MEMORANDUM

To: SR 520 Program Files

From: Anthony Sarhan, FHWA Major Projects Oversight Manager;
Allison Hanson, WSDOT ESO Mega Projects Environmental Director

Date: January 23, 2014

Copies To: Daniel Babuca, WSDOT SR 520 West Approach Bridge North Engineering Manager;
Daniele Dunjic Zeitner, WSDOT SR 520 West Approach Bridge North Assistant Project Engineer;
Margaret Kucharski, WSDOT SR 520 Environmental Lead;
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Subject: **SR 520, I-5 to Medina: Bridge Replacement and HOV Project – West Approach Bridge North**

The purpose of this memorandum is to document National Environmental Policy Act (NEPA), State Environmental Policy Act (SEPA), Endangered Species Act (ESA), and Section 106 and 4(f) compliance for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project associated with changes to the West Approach Bridge North (WABN). Once completed, the WABN structure will comprise the north side of the connection from the new floating bridge to the Montlake area.

Environmental documentation for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project includes the Final Environmental Impact Statement (June 2011) and supporting discipline reports, the Record of Decision (August 2011), SEPA Addenda (October and November 2011) NEPA Environmental Reevaluations (December 2011, January 2012, July 2012, October 2012, February 2013, and February 2013), and other memoranda. As the project proceeds with final design and construction, proposed modifications to design and delivery methods have been compared to findings in the Final Environmental Impact Statement (Final EIS), Record of Decision (ROD), and other existing reports and documentation.

The Final EIS described the West Approach Area as a project component that would be built between 2013 and 2018. The Final EIS stated that project components would be built in stages if full funding is not available by 2012. Due to current funding availability, WSDOT intends to

construct the West Approach Bridge North (WABN) structure first in the sequence of components to be built in the West Approach Area. In preparation for the construction of WABN, WSDOT has refined the design of the structure and the associated construction techniques. This memorandum describes the proposed changes to the WABN design and construction techniques, and compares potential environmental effects specific to WABN to the overall West Approach Area described in the Final EIS.

West Approach Bridge North Design Refinements

The Final EIS described the West Approach Area as one structural element including two bridge structures: one bridge to the north that would carry westbound traffic, and one bridge to the south that would carry eastbound traffic. The Final EIS stated that the Preferred Alternative would include replacement of the existing West Approach Bridge with wider and higher structures, maintaining a constant profile rising from the shoreline at Montlake out to the west transition span. The Preferred Alternative included removal of the existing Lake Washington Boulevard eastbound on-ramp and westbound off-ramp and the unused R.H. Thomson Expressway ramps.

The WABN phase of the I-5 to Medina project will construct the bridge to the north between the bridge abutment at Montlake and the west transition span. The bridge alignment has been shifted slightly, 29 feet to the north near Marsh Island, and the bridge abutment has been relocated approximately 50 feet west, compared to the Preferred Alternative. The profile of the WABN structure is the same as was described in the Final EIS, maintaining a 0.7 percent grade between the high point at the western high rise to the low point at Montlake. The lane configuration is also the same as the Preferred Alternative, with two general purpose lanes and one high occupancy vehicle (HOV) lane with shoulders. The WABN phase also includes a temporary connection to the existing 520 mainline in the Montlake area.

The design of the WABN structure is largely consistent with the Preferred Alternative; the primary difference being that only the northern of the two bridges of the West Approach Area described in the Final EIS is being constructed at this time. WABN includes some of the features that were included in the Preferred Alternative for the Montlake area; other features will be constructed at a later time. The westbound off ramp to Montlake Boulevard would be relocated and the westbound off ramp to Lake Washington Boulevard and R.H. Thompson ramps would be removed as part of WABN. The existing Lake Washington Boulevard eastbound on-ramp would remain in operation until the West Approach Bridge South (WABS) is constructed. The existing West Approach Bridge would be utilized as part of the interim connection to the floating bridge until WABS is constructed.

The design of WABN has been refined since the Final EIS was completed, with the goal of minimizing environmental impacts. The westbound off-ramp to Montlake Boulevard was reduced from two lanes to one over Foster Island, which allowed the overall footprint of the bridge structure to be reduced in this area. The number of columns needed to support the bridge structure has been reduced by one column per pier bent for a total reduction of 41 columns, and the configuration of the columns has been changed to further minimize impacts. Attachment 1 shows a graphical representation of the WABN column configuration.

WSDOT coordinated with the City of Seattle about design refinements to the I-5 to Medina Project through the Seattle Community Design Process (SCDP). One outcome of this coordination resulted in changes to the configuration of parking near East Montlake Park. The Final EIS stated that 26 spaces from the existing MOHAI parking area would be retained for use by visitors to East Montlake Park. Through the SCDP, the City of Seattle requested that the design of the park be refined to incorporate this existing parking area as open space, maintaining continuity of open space throughout the park. On East Park Drive East, diagonal parking will be added to the east side of the street, and will replace the limited (approximately 3 spaces) existing on-street parking in the same location with 12 spaces. This change would result in a reduction of 14 parking spaces from what was proposed in the Final EIS. The SCDP determined that this reduction in parking spaces was acceptable, considering the anticipated future parking needs in the area and the benefits associated with the additional open space incorporated into the park design.

A portion of East Montlake Park is designated as a Section 6(f) resource, including the parking area that will be removed for WABN construction. The removal and replacement of the parking area was coordinated with and approved by the University of Washington and Seattle Parks and Recreation (the 6(f) grantees), and the Washington State Recreation and Conservation Office (RCO).

West Approach Bridge North Construction Technique Changes

As the WABN design has progressed, changes to construction techniques and timing have also been identified. The configuration of the work bridges needed to construct WABN has been refined and the construction period for WABN has been reduced from what was assumed in the Final EIS, which has resulted in a reduction in duration of temporary in-water impacts.

Several road closures and traffic disruptions described in the Final EIS have changed or been reduced. The Final EIS stated that the 24th Avenue East Bridge in the Montlake area would be closed for approximately one year for demolition and reconstruction. By constructing WABN first, the closure of the 24th Avenue East Bridge would be reduced to approximately four months. Because the Montlake lid would not be constructed as part of WABN, the existing 24th Avenue East Bridge would be left in place temporarily. The on ramp from Lake Washington Boulevard to eastbound SR 520 would remain open and the off ramp from westbound SR 520 to Lake Washington Boulevard would be demolished, while the off ramp movement would be relocated to the existing 24th Avenue bridge, similar to the ultimate Preferred Alternative concept. Capacity improvements would be built at the Montlake / Lake Washington Boulevard Eastbound ramps intersection to facilitate additional traffic associated with the ramp closure. Traffic operations (vehicle speeds) along the local arterials for the WABN phase would be similar to existing conditions. The WABN design includes lengthening of 24th Avenue East, which will allow the Montlake lid to be constructed at a later time with fewer road closures and traffic disruptions.

Once WABN is completed, westbound traffic would be shifted onto the new bridge structure. Eastbound traffic would continue to use the existing south bridge structure until WABS is constructed. This configuration would maintain three lanes (two general purpose lanes and one HOV lane) of traffic eastbound and westbound until WABS construction begins. Attachment 2

provides an overview of traffic flow in the Montlake area following construction of the WABN phase.

Stormwater from the WABN structure will be managed as described in the Final EIS. The WABN structure would contribute only a portion of the stormwater associated with the West Approach Area described in the Final EIS; as such, a commensurate portion of the stormwater management infrastructure described in the Final EIS would be built as part of the WABN phase.

Stormwater Facility M would be partially constructed as part of WABN. WSDOT has determined that a portion of the stormwater generated cannot feasibly be routed to Facility M during the WABN phase. To address this temporary issue, WSDOT proposes to conduct high-efficiency street sweeping on an equivalent portion of the existing bridge structure as a temporary best management practice to augment stormwater treatment provided by Facility M during the WABN phase. The high-efficiency sweeping would begin once the WABN structure is built and would continue until future construction phases render this infeasible (e.g., existing bridges are demolished). The remaining WABN phase stormwater would then be routed to Facility M when construction of the facility is completed during a future construction phase. Additional stormwater management infrastructure would be completed at a later time as other project components are constructed.

Analyses of Changed Conditions and Effects

FHWA and WSDOT evaluated the proposed changes to the WABN phase and potential changes to environmental effects as described in the Final EIS. FHWA and WSDOT concluded that no additional adverse effects beyond those described in the Final EIS and ROD would result from the changed conditions. Additional detail pertaining to specific resources that had the potential to be affected by the changes is provided below.

Transportation

The WABN interim connection in the Montlake area differs from the construction phasing in this area that was described in the Final EIS. WSDOT has worked closely with the City of Seattle Department of Transportation to ensure that the interim connection in the Montlake area would not result in adverse effects to traffic operations on local streets (see Attachment 3). WSDOT worked with the City of Seattle, conducting traffic operations analysis over several months, to provide the City with a clear understanding of how traffic would operate, and an opportunity to identify traffic operation issues and strategies that could be implemented to address these concerns. The analysis demonstrated that traffic operations and vehicle speeds on local streets during the WABN interim connection in the Montlake area would be similar to existing conditions. This is consistent with the Final EIS description of traffic operations in this area during construction. Attachment 3 provides additional detail about the coordination with the City of Seattle and traffic operations analysis.

The changes to the WABN design described above would not result in any adverse effects to traffic operations on SR 520. The implementation of the WABN phase would allow the HOV lanes on the new SR 520 floating bridge to extend to the vicinity of the Montlake area, providing six lanes of traffic from Montlake to the eastside. This would reduce the congestion that would

otherwise occur on the new floating bridge, where six lanes would narrow to four lanes east of the west highrise section of the bridge.

Visual Quality

The proposed changes in the configuration of columns supporting the WABN structure would result in changes to views once the structure is completed, compared to the design described in the Final EIS. The proposed changes to the column configuration would be noticeable from many viewpoints, but are not expected to diminish or degrade visual quality. The reduction in columns would result in less blockage of views from many viewpoints. The proposed changes to the bridge alignment are so minor that they would likely not be noticeable from most viewpoints. The overall effect of the I-5 to Medina project on views would not be noticeably different from what was described in the Final EIS.

Cultural Resources

WSDOT identified the need to make minor adjustments (seven locations in total) to the limits of construction to facilitate construction of the WABN phase (see Attachment 4). None of the proposed updates were located outside of the previously identified Area of Potential Effects. WSDOT, on behalf of FHWA evaluated the proposed changes to the limits of construction and determined that they would not adversely affect historic properties.

Five of the updates are located within the Montlake Historic District. Of these, one of the updates, which is needed for the proposed changes to the East Montlake Park parking area described above, is located adjacent to four contributing resources. The diagonal parking would be visible from all of these resources, which would alter, but not diminish their integrity of setting. These properties are adjacent to a city street with existing on-street parking, and also overlook the existing MOHAI parking lot, which will be removed as construction of the I-5 to Medina Project progresses. The change in visual setting would be minor, and would not be an adverse effect to historic properties.

WSDOT, on behalf of FHWA notified the State Historic Preservation Office (SHPO) of the changes and determined that the proposed changes would not result in additional adverse effects to historic properties. Concurrence was received from SHPO on August 12, 2013.

Noise

WSDOT analyzed the potential effects of the interim connection in the Montlake area to ensure that no unanticipated temporary noise effects would occur (Attachment 5). The noise levels projected to occur following implementation of the WABN phase were compared to the 2030 Build condition noise levels modeled for the Preferred Alternative as described in the Final EIS. The WABN noise levels were modeled using year 2030 traffic to be comparable to the Build and No-Build conditions described in the Final EIS. This assumption results in a conservative estimate of noise levels, because year 2030 traffic is estimated to include additional traffic and higher noise levels than would be expected to occur during the WABN phase. The analysis concluded that noise levels would be expected to decrease slightly in 2030 when compared to

existing conditions modeled to 2030 at most of the modeled locations in the Montlake area; the maximum increase predicted at any location was one decibel, which would not amount to an audible change in noise levels. Attachment 5 provides additional detail about the noise analysis for the interim connection in the Montlake area. The changes to the WABN design described above would not result in any additional adverse effects related to noise.

Ecosystems

WSDOT analyzed the potential effects of proposed changes on fish and aquatic habitat, including potential changes in turbidity effects, pile driving activities, shading effects, and structural complexity (in-water columns and piles). Overall, the analysis demonstrated that the proposed changes to the bridge footprint, alignment, and column configuration generally reduced the amount and extent of take authorized in the Biological Opinion for PS Chinook, PS steelhead, and Coastal-Puget Sound bull trout. However, the timing of authorized take associated with construction activities over the course of the West Approach construction period has changed. Collectively, the proposed changes do not represent new mechanisms of effect not previously considered during ESA consultation, nor do they exceed the overall amount of take authorized in the incidental take statements.

Section 4(f) Use and Section 6(f) Impacts

As described above and in Attachment 4, WSDOT updated the limits of construction due to the proposed changes to the WABN phase. Three of these updates were evaluated for the potential for additional Section 4(f) use or 6(f) impacts.

The WSDOT Peninsula was not included in the Section 4(f) use discussion in the Final EIS because of an existing agreement between WSDOT and the City of Seattle signed in 1990, which stated that the right of way in that area was reserved for future transportation purposes. This agreement demonstrates that the parking lot used for access to the Washington Park Arboretum/ WSDOT Peninsula is not protected under Section 4(f), and the parking lot's addition into the limits of construction does not result in additional Section 4(f) use.

Regarding the addition to the limits of construction on Lake Washington Boulevard near 24th Avenue East, the Section 4(f) evaluation included in the Final EIS indicates that the Section 4(f) exception, 23 CFR 774.13(a) was applied to Lake Washington Boulevard. This exception is used for NRHP-eligible, linear historic properties such as transportation facilities.

The proposed changes to East Montlake Park would not result in any additional Section 4(f) use or conversion of Section 6(f) property. The proposed changes were developed per request from the City of Seattle through ongoing coordination. The proposed changes are consistent with the Section 4(f) use of East Montlake Park described in the Final EIS. Construction in the parking lot area would be completed within the 6-month period of exemption permitted under Section 6(f) for temporary use, and the property would be returned to the City of Seattle's jurisdiction once construction activities are completed. The proposed changes were approved by the Section 6(f) grantees (University of Washington and Seattle Parks and Recreation) and the Washington State Recreation and Conservation Office (RCO).

Environmental Justice

The WABN phase would be located within the Muckleshoot Indian Tribe's usual and accustomed fishing areas. As described above, minor additions were made to the previously described limits of construction, which were referenced in the Memorandum of Agreement among WSDOT, FHWA, and the Muckleshoot Indian Tribe. These additions are not anticipated to result in any effects beyond those anticipated to occur within the limits of construction as described in the Final EIS. FHWA and WSDOT do not anticipate additional impacts to tribal fisheries beyond those described in the Final EIS. FHWA and WSDOT will continue to coordinate with the Muckleshoot Indian Tribe. This commitment regarding continued coordination is documented in the Final EIS, and has been maintained throughout government-to-government consultation. There are no other changes that would affect low-income, minority, or limited-English proficient populations. Based on this information, the environmental justice determination as described in the Final EIS would not change.

Consistency with Environmental Documentation

FHWA and WSDOT evaluated the proposed changes to the WABN phase and potential changes to environmental effects as described in the Final EIS, and have concluded that that no additional adverse effects beyond those described in the Final EIS and ROD would result from the changed conditions.

As described above, FHWA and WSDOT do not expect the proposed changes to the WABN phase design or construction techniques to result in additional effects to fish or aquatic habitat beyond those described in the Final EIS. FHWA reinitiated Endangered Species Act consultation with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) on July 26, 2013 regarding the proposed changes to the WABN phase of the project. NMFS and USFWS have modified the ESA Section 7 consultation associated with this project to recognize the changes in described work, and have amended the extent and timing of take to reflect the updated WABN design; their conclusions remain unchanged resulting in a "no jeopardy" determination.

As described above, WSDOT consulted with SHPO regarding updates to the limits of construction for the WABN phase and received concurrence on August 12, 2013. A WSDOT Cultural Resources Specialist has determined that no additional analysis or consultation is necessary for Section 106 compliance or Section 4(f) compliance related to historic properties as a result of the proposed changes.

As documented above, the project remains compliant with current federal, state, local, and departmental regulations and directives with regard to NEPA/SEPA processes, Section 106, 4(f) and 6(f), and the Endangered Species Act. No additional environmental review is required.

We have reviewed and agree with the contents of this memorandum.

Region / Mode Official

Date

1/23/14

FHWA Official

Date

1/23/14

Attachments

1. WABN Column Configuation
2. Traffic Flow through Montlake during the WABN Phase
3. WABN Phase Traffic Operations Technical Memorandum
4. Section 106 Correspondence
5. WABN Phase Noise Level Comparison Technical Memorandum

Attachment 1
WABN Column Configuration

West Approach Bridge - Bridge Design Development

Vision

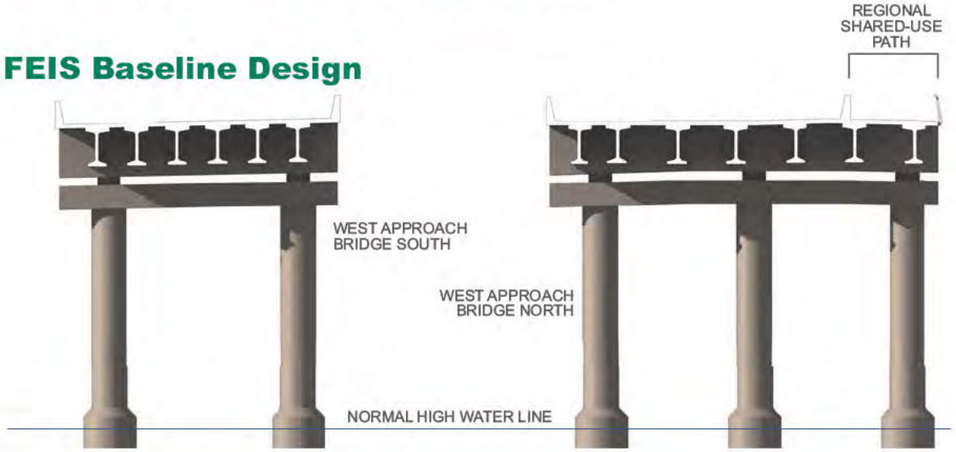
Our vision for the SR 520 corridor is to become the premier gateway for the City of Seattle by **reconnecting to the early Seattle vision of Nature meets City.**

We intend to implement the SR 520 Program in a manner that yields **affordable solutions** and fosters **groundbreaking sustainability practices** that support regional and local connectivity, ecology and the use of low-carbon materials. Further, the design of the corridor will **balance aesthetics, functionality, proportion and sense of speed** along the SR 520 facility to provide a **memorable experience** for all users.

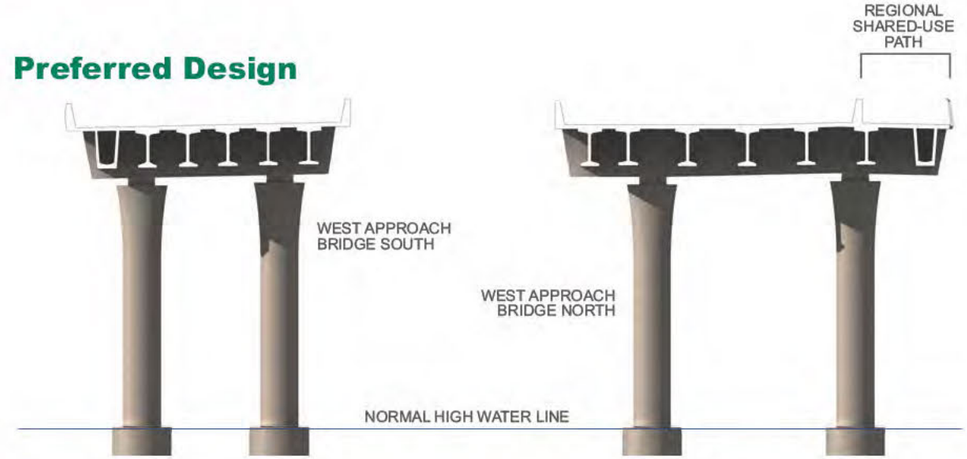
Design Refinements

From September - November 2012, the West Approach Bridge design team worked closely with the **Seattle Design Commission** to refine the baseline design established during the Final Environmental Impact Statement (FEIS) process, resulting in a preferred design that better reflects the goals and principles outlined in the project **Vision**.

FEIS Baseline Design



Preferred Design



CONCEPTUAL
DRAFT - THIS SKETCH ONLY DEPICTS THE IDEAL. ENGINEERING, OPERATIONS AND ENVIRONMENTAL ANALYSIS REQUIRED.

West Approach Bridge - Preferred Bridge Design

Preferred Design

Typical Pier

View of preferred design at a typical pier, facing northwest

View of preferred design at a typical pier, facing southwest

Preferred Design

Expansion Joint

View of preferred design at an expansion joint, facing northwest

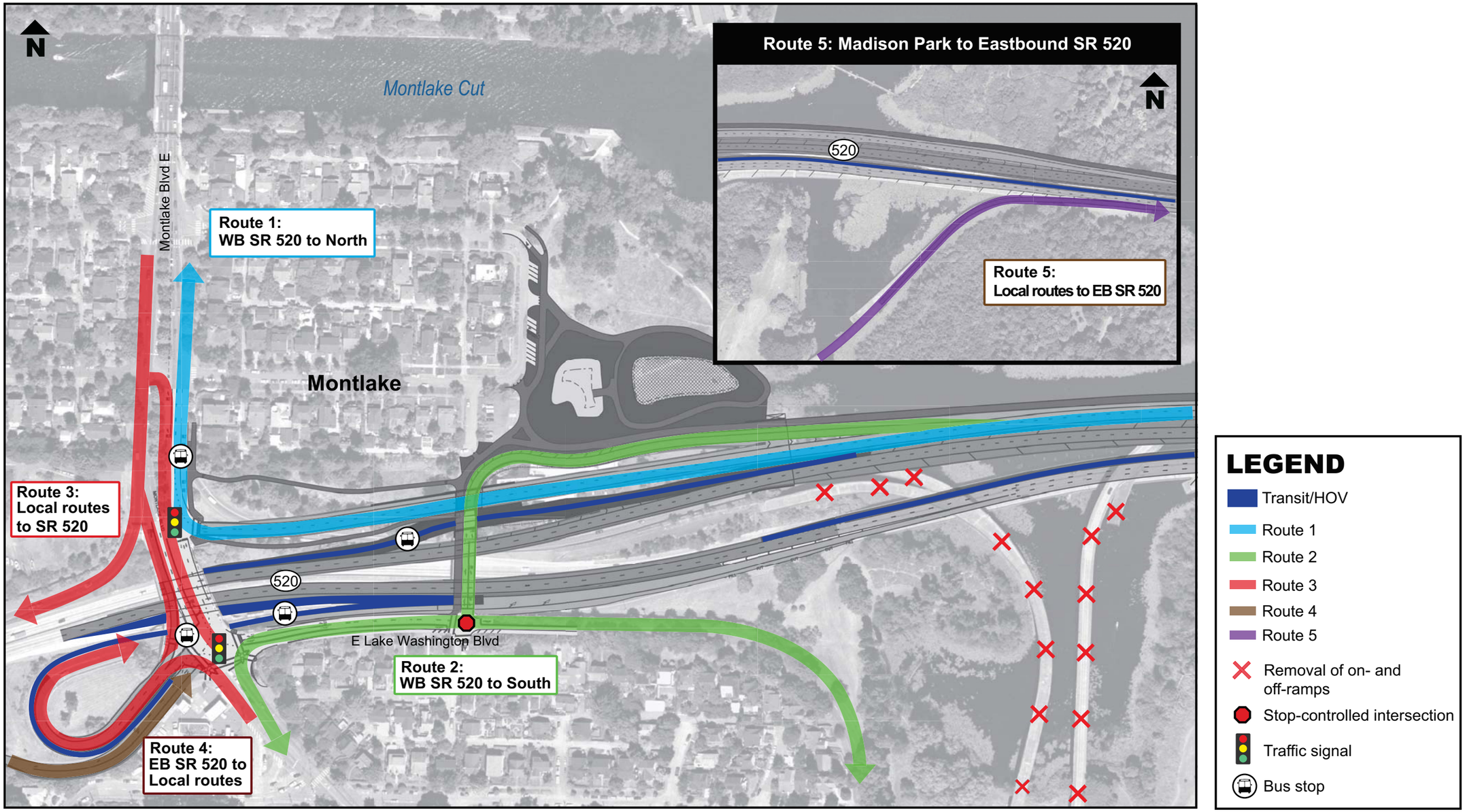
View of preferred design at an expansion joint, facing southwest

CONCEPTUAL

DRAFT - THIS SKETCH ONLY DEPICTS THE IDEA. ENGINEERING, OPERATIONS AND ENVIRONMENTAL ANALYSIS REQUIRED.

Attachment 2
Traffic flow through Montlake during the WABN Phase

How will I travel to my destination?



Attachment 3
WABN Phase Traffic Operations Technical Memorandum

MEMORANDUM

To: Daniel Babuca
From: Tresia Hammonds
Date: May 28, 2013
Copies To: Dave Edwards
Daniele Dunjic

Contract & Task Order: **Y-9761 HG**
File Code: **HG 5.2.1**

Subject: SR 520: I-5 to Medina, West Approach Bridge North Construction Phase
City of Seattle Coordination Traffic Operations Tech Memo

Introduction

Traffic operations analysis for the construction phases is necessary to provide a clear understanding for the lead agency and the affected agencies about how traffic will operate. This analysis also provides an opportunity to identify traffic operation issues that can be relieved with small design alterations, additional intelligent transportation systems planning, or travel demand management strategies. Working closely with the City of Seattle Department of Transportation ensures that the issues can be identified early and strategies can be implemented to address their concerns.

Comparison to FEIS Construction Phase

The WABN phase described in this memo includes portions of the construction phases described in the FEIS. Because funding is limited, the current WABN will not include construction of the Montlake lid and will utilize the existing 24th Avenue Bridge (rather than replace). The on ramp from Lake Washington Boulevard to eastbound SR 520 would remain open and the off ramp from westbound SR 520 to Lake Washington Boulevard would be demolished, while the off ramp movement would be relocated to access via the existing 24th Avenue bridge, similar to the ultimate Preferred Alternative concept. Capacity improvements would be built at the Montlake/Lake Washington Boulevard/Eastbound ramps intersection to facilitate additional traffic associated with the ramp closure.

Traffic operations (vehicle speeds) along the local arterials for the WABN phase would be similar to today. This is consistent with the FEIS construction phases that also provide operations similar to today.

The following discusses the phasing described in the FEIS and the WABN operations.

FEIS Construction Stages

In the FEIS traffic analysis, the construction stages similar to the WABN included the following phases:

1) In years 3 and 4 of construction of the I-5 to Medina project, the westbound off ramp to Lake Washington Boulevard would be closed and traffic rerouted to Montlake Boulevard. All westbound traffic that had used the Lake Washington Boulevard or Montlake Boulevard exit, would exit together at the Montlake Boulevard off ramp. A new signal and additional turn lanes would be constructed at the Montlake/SR 520 Westbound off ramp. This would allow traffic to turn left on southbound Montlake Boulevard and continue south or turn onto Lake Washington Boulevard. This replaced the function of the Lake Washington Boulevard off ramp for providing access to the south.

2) Before year 5, the Lake Washington Boulevard on ramp would be closed and rerouted to Montlake Boulevard. Additional capacity (or lanes) would be provided at the Montlake Boulevard/Lake Washington Boulevard/SR 520 Eastbound ramps intersection to facilitate this movement.

3) After the closure of the Lake Washington Boulevard on ramp and before year 5, the 24th Avenue bridge (previous access to MOHAI) would be reconstructed. Today the off ramp travels under the bridge. With the reconstruction of the bridge, the off ramp from SR 520 westbound would allow access to this new bridge. Traffic destined southbound along Montlake Boulevard or Lake Washington Boulevard would use 24th Avenue. It would no longer be needed to allow westbound left turns from the westbound off ramp to southbound Montlake.

WABN

The WABN phase as described in this memo includes the closure of the Lake Washington Boulevard off ramp. However the Lake Washington Boulevard on ramp would remain open and 24th Avenue would not be reconstructed.

The WABN phase would utilize the existing 24th Avenue bridge and reallocate lanes to provide the capacity needed to move these trips, and continue to provide non-motorized access over SR 520 between the neighborhoods.

This WABN phase differs from the FEIS in that the Lake Washington Boulevard on ramp remains open. When the Lake Washington Boulevard on ramp is closed, traffic will increase on Montlake Boulevard, triggering additional capacity improvements. These capacity improvements would require reconstruction of Montlake Boulevard and Lake Washington Boulevard. The reconstruction of those roadways requires portions of the lid to be constructed. Keeping the on ramp open would allow the WABN phase to continue within the funding available. Capacity improvements would still be provided at the Montlake/Lake Washington Boulevard/SR 520 westbound ramps intersection to move the additional trips at Montlake due to the Lake Washington off ramp closure but not to the extent as described in the FEIS with both ramps closed.

Traffic operations along the local arterials for the WABN phase would be similar to today. This is consistent with the FEIS construction phases that also provide operations similar to today.

The WABN phase would also allow the HOV lanes on the SR 520 mainline to extend to the vicinity of the Montlake interchange area, providing 6 lanes of traffic from Montlake to the eastside. This would reduce the congestion that would occur on the floating bridge with the FB&L project where 6 lanes narrow to 4 east of the west highrise.

Coordination Process

The SR 520 program met with the City of Seattle DOT to refine the WABN phase. The following are summary statements from each of the coordination meetings that were led by the SR 520 program transportation team. Materials for each of the meetings are included in Appendix A of this memorandum. Each of the meetings included staff attendance from the SR 520 program and from the City of Seattle DOT.

Review Traffic Volumes - October 2, 2012

Reviewed traffic volumes throughout the Montlake interchange area (AM and PM peak hours) with the toll on SR 520 in place. The count data supporting these volumes were collected in March through June of 2012. Agreed current conditions are represented by these volumes and are appropriate to use for the construction year analysis.

Follow up questions were to conduct an updated turn movement count at Montlake/Pacific Street because counts used in this analysis were completed in August (summer, UW is not in session) and to review the historic trends along Montlake to determine if growth over the next few years is anticipated.

Review Traffic Operations Analysis – October 25, 2012

Reviewed the traffic operations analysis process for the Montlake interchange area. Reviewed overall congestion levels and travel times for existing conditions and the WABN construction phase. Also reviewed storage needs WB along LWB between 24th and Montlake, and u-turn operations at Hamlin.

The City requested a follow up meeting to further review the model on the screen.

Review Traffic Operations Model – November 6, 2012

Reviewed the model on the screen. Comments from the City included the following:

- Today congestion on eastbound off ramp spills back onto SR 520, and
- Northbound congestion at Montlake/LWB spills south of Roanoke around “the bend”.

Reviewed the u-turn operations and noted that extending pocket or phase length could benefit u-turn spillback in the AM peak, but during the PM peak there is no receiving capacity on southbound Montlake because SR 520 westbound is queued onto Montlake.

Review Final Model Revisions and Westbound Lake Washington Boulevard Storage – January 10, 2013

The operations models were updated based comments on the model calibration. In addition, the team reviewed the storage needs along westbound Lake Washington Boulevard between 24th Avenue and Montlake Boulevard. The City agreed to the current design which provides two lanes of storage for the stretch between 24th Avenue and Montlake Boulevard.

Volumes

When the SR 520 Bridge Replacement and HOV Program's I-5 to Medina FEIS was completed, there was not a toll collection process initiated on the SR 520 corridor. For the construction chapter of the FEIS, the SR 520 Program transportation team estimated construction traffic volumes similar to existing conditions. Since the time of the FEIS Record of Decision and the coordination with the City of Seattle DOT for the first phase of construction, tolls have been implemented on the SR 520 corridor. It was agreed between the SR 520 program and the City of Seattle that the traffic volumes on the SR 520 corridor and on the City of Seattle arterials should be updated to reflect conditions with a toll in place.

Methodology

Through coordination with the City of Seattle, it was determined that the most conservative approach for forecasting traffic volumes would involve selecting a peak hour that would be determined based on the local traffic peaking conditions. This method ensured local operations would be most challenging during that peak hour. Traffic volume data for the on- and off-ramps that coincided with the peak local hour was used as a starting point for the balancing effort.

All traffic volumes were adjusted to match the local peak traffic as determined from counts across the Montlake cut. Turn movement counts were conducted for a single day; however, several counts over several months were available across the Montlake cut. With several counts available, a trend could be identified indicating typical traffic levels within the interchange area.

Results

The SR 520 team collected traffic volume data for both the freeway and multiple intersections adjacent to the SR 520 corridor. Some of the key changes in the updated ramp volumes with a toll in place compared to the FEIS construction or pre toll volumes are shown in Exhibit 1.

Exhibit 1. Comparison of Pre Toll and With Toll SR 520 Ramp Volumes

	Existing Pre toll and FEIS Construction / Existing with Toll and WABN Construction VPH		
SR 520 Westbound	On from Montlake	Off to Montlake	Off to Lake WA Blvd or 24th
AM Peak	620 / 1000	670 / 460	340 / 240
PM Peak	910 / 870	730 / 640	440 / 460
Eastbound	Off to Montlake	On from Montlake	On from Lake WA Blvd (redirected to Montlake with the WABN)
AM Peak	760 / 760	840 / 820	630 / 450
PM Peak	1030 / 810	890 / 680	350 / 230

The WABN overall forecasts at (or traffic in and out of) the Montlake interchange area are the same as today's conditions with the exception of changes in travel patterns associated with the closure of the off ramp from westbound SR 520 to Lake Washington Boulevard. When the

WABN is constructed, trips that take the off ramp today would be rerouted to exit to southbound 24th Avenue. From there, half the trips are anticipated to travel southbound on Montlake Boulevard and half southbound on Lake Washington Boulevard.

AM and PM peak hour turn movement volumes for existing conditions pre toll, existing conditions with the toll in place, and construction traffic volumes for the WABN are attached in Appendix B. Off peak hour turn movement volumes are attached in Appendix C.

Traffic Operations

Model Development/Refinement

The existing model developed for the SR 520 I-5 to Medina FEIS was used for this analysis. The model was further calibrated to reflect conditions with a toll in place. This included reducing capacity along Montlake to depict today's congestion that occurs from south of SR 520 to north of Pacific Street. The capacity was set to serve trips based on current count data. Up to a 100 vph increase in trips was added at both the north and southbound Montlake entry points to reflect current queued or unserved trips.

WABN Scenario Description

A base WABN scenario was used to start the analysis. As coordination continued with the City and design changes were implemented, some of these changes were included in the AM and PM peak models or only the PM peak model. Changes were not incorporated into all models as the conversation focused on the PM peak hour operations.

The base WABN model included northbound access to the park via 24th Avenue. This was removed in some subsequent models based on city and design coordination that allows this access to occur via Hamlin/Shelby Streets. When the park access is removed from 24th Avenue, 24th Avenue becomes southbound only from SR 520 westbound.

Coordination with the City determined the intersection of 24th Avenue/Lake Washington Boulevard would be all way stopped controlled. This was previously assumed to be a signal warrant however with the change to the park access and based on current volumes, a signal was not warranted. In addition, the cities bicycle route is designated along 24th Avenue across Lake Washington Boulevard at this location. Video files of an all way stop control and signal control were provided to the City and are included as a deliverable to the STATE.

Exhibit 2 identifies assumptions that were incorporated into various models.

Exhibit 2. Model Assumptions per Time Period

Time Period	24th/LWB intersection	Park Access via 24th	Bike/Ped path along west side of 24th	Freeway and westbound off ramp alignment
AM Peak	All way stop control	24th Avenue southbound only (no park access)	Not coded	Alignment based on October 2012
Off Peak (3PM)	Signal – If used for future	24th Avenue two way street with park access	Not coded	Alignment based on October 2012

	analysis, code as an all way stop			
PM Peak	All way stop control	24th Avenue southbound only (no park access)	Coded	Updated to reflect January 2013

Results

Results of the VISSIM model were shared with the City and included a variation of output type depending on the decisions needed or issues. Exhibit 3 shows the analysis scenarios and the type of results provided. Analysis results provided to the City are shown in Appendix A in the meeting materials.

Exhibit 3. Analysis Scenarios and Results Provided

Scenario	**Results Type**
AM Peak Hour	
Existing pre toll	Travel time charts, simulation shared on screen
Existing with toll	Travel time charts, simulation shared on screen
WABN with toll	Travel time charts, simulation shared on screen
PM Peak Hour	
Existing pre toll	Travel time charts, simulation shared on screen
Existing with toll	Travel time charts, simulation shared on screen
WABN with toll	
• Base scenario	Travel time charts, simulation shared on screen, Queue length WB approaching Montlake/LWB/EB Ramps intersection
• Stop control of LWB/24th	Video of 60 second cycle length at LWB/24th and all way stop at LWB/24th, no northbound park access
• Westbound storage along LWB between 24th and Montlake	Queue data through peak operating period
Off Peak Hour (3 PM)	
Existing with toll	Completed, analysis not provided (not requested)
WABN with toll	Completed, analysis not provided (not requested)

The videos of the stop control at 24th Avenue/Lake Washington Boulevard showed operations for both a signal and all way stop control condition. The City recommendation was for an all way stop control based on vehicle operations and nonmotorized travel.

Additional analysis was requested to show the queues along Lake Washington Boulevard (westbound) approaching Montlake Boulevard. The analysis determined that the two lanes of

storage between 24th and Montlake were exceeded 13 percent of the PM peak operating time period. If the storage were reduced to a 200 foot right turn lane, the storage would be exceeded 32 percent of the time period. Based on this analysis and the potential conflict with pedestrians and bicycles crossing Lake Washington Boulevard at 24th Avenue, the city concurred with the current design which provides two lanes of storage from 24th Avenue to Montlake Boulevard. Exhibit 4 shows the typical queues at this location. Additional information is included in Appendix A in the meeting materials.

Exhibit 4. Queue and Storage Needs for Westbound Lake Washington Boulevard approaching Montlake Boulevard, PM Peak Hour

Westbound Storage between 24th and Montlake	Typical Queue	Frequency queue extends past 24th
Two lanes to 24th	260 feet	13%
300' right turn pocket	330 feet	26%
200' right turn pocket	390 feet	32%

List of Appendices

Appendix A – Materials
Appendix B – Turn Movement Traffic Volumes, AM and PM Peak Hours
Appendix C – Turn Movement Traffic Volumes, Off Peak Hour (3PM)

Appendix A

Meeting Materials

SR 520 Program: WABN

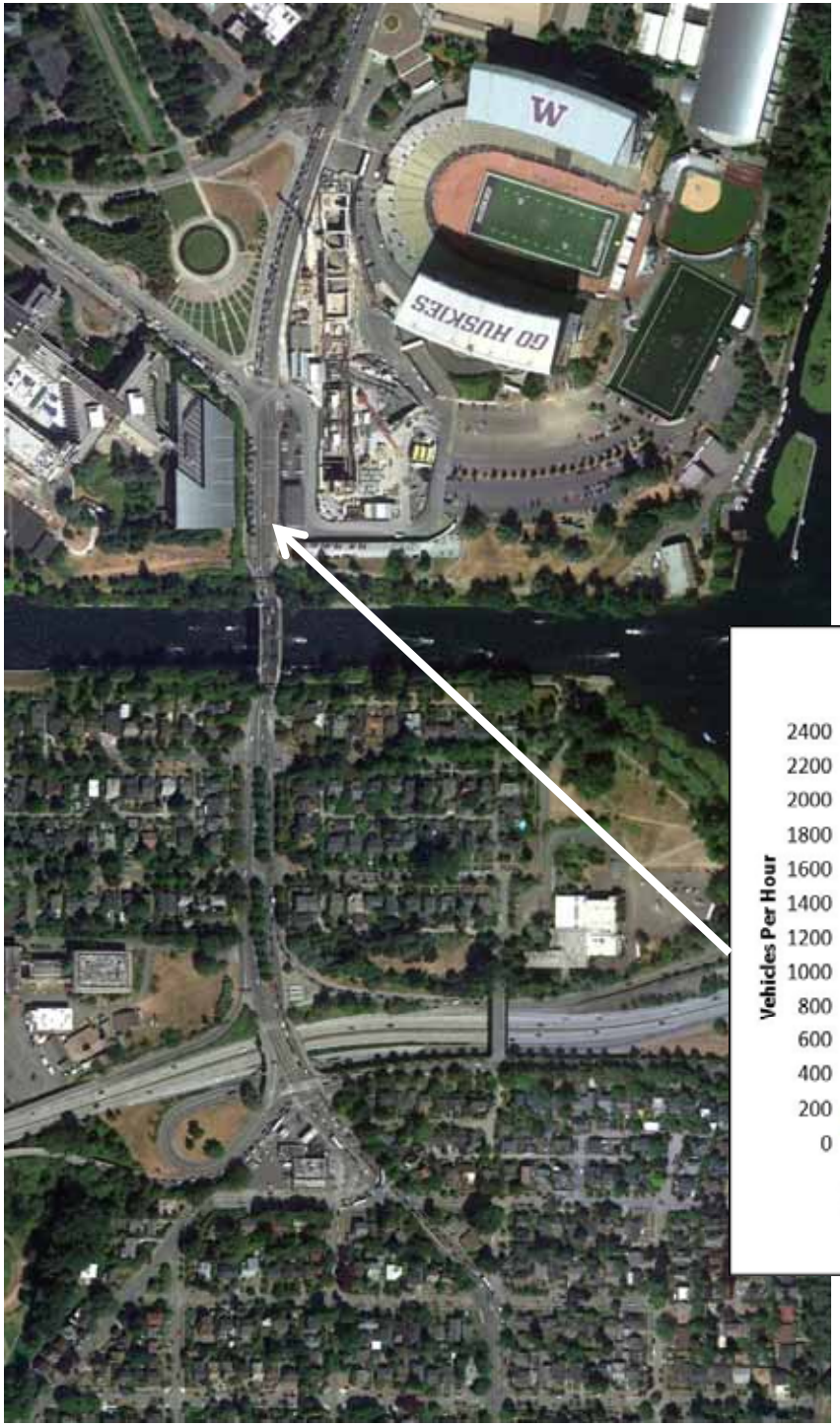
Construction Traffic Volumes

Update Existing Volumes

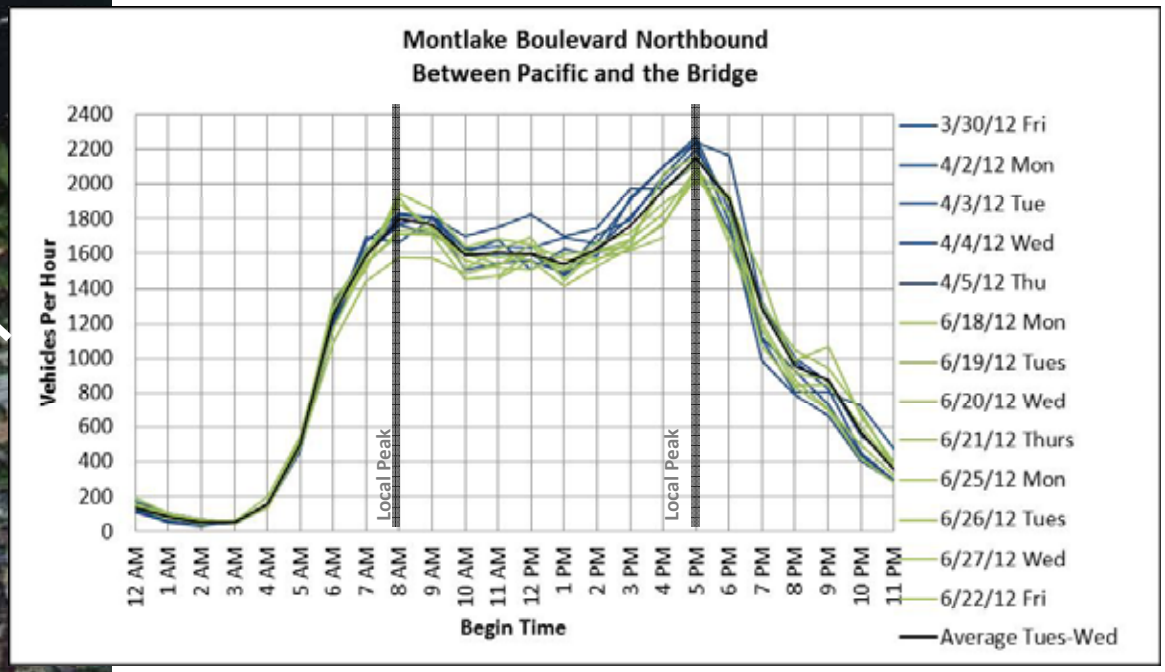
- Perform local intersection turning movement counts (August 2012)
  - Montlake/Pacific Street
  - Montlake/Hamlin
  - Montlake/Lake Washington Boulevard/Eastbound Ramps
  - Montlake/Roanoke
- Pull SR 520 interchange ramp count data (March – June 2012)
  - SR 520 westbound exit to Lake Washington Boulevard
  - SR 520 westbound exit to Montlake
  - From Montlake to SR 520 westbound
  - SR 520 eastbound exit to Montlake
  - From Montlake to SR 520 eastbound
  - From Lake Washington Boulevard to SR 502 eastbound

Balance Existing Volumes

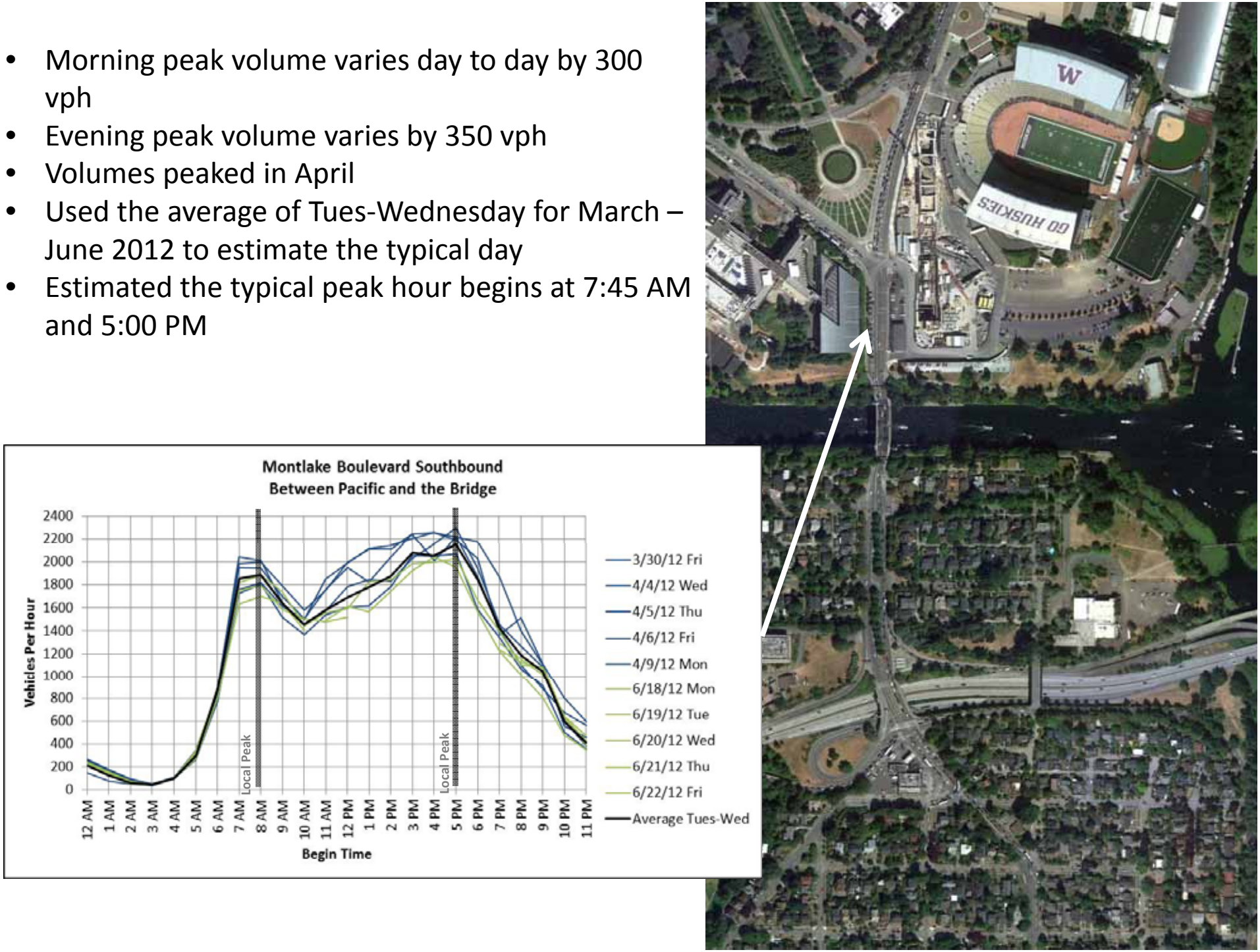
- Compare peaking characteristics of local and ramp traffic
- Select peak AM and PM hour
- Apply adjustments to local turn movement traffic to reflect typical day
  - Turn movement counts were conducted when UW was not in session and during the summer
  - Pulled peak volumes from counts (March – June 2012) across the Montlake cut and balanced local volumes along the Montlake corridor to match

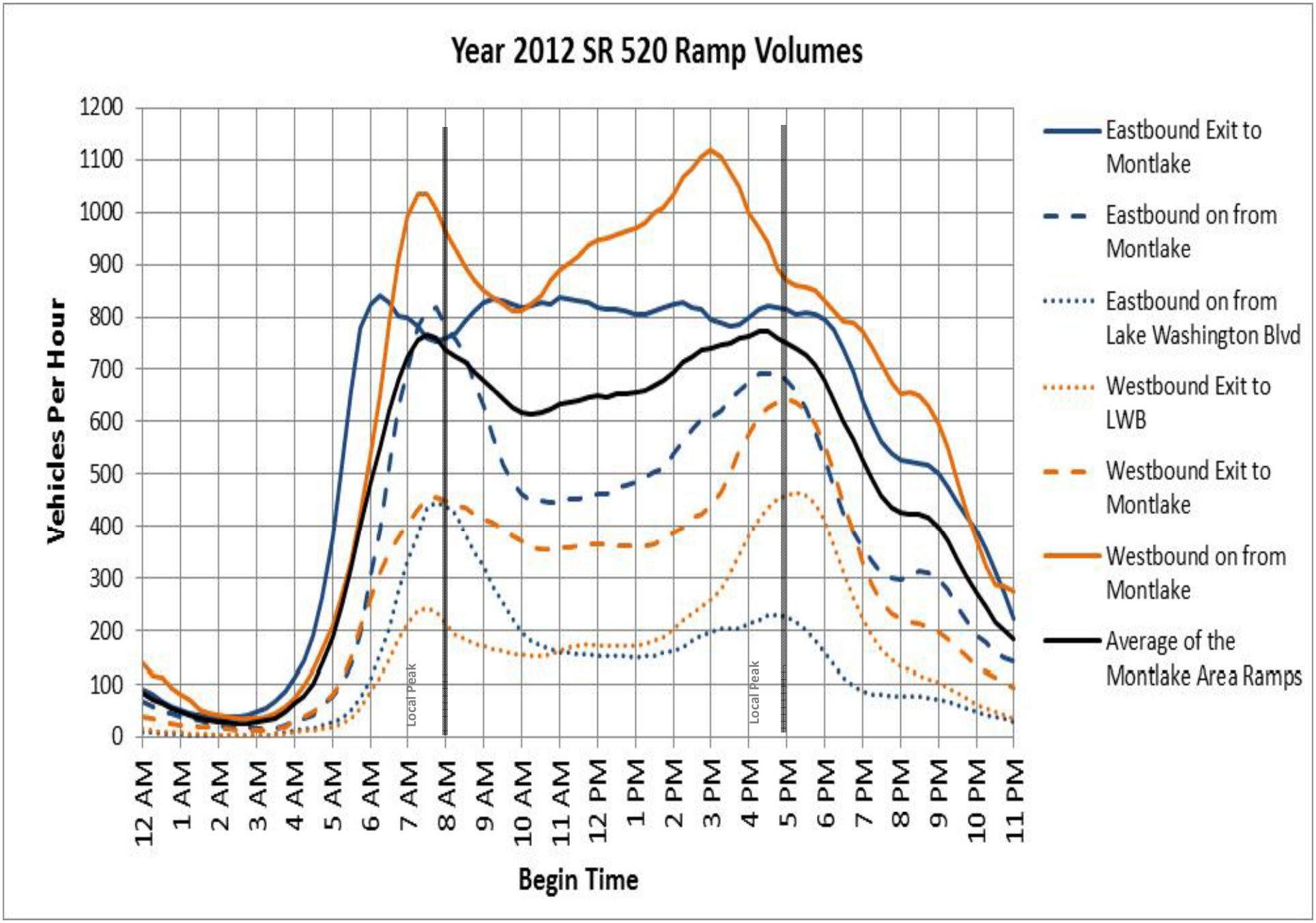


- Morning peak volume varies day to day by 300 vph
- Evening peak volume varies by 200 vph
- Morning volumes peak similar for all months; evening peaked in April
- Used the average of Tues-Wednesday for March – June 2012 to estimate the typical day
- Estimated the typical peak hour begins at 7:45 AM and 5:00 PM



- Morning peak volume varies day to day by 300 vph
- Evening peak volume varies by 350 vph
- Volumes peaked in April
- Used the average of Tues-Wednesday for March – June 2012 to estimate the typical day
- Estimated the typical peak hour begins at 7:45 AM and 5:00 PM




Year 2012 SR 520 Ramp Volumes
Vehicles Per Hour
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
12 AM
1 AM
2 AM
3 AM
4 AM
5 AM
6 AM
7 AM
8 AM
9 AM
10 AM
11 AM
12 PM
1 PM
2 PM
3 PM
4 PM
5 PM
6 PM
7 PM
8 PM
9 PM
10 PM
11 PM
Begin Time
Local Peak
Local Peak
Eastbound Exit to Montlake
Eastbound on from Montlake
Eastbound on from Lake Washington Blvd
Westbound Exit to LWB
Westbound Exit to Montlake
Westbound on from Montlake
Average of the Montlake Area Ramps

Traffic Redistribution for WABN

- Assumptions
  - Close Lake Washington Boulevard off-ramp
    - No canceled trips
    - 50% to Montlake
    - 50% to LWB
  - Redistribution based on license plate survey completed in 2009/2010.

Existing ramp destinations for Lake Washington Boulevard off-ramp: AM peak period

August 2010

Source: based on license plate survey data, travel demand model, and existing count data

Existing ramp destinations for Lake Washington Boulevard off-ramp: PM peak period

August 2010

Source: based on license plate survey data, travel demand model, and existing count data

Washington State Department of Transportation

SR 520 Bridge Replacement and HOV Program

I-5 to Medina: Bridge Replacement and HOV Project

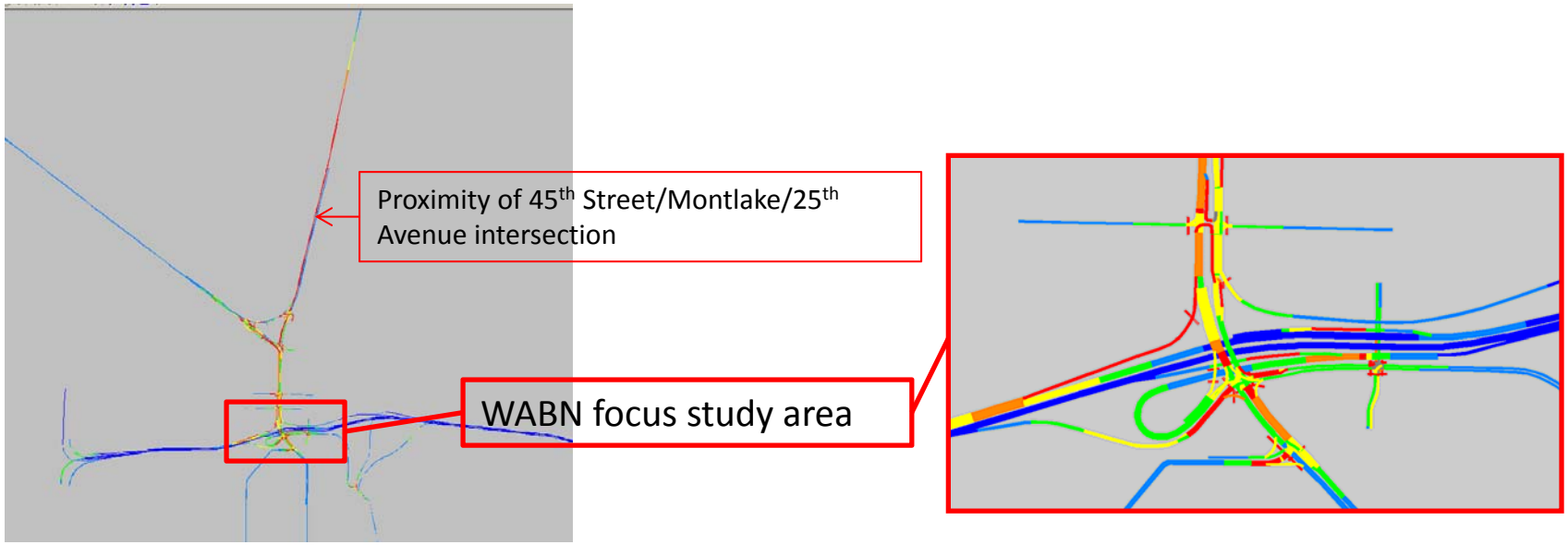
STATE ROUTE 520

WABN Construction Phase – Baseline Analysis
AM and PM Peak Hour Operations in 2012 With Toll

October 2012

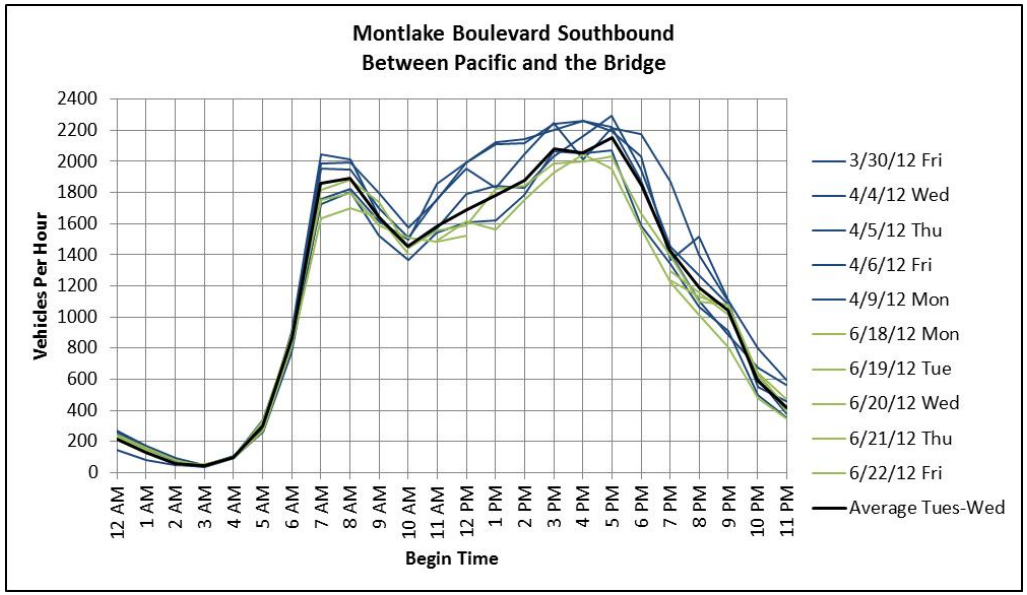
Method

- Analysis used VISSIM microsimulation model, developed for the Mediation process and the I-5 to Medina FEIS.
- Calibrated based on field observations and count data (compared with throughput).
- Model study limits were developed to capture year 2030 congestion levels.
- SR 520 corridor calibration further refined as we moved into construction analysis.
  - Increased segmentation of links to capture improvement limits through construction.
  - Based capacities on HCS analysis and existing throughput and congestion points.
- 10 iterations of each scenario for each time period are processed with varying random seed numbers.
- Travel time is primary measure of effectiveness (MOE) reported.
  - Results include average travel time for 24 routes through the interchange area.
  - The average travel time for the 24 routes combined is also reported to reflect a network-wide level of congestion. A 90% confidence interval is reported for this MOE.
- Link speed, queue calculations, and throughput for specific areas are also at times provided.



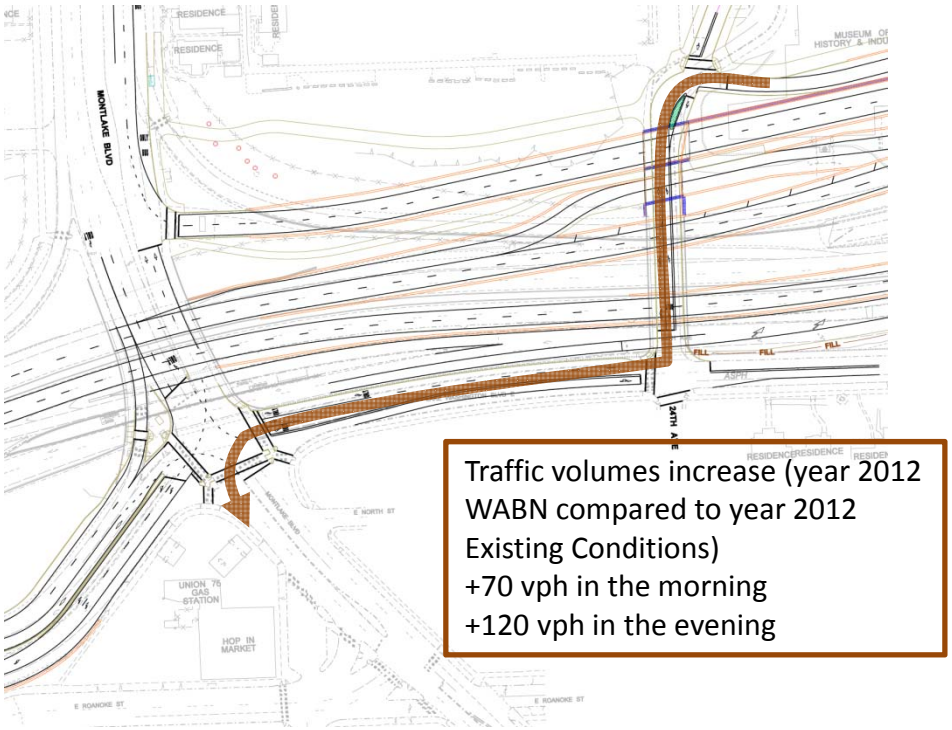
Method

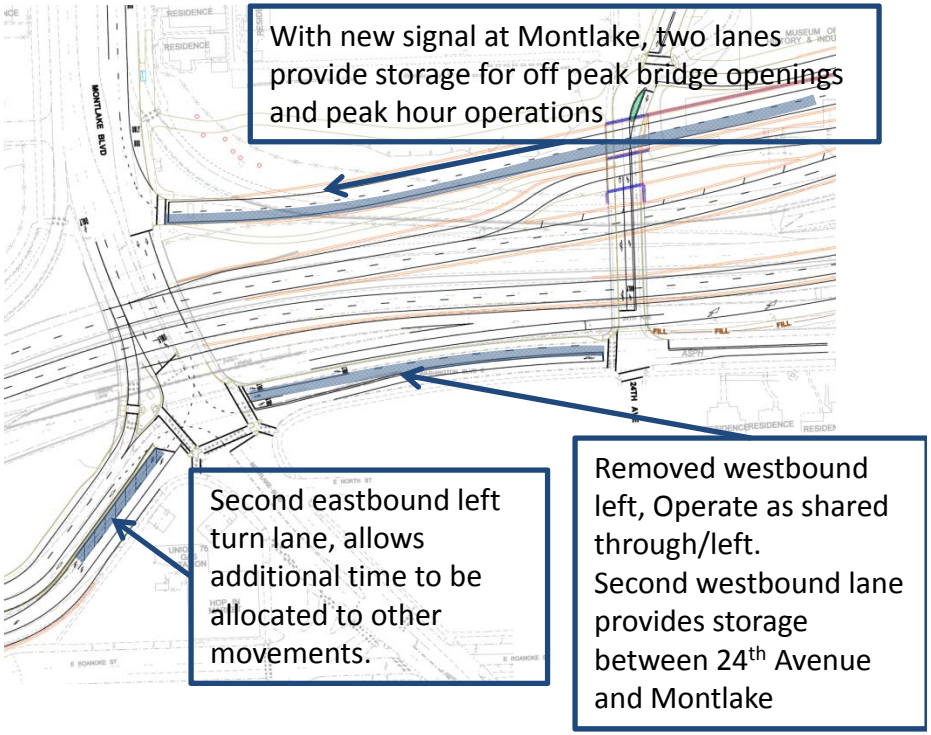
- Year 2012 Existing with Toll (AM and PM) has not been fully updated. For example, the model does not include the current signal operations at Montlake/Pacific Street and does not include changes to ramp meter rates based on existing freeway operations.
- All other signals (excluding Montlake/LWB/EB Ramps) for year 2012 WABN and year 2012 Existing Conditions use the same phasing, splits, and cycle lengths.
- Field observations show congestion occurs southbound along Montlake today in the morning approaching the Montlake/Pacific Street intersection. At the peak, this congestion can spill back to the Montlake/25th intersection. It also appeared this queue dissipates quickly, affecting flow from the pedestrian bridge to the Montlake/Pacific Street intersection for the remaining hour.
- A recalibration effort was completed for the AM peak hour analysis and incorporated into the PM peak hour model.
- This recalibration effort found the AM has a peak in volume that lasts for 15 minutes (see turn movement count data). During this peak, demand southbound from Montlake through the Montlake/Pacific Street intersection is the same for both the AM and PM peaks. AM demand volumes input into the model were increased to reflect the 15 minute peak volume.
- Capacity for the through movement of the Montlake/Pacific intersection and across the Montlake Cut was decreased to match maximum throughput (or counts).



Assumptions

- Traffic volumes for the westbound approach in the WABN compared to year 2012 Existing Conditions increases by 120 vph in the evening and 70 vph in the morning.
- Geometric changes with the WABN (compared to today) to serve those increases:
  - SR 520 off ramp to Montlake signalized at terminus, second lane provided for signal operations and storage when bridge opens
  - SR 520 off ramp to Lake WA Blvd closed
  - Adds eastbound left turn lane at Montlake/LWB/SR 520 eastbound ramps intersection
  - Adds second westbound lane between 24th Avenue and Montlake for storage
- With the new capacity at the Montlake/LWB/SR 520 eastbound ramps intersection, the signal was optimized for the WABN.

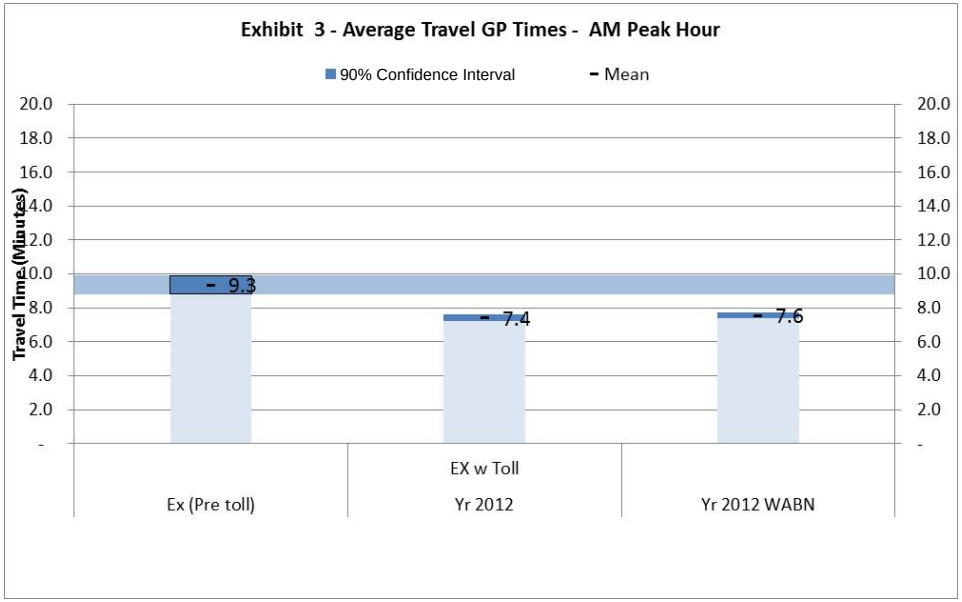


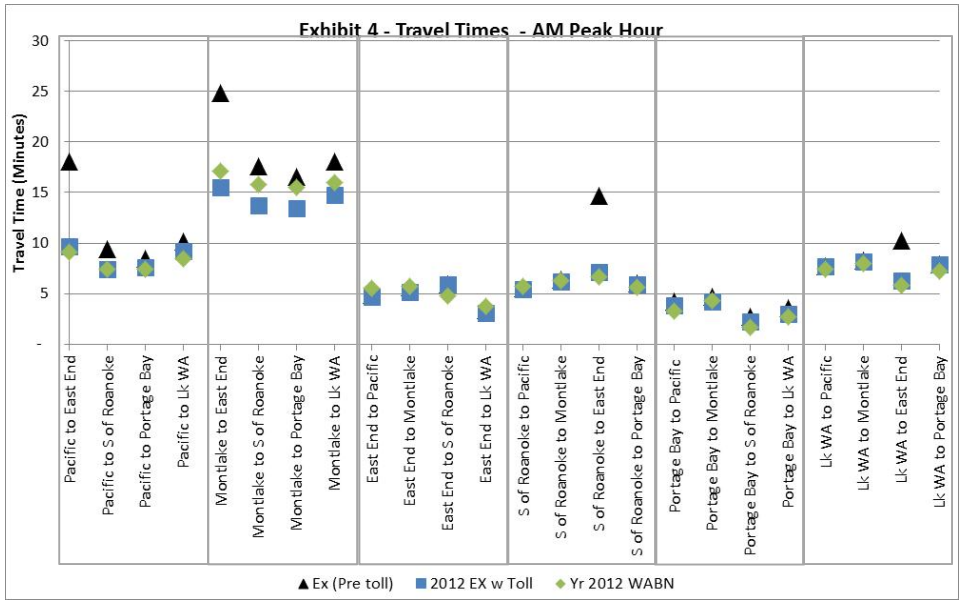


Results

AM Peak Hour

- Traffic volumes decrease by 10 percent across the Montlake Cut between year 2010 and today's conditions.
- Eastbound cross-lake trips also decrease from 4,200 vph in the year 2010 analysis to 3,200 in the year 2012 with toll analysis.
- Year 2012 WABN analysis indicates nearly free flow conditions through the Montlake interchange area and SR 520 through the study area, due to these decreases in trips and improvements to the SR 520 corridor.
- Congestion occurs for both year 2012 conditions along Montlake through the Montlake/Pacific Street intersection and across the Montlake Cut. The delta between the year 2012 Existing with Toll and year 2012 WABN travel times southbound along Montlake are likely due to the changes in signal at the Montlake/Pacific Street intersection as the change occurs only north of the signal. Volumes and geometrics for both scenarios are the same north of the intersection.

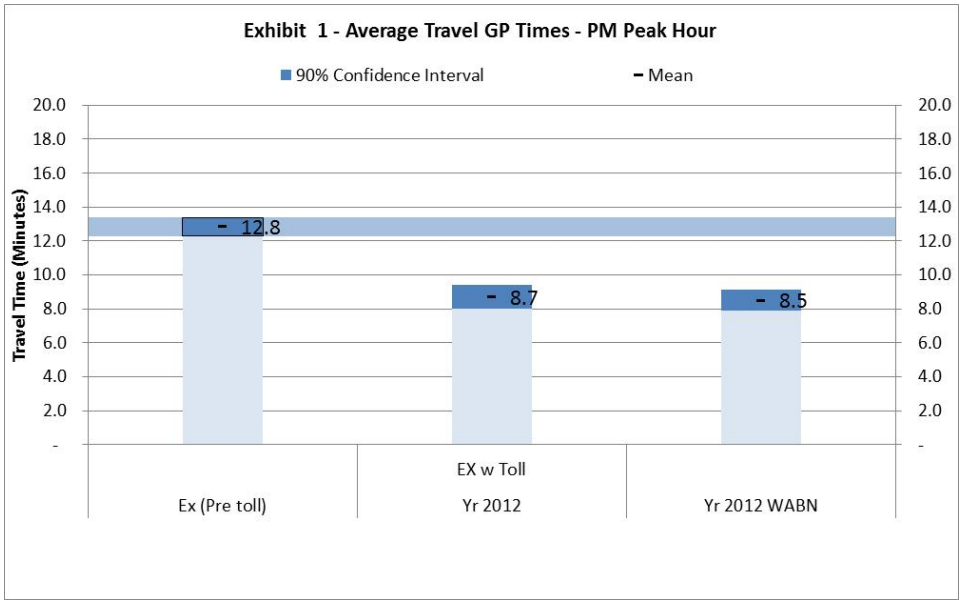


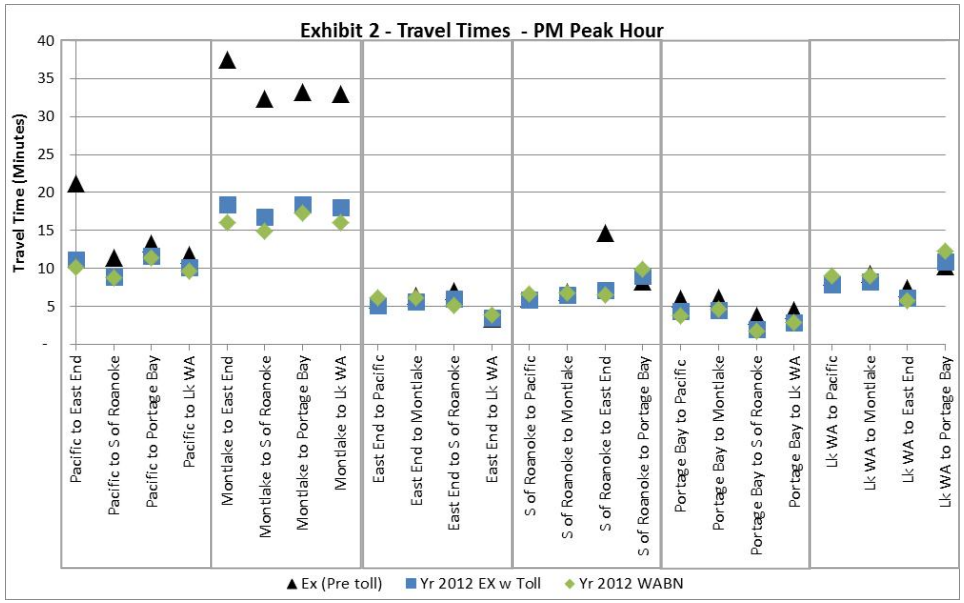


Results

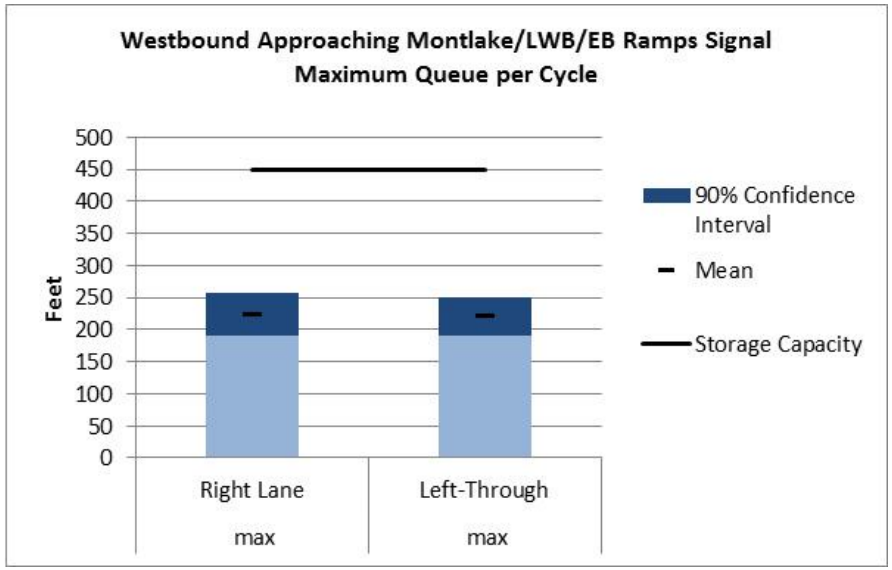
PM Peak Hour

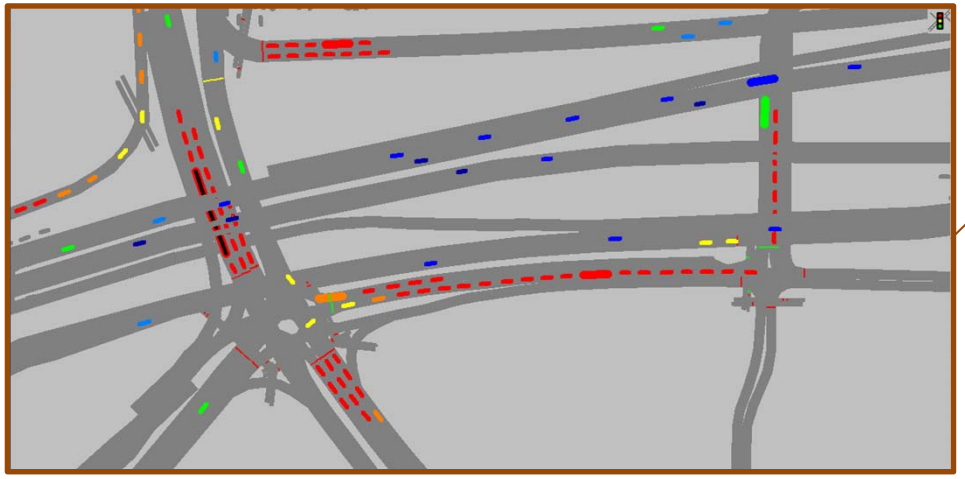
- Based on the travel time results, the WABN would operate similar to today's conditions. This means the additional capacity provided at the Montlake/LWB/EB ramps intersection accommodates the additional trips associated with the closure of the westbound SR 520 off ramp to LWB.





Results





Summary - Year 2012 WABN PM Peak Hour

	Queue (Feet)	
	max Right Lane	max Left-Through
Mean	224	221
90% Confidence Interval	33	29
>450	9	6
Total	80	80
	11%	8%

Max Queue per Cycle (Feet)					
Run	Right Lane	Left-Through	Run	Right Lane	Left-Through
06	228	181	36	170	246
06	167	198	36	543	176
06	219	261	36	237	345
06	90	244	36	143	195
06	548	238	36	139	222
06	108	234	36	144	288
06	218	173	36	264	348
06	242	114	36	183	388
12	193	415	42	123	243
12	147	645	42	178	242
12	165	712	42	214	117
12	267	733	42	97	245
12	128	622	42	102	203
12	238	731	42	230	139
12	225	726	42	118	180
12	191	195	42	118	29
18	295	117	48	173	124
18	327	73	48	124	223
18	173	133	48	0	0
18	106	73	48	100	139
18	112	140	48	29	174
18	106	73	48	130	139
18	33	157	48	87	136
18	34	269	48	245	52
24	271	113	54	71	137
24	263	134	54	309	94
24	192	96	54	0	0
24	104	178	54	95	135
24	235	119	54	207	186
24	98	205	54	77	140
24	169	228	54	173	248
24	162	180	54	277	198
30	246	333	60	356	116
30	28	333	60	296	140
30	115	264	60	0	0
30	293	180	60	342	180
30	621	178	60	650	155
30	662	177	60	647	221
30	689	161	60	546	204
30	931	220	60	346	348

Washington State Department of Transportation

SR 520 Bridge Replacement and HOV Program

I-5 to Medina: Bridge Replacement and HOV Project

WABN Construction Phase
PM Peak Hour Operations

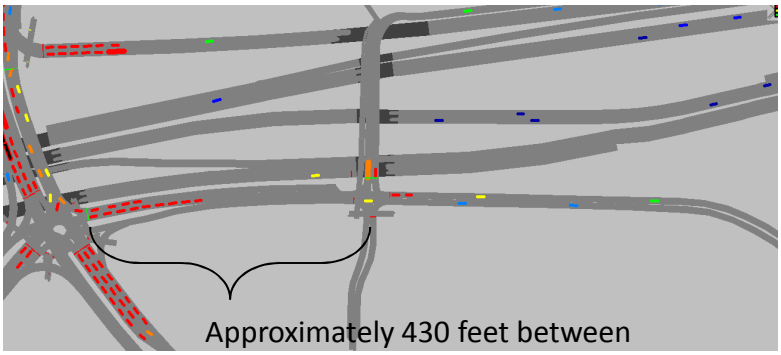
January 2013

WABN Traffic Operations,
Lake Washington Boulevard Storage between 24th and Montlake

- Congestion issues on Montlake at the intersections with Pacific, Shelby, and Hamlin (u-turn) spill back through the Montlake/Lake Washington Boulevard/Eastbound ramps intersection at times, limiting the receiving capacity from this intersection.
- Along Lake Washington Boulevard approaching Montlake, queues build in both the right and left-through turn lanes.
- The typical or average queue reported in the table below includes the lane with the maximum congestion for that time period. The queues are measured from the stop bar at the Montlake/Lake WA Blvd/Eastbound Ramps Intersection.
- The table also shows how often the queues from Montlake extend through the 24th Avenue/Lake Washington Boulevard intersection.
- Reducing the right turn lane storage by 100 feet, results in queues extending past 24th twice as often. Reducing the right turn lane storage in half, or by 200 feet, results in typical queues nearly reaching 24th and queues extending through the intersection a third of the time.

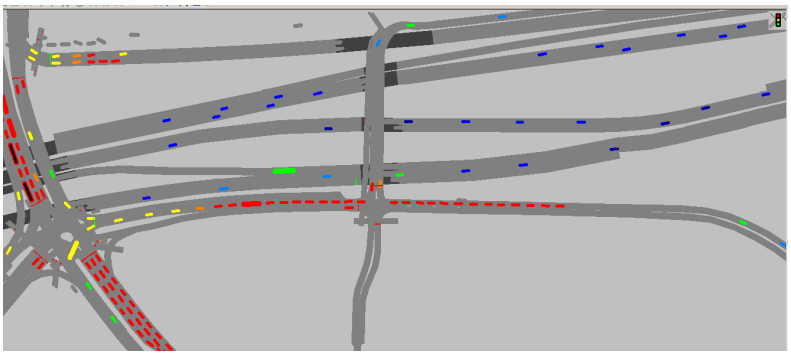
Opening Year WABN PM Peak Hour VISSIM Analysis

Westbound Storage between 24th and Montlake	Typical Queue	Frequency queue extends past 24th
Two lanes to 24th	260 feet	13%
300' right turn pocket	330 feet	26%
200' right turn pocket	390 feet	32%



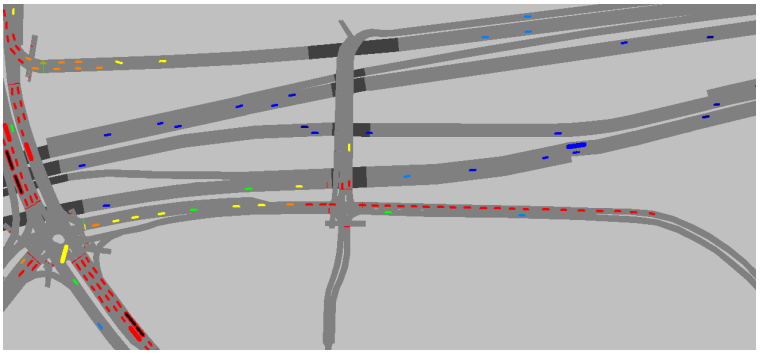
Depiction of Maximum Queue Occurrence – When Queue Extends Past 24th

Two lanes of storage



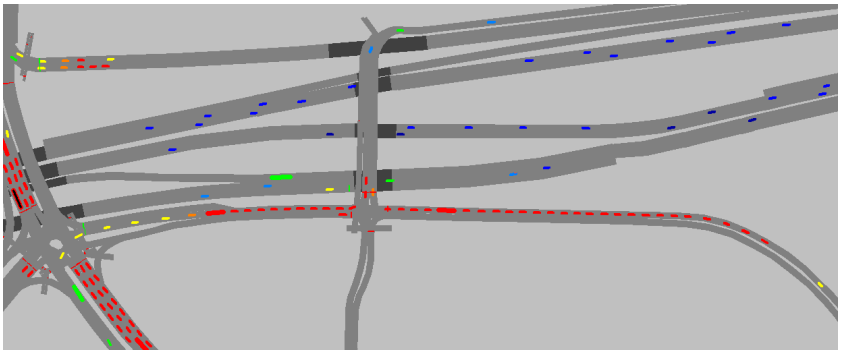
Occurs 13% of the time during the PM peak

300' Right Turn Pocket



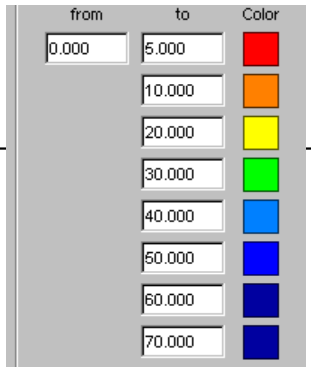
Occurs 26% of the time during the PM peak

200' Right Turn Pocket



Occurs 32% of the time during the PM peak

Legend
Speed (MPH)



Appendix B

Turn Movement Traffic Volumes, PM Peak Hour

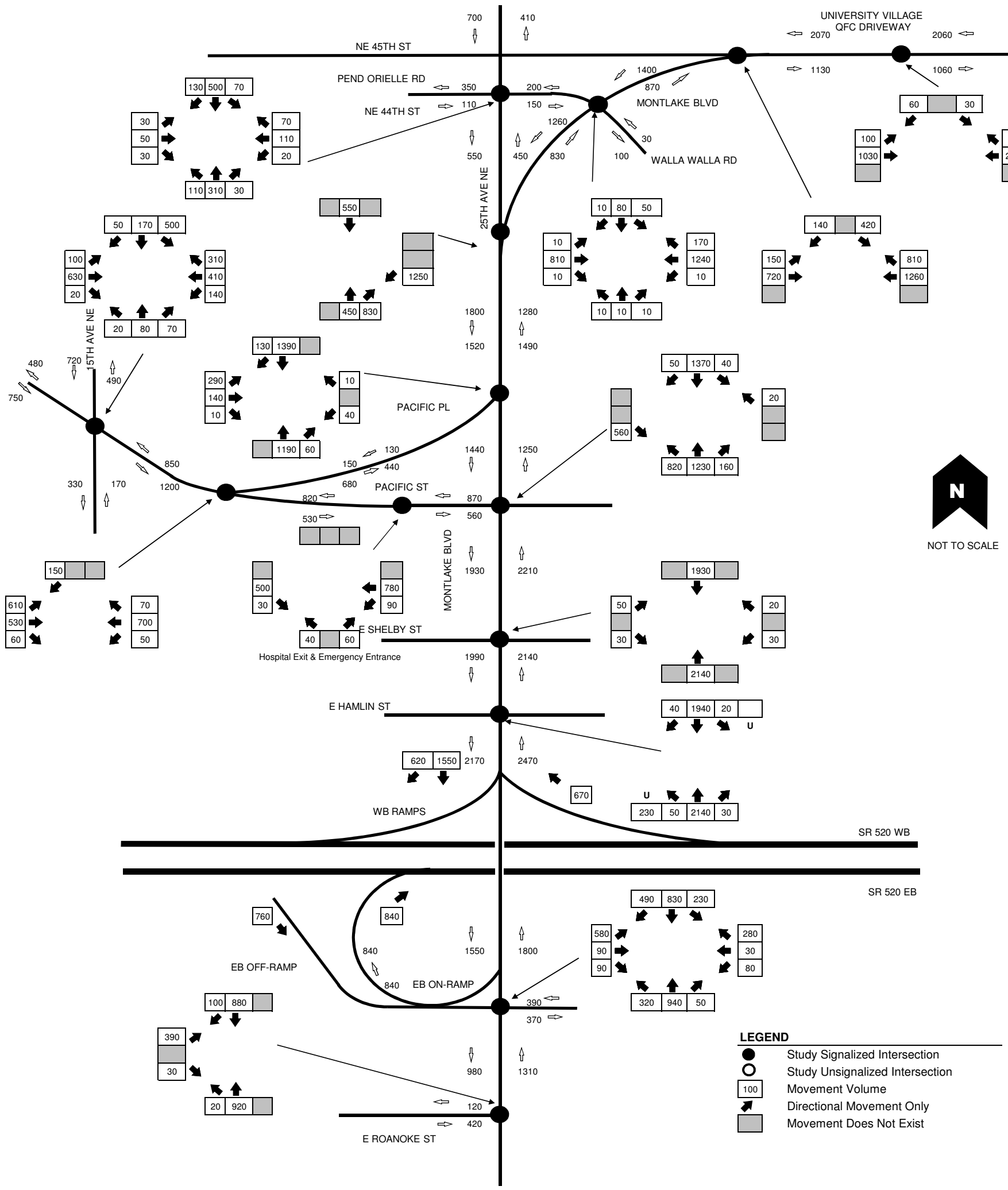
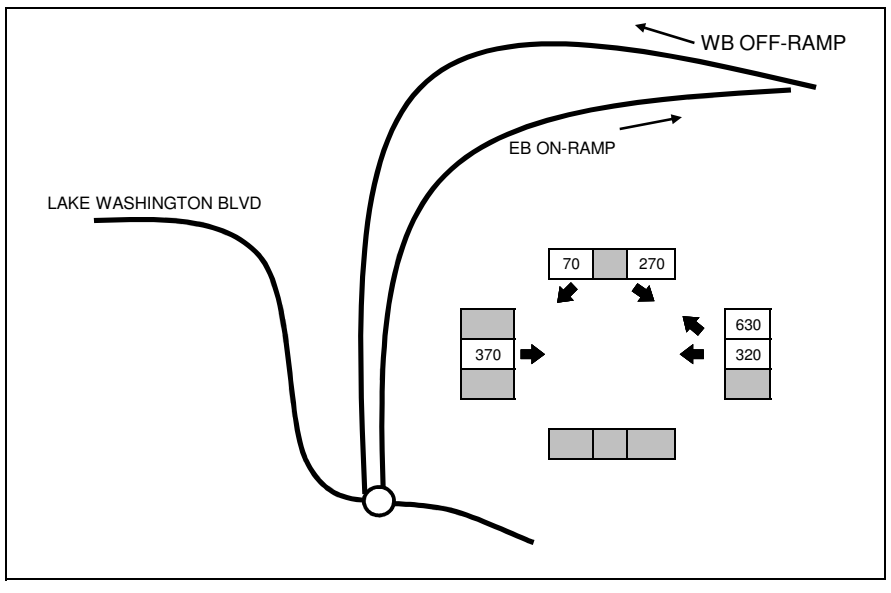


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
Existing Volumes (Pre toll) - AM PEAK HOUR



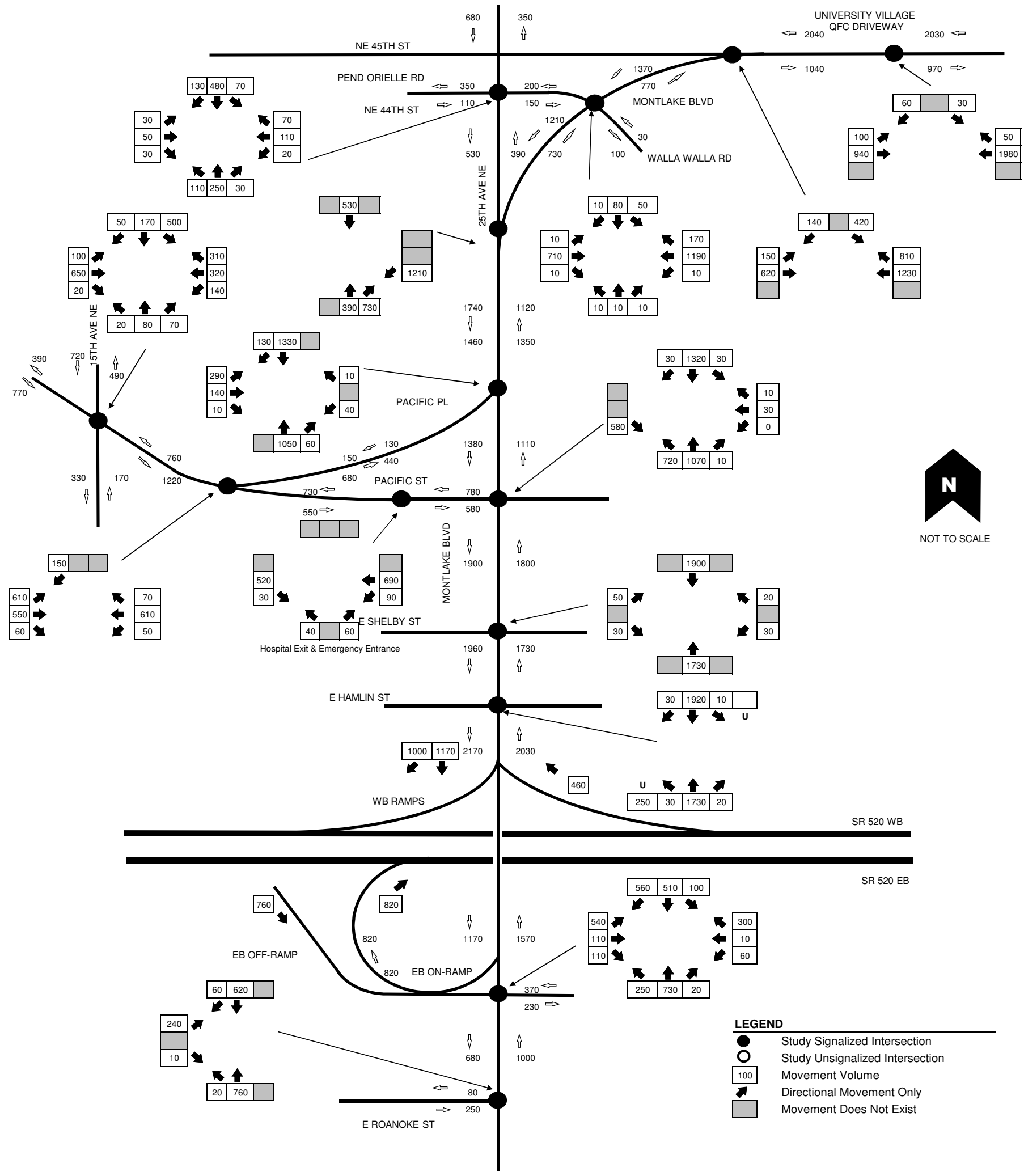
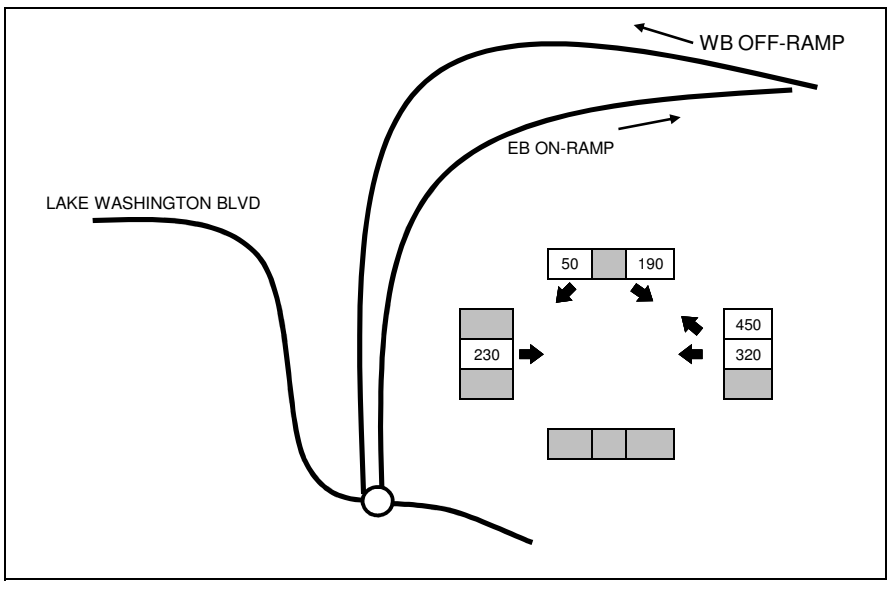


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
Existing Volumes (2012 with Toll) - AM PEAK HOUR



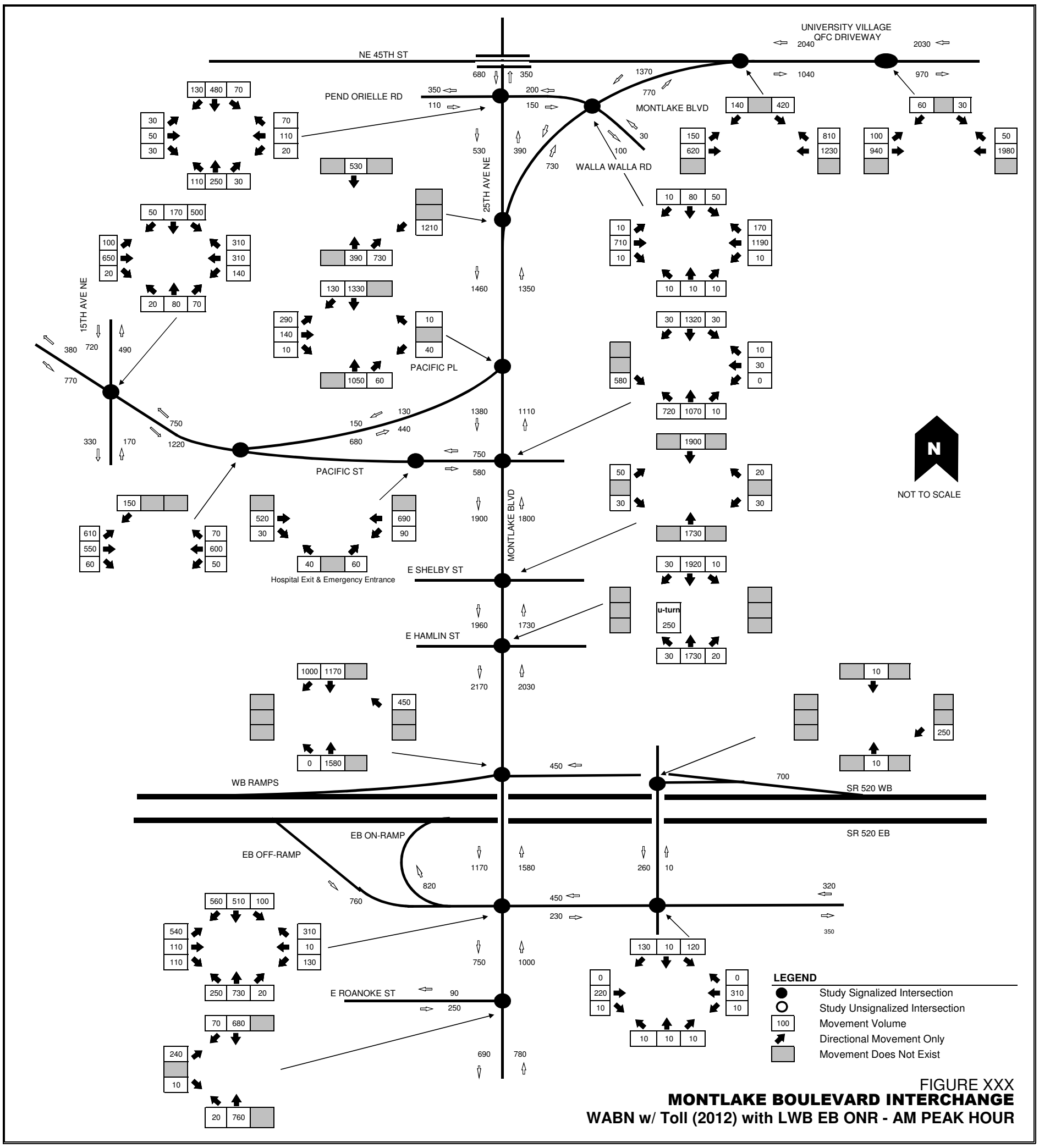
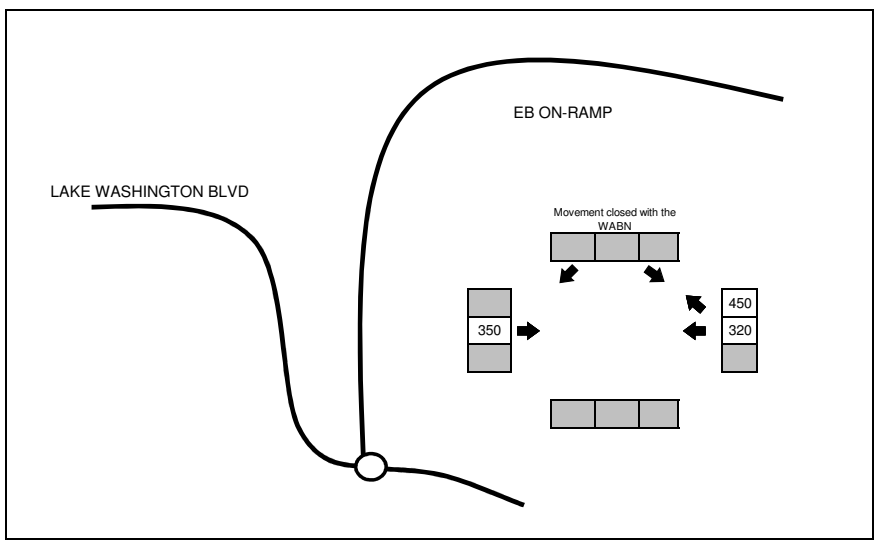


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
WABN w/ Toll (2012) with LWB EB ONR - AM PEAK HOUR



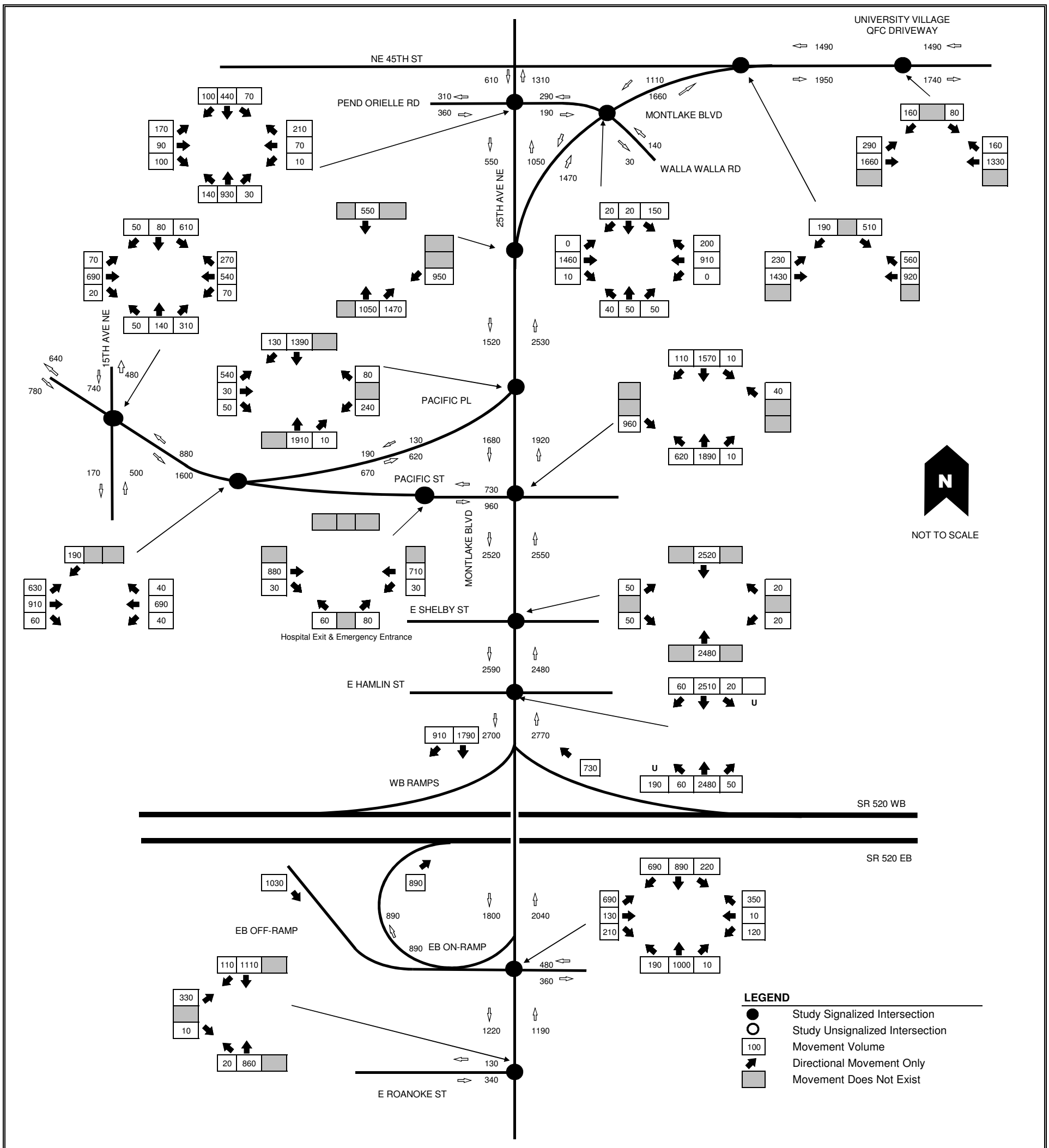
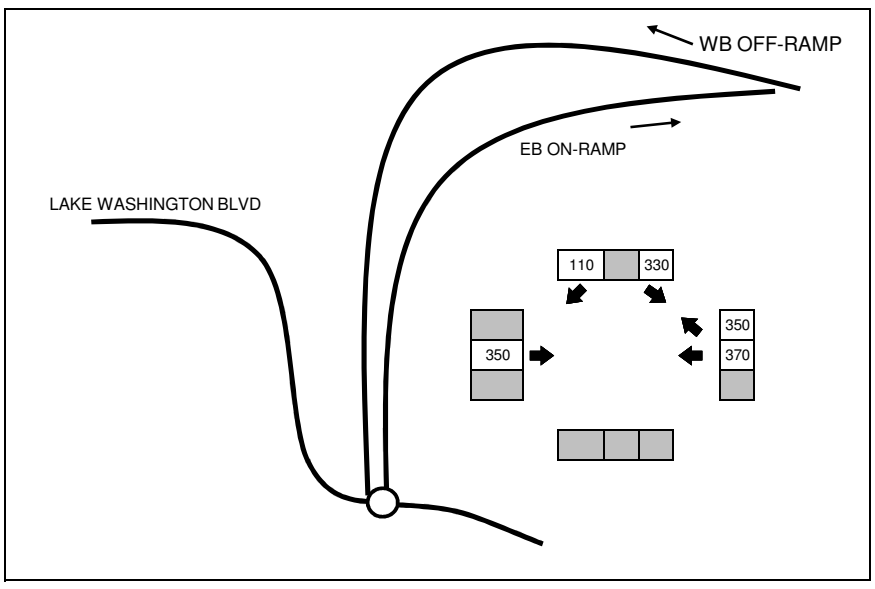


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
Existing Volumes (Pre toll) - PM PEAK HOUR



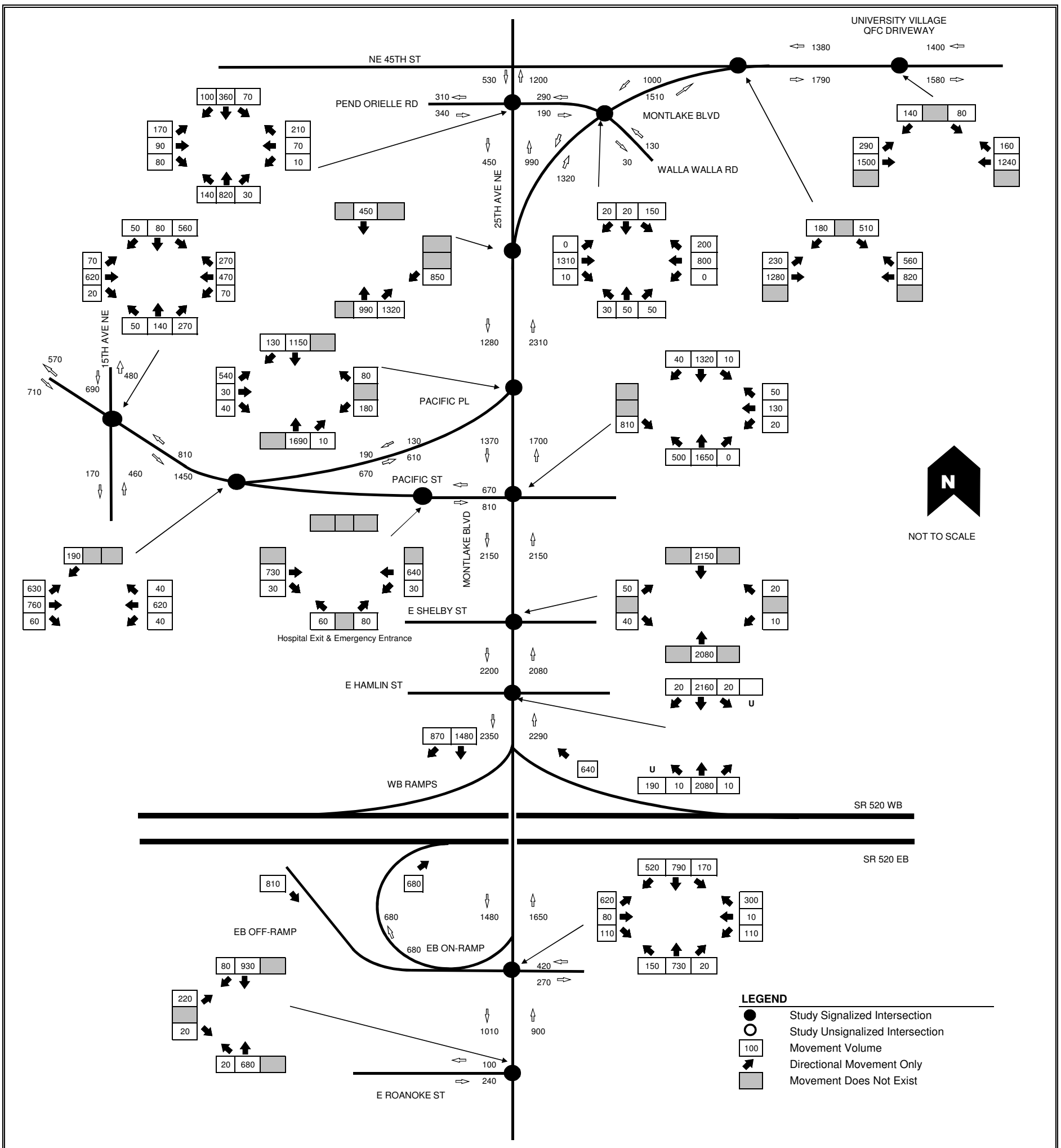
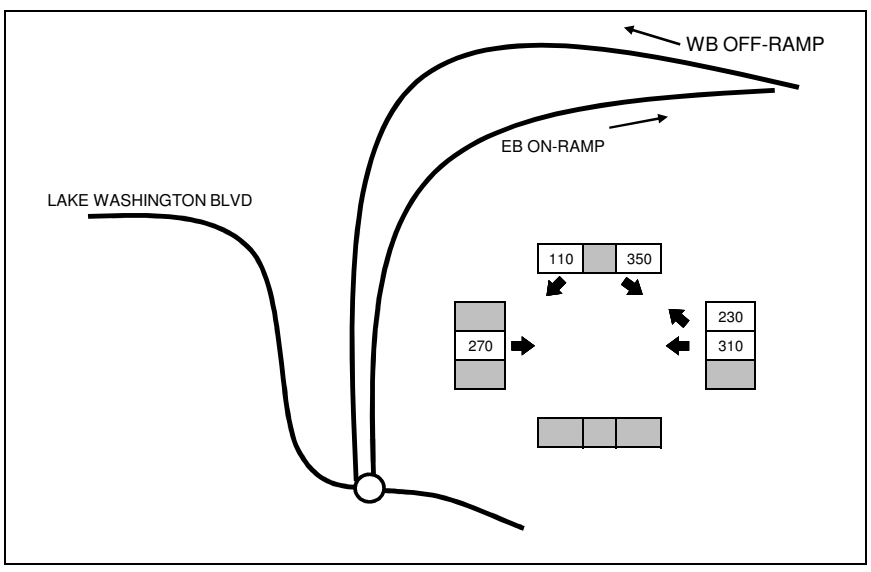


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
Existing Volumes (2012) w Toll - PM PEAK HOUR



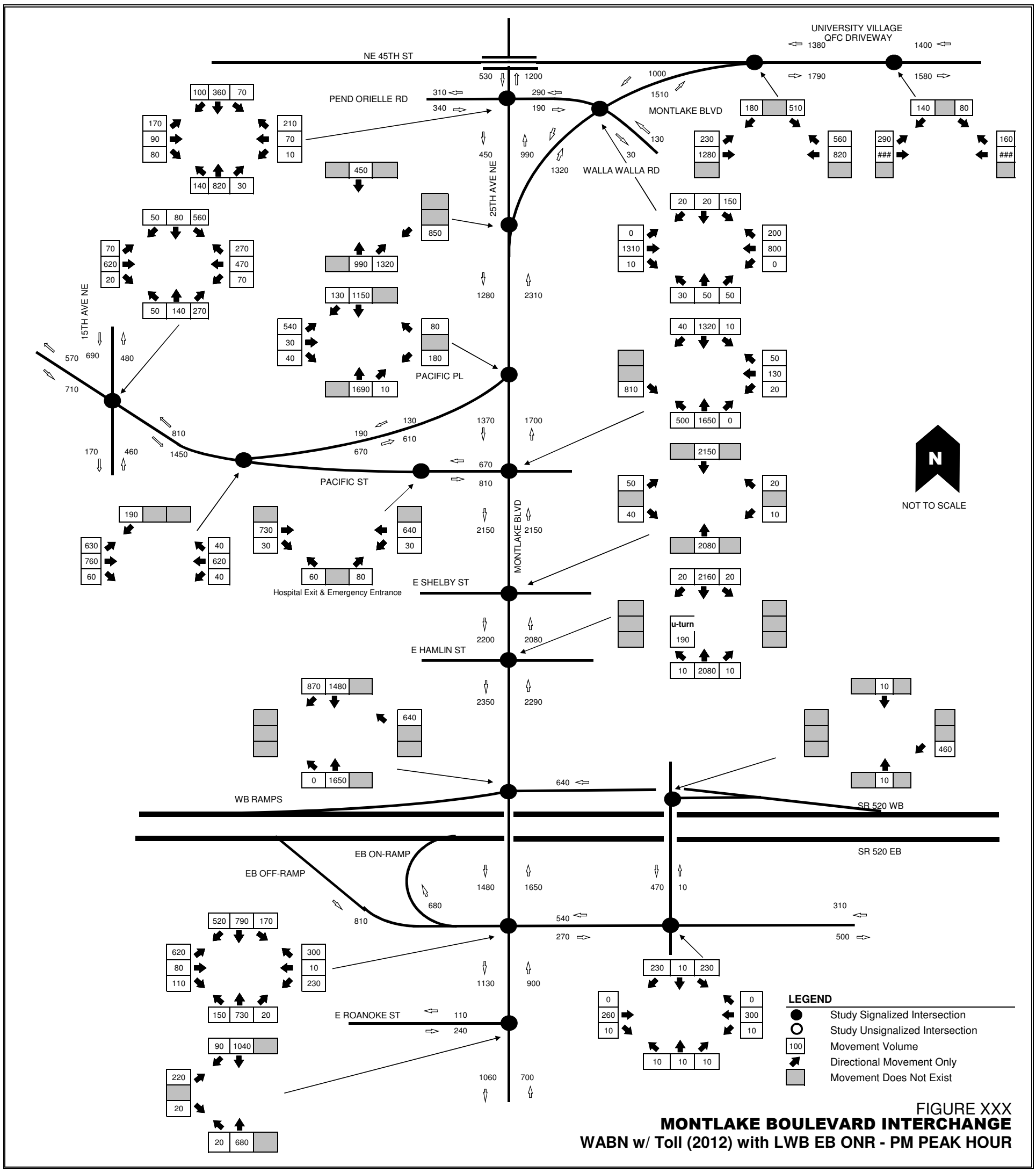
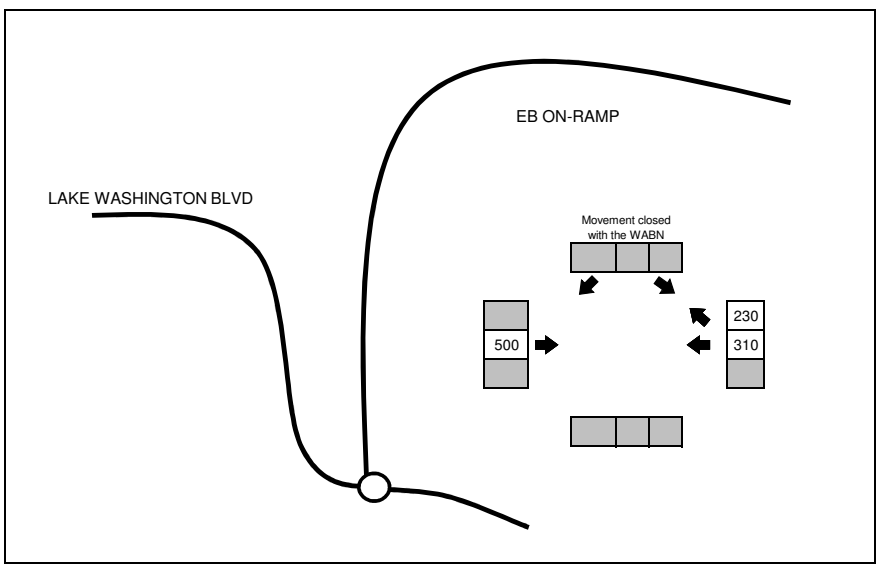


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
WABN w/ Toll (2012) with LWB EB ONR - PM PEAK HOUR



Appendix C

Turn Movement Traffic Volumes, Off Peak Hour (3 PM)

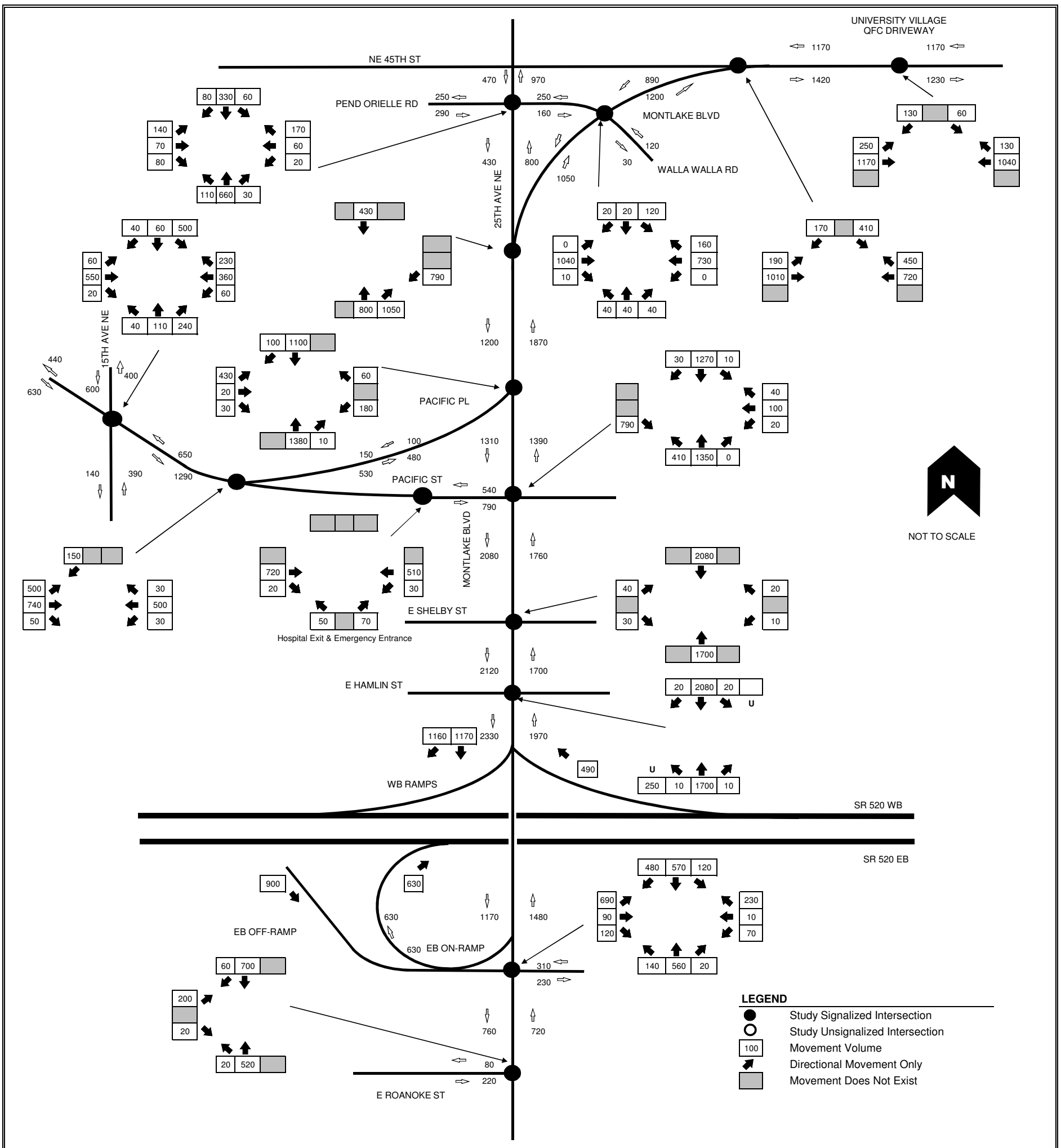
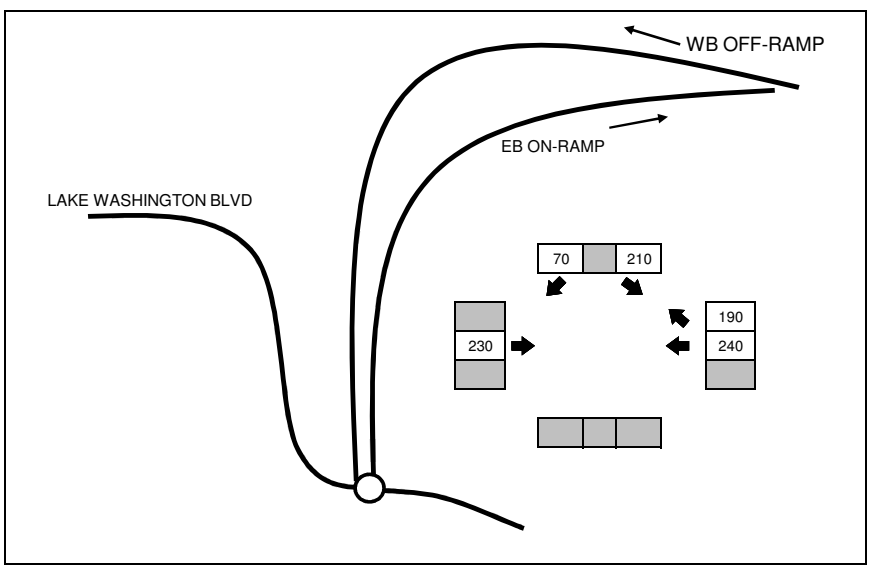


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
Existing Volumes (2012) w Toll - Off Peak Hour (3PM)



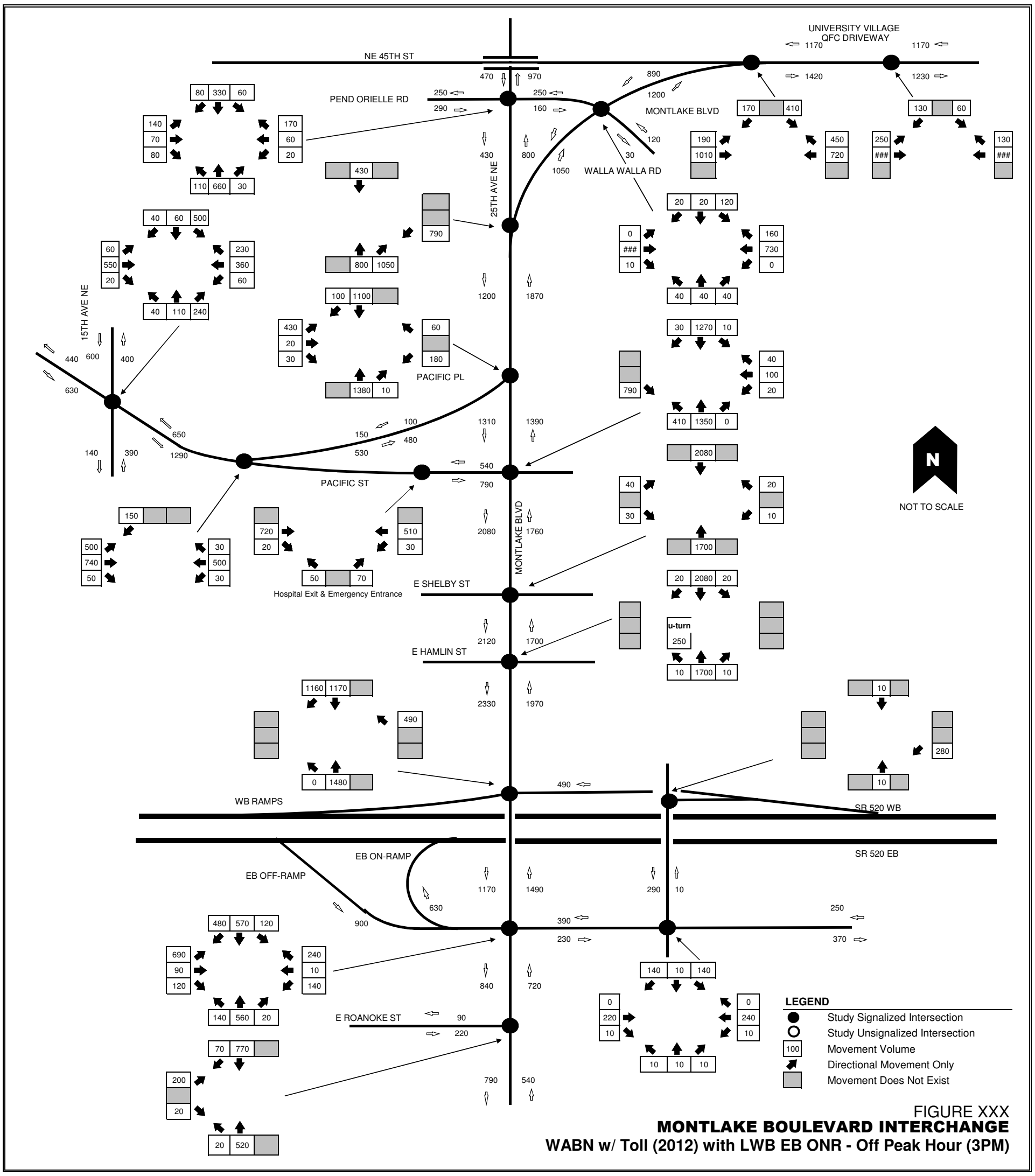
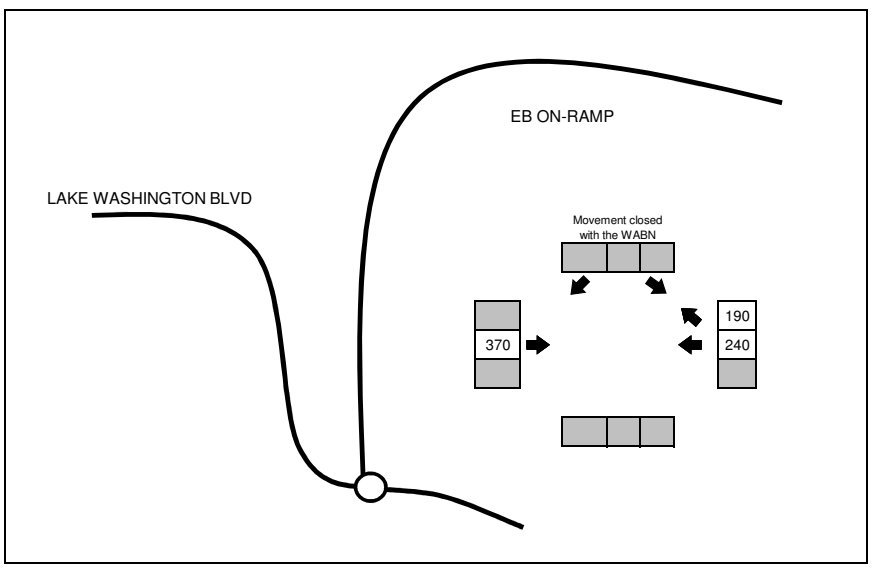


FIGURE XXX
MONTLAKE BOULEVARD INTERCHANGE
WABN w/ Toll (2012) with LWB EB ONR - Off Peak Hour (3PM)



Attachment 4
Section 106 Correspondence

Washington State Department of Transportation

Lynn Peterson
Secretary of Transportation

SR 520 Bridge Replacement and HOV Program
900 3rd Avenue, Suite 900, MS: NB82-99
Seattle, WA 98104
Phone: 206-770-3500 / Fax: 206-770-3569
TTY: 1-800-833-6388
www.wsdot.wa.gov

July 11, 2013 LTR# 2448

Allyson Brooks, Ph.D.
State Historic Preservation Officer
Director, Department of Archaeology and Historic Preservation
PO Box 48343
Olympia, WA 98504-8343
MS-48343

RE: SR 520, I-5 to Medina Bridge Replacement Project and HOV Project: Updated Limits of Construction for the West Approach Bridge North Construction Phase

LOG #: 121602-08-FHWA

Dear Dr. Brooks:

Pursuant to the *Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project* (PA), the Washington State Department of Transportation (WSDOT), on behalf of the Federal Highway Administration (FHWA), is continuing consultation with your office.

The purpose of this letter is to inform you of some adjustments to the project Limits of Construction (LOC) associated with the West Approach Bridge North (WABN) construction phase of the above-referenced project. All of the changes are within the existing Area of Potential Effects (APE). WSDOT has determined, on behalf of FHWA, that the design refinements will not cause an additional adverse effect to historic properties. Below please find a description of the design changes; the numbers correspond with the enclosed graphics.

1 – The retaining wall between the SR 520 eastbound off ramp and East Roanoke Street will require more space for construction access and/or shoring just north of the existing East Roanoke Street sidewalk. This area is located within the National Register of Historic Places (NRHP)-eligible Montlake Historic District boundaries, but no aspect of integrity would be altered or diminished as a result of this change.

2 – The sidewalk on the east side of Montlake Avenue between SR 520 and Hamlin Street will be repaired and reconfigured to tie into and accommodate relocation of the northbound bus stop. In addition, curb ramps will be modified to meet Americans with Disabilities Act (ADA) standards on Montlake Avenue. This area is located within the NRHP-eligible Montlake Historic District boundaries, but no aspect of integrity would be altered or diminished as a result of this change.

3 – On 24th Avenue East, curb ramps will be modified to meet ADA standards. This area is located within the NRHP-eligible Montlake Historic District boundaries, but no aspect of integrity would be altered or diminished as a result of this change.

4 – On East Park Drive East at Hamlin Street, a curb ramp will be constructed to accommodate ADA access to the new path/sidewalk system around the new stormwater facility. A new curb will also be added to accommodate the new path/sidewalk system at the east end of the alley behind Hamlin Street. The asphalt in front of the curb across the mouth of the alley will be replaced. This area is located within the NRHP-eligible Montlake Historic District boundaries, but no aspect of integrity would be altered or diminished as a result of this change.

5 – On East Park Drive East, diagonal parking will be added to the east side of the street, and will replace the limited existing on-street parking in the same location. The existing asphalt will be overlain to provide a stable surface that can be widened for the parking. The adjusted parking reconfiguration is a result of feedback generated through the Seattle Community Design Process (SCDP).

This area is located within the NRHP-eligible Montlake Historic District, and is adjacent to four contributing resources: 2158 E. Shelby Street (also individually NRHP eligible), 2159 E. Shelby Street (also individually NRHP eligible), 2817 E. Park Drive East, and 2160 E. Hamlin Street. The diagonal parking would be visible from all of these resources, which would alter their integrity of setting. However, the change would not be adverse. These properties are adjacent to a city street with existing on-street parking, and also overlook the existing MOHAI parking lot, which will be removed as construction of the I-5 to Medina Project progresses. The change in visual setting would be minor, and would not affect historic properties.

6 - The WSDOT parking lot on E. Lake Washington Blvd. will be used for access to the major staging area on WSDOT Peninsula. Lake Washington Boulevard and the Arboretum are historic properties, but no aspect of integrity would be altered or diminished as a result of this change.

#7 - The slight work bridge extensions will allow for work vehicles to maneuver on the work bridges during construction activities such as concrete girder deliveries during which huge girders must be lifted from the delivery trucks, raised, and set on the bridge piers. This activity will not occur on Foster Island, a NRHP-eligible Traditional Cultural Property (TCP), and would not affect it, or any other historic properties.

All of the above-referenced LOC expansions are within areas surveyed for archaeological sensitivity as part of this project. All construction within the expanded limits of construction will be subject to the same archaeological monitoring plan which DAHP concurred with in a letter dated February 12, 2013.

We respectfully request any comments you may have on the revised limits of construction and the above analysis and the determination that the changes result in no additional adverse effect to historic properties by no later than **August 12, 2013**.

If you have any questions or concerns, please contact me at (206) 805-2895, e-mail archers@wsdot.wa.gov, or Allison Hanson, Environmental Director for Mega Projects at (206) 805-2880, e-mail hansona@wsdot.wa.gov.

Sincerely,

Steve Archer
WSDOT Cultural Resources Specialist

Enclosures:
WS_WABN_LOCUpdate
WS_WABN_LOCUpdate_Area45
WS_WABN_LOCUpdate_OtherAreas

cc:

Matthew Sterner,DAHP
Anthony Sarhan, FHWA
Sharon Love, FHWA
Allison Hanson, WSDOT
Scott Williams, WSDOT

Union Bay

Portage Bay

MONTLAKE BLVD E

E LAKE WASHINGTON BLVD

LAKE WASHINGTON BLVD E

E ROANOKE ST

E MONTLAKE PL E

W MONTLAKE PL E

26TH AVE E

24TH AVE E

19TH AVE E

BOYER AVE E

E LYNN ST

520

Arboretum Creek

1

2

3

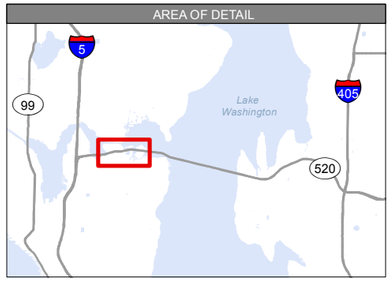
4

5

6

7

AREA OF DETAIL



Area of Potential Effects

Previous Limits of Construction

Revised Limits of Construction

Parcel

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), King County (2008) GIS Data (Parcel), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 250 500 1,000 Feet

Exhibit X **Revised Limits of Construction for West Approach Bridge North (WABN)**

SR 520, I-5 to Medina: Bridge Replacement and HOV Project

DVR \\MNUSTRICTGFS01\PROJECTS\PARAMETRIX_400707\MAPFILES\WESTSIDE\WABN\WS_WABN_LOCUPDATE.MXD RGRABAREK 6/6/2013 3:16:03 PM

2158 E. Shelby St

5

2159 E. Shelby St

2817 E. Park Dr East

E PARK DR E

2160 E. Hamlin St

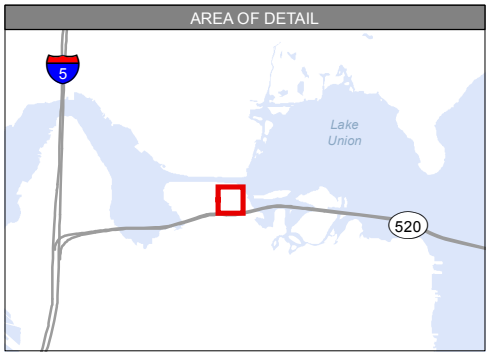
E HAMLIN ST

4

24TH AVE E

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), King County (2008) GIS Data (Parcel), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

AREA OF DETAIL



Area of Potential Effects

Previous Limits of Construction

Revised Limits of Construction

Parcel

Montlake Historic District

NRHP Eligibility

Contributing

Contributing and Eligible

Not NRHP Eligible

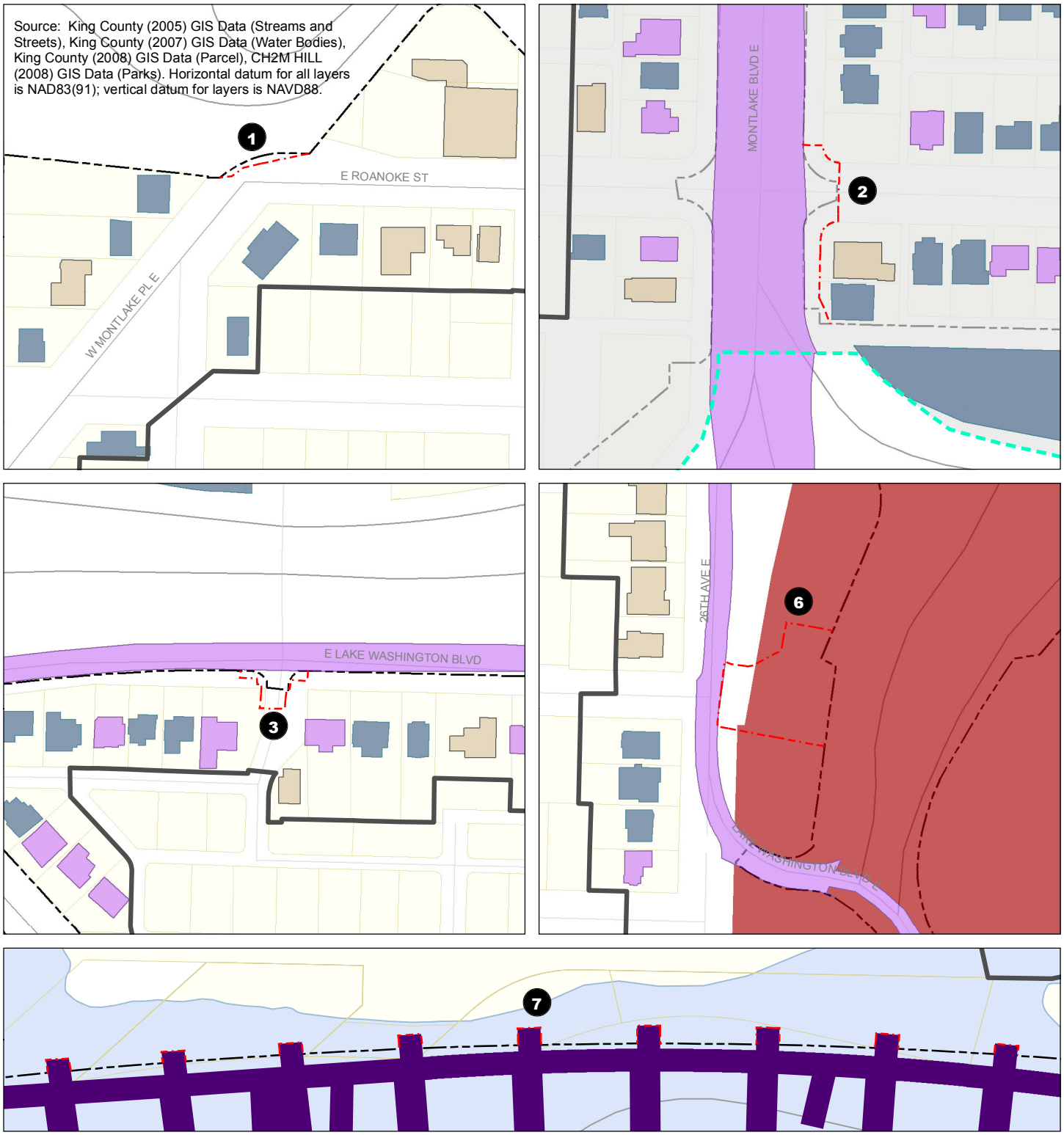
N

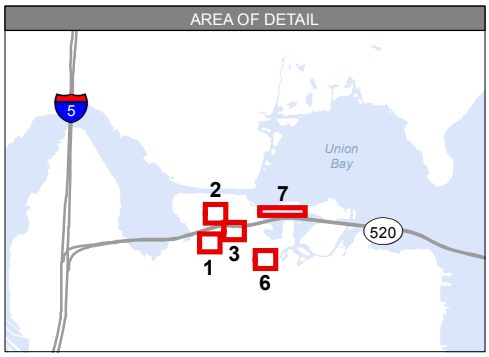
0 50 100 Feet

Exhibit X **Revised Limits of Construction for West Approach Bridge North (WABN) - Areas 4 and 5**

SR 520, I-5 to Medina: Bridge Replacement and HOV Project

Source: King County (2005) GIS Data (Streams and Streets), King County (2007) GIS Data (Water Bodies), King County (2008) GIS Data (Parcel), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.





Area of Potential Effects
Previous Limits of Construction
Revised Limits of Construction
Proposed Work Bridge
Parcel
Montlake Historic District

NRHP Eligibility
NRHP Eligible
Contributing
Contributing and Eligible
Not NRHP Eligible

N
0 75 150 Feet

Exhibit X **Revised Limits of Construction for West Approach Bridge North (WABN) - Areas 1, 2, 3, 6, and 7**

SR 520, I-5 to Medina: Bridge Replacement and HOV Project

DEPARTMENT OF
ARCHAEOLOGY &
HISTORIC PRESERVATION
Protect the Past. Shape the Future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

August 12, 2013

Mr. Steve Archer
Cultural Resource Specialist
SR 520 Bridge Replacement Project
999 Third Ave., Suite 2424
Seattle, WA 98104

In future correspondence please refer to:
Log: 121602-08-FHWA
Property: SR 520 Corridor Trans-Lake Washington, Bridge Replacement and HOV
Re: Review of Updated Limits of Construction Notification

Dear Mr. Archer:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP). I have reviewed the information on the updated limits of construction that you provided to our office in July on behalf of the State Historic Preservation Officer under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. I have no issues with the proposed changes and understand that all areas will continue to be covered by the parameters outlined in the archaeological monitoring plan.

Please note that DAHP requires that all historic property inventory and archaeological site forms be provided to our office electronically.

Thank you for the opportunity to review and comment.

Sincerely,

Matthew Sterner, M.A.
Transportation Archaeologist
(360) 586-3082
matthew.sterner@dahp.wa.gov

Attachment 5
WABN Noise Level Comparison Technical Memorandum

Washington State Department of Transportation

Lynn Peterson
Secretary of Transportation

Northwest Region
15700 Dayton Avenue North
P.O. Box 330310
Seattle, WA 98133-9710
206-440-4000
TTY: 1-800-833-6388
www.wsdot.wa.gov

May 15, 2013

To: Daniel Babuca, WSDOT SR520 Engineering Manager

From: Tim Sexton, WSDOT Air Quality, Noise, and Energy Policy Manager

RE: Noise Level Comparison: SR 520 WABN to SR 520 EIS Preferred Alternative

The following describes sound levels in the temporary condition of the West Approach Bridge North (WABN)[1] compared to 2030 Build condition sound levels modeled for the preferred alternative as described in the *SR 520, I-5 to Medina: Bridge Replacement and HOV Project Final Environmental Impact Statement* (FEIS) (June 2011). The WABN sound levels were modeled using year 2030 traffic to be comparable to the Build and No-Build conditions described in the FEIS. This assumption results in a conservative estimate of noise levels, because year 2030 traffic is estimated to include much more traffic and higher sound levels than would be expected to occur during the WABN temporary condition. Sound levels are reported in A-weighted decibels (dBA).

WABN Compared to Build Condition – Year 2030 Traffic (dBA)

Neighborhood	Average	Max Reduction	Min Reduction/ Max Increase	# Locations with higher sound levels
Montlake - North	-1	-7	1	1
Montlake - South	-1	-2	0	0
UW Campus	-1	-2	0	0
Arboretum	-1	-3	1	3
Madison Park	-2	-3	-1	0
Laurelhurst	-1	-3	0	0

In general, 3 dBA is considered the minimum audible change in sound levels, 5 dBA is clearly audible and 10 dBA is half or twice as loud.

Using the highly conservative approach with year 2030 traffic, the WABN temporary condition would result in the following changes in noise levels:

- Decreased average noise levels of 1-2 dBA at all modeled neighborhoods when compared to the Build condition.
- Increased sound levels only at locations where increases are also expected to occur during the Build condition.
- Up to 1 dBA higher sound levels along E. Hamlin Street than expected in the Build condition because the lid will not yet be in place.
- Sound levels in the arboretum may be up to 1 dBA higher than expected in the Build condition, because the 4 foot barriers along eastbound SR520 will not yet be in place.

Additional design features expected to reduce were not included in the analysis described above, or in the FEIS, because the effect of these measures cannot be modeled with the federally-required noise model. These design features are expected to provide additional sound reduction at some locations of an estimated 1-4 decibels.

[1] Includes the West Connection Bridge and Floating Bridge and Landings construction phases preceding WABN.

For questions, contact Tim Sexton at sextont@wsdot.wa.gov or (206) 440-4549.

Cc: Dave Edwards, SR520 Project Office
Daniele Dunjic, SR520 Project Office
Suryata Halim, SR520 Project Office (Consultant)

Attachments: Summary tables with modeled sound level results

Noise Level Evaluation for WABN Compared to the FEIS Assuming Year 2030 Traffic

	FEI		WABN (2030)	Both with year 2030 Traffic
Values in dBA	Existing (2004)	Build (2030)	4' on New, 3' on Existing	WABN vs. Build
AB-1	**66**	61	59	-2
AB-2	**67**	62	60	-2
AB-3	**68**	62	60	-2
AB-6	**72**	61	-	-
AB-7	**70**	62	63	1
AB-8	**69**	62	63	1
AB-9	**68**	63	63	0
AB-10	**67**	63	63	0
AB-11	**67**	63	63	0
AB-12	**66**	63	62	-1
AB-13	65	63	62	-1
AB-14	63	62	60	-2
AB-15	**71**	**66**	**67**	1
AB-16	65	64	62	-2
AB-17	60	60	58	-2
AB-18	56	55	54	-2
AB-19	64	58	55	-3
AB-20	63	62	59	-3

	FEIS		WABN (2030)	Both with year 2030 Traffic
Values in dBA	Existing (2004)	Build (2030)	4' on New, 3' on Existing	WABN vs. Build
MP-1	**66**	62	60	-2
MP-2	**67**	62	60	-2
MP-3	**68**	62	60	-2
MP-4	**69**	63	61	-2
MP-5	**66**	62	60	-2
MP-6	63	61	58	-3
MP-7	61	59	56	-3
MP-8	60	57	54	-3
MP-9	61	58	56	-2
MP-10	61	59	57	-2
MP-11	61	59	57	-2
MP-12	59	57	56	-1
MP-13	60	59	56	-3
MP-14	61	59	56	-3
MP-15	61	59	56	-3
MP-16	63	61	58	-3
MP-17	64	62	59	-3
MP-18	65	62	60	-2
MP-19	**66**	64	61	-3
MP-20	60	63	60	-3
MP-21	64	58	56	-2
MP-22	58	56	55	-1
MP-23	57	56	55	-1

	FEIS		WABN (2030)	Both with year 2030 Traffic

Values in dBA	Existing (2004)	Build (2030)	4' on New, 3' on Existing	WABN vs. Build
LH-1	61	60	59	-1
LH-2	60	59	59	0
LH-3	59	59	58	-1
LH-4	60	59	58	-1
LH-5	53	55	52	-3
LH-6	57	56	55	-1
LH-7	51	53	53	0

	FEIS		WABN (2030)	Both with year 2030 Traffic
Values in dBA	Existing (2004)	Build (2030)	4' on New, 3' on Existing	WABN vs. Build
UW-1	65	**69**	**68**	-1
UW-2	58	62	61	-1
UW-3	55	58	56	-2
UW-4	54	56	54	-2
UW-5	54	57	55	-2
UW-6	58	60	59	-1
UW-7	62	63	63	0
UW-8	52	55	54	-1
UW-9	53	56	55	-1
UW-10	62	65	64	-1
UW-11	**66**	**68**	**68**	0
UW-12	64	65	65	0
UW-13	59	62	61	-1
UW-14	61	65	63	-2
UW-15	64	65	64	-1

	FEIS		WABN (2030)	Both with year 2030 Traffic
Values in dBA	Existing (2004)	Build (2030)	4' on New, 3' on Existing	WABN vs. Build
MS-1	74	75	74	-1
MS-2	74	70	-	-
MS-3	74	67	-	-
MS-4	72	68	-	-
MS-5	70	67	66	-1
MS-6	59	59	58	-1
MS-7	59	59	59	0
MS-8	61	62	-	-
MS-9	62	65	-	-
MS-10	67	70	70	0
MS-11	60	62	62	0
MS-12	56	58	58	0
MS-13	58	58	57	-1
MS-14	60	59	59	0
MS-15	56	58	56	-2
MS-16	62	63	63	0
MS-17	73	72	72	0
MS-31	58	58	57	-1
MS-32	61	60	60	0
MS-33	64	63	62	-1

	FEIS		WABN (2030)	Both with year 2030 Traffic
Values in dBA	Existing (2004)	Build (2030)	4' on New, 3' on Existing	WABN vs. Build
MN-1	**69**	62	-	-
MN-2	**66**	62	59	-3
MN-3**	x			-
MN-4	**67**	61	62	1
MN-5	**67**	62	-	-
MN-6	**66**	**67**	-	-
MN-7	**69**	**73**	73	0
MN-8	**68**	**72**	72	0
MN-9	64	65	63	-2
MN-10	64	62	-	-
MN-11	**66**	61	-	-
MN-12	65	60	-	-
MN-13	64	60	53	-7
MN-14	64	61	55	-6
MN-15	64	62	57	-5
MN-16	63	64	62	-2
MN-17	**68**	**73**	72	-1
MN-18	**72**	**72**	72	0
MN-19	62	64	64	0
MN-20	60	62	62	0
MN-21	61	61	61	0
MN-22	63	60	59	-2
MN-23	**68**	**72**	72	0
MN-24	62	59	54	-5
MN-25	63	65	-	-
MN-26	**72**	**71**	-	-
MN-27	65	**66**	66	0
MN-28	60	62	60	-2
MN-29	65	-	-	-
MN-30	60	60	58	-2
MN-31	59	61	60	-1
MN-32	62	65	65	-1
MN-33	64	**67**	67	0
MN-34	**66**	**69**	69	0
MN-35	63	**67**	66	-1
			Average:	-1
			Max Reduction:	-7
			Min Reduction:	1

Notes:
- Bolded numbers are residential noise impacts (≥66 dBA)
- Existing and Build levels from Noise Discipline Report Addendum and Errata (May 2011)
- WABN noise levels were modeled separately
- Receivers without values were not included because of modeling challenges and time limitations. The trends for null values can be estimated and are captured in the memo text.
- ** Receiver located on new lid that does not exist in Existing or WABN conditions.