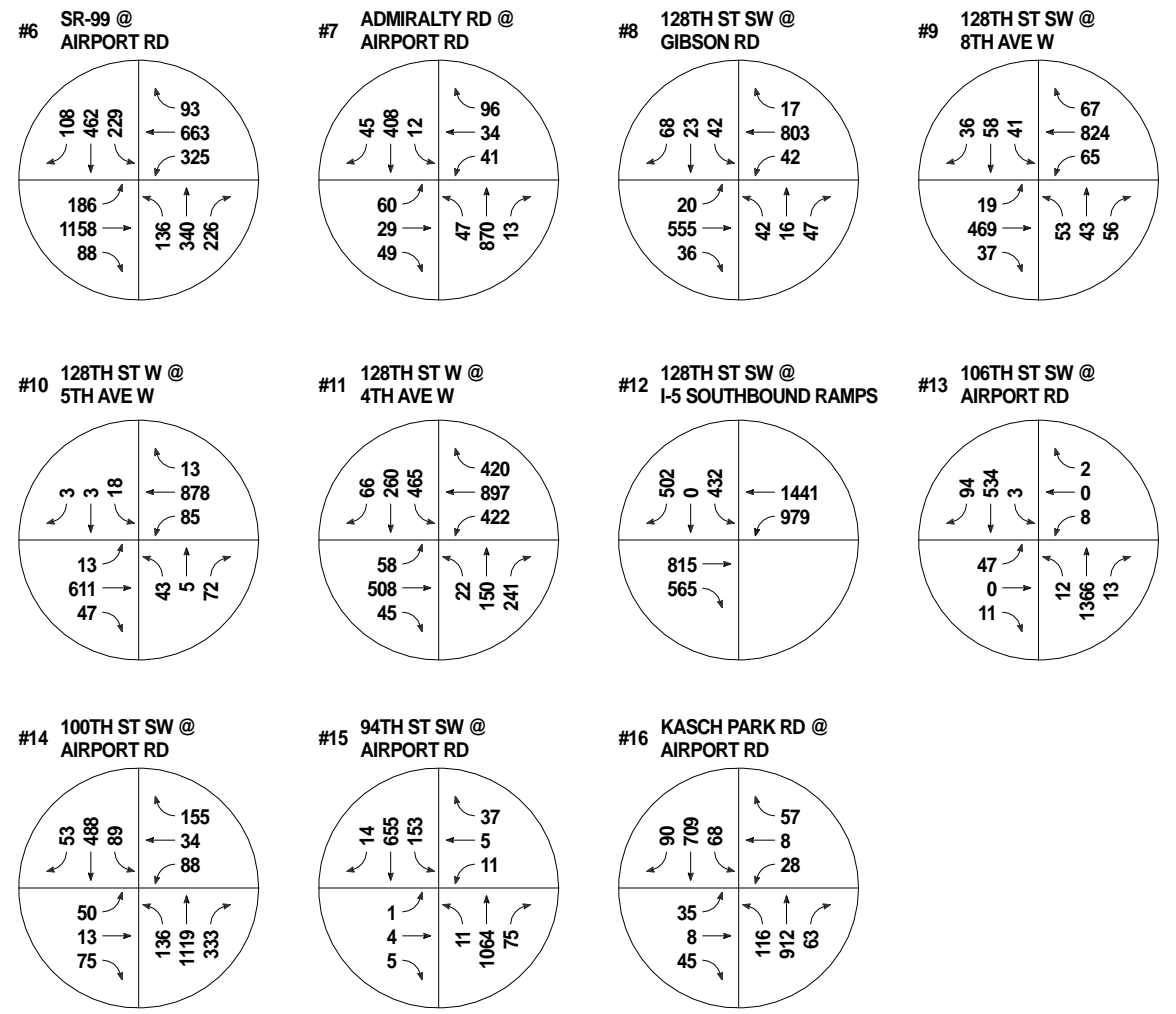
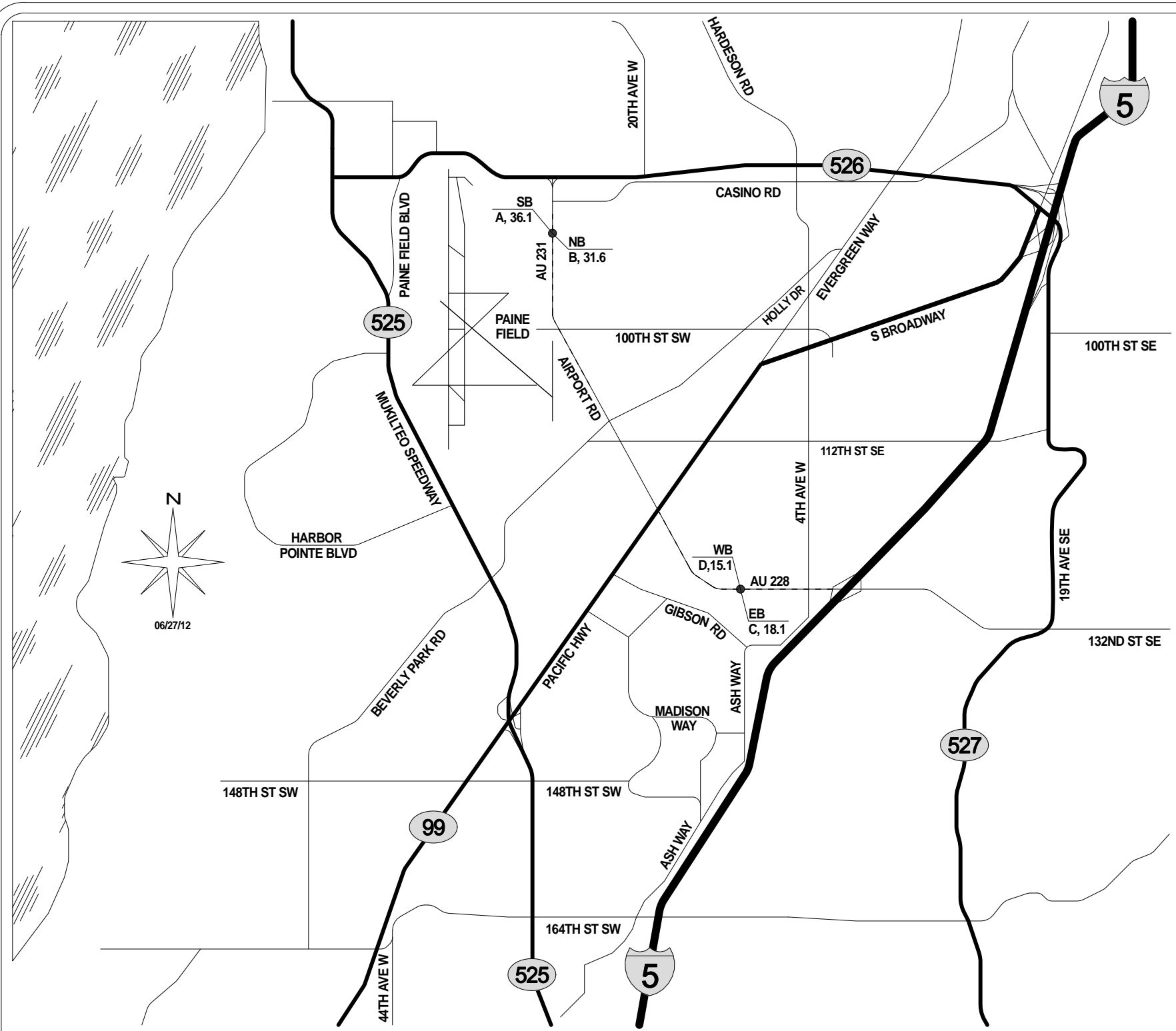
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 12
2018 WITHOUT PROJECT
PM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #09-017

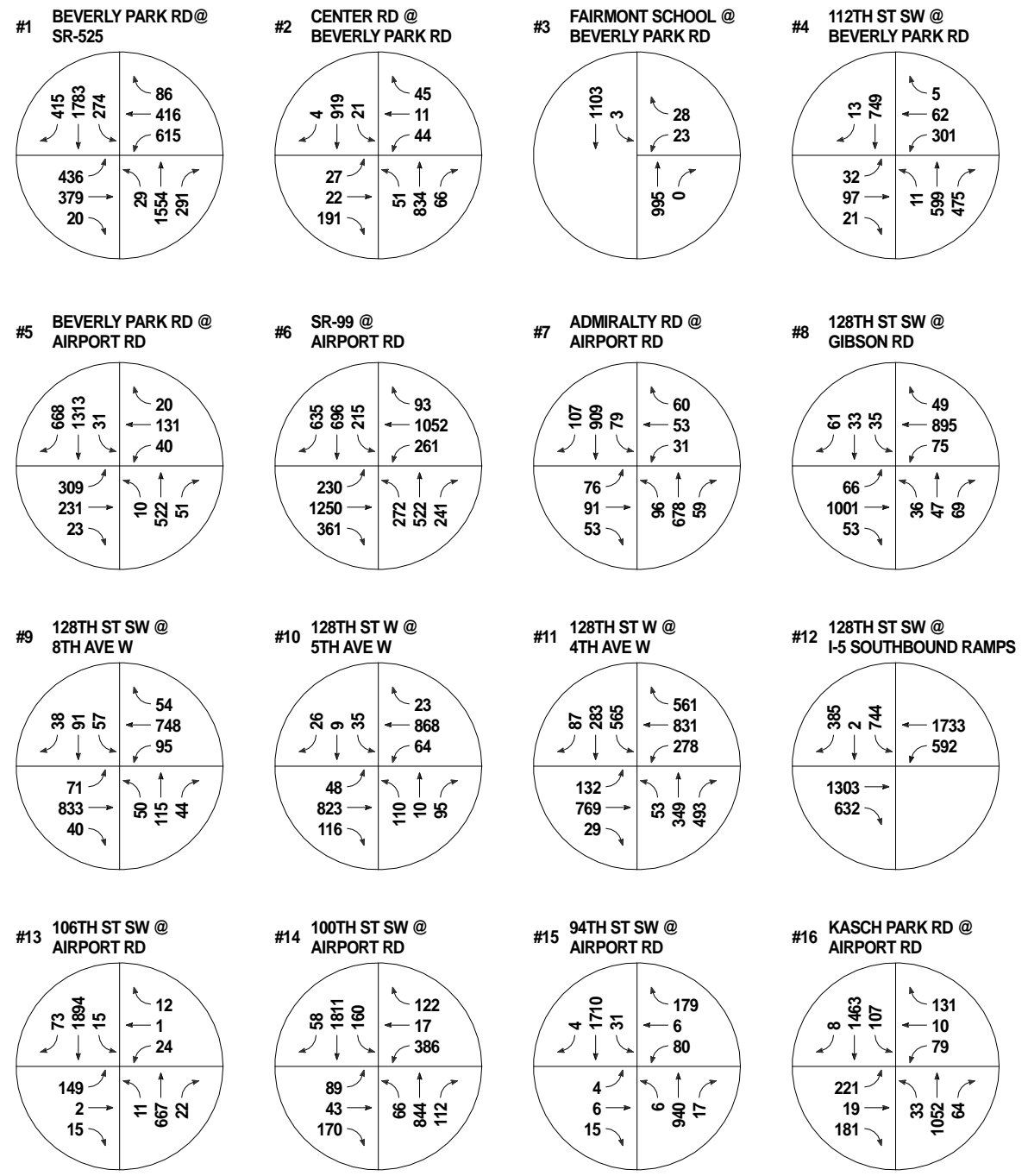
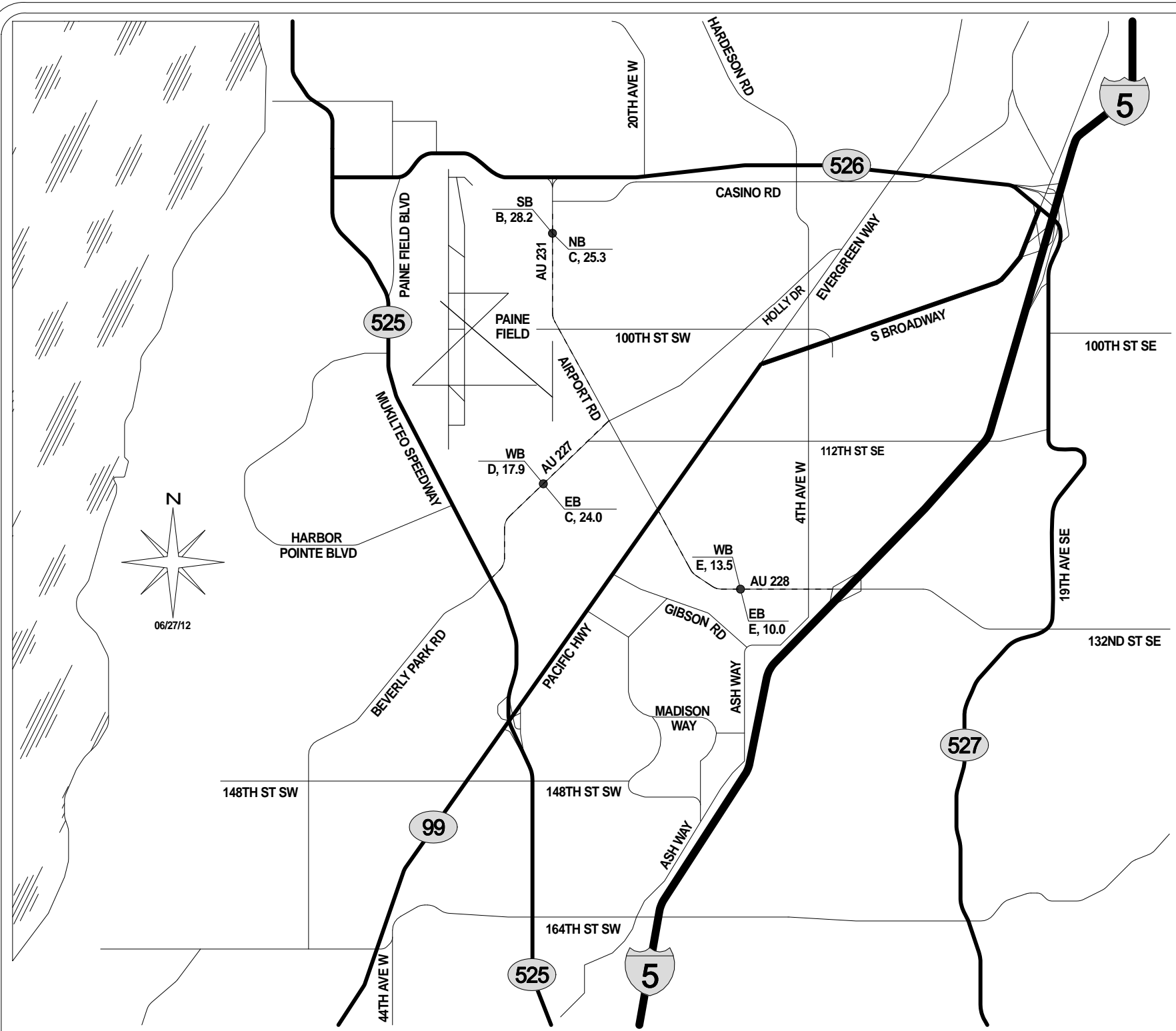
PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → AM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 13
2018 WITH PROJECT
AM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

- XXX → PM PEAK-HOUR TURNING MOVEMENT VOLUMES
- XX ARTERIAL DIRECTION
- X, xx.x ARTERIAL LEVEL OF SERVICE, AVERAGE SPEED IN MPH

SNOHOMISH COUNTY

FIGURE 14
2018 WITH PROJECT
PM PEAK-HOUR
ARTERIAL TURNING
MOVEMENTS

6.1.2. 2013 without Project Conditions

Arterial Unit #227 is anticipated to remain at LOS C in the eastbound direction and LOS D in the westbound direction during the PM peak-hour under the 2013 without project conditions. Arterial Unit #227 is anticipated to continue to operate acceptably under the 2013 without project conditions.

6.1.3. 2013 with Project Conditions

The addition of the trips from the project will have only a minor effect on the operation of Arterial Unit #227. The arterial flow speed for the eastbound and westbound directions are anticipated to experience minor decreases from the 2013 without project to 2013 with project conditions during the PM peak-hour. The eastbound and westbound directions are anticipated to decrease by 0.1 mph with the addition of the project under the 2013 with project conditions.

6.1.4. 2018 without Project Conditions

The additional trips due to the Snohomish County, City of Mukilteo and City of Everett developments will cause the arterial flow speeds to decrease from their levels under the 2013 with project conditions. However, the eastbound and westbound directions will continue to remain at LOS C and LOS D, respectively, during the PM peak-hour under the 2018 without project conditions.

6.1.5. 2018 with Project Conditions

The trips from the project are not anticipated to significantly affect the arterial flow speed of Arterial Unit #227 during the PM peak-hour. The arterial flow speeds of the eastbound and westbound directions during the PM peak-hour are anticipated to decrease by 0.1 mph with the project. The eastbound direction will remain at LOS C and the westbound direction will remain at LOS D under the 2018 with project conditions during the PM peak-hour.

6.1.6. Conclusions for Arterial Unit #227 – Beverly Park Road

Arterial Unit #227, Beverly Park Road between SR-525 and Airport Road, will operate at an acceptable level of service in the eastbound and westbound directions during the PM peak-hour with the project. The eastbound direction is anticipated to operate at LOS C and the westbound direction is anticipated to operate at LOS D during the PM peak-hour. The PM peak-hour arterial level of service analysis is summarized in Table 10 for the eastbound direction and Table 11 for the westbound direction.

Table 10: Arterial Unit #227 PM Peak-Hour Eastbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	43 sec	176 sec	27.2 mph	C
Existing Conditions (Calibration)	57 sec	192 sec	24.9 mph	C
2013 without Project Conditions	58 sec	193 sec	24.8 mph	C
2013 with Project Conditions	59 sec	194 sec	24.7 mph	C
2018 without Project Conditions	63 sec	198 sec	24.1 mph	C
2018 with Project Conditions	64 sec	199 sec	24.0 mph	C

Table 11: Arterial Unit #227 PM Peak-Hour Westbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	107 sec	245 sec	19.5 mph	D
Existing Conditions (Calibration)	116 sec	247 sec	19.4 mph	D
2013 without Project Conditions	120 sec	251 sec	19.0 mph	D
2013 with Project Conditions	122 sec	253 sec	18.9 mph	D
2018 without Project Conditions	135 sec	266 sec	18.0 mph	D
2018 with Project Conditions	137 sec	268 sec	17.9 mph	D

The level of service calculations for Arterial Unit #227 are included in the attachments of this report.

6.2 Arterial Unit #228 – Airport Road/128th Street SW

Arterial Unit #228, Airport Road/128th Street SW between SR-99 and the Interstate-5 southbound ramps, is a 1.35 mile long arterial that is critical in the eastbound and westbound directions during the AM and PM peak-hours. Arterial Unit #228 is an Urban Category III arterial, which has an acceptable arterial travel speed threshold of 10 mph.

6.2.1. Existing Conditions

The existing arterial travel time data for Arterial Unit #228 was collected by TDG in June 2012. The calibration of Arterial Unit #228 was calibrated as close as possible with the Synchro software. There are several intersections where additional all-red time was added to get the delays to be similar to the field collected data. However, the all-red times were not increased beyond 15 seconds, which was estimated to reflect the effect of queue back-ups from downstream signals. It should be noted that the calibration of some signals also includes the maximum lost time adjust value (3 seconds), which results in essentially 18 seconds of lost time.

The eastbound direction during the AM and PM peak-hours was only able to be calibrated to within 0.6 mph of the field collected arterial flow speed; however, this is within the acceptable

1.0 mph threshold established by Snohomish County (which would allow a calibration to 14.5 mph). The eastbound direction operates at LOS C during the AM peak-hour and LOS D (the calibration is 0.1 mph above the threshold between LOS D and LOS E) during the PM peak-hour, both of which are acceptable levels of service. The westbound direction during the AM peak-hour was calibrated to within 0.4 mph during the AM peak-hour and 0.8 mph during the PM peak-hour. The westbound direction during the PM peak-hour was calibrated to a lower arterial flow speed than the field collected data. The westbound direction operates at LOS D during the AM and PM peak-hours, which is an acceptable level of service.

6.2.2. 2013 without Project Conditions

Arterial Unit #228 is anticipated to remain at LOS C in the eastbound direction during the AM peak-hour and operate at LOS E during the PM peak-hour under the 2013 without project conditions. The westbound direction during the AM and PM peak-hours is anticipated to operate at LOS D under the 2013 without project conditions. Arterial Unit #228 is anticipated to continue to operate acceptably under the 2013 without project conditions.

6.2.3. 2013 with Project Conditions

The addition of the trips from the project will increase the delay and reduce the arterial flow speeds for both directions of Arterial Unit #228 during the AM and PM peak-hours. Both directions during the AM and PM peak-hours are anticipated to remain at their 2013 without project levels with the trips from the project. The eastbound direction during the AM peak-hour is anticipated to operate at LOS C during the AM peak-hour and LOS E during the PM peak-hour. Both directions during the PM peak-hour are anticipated to operate at LOS D under the 2013 with project conditions.

6.2.4. 2018 without Project Conditions

The additional trips due to the Snohomish County, City of Mukilteo and City of Everett developments will cause the delay to increase and arterial flow speeds to decrease from their levels under the 2013 with project conditions. However, the eastbound direction is anticipated to remain at LOS C during the AM peak-hour and LOS E during the PM peak-hour. The westbound direction is anticipated to remain at LOS C during the AM peak-hour, but the westbound direction during the PM peak-hour will operate at LOS E under the 2018 without project conditions.

6.2.5. 2018 with Project Conditions

The trips from the project are not anticipated change the level of service of Arterial Unit #228 during either the AM or PM peak-hours. The delays along the arterial are anticipated to increase and the arterial travel speeds are anticipated to decrease with the additional traffic, but all of the arterials will remain at acceptable LOS E or better. During the AM peak-hour the eastbound direction will remain at LOS C and the westbound direction will remain at LOS E under the 2018 with project conditions. The eastbound direction during the PM peak-hour is anticipated to

operate at LOS D and the westbound direction is anticipated to operate at LOS E under the 2018 with project conditions during the PM peak-hour.

6.2.6. Conclusions for Arterial Unit #228 – Airport Road/128th Street SW

Arterial Unit #228, Airport Road/128th Street SW between SR-99 and the I-5 southbound ramps, will operate at an acceptable level of service in the eastbound and westbound directions during the AM and PM peak-hours with the project. The eastbound direction is anticipated to operate at LOS C during the AM peak-hour and LOS E during the PM peak-hour. The westbound direction is anticipated to operate at LOS D during the AM peak-hour and LOS E during the PM peak-hour. The AM peak-hour arterial level of service analysis is summarized in Table 12 for the eastbound direction and Table 13 for the westbound direction. The PM peak-hour arterial level of service analysis is summarized in Table 14 for the eastbound direction and Table 15 for the westbound direction.

Table 12: Arterial Unit #228 AM Peak-Hour Eastbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	121 sec	252 sec	19.3 mph	C
Existing Conditions (Calibration)	119 sec	243 sec	19.9 mph	C
2013 without Project Conditions	122 sec	247 sec	19.7 mph	C
2013 with Project Conditions	125 sec	249 sec	19.5 mph	C
2018 without Project Conditions	137 sec	262 sec	18.5 mph	C
2018 with Project Conditions	143 sec	267 sec	18.1 mph	C

Table 16: Arterial Unit #228 AM Peak-Hour Westbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	156 sec	299 sec	16.3 mph	D
Existing Conditions (Calibration)	147 sec	291 sec	16.7 mph	D
2013 without Project Conditions	155 sec	297 sec	16.3 mph	D
2013 with Project Conditions	160 sec	302 sec	16.1 mph	D
2018 without Project Conditions	173 sec	316 sec	15.4 mph	D
2018 with Project Conditions	178 sec	320 sec	15.1 mph	D

Table 14: Arterial Unit #228 PM Peak-Hour Eastbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	192 sec	360 sec	13.5 mph	E
Existing Conditions (Calibration)	175 sec	344 sec	14.1 mph	D
2013 without Project Conditions	180 sec	349 sec	13.9 mph	E
2013 with Project Conditions	184 sec	353 sec	13.8 mph	E
2018 without Project Conditions	301 sec	469 sec	10.4 mph	E
2018 with Project Conditions	318 sec	487 sec	10.0 mph	E

Table 15: Arterial Unit #228 PM Peak-Hour Westbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	176 sec	311 sec	15.6 mph	D
Existing Conditions (Calibration)	179 sec	328 sec	14.8 mph	D
2013 without Project Conditions	186 sec	335 sec	14.5 mph	D
2013 with Project Conditions	191 sec	340 sec	14.3 mph	D
2018 without Project Conditions	200 sec	349 sec	13.9 mph	E
2018 with Project Conditions	211 sec	360 sec	13.5 mph	E

The level of service calculations for Arterial Unit #228 are included in the attachments of this report.

6.3 Arterial Unit #231 – Airport Road

Arterial Unit #231, Airport Road between 106th Street SW and Kasch Park Road, is a 1.17 mile long arterial that is impacted with 50 or more directional trips during the AM and PM peak-hours in the northbound and southbound directions. Arterial Unit #231 is an Urban Category II arterial which has an acceptable arterial travel speed threshold of 13.0 mph. The arterial is not currently classified as a critical arterial by Snohomish County. The arterial has been analyzed with the *Synchro* software using an arterial length of 1.16 miles, which is within acceptable tolerances of Snohomish County.

6.3.1. Existing Conditions

The existing arterial travel time data for Arterial Unit #231 was collected by the independent count firm TDG. Arterial travel time data for Arterial Unit #231 was collected in May of 2012.

The network for Arterial Unit #231 in the *Synchro* software was not able to be calibrated to similar delay, segment travel times and arterial flow speeds as the data collected by TDG. The northbound direction during the AM and PM peak-hours was calibrated with a higher arterial flow speed, but both are within the acceptable range according to Snohomish County's

methodology. The southbound direction during the AM and PM peak-hours was calibrated with arterial flow speeds less than the data collected by TDG, which represents a conservative analysis.

The northbound direction currently operates at LOS B during the AM peak-hour and LOS C during the PM peak-hour. The southbound direction has been calibrated to LOS A during the AM peak-hour and LOS B during the PM peak-hour.

6.3.2. 2013 without Project Conditions

The 2013 without project analysis shows that the northbound and southbound directions during the AM and PM peak-hours will only experience minor increases in delay, resulting in minor decreases in arterial flow speed. Arterial Unit #231 will remain at the calibrated arterial levels of service for both directions during the AM and PM peak-hour under the 2013 without project conditions.

6.3.3. 2013 with Project Conditions

The arterial flow speeds of Arterial Unit #231 are anticipated to decrease with the addition of the trips from the project. However, the additional trips from the project are not anticipated to cause the level of service to change for the arterial in either direction during either peak-hour.

6.3.4. 2018 without Project Conditions

The additional trips due to the Snohomish County, City of Mukilteo and City of Everett developments will not change the levels of service of Arterial Unit #231 from the existing calibrated levels of service. The northbound direction during the AM peak-hour is anticipated to remain at LOS B and the southbound direction during the AM peak-hour is anticipated to remain at LOS A. During the PM peak-hour the northbound direction is anticipated to remain at LOS C and southbound direction is anticipated to remain at LOS B under the 2018 without project conditions.

6.3.5. 2018 with Project Conditions

The trips from the project will not change the level of service of Arterial Unit #231. The northbound direction is anticipated to operate at LOS B during the AM peak-hour and LOS C during the PM peak-hour with the trips from the project. The southbound direction is anticipated to operate at LOS A during the AM peak-hour and LOS B during the PM peak-hour under the 2018 with project conditions.

6.3.6. Conclusions for Arterial Unit #231 – Airport Road

Arterial Unit #231, Airport Road between 106th Street SW and Kasch Park Road, will operate at an acceptable level of service in the northbound and southbound directions during the AM and PM peak-hours with the project. The arterial is anticipated to operate at LOS C or better with the project. The arterial level of service analysis for the AM peak-hour is summarized in Table 16 for the northbound direction and Table 17 for the southbound direction. The arterial level of service analysis for the PM peak-hour is summarized in Table 18 for the northbound direction and Table 19 for the southbound direction.

Table 16: Arterial Unit #231 AM Peak-Hour Northbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	27 sec	129 sec	32.4 mph	B
Existing Conditions (Calibration)	32 sec	128 sec	32.5 mph	B
2013 without Project Conditions	32 sec	129 sec	32.4 mph	B
2013 with Project Conditions	34 sec	131 sec	31.8 mph	B
2018 without Project Conditions	33 sec	130 sec	32.2 mph	B
2018 with Project Conditions	35 sec	132 sec	31.6 mph	B

Table 17: Arterial Unit #231 AM Peak-Hour Southbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	11 sec	109 sec	38.4 mph	A
Existing Conditions (Calibration)	15 sec	112 sec	37.3 mph	A
2013 without Project Conditions	15 sec	112 sec	37.3 mph	A
2013 with Project Conditions	18 sec	115 sec	36.2 mph	A
2018 without Project Conditions	15 sec	112 sec	37.3 mph	A
2018 with Project Conditions	19 sec	115 sec	36.1 mph	A

Table 18: Arterial Unit #231 PM Peak-Hour Northbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	65 sec	170 sec	24.6 mph	C
Existing Conditions (Calibration)	62 sec	164 sec	25.5 mph	C
2013 without Project Conditions	63 sec	164 sec	25.4 mph	C
2013 with Project Conditions	63 sec	164 sec	25.4 mph	C
2018 without Project Conditions	66 sec	167 sec	25.0 mph	C
2018 with Project Conditions	64 sec	165 sec	25.3 mph	C

Table 19: Arterial Unit #231 PM Peak-Hour Southbound Level of Service Summary

Analysis Scenario	Total Intersection Delay	Segment Travel Time	Arterial Flow Speed	Arterial LOS
Existing Conditions (Field Data)	24 sec	137 sec	30.7 mph	A
Existing Conditions (Calibration)	31 sec	141 sec	29.7 mph	B
2013 without Project Conditions	31 sec	141 sec	29.6 mph	B
2013 with Project Conditions	37 sec	147 sec	31.6 mph	B
2018 without Project Conditions	32 sec	142 sec	29.4 mph	B
2018 with Project Conditions	38 sec	148 sec	28.2 mph	B

The level of service calculations for Arterial Unit #231 are included in the attachments of this report.

6.4 Summary of Arterial Impacts

The project will impact three Snohomish County arterials with 3 or more peak-hour trips in the critical direction or with 50 or more peak-hour trips. The arterials analyzed under the requirements of Snohomish County Code 30.66B will operate at acceptable levels of service under the 2013 with project and 2018 with project conditions. No additional improvements will be required to ensure the impacted arterials operate acceptably with the project.

7. INTERSECTION ANALYSIS FOR SURROUNDING JURISDICTIONS

The trips from the project will impact intersections within the surrounding jurisdictions of WSDOT, the City of Mukilteo and the City of Everett. Snohomish County has an interlocal agreement with WSDOT and the City of Mukilteo that provides the methodology for determining which intersections are to be analyzed. There is not an interlocal agreement between Snohomish County and the City of Everett and therefore the analysis of impacts to intersections within the City of Everett has been performed to satisfy SEPA requirements, after detailed scoping with the City of Everett staff, and WSDOT scoping requirements.

The WSDOT, City of Mukilteo and City of Everett intersections that have been analyzed as part of this report are summarized in Table 20.

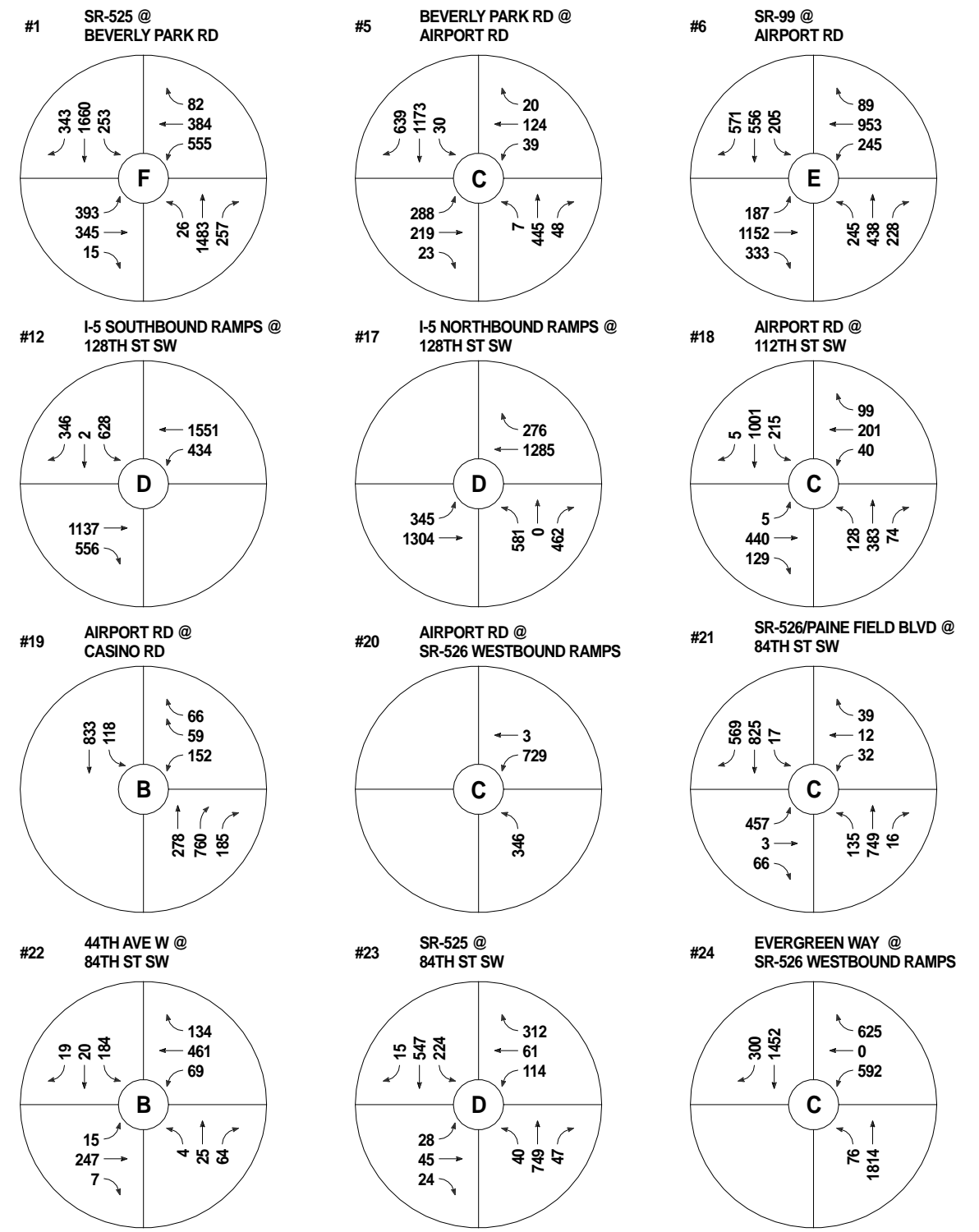
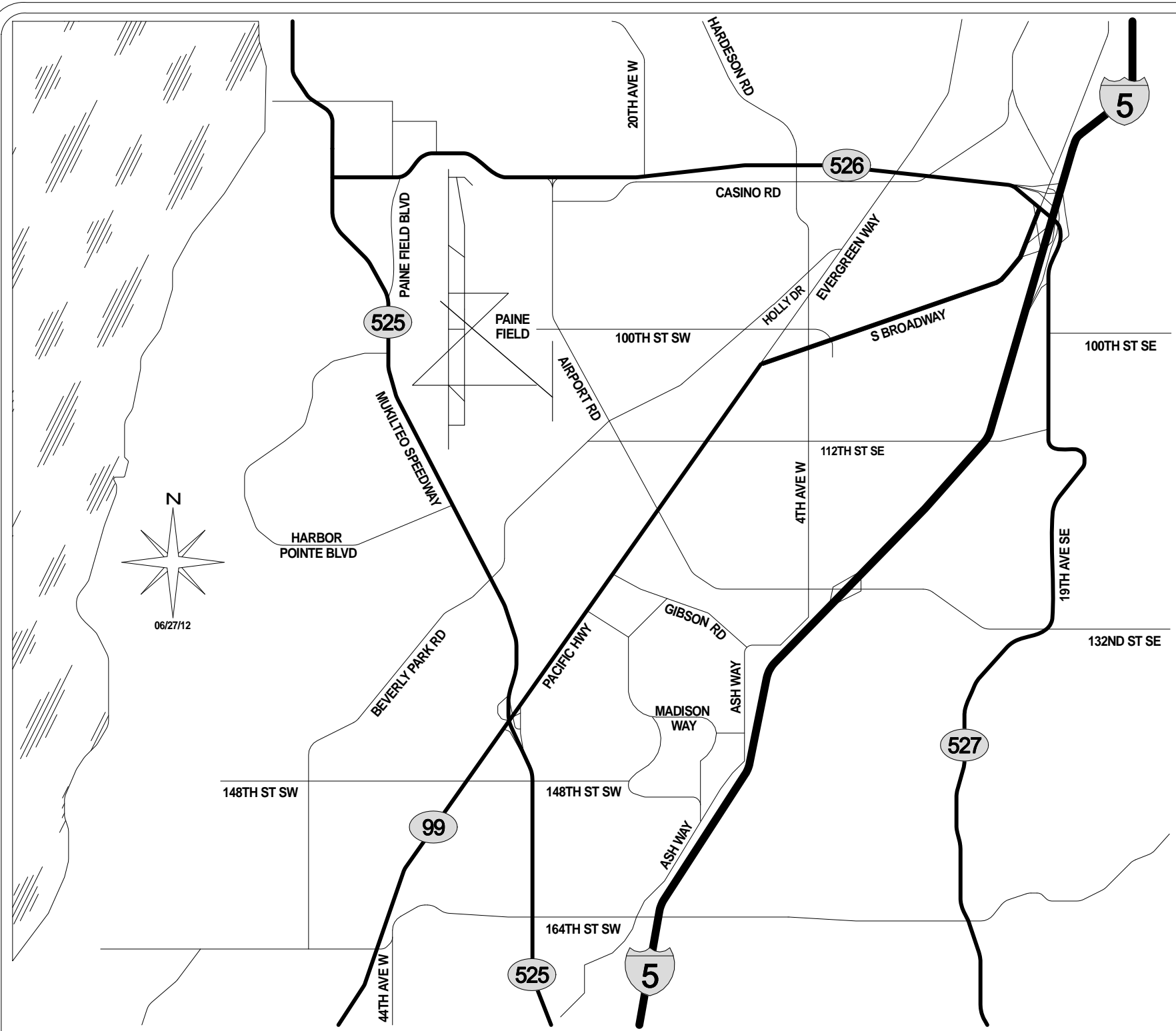
Table 20: Intersections Analyzed for Surrounding Jurisdictions

Intersection	Jurisdiction
1. SR-525 at Beverly Park Road	WSDOT
5. Beverly Park Road at Airport Road	City of Everett
6. SR-99 at Airport Road	City of Everett
12. I-5 Southbound Ramps at 128 th Street SW	WSDOT
17. I-5 Northbound Ramps at 128 th Street SW/SR-96	WSDOT
18. Airport Road at 112 th Street SW	City of Everett
19. Airport Road at Casino Road	City of Everett
20. Airport Road at SR-526 Westbound Ramps	WSDOT
21. SR-526/Paine Field Boulevard at 84 th Street SW	City of Mukilteo
22. 44 th Avenue W at 84 th Street SW	City of Mukilteo
23. SR-525 at 84 th Street SW	City of Mukilteo
24. SR-526 Westbound Ramps at Evergreen Way	City of Everett

Gibson Traffic Consultants, Inc. staff corresponded with WSDOT, the City of Mukilteo and the City of Everett staff over methodology and scope of the analysis. WSDOT and the City of Everett provided detailed correspondence over which intersections require analysis, based on the appropriate interlocal and SEPA thresholds. WSDOT, the City of Mukilteo and the City of Everett have identified the PM peak-hour as the required analysis period under their interlocal agreements or under their own standards.

The City of Mukilteo and the City of Everett use a level of service threshold of LOS D while WSDOT uses a threshold of LOS D along SR-525 and SR-526 and LOS E for the I-5 ramps intersections. The typical threshold for analysis of WSDOT intersections in unincorporated Snohomish County is 10 PM peak-hour trips. WSDOT intersections in the City of Mukilteo or City of Everett follow the respective city threshold for analysis. The City of Mukilteo uses a threshold of 10 directional peak trips at arterial intersections while the City of Everett uses a threshold of 50 PM peak-hour trips. WSDOT has requested that the intersection of Evergreen Way at SR-526 westbound ramps be analyzed even though the impacts of the project do not meet the threshold for the City of Everett, which controls and operates the intersection.

The existing turning movements for the interlocal and SEPA intersection analysis are shown in Figure 15 and the 2013 without project conditions turning movements are shown in Figure 16. The trips generated by the project used for the interlocal and SEPA intersection analysis are shown in Figure 17 and the turning movements for the 2013 with project conditions are shown in Figure 18. The 2018 without project conditions and 2018 with project conditions turning movements for the interlocal and SEPA intersection analysis are shown in Figure 19 and Figure 20, respectively.



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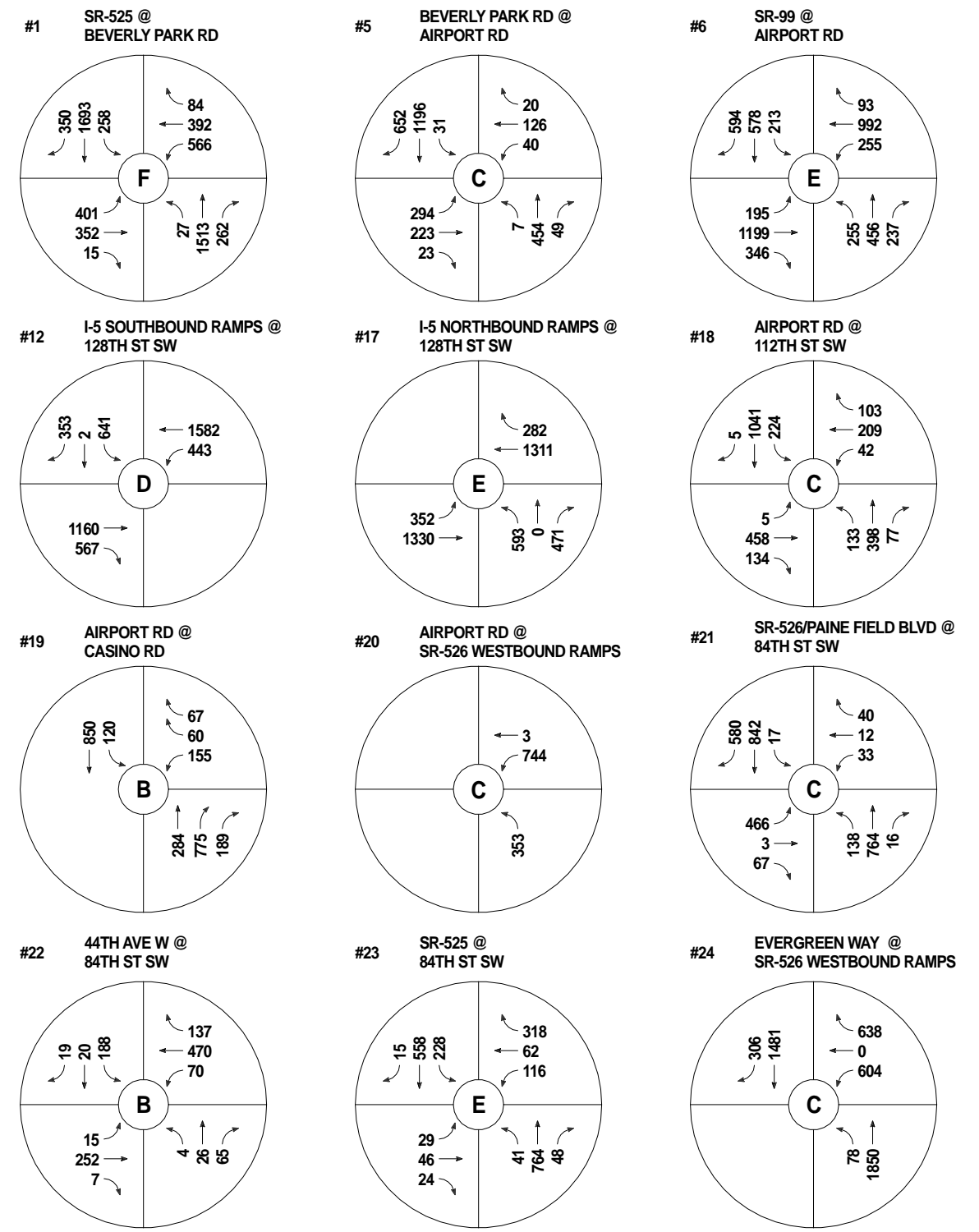
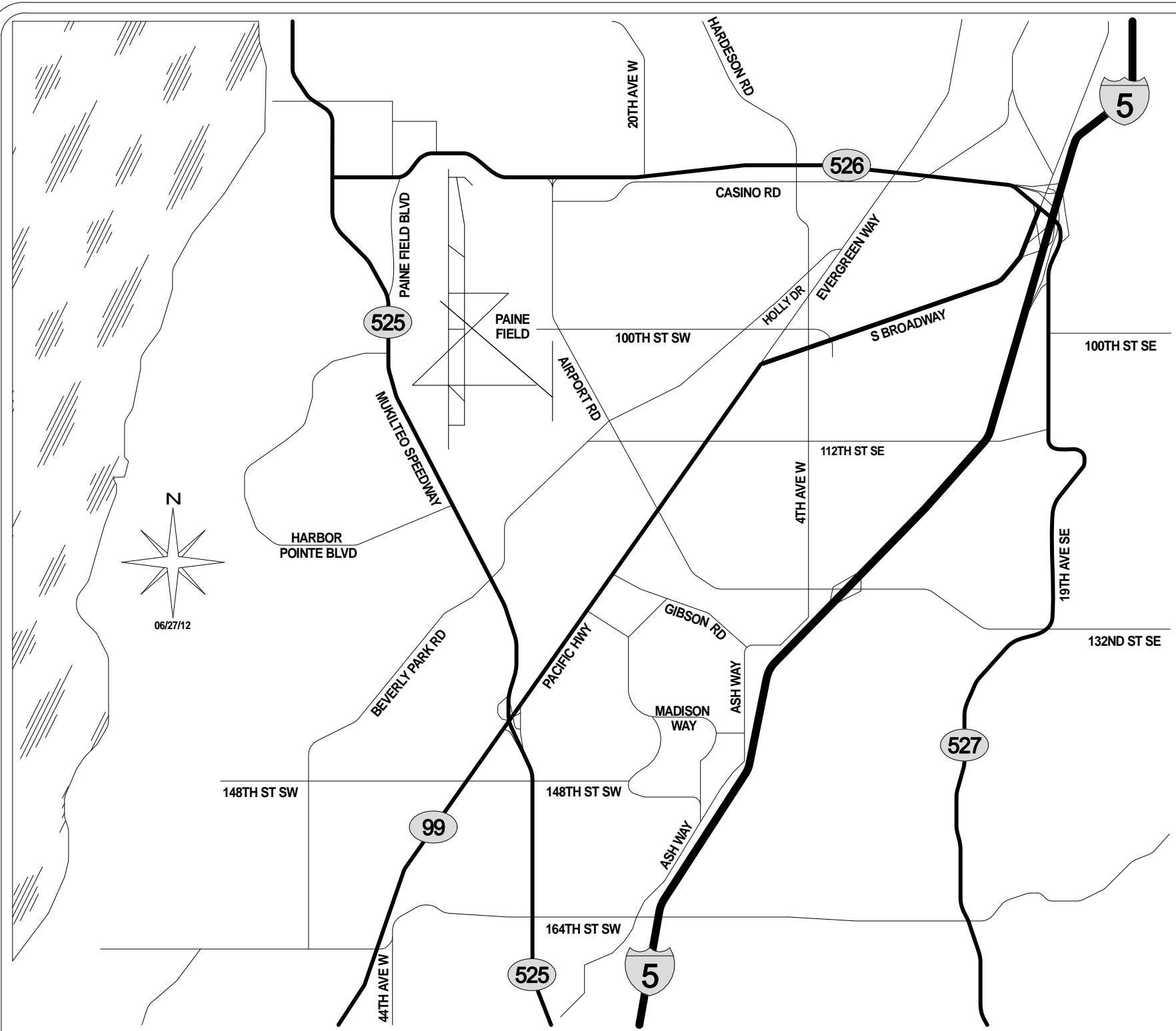
LEGEND

xxx → TURNING MOVEMENT VOLUMES

X INTERSECTION LEVEL OF SERVICE

SNOHOMISH COUNTY

FIGURE 15
EXISTING INTERLOCAL & SEPA
TURNING MOVEMENTS
PM PEAK-HOUR



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PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

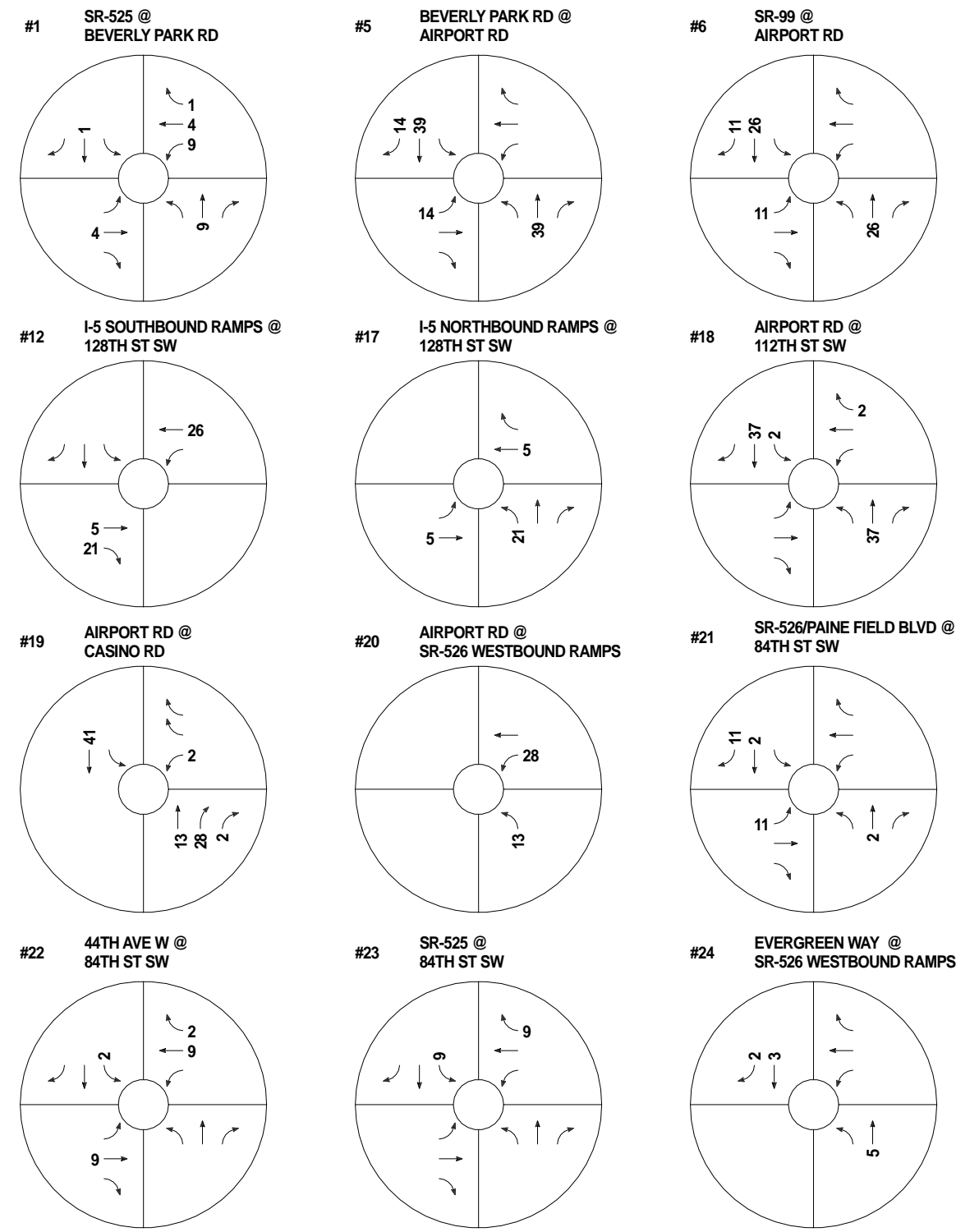
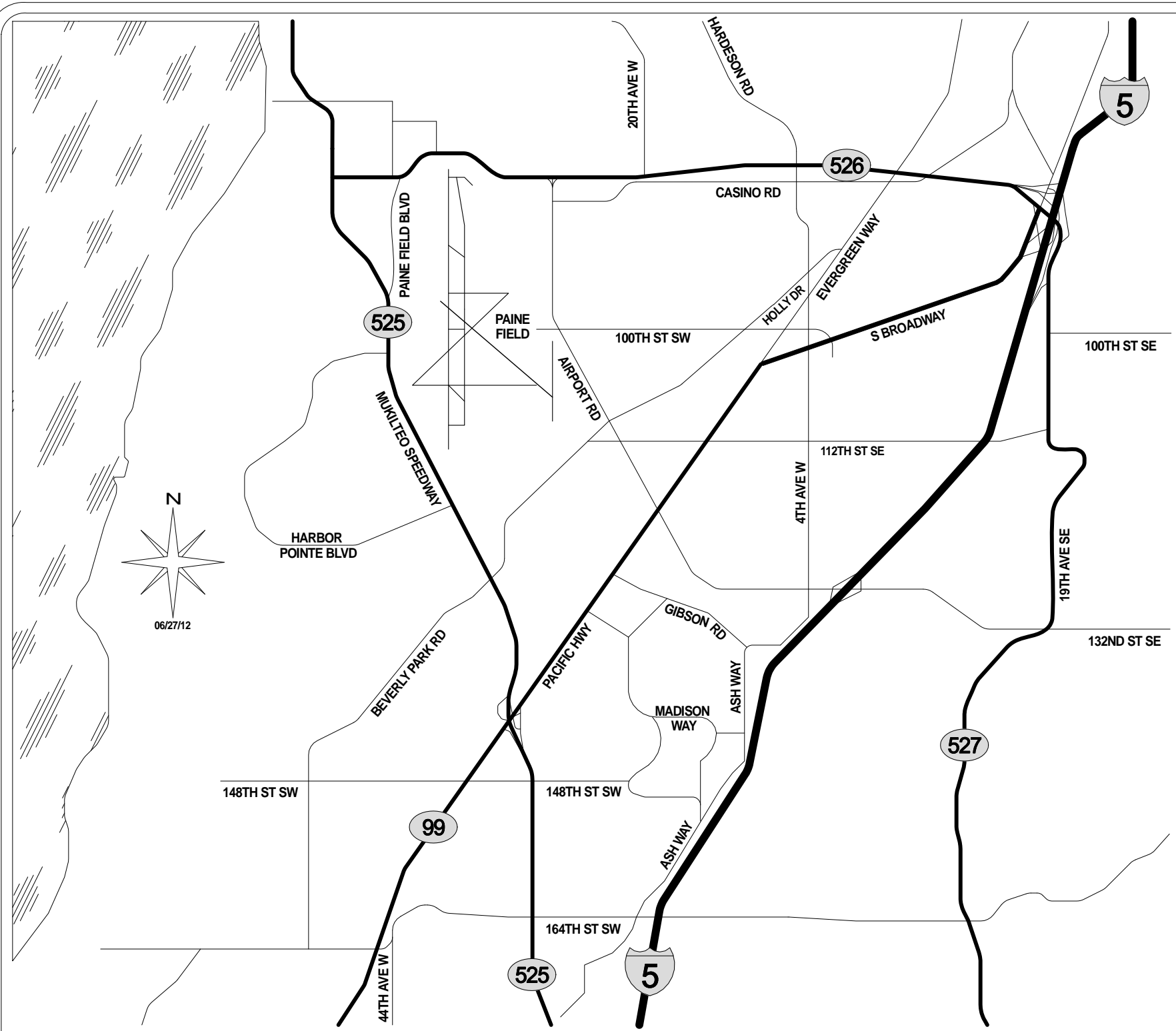
LEGEND

xxx → TURNING MOVEMENT VOLUMES

X INTERSECTION LEVEL OF SERVICE

SNOHOMISH COUNTY

FIGURE 16
2013 WITHOUT PROJECT
INTERLOCAL & SEPA
TURNING MOVEMENTS
PM PEAK-HOUR



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PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

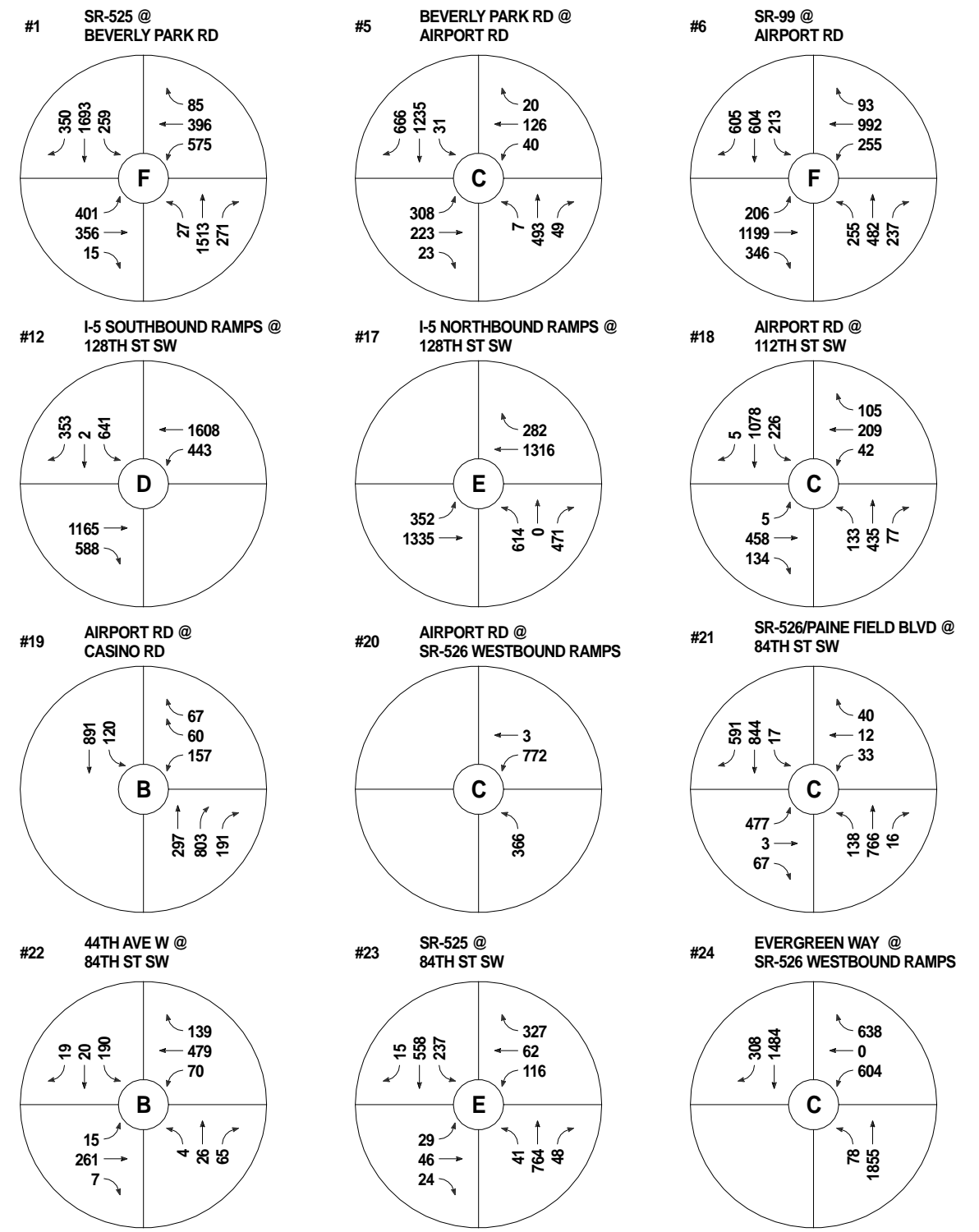
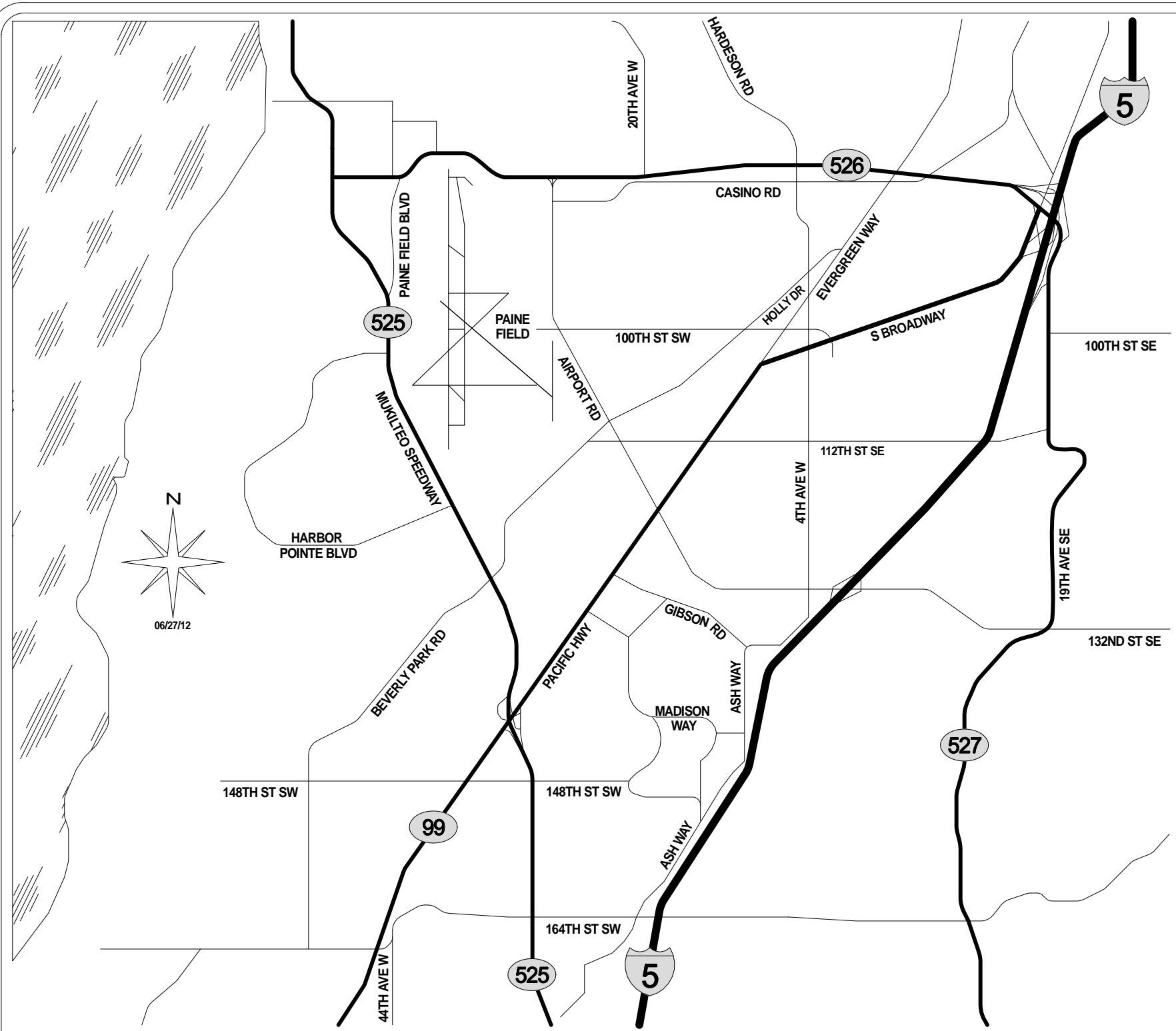
xxx → TURNING MOVEMENT VOLUMES

X INTERSECTION LEVEL OF SERVICE

FIGURE 17

PROJECT TRIPS

SNOHOMISH COUNTY



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PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

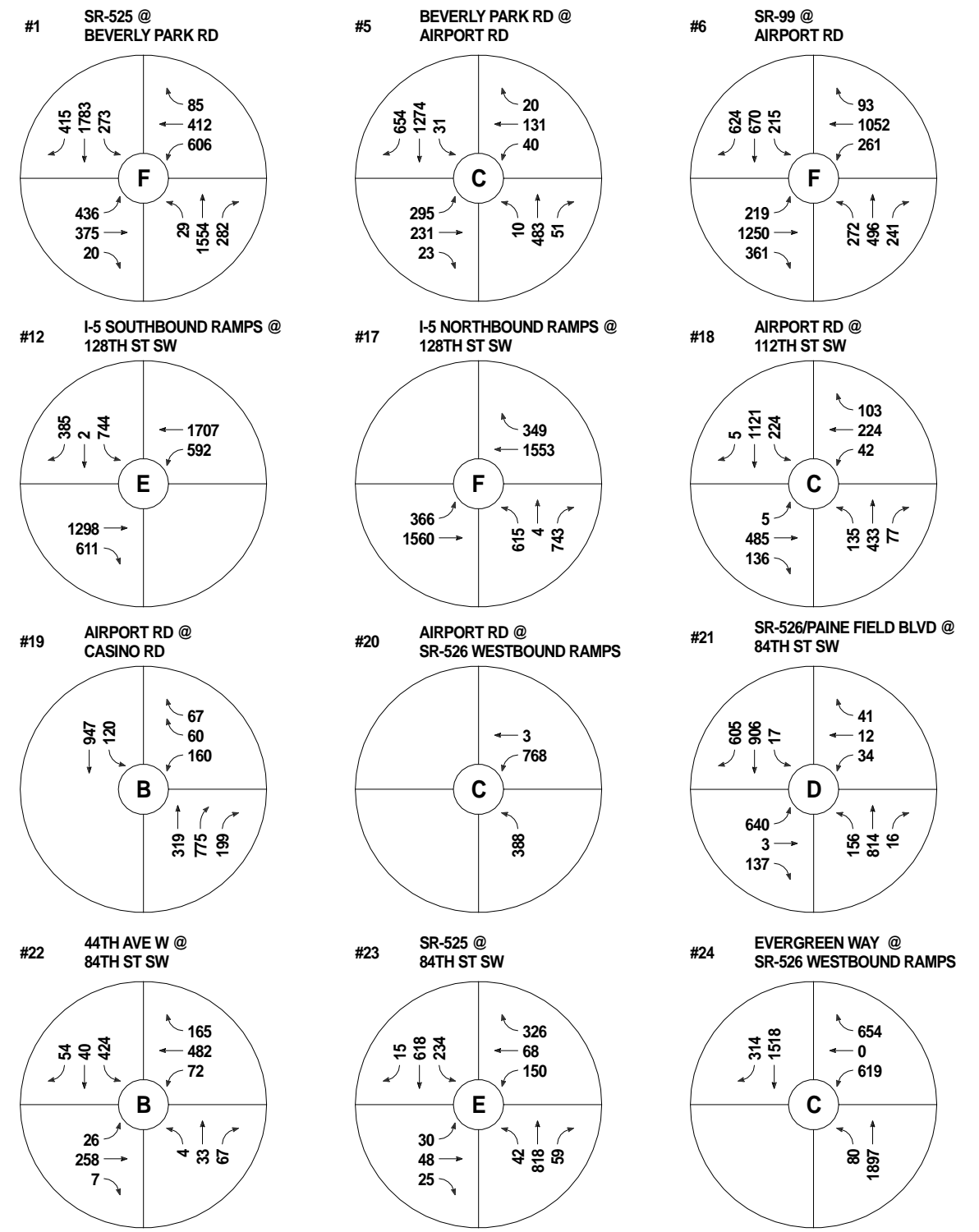
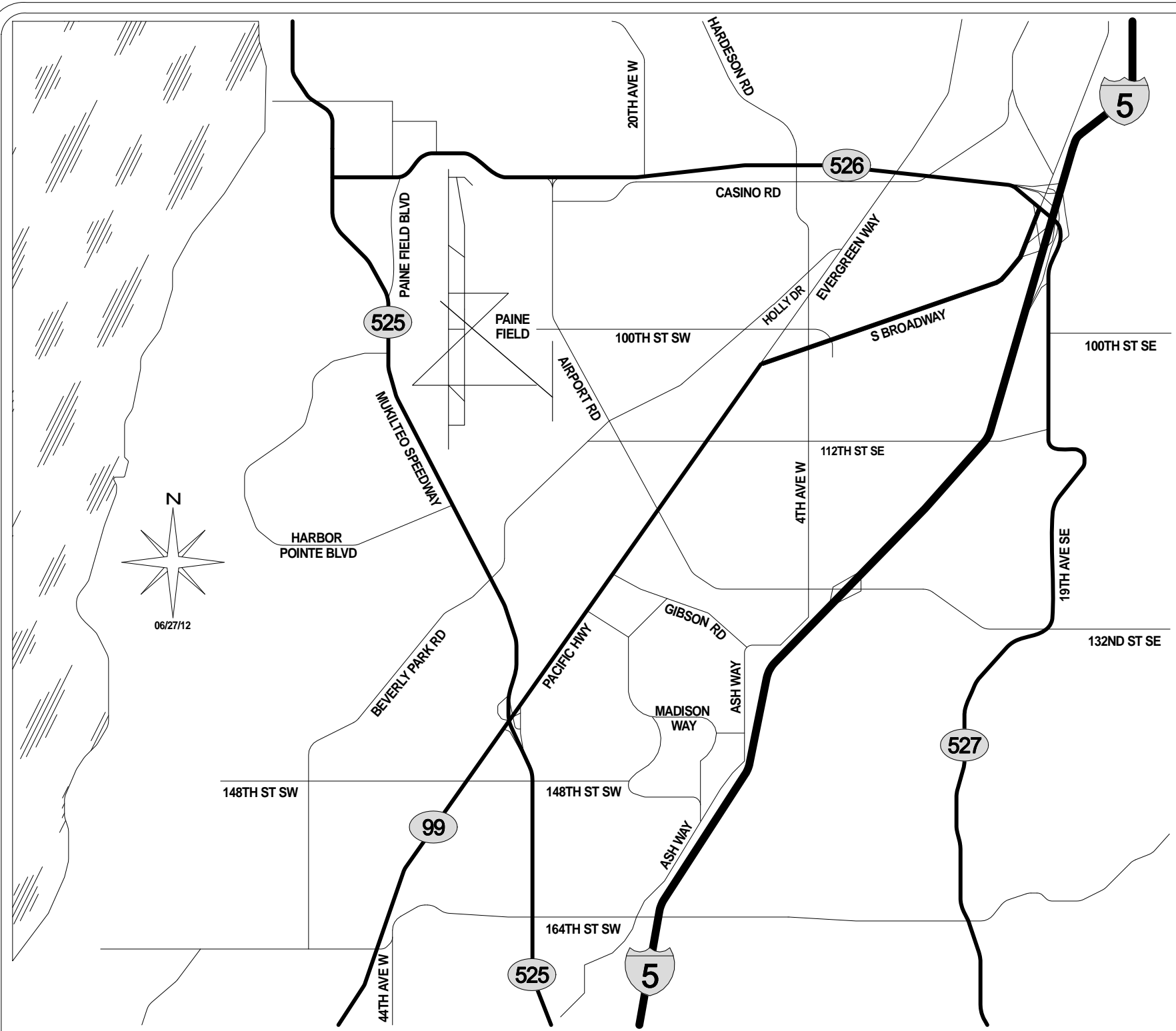
LEGEND

xxx → TURNING MOVEMENT VOLUMES

X INTERSECTION LEVEL OF SERVICE

SNOHOMISH COUNTY

FIGURE 18
2013 WITH PROJECT
INTERLOCAL & SEPA
TURNING MOVEMENTS
PM PEAK-HOUR



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GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

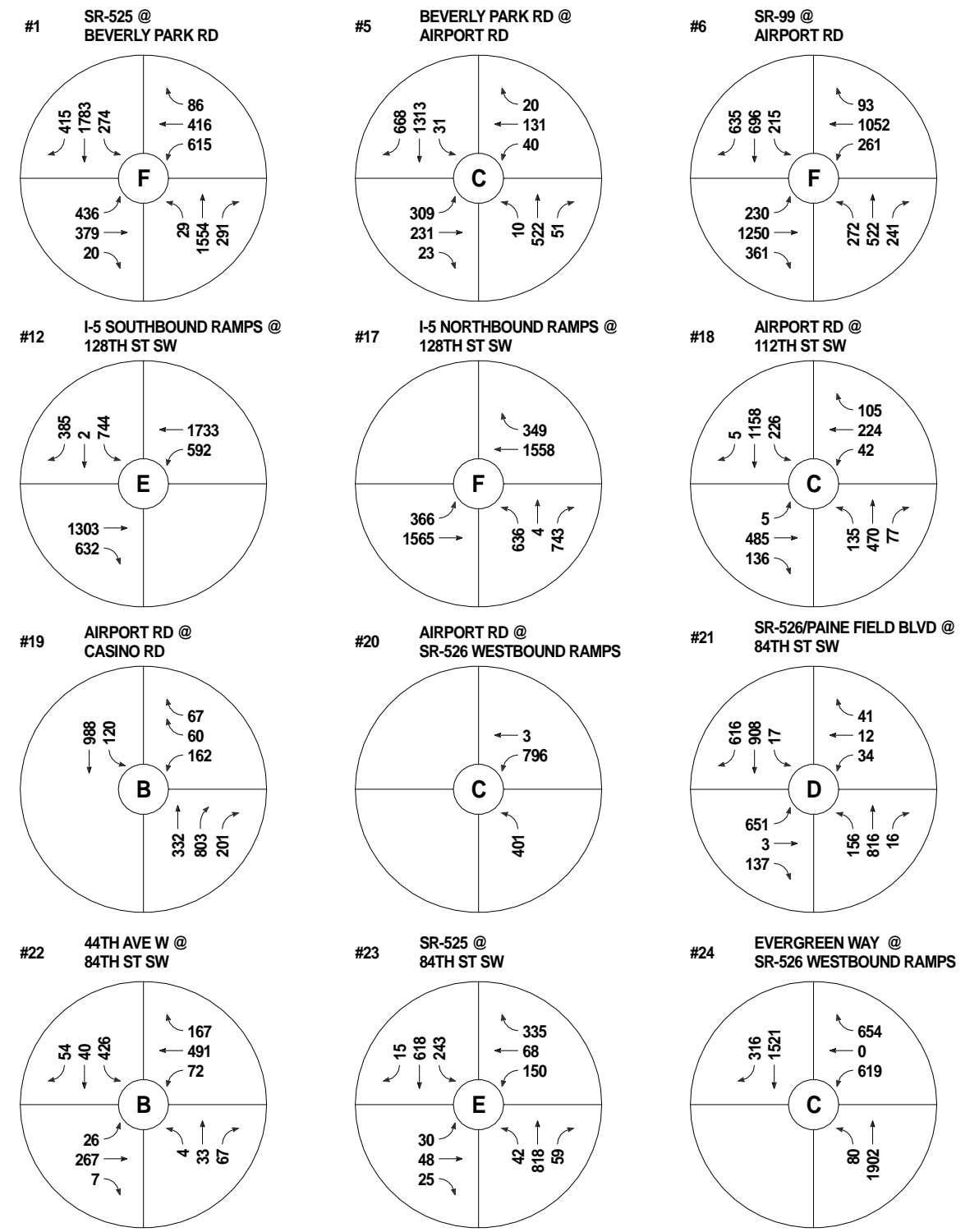
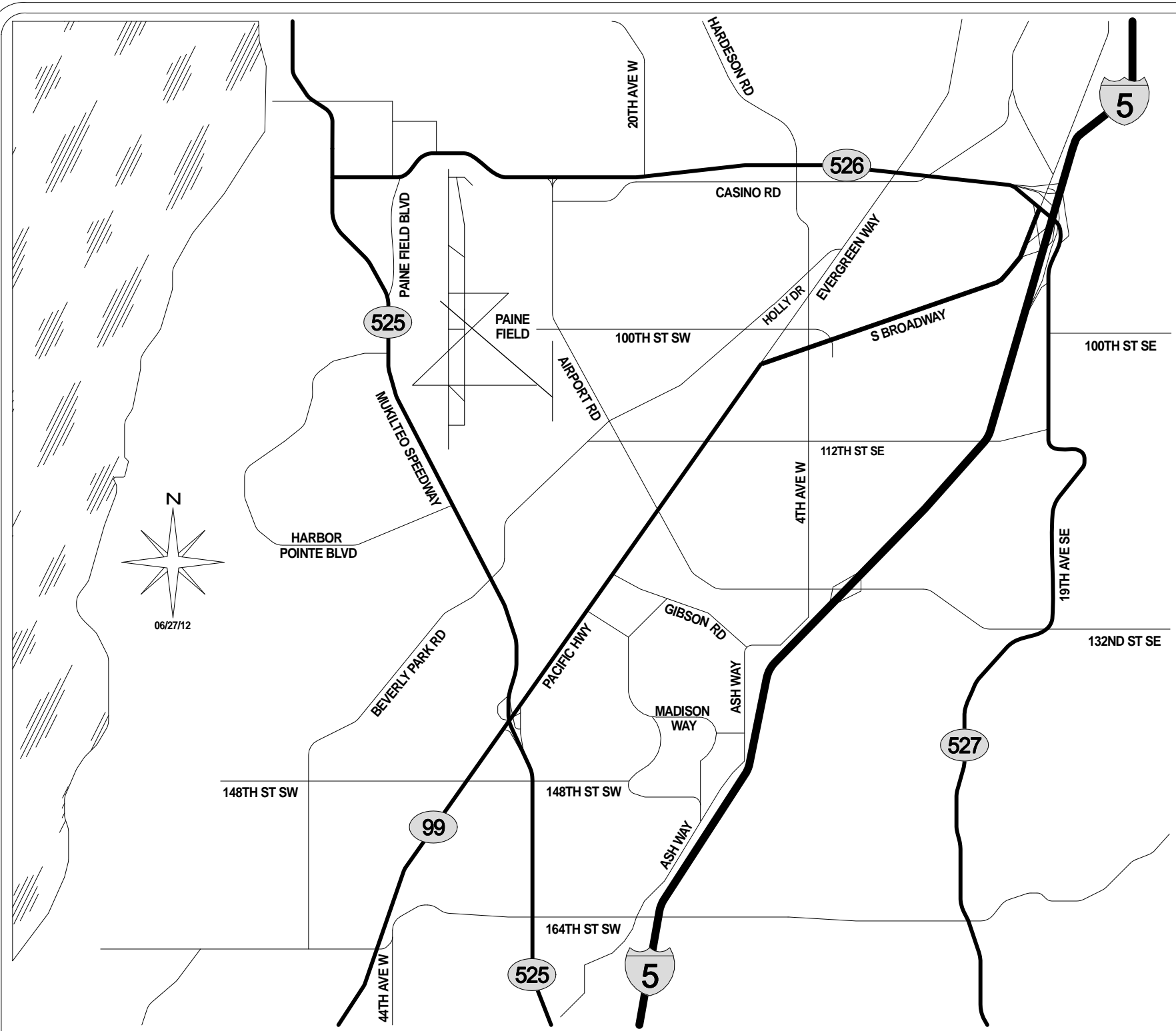
LEGEND

xxx → TURNING MOVEMENT VOLUMES

X INTERSECTION LEVEL OF SERVICE

SNOHOMISH COUNTY

FIGURE 19
2018 WITHOUT PROJECT
INTERLOCAL & SEPA
TURNING MOVEMENTS
PM PEAK-HOUR



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TRAFFIC IMPACT STUDY
GTC #09-017

PROPOSED COMMERCIAL SERVICE
AT PAINE FIELD

LEGEND

xxx → TURNING MOVEMENT VOLUMES

X INTERSECTION LEVEL OF SERVICE

SNOHOMISH COUNTY

FIGURE 20
2018 WITH PROJECT
INTERLOCAL & SEPA
TURNING MOVEMENTS
PM PEAK-HOUR

7.1 Existing Conditions

The existing intersection and SEPA analysis shows that the majority of the study intersections operate within acceptable levels of service. There is one WSDOT intersection that currently operates at a deficient level of service, SR-525 at Beverly Park Road. All of the City of Mukilteo intersections currently operate at LOS D or better. The majority of the City of Everett intersections currently operate acceptably, except for the intersection of SR-99 at Airport Road. This intersection currently operates at LOS F due to the high volume of traffic at the intersection. The intersections of SR-525 at Beverly Park Road and SR-99 at Airport Road are currently built to their ultimate configurations for single-occupancy vehicles and additional lanes at these intersections are not planned.

7.2 2013 without Project Conditions

The majority of the intersections analyzed for the surrounding jurisdictions will continue to operate at their existing level of service under the 2013 without project conditions, although the average delay at the intersections will increase. The intersections of SR-525 at Beverly Park Road and SR-99 at Airport Road will continue to operate at deficient levels of service and the intersection of SR-525 at 84th Street SW will degrade to deficient LOS F under the 2013 without project conditions.

7.3 2013 with Project Conditions

The trips from the project will not cause the level of service to change at any of the study intersections of the surrounding jurisdictions. The additional trips will cause the average delay at the intersections to increase, but all of the study intersections, except the three intersections that will operate at deficient levels of service under the 2013 without project condition, are anticipated to continue operating within the acceptable thresholds of the surrounding jurisdictions.

7.4 2018 without Project Conditions

The additional trips from the Snohomish County, City of Mukilteo and City of Everett pipeline developments will cause the level of service to change at one of the intersections studied for the surrounding jurisdictions, the I-5 northbound ramps at 128th Street SW/SR-96. This intersection is anticipated to change from LOS E to LOS F under the 2018 without project conditions. The remaining intersections of the surrounding jurisdictions studied for this report are anticipated to remain at their 2013 with project levels under the 2018 without project conditions.

Under the 2018 without project conditions there are four intersections that are anticipated to operate at deficient levels of service. The intersections are SR-525 at Beverly Park Road, SR-99 at Airport Road, the I-5 northbound ramps at 128th Street SW/SR-96 and SR-525 at 84th Street SW. These four intersections are all anticipated to operate at a deficient level of service under the 2018 without project conditions.

7.5 2018 with Project Conditions

The additional trips from the project will not change the anticipated level of service at the intersections studied for the surrounding jurisdictions. The four intersections that are anticipated to operate at deficient levels of service under the 2018 without project conditions will continue to operate at deficient levels of service with the development. The remaining intersections studied for the surrounding jurisdictions are anticipated to continue operating within acceptable thresholds of the surrounding jurisdictions under the 2018 with project conditions.

7.6 Summary of Impacts to Intersections of Surrounding Jurisdictions

The trips from the project are not anticipated to cause any of the study intersections for the surrounding jurisdictions to operate below acceptable thresholds. The project will add trips to four intersections operating at a deficient level of service, but these intersections will operate at a deficient level of service regardless of the project. A summary of the intersection level of service analysis for the surrounding jurisdictions is included in Table 21.

The project will add trips to the intersection of SR-99 at Airport Road, which currently operates at LOS F and will continue to operate at LOS F. The City of Everett has indicated that additional capacity improvements for single-occupancy vehicles to this intersection are not practical due to the existing channelization and lack of right-of-way. However, the City of Everett has provided high-occupancy vehicle and signal timings improvements at the intersection as part of the SWIFT bus rapid transit along the SR-99 corridor. The project will also add trips to two WSDOT intersections operating at deficient levels of service, SR-525 at Beverly Park Road and the I-5 northbound ramps at 128th Street SW/SR-96. WSDOT is planning to improve the I-5 interchange at 128th Street SW to a Single-Point Urban Interchange (SPUI) that will also include improvements to the surrounding intersections on SR-96. These improvements will consolidate the southbound and northbound ramps into a single intersection and add capacity out to 3rd Avenue W, which is anticipated to allow the interchange to operate at acceptable LOS D. The WSDOT traffic mitigation fees will help pay for this improvement project and will off-set the impacts of the project. The City of Mukilteo intersection of SR-525 at 84th Street SW is anticipated to operate at deficient LOS E, regardless of the project. However, WSDOT is currently working on the signal timings along the SR-525 corridor to improve the operation of the intersection. Optimizing the signal timings for the intersection of SR-525 at 84th Street SW would allow the intersection to operate at acceptable LOS D under the 2018 future with project conditions. It should also be noted that traffic mitigation fee payments to WSDOT and the City of Mukilteo are proposed, which would mitigate the project's impacts to these study intersections.

Table 21: Level of Service Summary for Surrounding Jurisdictions Intersections

Intersection	Existing Conditions		2013 without Project Conditions		2013 with Project Conditions		2018 without Project Conditions		2018 with Project Conditions	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. SR-525 at Beverly Park Road	F	144.1 sec	F	151.5 sec	F	154.2 sec	F	172.3 sec	F	175.2 sec
5. Beverly Park Road at Airport Road	C	23.2 sec	C	23.7 sec	C	24.3 sec	C	24.4 sec	C	25.0 sec
6. SR-99 at Airport Road	E	73.9 sec	E	78.8 sec	F	81.1 sec	F	86.7 sec	F	90.7 sec
12. I-5 Southbound Ramps at 128 th Street SW	D	36.0 sec	D	37.3 sec	D	37.6 sec	E	72.5 sec	E	75.2 sec
17. I-5 Northbound Ramps at 128 th Street SW/SR-96	D	59.2 sec	E	64.8 sec	E	66.4 sec	F	138.3 sec	F	139.4 sec
18. Airport Road at 112 th Street SW	C	28.5 sec	C	29.7 sec	C	30.1 sec	C	32.4 sec	C	32.9 sec
19. Airport Road at Casino Road	B	11.5 sec	B	11.6 sec	B	11.6 sec	B	11.4 sec	B	11.4 sec
20. Airport Road at SR-526 Westbound Ramps	C	26.5 sec	C	26.6 sec	C	26.7 sec	C	26.6 sec	C	26.6 sec
21. SR-526/Paine Field Blvd at 84 th Street SW	C	32.3 sec	C	32.7 sec	C	33.1 sec	D	39.5 sec	D	40.2 sec
22. 44 th Avenue W at 84 th Street SW	B	10.2 sec	B	10.3 sec	B	10.4 sec	B	17.1 sec	B	17.3 sec
23. SR-525 at 84 th Street SW	D	54.7 sec	E	58.5 sec	E	59.5 sec	E	74.7 sec	E	76.1 sec
24. Evergreen Way at SR-526 Westbound Ramps	C	23.3 sec	C	24.0 sec	C	24.0 sec	C	25.3 sec	C	25.3 sec

The level of service calculations for the existing intersection and SEPA analysis is included in the attachments of this report.

8. MITIGATION

The Washington GMA and RCW 82.02.050(2) authorize local jurisdictions to establish proportionate share traffic mitigation fees in order to fund capital facilities, such as roads and intersections. SCC 30.66B applies that authority to developments in order to fund road improvements that would accommodate development. Additionally, through SCC 30.66B and SEPA, Snohomish County has established reciprocal traffic mitigation fee interlocal agreements with WSDOT and the City of Mukilteo that are within the influence area of the project.

The project is located in Snohomish County, which assesses Transportation Demand Management and general traffic mitigation fees for new trips generated within unincorporated Snohomish County. In addition, Snohomish County has interlocal agreements with WSDOT and the City of Mukilteo for reciprocal payment of mitigation fees. The Snohomish County, WSDOT and City of Mukilteo traffic mitigation fees are assessed, regardless of a development's impact on the surrounding arterials and intersections. Transportation Demand Management can be satisfied through on-site improvement or payment of the Transportation Demand Management mitigation fee.

Snohomish County does not have an interlocal agreement with the City of Everett for the payment of mitigation fees. However, the City of Everett can request mitigation for impacts to City of Everett intersections through SEPA if its determined there is a significant impact.

8.1 Transportation Demand Management

Snohomish County imposes Transportation Demand Management (TDM) as a way to reduce single-occupancy vehicles during the AM and PM peak-hours. TDM mitigation can be satisfied by paying a fee or providing adequate on-site measures. SCC 60.66B.640 requires pedestrian improvements and bicycle parking to satisfy the on-site TDM requirements.

An existing pedestrian walkway from Airport Road to the project will satisfy the on-site pedestrian walkway measures of TDM. Bicycle parking spaces for 5 bicycles, equal to 2% of the peak-hour trips generated by the project, will need to be provided to satisfy the bicycle portion of the TDM requirements.

Providing these on-site measures will mean that the project is not required to pay TDM mitigation fees and will also receive a 5% credit towards the Snohomish County, WSDOT and City of Mukilteo mitigation fees.

8.2 Snohomish County

The project will be considered a commercial development for the purposes of assessing Snohomish County traffic mitigation fees. Snohomish County traffic mitigation fees are \$227 per daily trip for commercial developments inside the Urban Growth Area (UGA). The project is anticipated to generate 956 off-site daily trips that traffic mitigation fees will need to be paid for. The Snohomish County traffic mitigation fees for the project will be \$206,161.40 with the

5% credit for the on-site TDM measures. These mitigation fees are assessed by Snohomish County regardless of the impact the project has on Snohomish County arterials.

8.3 Washington State Department of Transportation

WSDOT has established an area-wide traffic mitigation fee of \$36 per daily trip for developments in Snohomish County. The 956 off-site daily trips generated by the project will result in WSDOT traffic mitigation fees of \$32,695.20 with the 5% credit for the on-site TDM measures. The traffic mitigation fees are assessed regardless of the impact the development has on the level of service of WSDOT intersections.

The project will add trips to two WSDOT intersections that are operating or are anticipated to operate at deficient levels of service, SR-525 at Beverly Park Road and the I-5 northbound ramps at 128th Street SW/SR-96. The intersection of SR-525 at Beverly Park Road was recently improved to provide the ultimate channelization for the intersection, including dual left-turn lanes for the southbound and westbound movements. WSDOT is planning to improve the I-5 interchange at 128th Street SW/SR-96 to a SPUI, which the project's WSDOT traffic mitigation fees will help pay for. The trips from the project will account for 28 of the 6,298 trips at the SR-525 at Beverly Park Road intersection and 31 of the 5,221 trips anticipated at the I-5 northbound ramps at 128th Street SW/SR-96 under the 2018 with project conditions (see pages F-1, F-2, F-49 and F-50 of the attachments). These trips will account for a proportionate share of 0.44% at the /SR-525 intersection and 0.59% at the northbound ramps. The impact of trips from the project should not be considered significant since the impact of trips is less than 1%, the change in delay is less than 3 seconds with the project and the intersection operates at LOS F regardless of whether the project is implemented. The remaining WSDOT intersections analyzed for this report will operate LOS D or better with the project.

The interlocal agreement between Snohomish County and WSDOT requires high accident locations impacted with 10 or more PM peak-hour trips to be disclosed. WSDOT no longer publishes HAL information and therefore it is not possible to determine if the project will impact any current HALs with 10 or more PM peak-hour trips. The latest data available to Gibson Traffic Consultants, Inc., which was published in 2007, shows that there are several HALs along SR-96, SR-99, SR-525 and SR-526 that will be impacted. It is likely that recent improvements to these roadways or revised accident data has eliminated several sections as HALs since the publication in 2007. Impacts to HALs have historically been mitigated through payment of WSDOT's area-wide mitigation fee.

8.4 City of Mukilteo

Snohomish County and the City of Mukilteo have an interlocal agreement that provides for reciprocal mitigation fees between the two jurisdictions. The project is located in Zone 4 of the interlocal agreement. Projects in Zone 4 have a predetermined impact of 25% on City of Mukilteo roadways, based on the interlocal agreement. The current City of Mukilteo traffic mitigation fee is \$1,875 per PM peak-hour trip. The project will generate 212 off-site PM peak-hour trips, for which traffic mitigation fees will need to be paid. The City of Mukilteo traffic mitigation fee, based on a 25% impact for 212 off-site trips and a mitigation fee of \$1,875 per

PM peak-hour trip, is \$94,406.25 with the 5% credit for the on-site TDM measures. These traffic impact fees are assessed regardless of the project's impacts to the operation of City of Mukilteo intersections.

The payment of these traffic mitigation fees will help fund roadway improvements and work to ensure that intersections operate as efficient as possible, such as improvements to signal timings. Optimized signal timings are anticipated to allow the intersection of SR-525 at 84th Street SW to operate at acceptable LOS D with 48.5 seconds of delay (the level of service analysis is included in the Attachment X). The project will account for 18 of the 2,428 trips at the intersection of SR-525 at 84th Street SW under the 2018 with project conditions (see pages xxx of the attachments). These trips will account for a proportionate share of 0.74%. The impact of trips from the project should not be considered significant since the impact of trips is less than 1%, the change in delay is less than 4 seconds with the project and the intersection operates at LOS E without signal timing improvements, regardless of whether the project occurs.

8.5 City of Everett

Snohomish County and the City of Everett do not have an interlocal agreement that provides for reciprocal traffic mitigation fees. However, the project will add trips to the intersection of SR-99 at Airport Road, which operates at deficient LOS F under the existing and future conditions. City of Everett staff has indicated that additional improvements for single-occupancy vehicles are not planned. The only potential improvements, based on comments from City of Everett staff, are for buses and high-occupancy vehicles.

It is at the discretion of the City of Everett as to whether mitigation fees for impacts to the intersection of SR-99 at Airport Road are required. If they are required, the traffic mitigation fees for trips from the project should not be in excess of the proportionate share. The trips from the project will account for 74 of the 5,828 trips anticipated at the intersection under the 2018 with project conditions (see pages F-16 and F-17 of the attachments). These trips will account for a proportionate share of 1.27%. The impact of trips from the project should not be considered significant since the impact of trips is less than 2%, the change in delay is less than 4 seconds with the project and the intersection operates at LOS F under the existing conditions.

8.6 Summary of Traffic Mitigation Fees

The project will generate 956 off-site daily trips and 212 off-site PM peak-hour trips. The traffic mitigation fees to mitigate the impacts of these trips are summarized in Table 26.

Table 22: Traffic Mitigation Fee Summary

Jurisdiction	Fee per Trip Type	Trip Type	Trips	Mitigation Fee with 5% TDM reduction
Snohomish County	\$227	ADT	956	\$206,161.40
WSDOT	\$36	ADT	956	\$32,695.20
City of Mukilteo	\$1,875	25% of PM Peak-Hour	53	\$94,406.25
TOTAL				\$333,262.85

The traffic mitigation fees for the project include a 5% reduction for on-site TDM measures. These mitigation fees are assessed regardless of the impact the project has on the Snohomish County arterials and WSDOT, City of Mukilteo and City of Everett intersections.

9. CONCLUSIONS

The project is proposed to result in 956 average daily trips and 212 peak-hour trips impacting the surrounding roadways and intersections. These trips will not cause any Snohomish County arterials or any WSDOT, City of Mukilteo or City of Everett intersections analyzed for this report to operate at a deficient level of service. The total traffic mitigation fees paid to Snohomish County, WSDOT and the City of Mukilteo for the project is \$333,262.85. In addition, there are existing pedestrian facilities to the terminal and bicycle facilities at the terminal in the form of bike racks will be completed to satisfy the requirements of Transportation Demand Management.